2020 ANNUAL REPORT

maravai LifeSciences

Enabling the miracles of science.

$284M
2020 Revenue
~98.5% y/y growth[1]

$79M
2020 Net Income

$169M
Adjusted EBITDA[2]
~59.6% margin | 173% y/y growth[2]

1. Results for the full year ended December 2020
2. Non-GAAP Adjusted EBITDA, unaudited. GAAP net income to Adjusted EBITDA reconciliation provided on page 79

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

FORM 10-K

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

For the fiscal year ended December 31, 2020

OR

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

Commission file number 001-39725

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

Delaware	**8731**	**85-2786970**
(State or other jurisdiction of incorporation or organization)	**(Primary Standard Industrial Classification Code Number)**	**(I.R.S. Employer Identification No.)**

10770 Wateridge Circle Suite 200
San Diego, California 92121
(Address of principal executive offices)

Registrant's telephone number, including area code: (858) 546-0004

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

Title of each class	Trading Symbol(s)	Name of each exchange on which registered
Class A common stock, $0.01 par value	**MRVI**	**The Nasdaq Stock Market LLC**

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

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

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

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

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

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

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 is a shell company (as defined in Rule 12b-2 of the Act). Yes ☐ No ☒

The registrant was not a public company as of June 30, 2020, the last business day of its most recently completed second fiscal quarter and therefore cannot calculate the aggregate market value of its voting and non-voting common equity held by non-affiliates as of such date. The registrant's Class A common stock began trading on the Nasdaq Global Select Market on November 20, 2020.

As of March 17, 2021, 96,646,515 shares of the registrant's Class A common stock were outstanding and 160,974,129 shares of the registrant's Class B common stock were outstanding.

DOCUMENTS INCORPORATED BY REFERENCE

The information required by Part III of this Report, to the extent not set forth herein, is incorporated herein by reference from the registrant's definitive proxy statement relating to the Annual Meeting of Shareholders to be held in 2021, which definitive proxy statement shall be filed with the Securities and Exchange Commission within 120 days after the end of the fiscal year to which this Report relates.

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SPECIAL NOTE REGARDING FORWARD LOOKING STATEMENT

This Annual Report on Form 10-K contains "forward-looking statements" within the meaning of the safe harbor provisions of the U.S. Private Securities Litigation Reform Act of 1995. Investors are cautioned that statements which are not strictly historical statements constitute forward looking statements, including, without limitation, statements under the captions "Risk Factors," "Management's Discussion and Analysis of Financial Condition and Results of Operations" and "Business" and are identified by words like "believe," "expect," "may," "will," "should," "seek," "anticipate," or "could" and similar expressions.

Forward-looking statements are neither historical facts nor assurances of future performance. Instead, they are based only on our current beliefs, expectations and assumptions regarding the future of our business, future plans and strategies, projections, anticipated events and trends, the economy and other future conditions. Because forward-looking statements relate to the future, they are subject to inherent uncertainties, risks and changes in circumstances that are difficult to predict and many of which are outside of our control. Our actual results and financial condition may differ materially from those indicated in the forward-looking statements. Therefore, you should not rely on any of these forward-looking statements. Important factors that could cause our actual results and financial condition to differ materially from those indicated include those discussed under the heading "Item 1A. Risk Factors" as well as those discussed elsewhere in this Annual Report on Form 10-K.

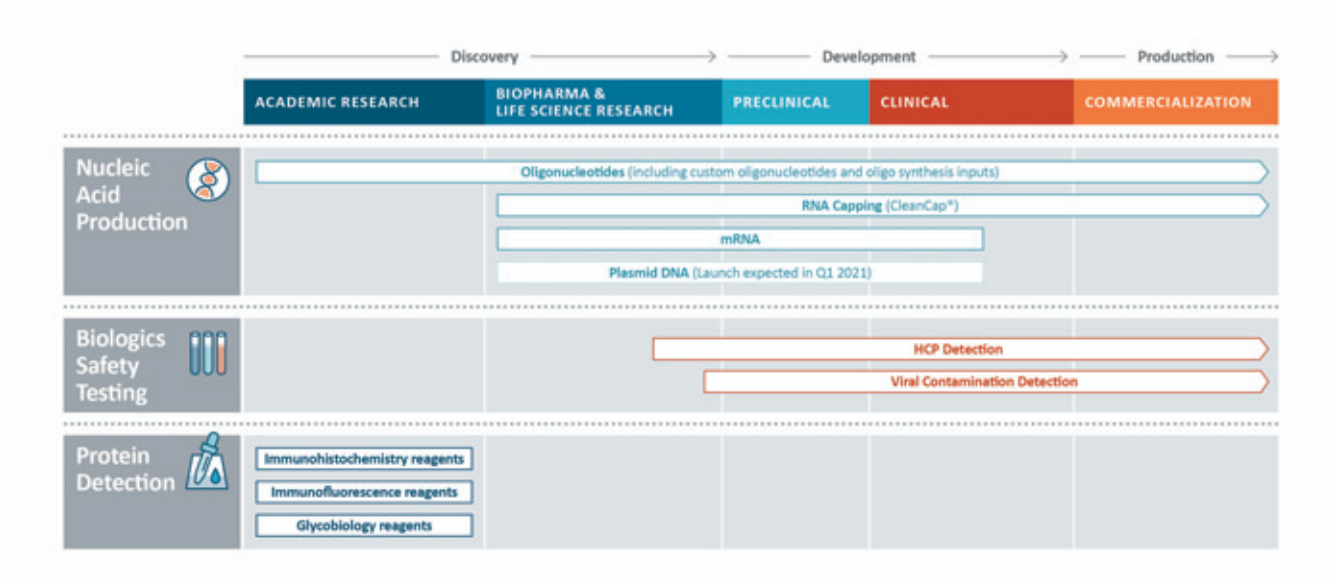
Any forward-looking statement made by us in this report is based only on information currently available to us and speaks only as of the date of this report. We undertake no obligation to publicly update any forward-looking statement, whether written or oral, that may be made from time to time, whether as a result of new information, future developments or otherwise.

Part I.

Item 1. Business

Overview

Maravai LifeSciences Holdings, Inc. (also referred to in this document as "Maravai", "Pubco", "we", "us" or "the Company") is a leading life sciences company providing critical products to enable the development of drug therapies, diagnostics, novel vaccines and support research on human diseases. Our more than 5,200 customers as of December 31, 2020 include the top 20 global biopharmaceutical companies ranked by research and development expenditures according to industry consultants, and many other emerging biopharmaceutical and life sciences research companies, as well as leading academic research institutions and *in vitro* diagnostics companies. Our products address the key phases of biopharmaceutical development and include complex nucleic acids for diagnostic and therapeutic applications, antibody-based products to detect impurities during the production of biopharmaceutical products, and products to detect the expression of proteins in tissues of various species.



Our businesses principally address high growth market segments in biopharmaceutical development that are growing at a weighted average blended rate of 20% per annum. In particular, the field of cell and gene therapy has emerged as one of the fastest growing treatment modalities to address a host of human conditions. There are more than 400 cell and gene therapies in development or launched and sales in this category are expected to grow more than tenfold by 2024, according to industry consultants and management estimates. Our portfolio offers key products for each stage of the cell and gene therapy development lifecycle. For example, our mRNA products are used in drug development to assist in the production of immune-activating antigens; our CleanCap® technology is used to stabilize mRNA and streamlines mRNA manufacturing; and our plasmid DNA products are used as templates for the production of our RNA products. We also provide biologics safety testing technology used to ensure the safety of the biological drug manufacturing process and drug products. We have relationships with the following categories of customers (percentages represent the share of revenue in each category for the year ended December 31, 2020): developers of therapeutics and vaccines (66%), other biopharmaceutical and life science research companies (27%), academic institutions (4%) and molecular diagnostic companies (3%).

Our proprietary capabilities and products underpin the value we aim to provide to our customers. Among other capabilities, we are experts in RNA and mRNA products, which are challenging and often unstable molecules requiring significant chemical modifications to ensure their stability and efficacy in our customers' applications. Notably, according to research commissioned by us consisting of over 70 interviews with our current and former customers, our competitors and industry experts focused across our three business segments (the "Industry Analysis"), we believe CleanCap® is viewed as a leading solution to incorporate the 5' cap into mRNA. CleanCap® is a novel chemical approach to produce the 5' cap analog, which, in addition to making mRNA more stable, aids in protein production and helps prevent an unwanted immune response to the mRNA. As of December 31, 2020, CleanCap® had been used by over 110 customers as a stand-alone reagent and had been incorporated into several development programs targeting immunization against the novel strain of coronavirus, SARS-CoV-2 ("COVID-19"). We also work with over 400 customers who use our CleanCap® technology through our custom mRNA services and catalog mRNA in support of their research and pre-clinical work. These programs included two commercial programs led by Pfizer in partnership with BioNTech and the other led by BioNTech in partnership with Fosun Pharma, one phase I clinical program led

by Chulalongkorn University, one phase I/II clinical programs led by Imperial College London, and one phase III program led by CureVac, and three pre-clinical programs led by the University of Tokyo in partnership with Daiichi-Sankyo, eTheRNA Immunotherapies and Greenlight Biosciences. Given the early stage of these three programs, there can be no assurance they will continue to use CleanCap® through commercialization. We estimate our mRNA and CleanCap® products have also been incorporated in at least 40 therapeutic programs in development as of December 31, 2020. These therapeutic programs address a number of disease states, including ornithine transcarbamylase deficiency, glycogen storage disorders, Alpha-1 antitrypsin deficiency, acute lymphoblastic leukemia, Hurler syndrome, ovarian cancer and cardiovascular disease. These therapeutic programs also use multiple therapeutic modalities, including CRISPR/Cas-9, transcription activator-like effector nuclease (TALENS), enzyme replacement therapies, allogeneic CAR-T cells and base editing. Should one or more of these programs proceed to commercialization, we believe we will continue to supply our customers and our products will likely be incorporated in customer regulatory filings. Additionally, The FDA recently issued policies on February 22, 2021 to guide medical product developers concerning the development of products to address the future of variants of the SARS-CoV-2 virus specifically covering vaccines and therapeutics. We believe this guidance may streamline the future development and approval of mRNA vaccines utilizing our products and that they would likely be incorporated into customer regulatory filings.

mRNA is at the core of our capabilities. We developed our expertise in mRNA with a belief in its potential as a therapeutic modality. The first clinical trial for an mRNA therapeutic agent occurred in 2016. More than 30 clinical trials have occurred since then, principally focused on vaccines against viruses and cancer vaccines. With the COVID-19 pandemic, mRNA has shown its potential for more rapid vaccine design and manufacture when compared to traditional techniques involving culturing inactivated virus to elicit an immune response. According to the World Health Organization, there were 263 COVID-19 vaccine development programs as of March 9, 2021, with two candidates approved in the RNA class and some additional RNA lead candidates for approval with anticipated program data readouts, including results of preclinical studies and phase I/II and phase III clinical trials. COVID-19 has helped highlight the potential advantage of mRNA as a treatment modality and directed significant resources to the developing base of knowledge about mRNA. We believe this knowledge will be directed at future vaccine programs as well as therapeutic agents for a host of human diseases. We are positioned to serve our biopharmaceutical customers in the fast-growing field of mRNA across a range of clinical programs for a variety of diseases. For the year ended December 31, 2020, 47% of our revenue was derived from products that support mRNA research.

Forming long-term partnerships with our customers is core to our strategy. We primarily serve our customers during the product development and process development phases. During product development, we collaborate with our customers to develop and synthesize nucleic acids, which in some cases comprise the APIs of our customers' products in development. We also provide our customers a host of chemically complex and highly specialized raw materials. Process development is a complex phase that establishes highly validated procedures and determines the investment in facilities and equipment required to bring biopharmaceutical products to market. These decisions impact the viability of our customers' products for the long-term. During process development, we provide enzyme-linked immunosorbent assays ("ELISAs") that reduce the risk posed by impurities and contaminants in biological drugs, a critical step to ensure the safety of the drug product.

While we do not provide products that are themselves regulated as drugs or *in vitro* diagnostics, our customers frequently incorporate our products into their highly validated products and processes. For example, we provide oligonucleotides and antibody-based products used by *in vitro* diagnostic product manufacturers for their on-market products. Because of the extensive validation required for these products, these components are frequently purchased for the life of our customers' products and we believe they are unlikely to be substituted. In addition, our analytical tools are used in the design and development of manufacturing processes and often will be used throughout the life cycle of our customers' manufactured products. As a result, our customer relationships may span many years.

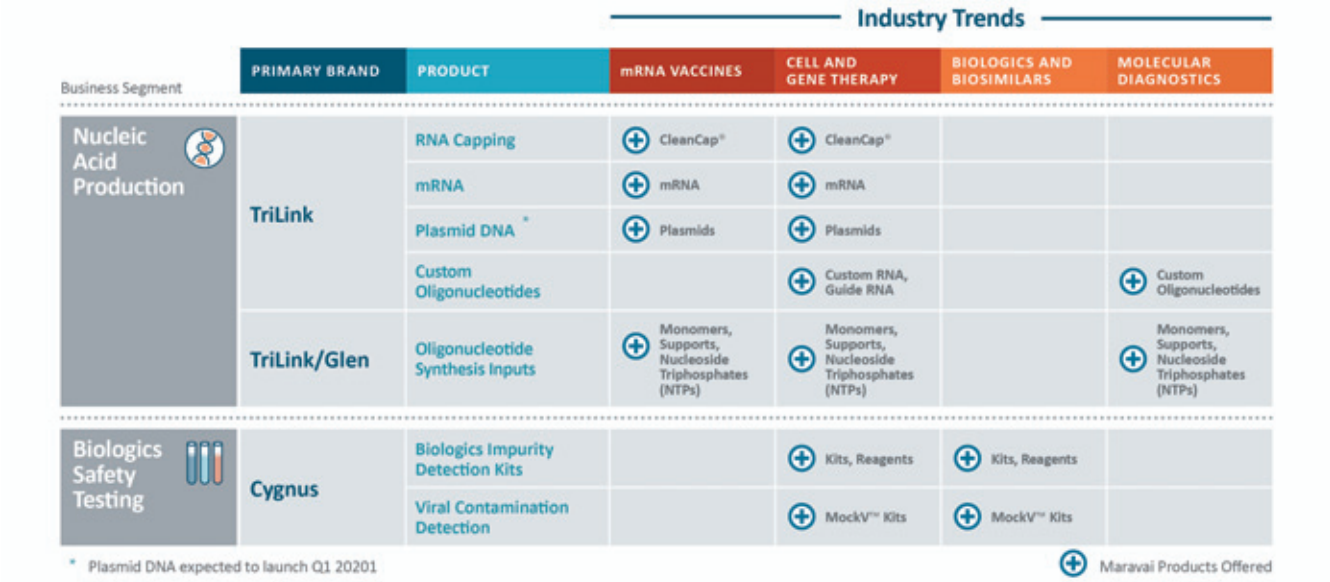
The nature of our products and their uses require that they be manufactured by highly trained personnel in state-of-the-art facilities following exacting procedures to ensure quality. We manufacture our nucleic acid products at our San Diego, California facility, one of four facilities we occupy in the United States. The facility was purpose-built to address our customers' needs for critical raw materials manufactured under certain good manufacturing practices ("GMP") conditions and APIs for investigational use. Our raw material products are manufactured following the voluntary quality standards of ISO 9001:2015. Our GMP-grade raw materials follow ISO 9001:2015 standards, additional voluntary GMP quality standards and customer specific requirements. Our API products are manufactured following the voluntary quality standards of ISO 9001:2015, the International Council for Harmonisation's GMP Guide, comparable GMP principles for the European Union and customer specific requirements. We believe our products are exempt from compliance with the current GMP ("cGMP") regulations of the Food and Drug Administration ("FDA"), as our products are further processed or incorporated into final drug products by our customers and we do not make claims related to their safety or effectiveness. As of December 31, 2020, we have invested $75.0 million in our San Diego facility. Our other facilities are similarly designed for specific applications with quality systems to match our customers' requirements. All of our facilities meet applicable ISO standards. In addition, as of December 31, 2020, approximately 20% of our workforce have earned advanced degrees and all receive rigorous training.

We built our business through a combination of acquisitions and subsequent investments in our acquired companies to grow their commercial capabilities, upgrade and expand their research and production facilities, deploy stringent quality systems, integrate their back-office functions, and develop the personnel and management to fuel continued growth. Today, we offer an integrated portfolio that enables innovation across the biopharmaceutical and academic markets. We completed our first acquisition in April 2016. The trailing twelve-month revenue of each of our acquired businesses at the time we acquired each of them totaled approximately $85.0 million. Mergers, acquisitions and strategic partnerships that complement our capabilities in cell and gene therapy and biopharmaceutical production remain core to our strategy. Our strategy aims to augment our strong organic growth with the addition of synergistic products and capabilities.

Our Portfolio and Capabilities

We provide products that support our customers' needs from discovery through commercialization of their vaccines, therapeutic agents and *in vitro* diagnostic products. Our products are frequently incorporated into our customers' products, whether as research products or APIs used in development or research products incorporated as raw materials into on-market products. They may also be incorporated into the manufacturing process itself. We are therefore a critical part of our customers' supply chain and they frequently seek to maintain their supply relationship with us for the life of their products or development programs.

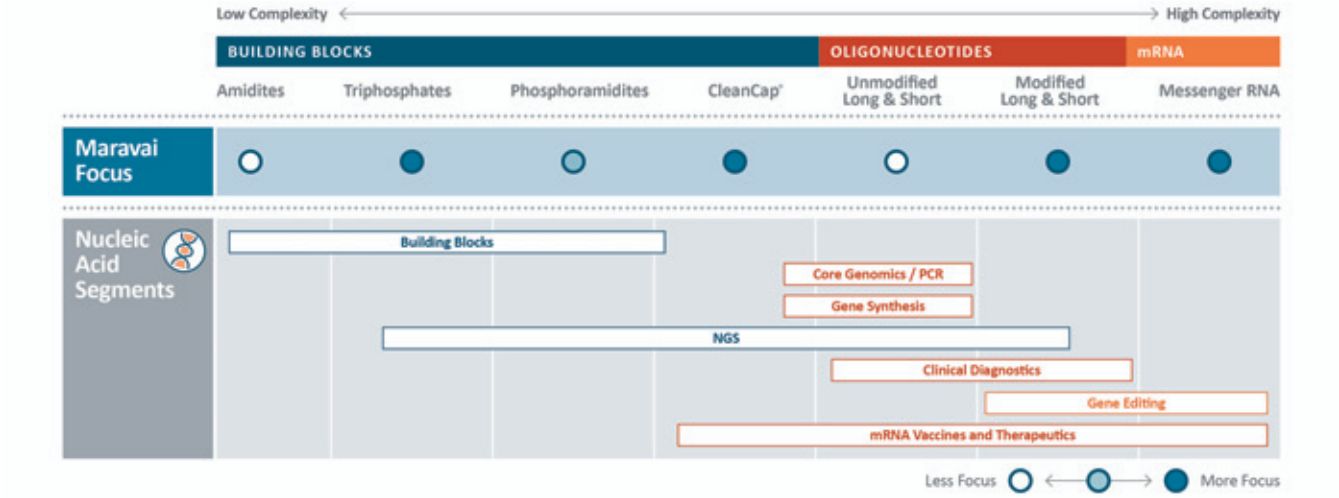
Our products address our customers' needs for nucleic acid production, biologics safety testing and protein detection, and our operations are aligned to these three segments.



* *Our plasmid DNA products launched in Q1 2021*

Nucleic Acid Production (73% of Revenue for the Year Ended December 31, 2020)

We are a global provider of highly modified, complex nucleic acids and related products. We have recognized expertise in complex chemistries and products provided under exacting quality standards. Our core offerings include mRNA, long and short oligonucleotides, our proprietary CleanCap® capping technology and oligonucleotide building blocks. Our offerings address key customer needs for critical components, from research to GMP-grade materials. We market our nucleic acid products under the TriLink BioTechnologies and Glen Research brands.



The growth in our nucleic acid production business segment has been fueled by the significant growth in biological drugs in development, many of which are addressing cell and gene therapies, and by the rapid rise in mRNA vaccines. mRNA as a treatment modality has been an area of acute interest for several years. The global COVID-19 pandemic, however, has demonstrated its potential advantages in speed of development and manufacturing, as well as cost. Of the estimated 263 COVID-19 vaccine development programs underway as of March 9, 2021, according to the World Health Organization, 34 are mRNA-based. Five of the 34, including two commercial programs led by Pfizer in partnership with BioNTech and the other led by BioNTech in partnership with Fosun Pharma, one phase I clinical program led by Chulalongkorn University, one phase I/II clinical programs led by Imperial College London and , one phase III program led by CureVac use our CleanCap® products and up to three more in early stages of development, led by the University of Tokyo in partnership with Daiichi-Sankyo, eTheRNA Immunotherapies and Greenlight Biosciences, are currently using our CleanCap® products. Given the early stage of these 3 programs, there can be no assurance they will continue to use CleanCap® through commercialization.

We further serve cell and gene therapies with our RNA and mRNA products and expect to supplement with our upcoming plasmid DNA capability. In addition to the vaccine programs above, our products have been incorporated in over 40 therapeutic programs in development for CRISPR/Cas-9, CAR-T, base editing, vaccine and enzyme replacement therapies, among others with over 25 utilizing CleanCap® technology.

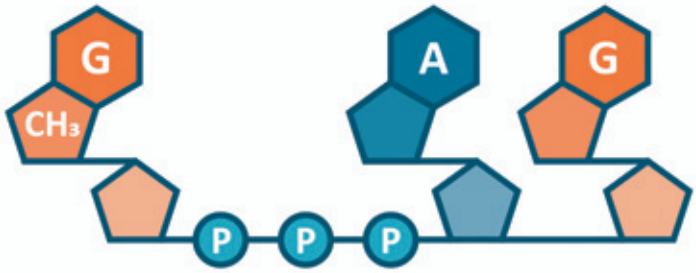
Our nucleic acid products fall into three categories: mRNA, oligonucleotides and plasmid DNA. We began offering our plasmid DNA products in the first quarter of 2021.

mRNA. mRNA is an intermediary molecule that translates the genetic information stored in DNA into proteins. The genetic information stored in DNA is transferred to mRNA in a cellular process called transcription. This process occurs in the nucleus of cells. DNA, a double stranded molecule, is unwound and copied as mRNA by the enzyme RNA polymerase. mRNA is then transferred out of the nucleus to the cytosol, a component of the cytoplasm of a cell, where it serves as a blueprint for making cellular proteins by a multi-component organelle complex called the ribosome.

mRNA has traditionally been a difficult molecule for vaccine and therapeutic purposes. mRNA is inherently unstable compared to DNA and is susceptible to degradation by ubiquitous enzymes called RNases. mRNAs are also physically and chemically fragile and can degrade at elevated temperatures and under shear forces that occur during downstream manufacturing processes. We have developed manufacturing processes that overcome some of these obstacles, resulting in highly effective mRNA.

We develop and manufacture mRNA products to support vaccine and therapeutic programs from pre-clinical development through and including clinical phases, including scale-up and analytical development services. The mRNA molecules may serve as APIs for diverse applications, such as enzyme replacement therapies, gene editing therapies and vaccines. We offer both research grade material and material made under GMP conditions for early phase clinical trials.

Within the mRNA category, we also offer our CleanCap® products. Our proprietary CleanCap® analogs principally serve the mRNA vaccine and therapeutics markets, including vaccine candidates in development for immunizing against COVID-19. Cap analogs are a component of mRNA that aids in protein production as well as making mRNA more stable inside cells. For mRNA to serve as a template to make a protein, it requires a special cap at the 5' (five prime) end of the molecule. The cap structure also affects the stability of the mRNA. The lack of a cap can result in activation of the innate immune system, which can affect the production of the desired protein or elicit undesired biological effects. We offer a suite of CleanCap® analogs that are specifically made for therapeutics and vaccines. Based on the Industry Analysis, we believe our cap analogs are critical features of several mRNA vaccines in development.



CleanCap® is a synthetic capping reagent composed of N7 Methyl (G) linked to a dimer at (A) and (G) through a triphosphate (P) linkage that is added during the transcription reaction and resulting in high levels of mRNA capping.

Traditionally, the 5' cap has been added in one of two ways. The cap can be added post mRNA synthesis by an enzymatic process. This enzymatic method has several drawbacks, including the high cost of the capping enzymes as well as the need to perform additional processing steps to the mRNA to remove enzymes and byproducts of the capping reaction. While capping efficiency is usually high, the extra processing steps typically result in mRNA of poorer quality and degradation often results. The second method is to add a synthetic cap analog into the transcription reaction such that the mRNA is transcribed and capped in a single step. Anti-reverse cap analog ("ARCA") is an example of a cap analog that is added to the transcription reaction. This avoids the workflow challenges of the enzymatic process, but typically results in lower yields.

Like ARCA, CleanCap® is a synthetic, chemically made mRNA 5' cap analog added to the transcription process in a single step. Unlike ARCA, however, CleanCap® results in significantly higher levels of capping efficiency, resulting in very low levels of uncapped mRNA, which in turn minimizes the risk of activation of the innate immune system. In addition, CleanCap®'s higher mRNA yields compared to ARCA result in lower cost of goods. When compared to enzymatic capping, CleanCap® removes the additional downstream purification steps required. We have developed a suite of CleanCap® analogs that are specifically designed for therapeutics and vaccines. CleanCap® is sold as a stand-alone reagent or bundled with other mRNA products. More than 110 customers have purchased CleanCap® as a stand-alone reagent and more than 250 customers have purchased mRNA with CleanCap®. mRNA products represented 65% of our nucleic acid production revenue for the year ended December 31, 2020 (including the revenue from CleanCap® products).

Oligonucleotides. The oligonucleotide product category supports broad customer applications, including therapeutics, *in vitro* diagnostics, next generation sequencing ("NGS") and CRISPR-based gene editing. Most of our TriLink BioTechnologies oligonucleotide products are custom manufactured DNA or RNA sequences, often highly modified and produced as research grade or under GMP conditions for use in development, clinical and commercial applications.

We also provide nucleoside triphosphates ("NTPs"). NTPs are the precursors to DNA and RNA. They are composed of a nitrogen base bound to either ribose or deoxyribose with three phosphate groups added to the sugar. We manufacture NTPs that are used in polymerase chain reactions ("PCR"), sequencing reactions and in the manufacture of mRNA. The NTPs can be unmodified, composed of the four standard bases, or modified, with a base altered to enhance a particular biological property, such as the ability to evade the innate immune system in therapeutic applications. TriLink BioTechnologies NTPs are used by customers in both research and clinical trial applications.

Our product offerings also include reagents that form the building blocks of oligonucleotides with our Glen Research products, including high quality specialty chemicals and amidites. The oligonucleotide products category represented 35% of our nucleic acid production revenue for the year ended December 31, 2020.

Plasmid DNA. In December of 2020, we completed the manufacturing verification of plasmid DNA within our newly released manufacturing suite inside our San Diego facility. The manufacturing of beta customer plasmids began in the first quarter of 2021. Unlike genomic DNA, which constitutes the chromosome, plasmid DNA exists outside the chromosome and represents small circular double-stranded constructs. Plasmid DNA is frequently used as a vector for replicating nucleic acid products. Plasmid DNA is integral to the production of mRNA and our production of plasmid DNA will assist in ensuring the quality and timeliness of the mRNA we produce.

Biologics Safety Testing (19% of Revenue for the Year Ended December 31, 2020)

We provide products and services under the Cygnus Technologies, LLC ("Cygnus Technologies") brand that ensure the purity of our customers' biopharmaceutical products, including biological drugs. For over 20 years, the Cygnus Technologies brand has been associated with products and services that enable the detection of impurities present in bioproduction. Our biologics

safety testing products are used during development and scale-up, during the regulatory approval process and throughout commercialization. We are recognized globally for the detection of host cell proteins ("HCPs") and process-related impurities during bioproduction.

Our customers in this segment manufacture a broad range of biopharmaceutical products. These include monoclonal antibodies and recombinant proteins, both as novel biologics and biosimilars, and recombinant vaccines including vaccines to prevent COVID-19 and to treat cancer. We also provide products in support of the development of cell and gene therapies. Recombinant vaccines and cell and gene therapies rely on manufacturing of various viral vectors produced using recombinant nucleic acid and cell culture technologies. Viral vector manufacturing processes require rigorous analytics, including testing for process-related impurities such as HCPs, host cell DNA, purification leachates, growth media additives and enzymes used in viral vector purification processes.

ELISA is the benchmark method for monitoring levels of process-related impurities during the purification process and in product release testing. The advantages of well-developed ELISA kits include the ability to measure very low levels of impurities in the presence of high amounts of drug product, without requiring a high level of expertise to run, and are readily transferable across an organization from process development to manufacturing and quality control bioanalytical groups. Though relatively simple to run, these ELISA kits require a high level of expertise to design, develop and qualify.

Customers establishing biopharmaceutical manufacturing processes may use off-the-shelf or generic HCP kits provided by manufacturers like ourselves, or they may choose to design their own in-house assays for their specific processes. Some customers may choose to use generic assays early in development and migrate to process-specific assays later. The trend in recent years has been for customers to increasingly use generic assays throughout their development pathway, relying on our expertise and the established performance of our assays. If customers choose to develop process specific assays, we offer custom antibody production and assay development as well as characterization services to meet their needs.

Our comprehensive catalog of Cygnus Technologies HCP ELISA kits covers 23 expression platforms and provides the specificity and sensitivity to detect impurities with reproducibility, which supports regulatory compliance. Our reputation for quality is recognized by the industry and global regulatory agencies, with Cygnus Technologies assays used as reference methods throughout the industry and to support manufacturing and quality control of commercialized biologics.

Our customers in this segment are biopharmaceutical companies, contract research organizations ("CROs"), contract development and manufacturing organizations ("CDMOs") and life science companies, which together accounted for 46% of our biologics safety testing revenue for the year ended December 31, 2020. International distributors and United States-based resellers accounted for 53% of this revenue. These customers largely serve the biopharmaceutical industry. Academia, hospitals and government accounts contributed 1% of our biologics safety testing revenue in the year ended December 31, 2020.

Cygnus Technologies product categories include HCP ELISA kits, other bioprocess impurity and contaminant ELISA kits, ancillary reagents and custom services.

HCP ELISA kits. HCP ELISAs are kits used to detect residual proteins from the expression system used in bioproduction. HCPs constitute a major group of process-related impurities produced using cell culture technology no matter what cell expression platform is used. HCPs pose potential health risks for patients and the risk of failure of safety endpoints for drug manufacturers. When present in the administered product, even at low levels, HCPs can induce an undesired immune response, interfere with drug efficacy and impact drug stability. HCPs are a critical quality attribute for biologics safety testing development and must be adequately removed during the downstream purification process.

HCP ELISA kits represented 63% of our Biologics Safety Testing revenue in the year ended December 31, 2020.

Other impurity and contaminant kits. Products in this category include kits for measuring Protein A leachate, which results from the affinity purification method used for monoclonal antibody therapeutic agents; ELISA kits for measuring additives in growth media, such as bovine serum albumin; ELISA kits for measuring host cell DNA; and ELISA kits to detect and quantify residual endonuclease impurities in recombinant viral vector and vaccine preparations.

In addition, in 2020, Cygnus Technologies introduced the MockV™ Minute Virus of Mice (MVM) kit, a novel, proprietary viral clearance prediction tool that includes a non-infectious "mock virus particle" mimicking the physicochemical properties of live virus that may be present endogenously in the drug substance or introduced during bioproduction. The kit enables manufacturers to conduct viral clearance assessments easily and economically and to predict outcomes in-house ahead of costly and logistically challenging live viral clearance studies.

Other impurity and contaminant kits represented 19% of our biologics safety testing revenue for the year ended December 31, 2020 in the biologics safety testing segment.

Ancillary reagents. These products include antibodies, antigens, sample diluents and other auxiliary products necessary to optimize applications for customer processes. Ancillary reagents represented 11% of our biologics safety testing revenue for the year ended December 31, 2020.

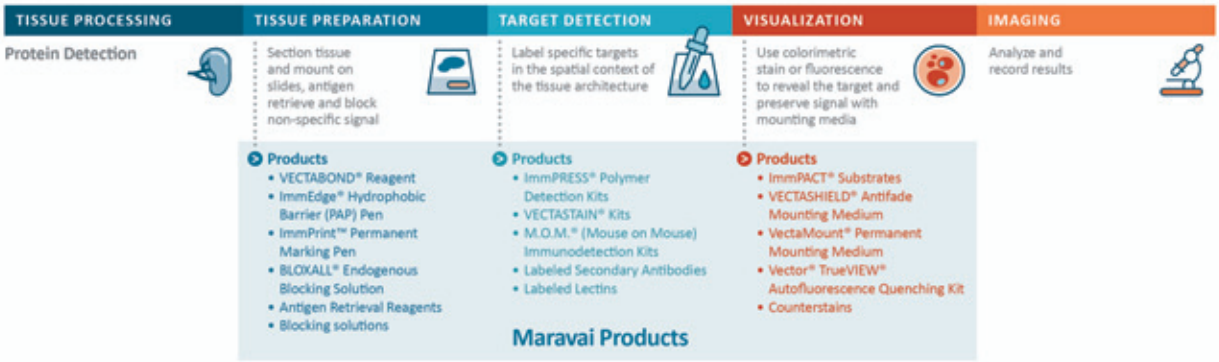
Custom services. We provide process-specific antibody and ELISA development, qualification and maintenance services. In addition, we have pioneered advanced orthogonal methods including antibody affinity extraction (AAE™) and mass spectrometry for HCP antibodies coverage analysis and HCP identification, which we provide as custom services. Custom services represented 7% of our biologics safety testing revenue for the year ended December 31, 2020.

Protein Detection (8% of Revenue for the Year Ended December 31, 2020)

We believe that we are a leader in labeling and detection reagents for immunohistochemistry, immunofluorescence and glycobiology, principally in research settings, with Vector Laboratories, Inc. ("Vector Laboratories"), the brand under which we market our protein detection products, having been cited over 350,000 times in scientific publications. Our products are used to detect the expression of proteins in tissue, which may indicate an ongoing disease process, with the use of antibody-based detection systems. We also manufacture lectins, proteins that preferentially bind to carbohydrates and which are used, for example, in the study of glycosylation, the process by which carbohydrates attach to proteins and lipids. Glycosylation is critical in a range of biological processes, including cell-to-cell adhesion, the performance of glycoprotein-based drugs and cancer. In addition, we manufacture bioconjugation reagents to allow rapid and quantifiable conjugation of all classes of biomolecules.

Our presence in protein detection dates to the founding of Vector Laboratories in 1976. Under the Vector Laboratories brand, we provide reagents to researchers worldwide investigating biological processes and the nature of disease in tissue, including oncology research applications. Our reagents span the immunohistochemistry and immunofluorescence workflows and include products for tissue preparation, tagging targets of interest via secondary antibodies, detection systems for visualizing proteins, enzyme substrates for chromogenic color development, secondary antibodies to amplify target signal, fluorescent dyes for use in live cell imaging, fluorophore-conjugated secondary antibodies and products for the identification and isolation of glycosylated targets.

Our expertise includes the development of a broad range of highly validated secondary antibodies, used for labeling targets of interest. We produce over 20 proprietary antibodies constituting over 180 different SKUs in different formats and quantities. We also offer a broad portfolio of over 5 distinct lectins making up nearly 140 Stock Keeping Units ("SKUs") addressing a broad set of applications. Our capabilities extend to assay development, protein purification and bioconjugation as well as development of critical related reagents such as mounting media and substrates.



We principally serve academic researchers worldwide in our protein detection segment. Our research customers generally rely on us to provide our catalog products in a timely fashion, often overnight, and to provide live technical support and responsive customer service. All protein detection products sold directly to academic researchers carry the Vector Laboratories brand. We also sell custom products to industry customers, whether as components to be integrated into their own products, or to be resold. We serve these customers with catalog products directly via Web, email and phone ordering; with custom or bulk products through direct sales; and through distributors and resellers. Direct catalog sales represented 24% of our protein detection revenue for the year ended December 31, 2020. Bulk and custom products sold directly accounted for 31% of our protein detection revenue and resellers and distributors together accounted for 45% of our protein detection revenue during the same period.

Our Competitive Strengths

We believe we are a leader in providing nucleic acid products and biologics safety testing products and services to biopharmaceutical customers worldwide. Our success is built on the ability of our proprietary technologies and products, provided under exacting quality standards, to reliably serve our customers' needs for critical raw materials.

Leading Supplier of Critical Solutions for Life Sciences from Discovery to Commercialization

We seek to be an important component of our customers' supply chain by providing inputs that are central to the performance of their products and processes throughout the product lifecycle. By collaborating with customers early in the development phase, our products frequently follow our customers' development path to commercialization and are likely to be incorporated as raw materials in their on-market products and processes. Our decades-long experience and track record, coupled with our ongoing investment in facilities and quality systems, allow our customers to rely on us for their critical products. Our approach is to be a trusted partner throughout the life cycle of our customers' products.

Innovation, Proprietary Technologies and Know-how Underpin Our Portfolio

Our expertise in complex chemistries leads customers to seek our collaboration in designing complex products that meet high performance expectations. Based on the responses to the Industry Analysis, we believe the solutions we provide, in many cases, cannot be provided effectively by our competitors. In certain cases, like our CleanCap® technology, our know-how is backed by intellectual property. In other cases, such as our HCP products, our antibodies are proprietary and therefore can only be supplied by us. We believe the proprietary nature of our know-how and products solidifies our long-term customer relationships.

Products with Outstanding Quality Performance

We believe our products stand out when compared to our competitors' because they present innovative solutions to customer needs, as indicated by the responses to the Industry Analysis, while providing reliable performance and quality. CleanCap®, for example, offers advantages over competing capping technologies in yield, stability and safety. Our oligonucleotides address complex chemistry challenges, which we believe few competitors can address. The results of the Industry Analysis indicate that our HCP ELISAs have defined the market for impurity detection and we believe they have become a *de facto* standard in biologics safety testing. Similarly, our protein detection assays have been recognized for their performance for over 40 years.

Trusted Brands

Our TriLink BioTechnologies, Glen Research, Cygnus Technologies and Vector Laboratories brands are well known in their respective markets for consistent quality and performance. This brand recognition has been earned over decades. Our

manufacturing processes, quality standards, technical support and high-touch customer service ensure that we maintain the reputation of our brands.

State-of-the-Art Manufacturing Facilities

Our biopharmaceutical customers manufacture their products to meet stringent quality standards and expect their critical suppliers to meet their exacting requirements. Our customers further expect that we have the production capacity to meet their needs in a timely manner. As of December 31, 2020, we have invested approximately $75.0 million into our flagship San Diego facility and its five dedicated manufacturing suites to produce materials under GMP conditions, along with the required quality systems to meet requirements specified by our customers. Additionally, this investment in our San Diego facility allows us to meet our customers demand for our nucleic acid products, including CleanCap®. We similarly invest in our other sites to ensure we meet our customers' expectations. We believe that the capacity to manufacture to stringent biopharmaceutical standards is constrained within the industry and our ability to meet this demand sets us apart from our competition.

Experienced Leaders and Talented Workforce

Our management includes experienced leaders with demonstrated records of success at Maravai and other highly regarded industry participants. In addition, as of December 31, 2020, approximately 20% of our workforce have earned advanced degrees and all receive rigorous on the job training. We believe the quality of our personnel is critical to ensuring the collaborative, long-standing relationships we maintain with many of our customers.

Our Markets

We participate in three distinct market segments: nucleic acid production, biologics safety testing and protein detection, which together represented approximately $8.4 billion in annual spending in 2019 and which are expected to grow at a 15% compound annual growth rate ("CAGR") through 2023. Of that combined market, we estimate our addressable portion represents approximately $3.6 billion. Our addressable segments as a whole, adjusted for the mix of products we offer, are expected to grow at a weighted average blended rate of 20% per annum through 2023, according to industry consultants and management estimates. We benefit from favorable industry dynamics in our broader market segments and specific growth drivers in our addressable market segments.

Business Segment	PRIMARY BRAND	PRODUCT	TOTAL MARKET SIZE (2019)	MARKET GROWTH (2019-2023 CAGR)	ADDRESSABLE MARKET SIZE[1] (2019)	ADDRESSABLE MARKET GROWTH[2] (2019-2023 CAGR)
Nucleic Acid Production	TriLink Biotechnologies and Glen Research	• RNA Capping (CleanCap®) • mRNA • Plasmid DNA • Oligonucleotides and Inputs	$3.5B	19%	$2.8B	28%
Biologics Safety Testing	Cygnus Technologies	• Biologics Impurity Detection • Viral Contamination Detection	$2.8B	12%	$575M	13%
Protein Detection	Vector Laboratories	• Immunohistochemistry	$2.2B	8%	$200M	6%
		TOTAL	$8.4B	15%	$3.6B	20%

1 Includes products, use cases, and customer types relevant to Maravai

2 Growth rates weighted by revenue exposure to addressable market segments

Biopharmaceutical customers are increasingly relying on outside parties to provide important inputs and services for their clinical research and manufacturing, a development driving growth for suppliers with unique capabilities and the ability to manufacture at an appropriate scale to support customer programs. We believe that suppliers like ourselves, with this rare combination of capabilities, proprietary products and the required investment in manufacturing and quality systems, are benefiting from rapid growth as biopharmaceutical customers seek to partner with a small number of trusted suppliers.

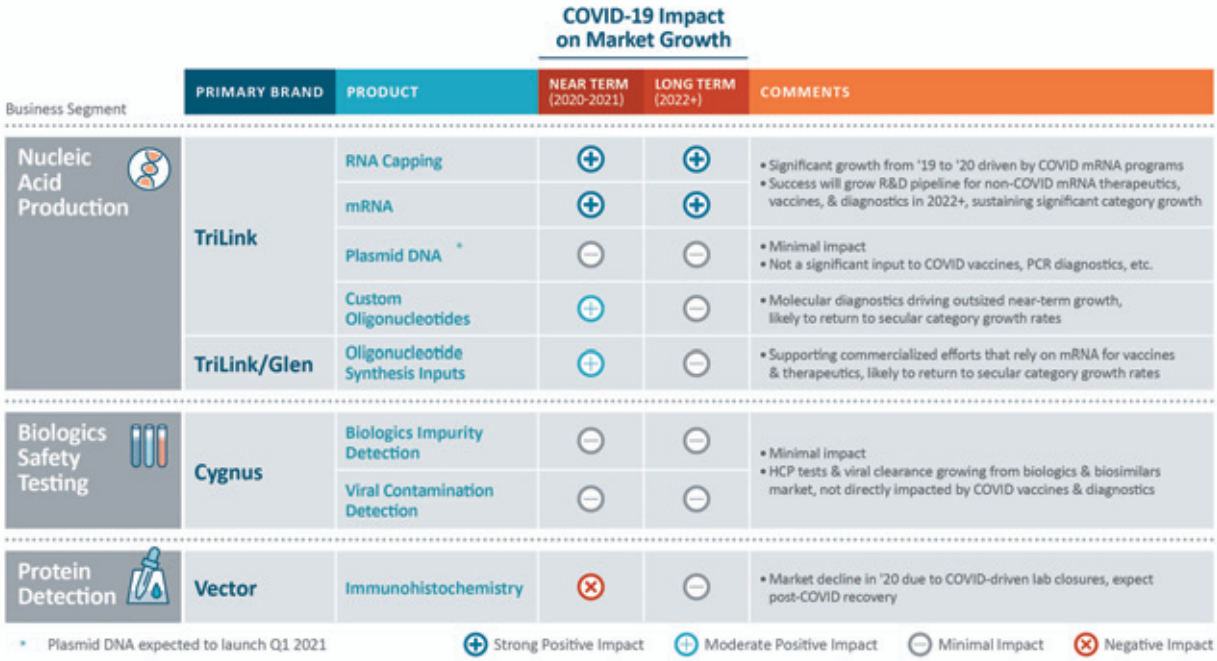
In addition to the continued trend toward outsourcing, several market developments are driving increased growth, above the broader market growth rates, in our addressable market segments, including:

- **Pivot toward mRNA vaccines driven in part by COVID-19**. The first two vaccines to be approved for use in combating the COVID-19 pandemic were mRNA vaccines, including the vaccine developed by Pfizer and BioNTech. mRNA vaccine pre-clinical programs grew approximately 38% in 2019, before the COVID-19 pandemic. That rate is

estimated to have increased to approximately 63% in 2020. The increased growth is being driven, in part, by 34 COVID vaccine programs using mRNA as of March 9, 2021, according to the World Health Organization. Five of the 34, including two commercial programs led by Pfizer in partnership with BioNTech and the other led by BioNTech in partnership with Fosun Pharma, one phase I clinical program led by Chulalongkorn University, one phase I/II clinical programs led by Imperial College London and , one phase III program led by CureVac use our CleanCap® products and up to three more in early stages of development, led by the University of Tokyo in partnership with Daiichi-Sankyo, eTheRNA Immunotherapies and Greenlight Biosciences, are currently using our CleanCap® products. The mRNA vaccine technology is gaining prominence as a result of its faster development time, lower manufacturing costs and improved safety because of the lower risk of unwanted immune responses. RNA expertise is highly specialized and customers seek partners to provide these complex products. A small number of providers, like ourselves, can provide this RNA capability.

- **Rapid growth in development of cell and gene therapies**. Sales of cell and gene therapy drugs are expected to grow from $1 billion in 2019 to $25 billion by 2024 and recent approvals of Kymriah®, Yescarta® and Luxturna□ have added clinical credibility to cell and gene therapies. We support the development of cell and gene therapies with products used in gene editing and cell therapy research, and we are well positioned to supply materials for gene therapy with the launching of our DNA plasmid products in the first quarter of 2021.

- **Large and growing pipeline of protein-based therapeutics**. In addition to cell and gene therapies, an increase in protein-based therapies is driving the need for impurity testing during process development and manufacturing.
- **Rise in molecular diagnostics driven by COVID-19**. The market for molecular diagnostics is growing dramatically because of demand for new tests related to COVID-19. This growth is driving demand for our products, particularly oligonucleotides and related inputs.
- **COVID-19 providing both short-term and expected long-term growth**. Several of our product categories have experienced accelerated growth in 2020, notably our CleanCap® and oligonucleotide products. We expect the impact of COVID-19 on our growth to sustain in the longer-term as the entire mRNA category benefits from lessons learned during the COVID-19 pandemic. We expect research in other therapeutic categories to experience increased growth as research conducted for COVID-19 diffuses more broadly into other vaccines and therapies.



* Our plasmid DNA products launched in Q1 2021.

Nucleic Acid Production Market

The nucleic acid production market includes the production and synthesis of reagents for research and manufacturing of DNA and RNA-based biologics. Nucleic acid production is a $3.5 billion market expected to grow at 19% annually through 2023. Growth has generally accelerated in recent years with continued innovation in cell and gene therapy, including mRNA

therapeutics and synthetic biology approaches. Our addressable portion of the market is $2.8 billion with expected growth of 28% annually through 2023. This higher growth rate is driven by our exposure to high growth sub-markets including RNA cap analog production and mRNA. Capping and mRNA growth is fueled by the continued growth of nucleic acid vaccines and therapies, which we expect will accelerate because of research into COVID-19. That research has highlighted the benefits of mRNA vaccines and therapies more broadly.

The field of mRNA-based drugs and vaccines has advanced dramatically within a few short years. Capacity to manufacture these products when approved, however, remains in short supply. Providers of technical expertise and manufacturing capabilities, like ourselves, with the facilities and quality systems demanded by biopharmaceutical customers, benefit from the demand created in the mRNA category.

COVID-19 is further accelerating growth in custom oligonucleotides and related inputs, which are used to manufacture diagnostic tests. New participants have entered the diagnostics market. Reference labs and hospitals have rapidly expanded their capacity. And demand for testing is increasing rapidly. These developments in turn lead to increased demand for our oligonucleotide products.

Biologics Safety Testing Market

The biologics safety testing market includes the detection and clearance of downstream bioprocessing product and process impurities. Biologics safety testing is a $2.8 billion market expected to grow at 12% annually through 2023. We participate in the HCP and other process related impurities and viral contamination segments of this market for biopharmaceutical vaccine and therapeutics manufacturing. These addressable segments account for $575.0 million of the market and are expected to grow at 13% annually through 2023. The growth in this market is driven by continued growth of biologics and biosimilars and increased outsourcing of process development.

Protein Detection Market

The protein detection market includes methods to detect and visualize proteins (antigens) in tissue sections to provide insight into gene expression, spatial relationships, and biomarker identification. Protein detection includes immunohistochemistry, immunofluorescence and glycobiology. Immunohistochemistry, our largest market within protein detection, is a $2.2 billion market, expected to grow at 8% annually through 2023. We participate in the immunohistochemistry segment of the academic and biopharmaceutical research market, which represents $200 million of annual expenditures expected to grow at 6% annually through 2023. This market saw a temporary contraction in 2020 of approximately 15% given lab closures due to COVID-19, but is expected to return to historical numbers.

Our Strategy

Our customers strive to improve human health. Our goal is to provide them with products and services to accelerate their development efforts, from basic research through clinical trials and ultimately to commercialization for drugs, diagnostics and vaccines.

Supporting Biopharmaceutical Customers from Product Development Through Commercialization

Our customers include both emerging and established biopharmaceutical leaders developing novel therapies, diagnostics and vaccines. Emerging biopharmaceutical customers frequently seek the support we can offer in our state-of-the-art facilities under our stringent quality standards, with the capabilities that result from the capital and process investments we have made over the last several years. We are capable of manufacturing reagents from research-grade to GMP-grade, which often exceeds the in-house capabilities of our pre-commercial customers. The results of the Industry Analysis indicate that our emerging and established customers also seek us out for our leading capabilities in nucleic acid chemistries and process control assays. We have expertise in complex chemistries, especially in highly modified nucleic acids and mRNA, and we believe we are a leader in applying these capabilities to the development of vaccines and therapeutics. We further support our customers as they transition from product development to commercialization by providing critical raw materials for their drugs. A core component of our strategy is the continued investment in facilities, quality standards and products and services that allow us to support our customers through the entire life cycle of their drugs.

Developing Proprietary Technologies that Deepen our Relationships with Our Customers

We believe we are experts in nucleic acids and our scientists aim to develop proprietary enabling technologies that become integral to our customers' products. For example, CleanCap®, our proprietary chemical capping technology, has demonstrated its advantages in terms of the stability of the associated mRNA and its efficiency in protein production when compared to

traditional capping technologies. This efficiency has led biopharmaceutical customers to employ CleanCap® in their vaccine and therapeutic programs. As those products proceed through development into commercialization, we believe CleanCap® will be a critical input in on-market vaccines and therapeutics, with over 110 customers having used CleanCap® as of December 31, 2020 and five COVID-19 vaccine programs incorporating CleanCap® as of March 9, 2021, including two commercial program led by Pfizer in partnership with BioNTech and another led by BioNTech in partnership with Fosun Pharma, one Phase I clinical program led by Chulalongkorn University, one phase I/II clinical programs led by Imperial College London and, one Phase III program led by CureVac, and three pre-clinical programs led by the University of Tokyo in partnership with Daiichi-Sankyo, eTheRNA Immunotherapies and Greenlight Biosciences. We expect to supply our customers throughout their products' life cycle.

Forming Long-Term Partnerships for Critical Biopharmaceutical Components and Process Tests

Our products are frequently incorporated into regulated and highly validated therapeutic and diagnostic products and processes. Our biopharmaceutical customers expect us to provide them with consistent, high quality products that meet narrow specifications, and that we ensure their supply chain for such products for the length of their programs. In many cases, we may be the sole source of the products we provide. We therefore take seriously our responsibility to our biopharmaceutical partners, and by extension the patients they serve. Our emphasis on partnership generally leads to long-term relationships with our customers.

Focusing Our Efforts on High Growth End Markets

While biopharmaceutical research and *in vitro* diagnostics markets are experiencing strong growth, we target the highest growth segments within those markets. Our product portfolio is well positioned to serve the biologic, cell and gene therapy and mRNA vaccine and therapeutic end markets, which are currently experiencing above-market growth. By investing in technologies at the forefront of biopharmaceutical and *in vitro* diagnostics, we aim to remain focused on the highest-growth applications.

Opportunistically Acquiring Leading Life Sciences Businesses and Supporting Their Continued Development

We built our business by acquiring established and emerging companies with strong scientific foundations in our target markets and investing in their systems, processes and people to accelerate their growth and expand their technologies. Going forward, we may opportunistically pursue strategic acquisitions that we believe meet, or could meet after being acquired and expanded, the following criteria:

- address our core target markets;
- have a demonstrated adherence to high quality standards;
- be leaders in their market niches;
- have differentiated or proprietary products and processes that provide clear value to our biopharmaceutical and other customers; and
- have a track record of attractive rates of growth and compelling returns on invested capital.

Our acquisition strategy is to invest significantly in our acquired businesses. We strive to rapidly integrate their information and financial systems. All of our companies share a common enterprise resource planning system and we implement our financial controls and reporting systems soon after acquisition. We seek opportunities to invest in their facilities and personnel to provide an operating foundation for growth. We also augment their commercial capabilities through a combination of sales and marketing resources dedicated to each business, supported by our global marketing infrastructure.

We will continue to seek a balance between driving growth organically and through opportunistic acquisitions.

Commercial

We have relationships with the following categories of customers (percentages represent the share of revenue in each category for the year ended December 31, 2020): developers of therapeutics and vaccines (66%), other biopharmaceutical and life science research companies (27%), academic institutions (4%) and molecular diagnostic companies (3%). Our biopharmaceutical customers include startups, established biotechnology companies and large pharmaceutical companies developing enzyme replacement therapies, gene editing therapies, *ex vivo* therapies and vaccines.

Our commercial function includes direct sales, marketing, customer service, technical support and distributor management. We serve customers through direct sales in each business segment, with a primary focus on our larger biopharmaceutical and other

industry customers. We serve our academic customers via Web, email and phone ordering. We support all customers with live technical support and customer service.

We address customers outside the United States with a combination of direct sales and distributors. We serve many of our biopharmaceutical customers, especially in our nucleic acid production segment, via direct sales worldwide. Our distributors also sell our products in over 50 countries and provide customer service and local sales and marketing. As of December 31, 2020, our commercial organization included 58 employees and over 83 distributors.

Competition

We compete with a range of companies across our segments.

Nucleic Acid Production

Within nucleic acid production, we compete with four primary types of companies: (1) chemistry companies that create and produce the basic monomers, amidites, and supports that go into the creation of an oligonucleotide; (2) oligonucleotide manufacturers that specialize in custom oligonucleotide development of varying complexities and scales; (3) mRNA biotechnology companies that create fully processed mRNA and specialize in custom, complex orders; and (4) CDMO organizations that have the capability to accept work from large biopharmaceutical companies and serve as the outsourcing entity for the development and manufacturing of nucleic acid products. However, it is important to note that CDMOs seldom offer proprietary products.

For mRNA capping analogs, we compete principally with Thermo Fisher Scientific Inc. ("Thermo Fisher") and Hongene Biotech Corporation, who offer alternatives to CleanCap®. Many biopharmaceutical companies produce capping solutions in-house using enzymatic or ARCA processes. However, given CleanCap®'s high yield and process efficiency, many customers who previously insourced these processes have begun to partner with us. Based on the Industry Analysis, we believe our products and services are more effective than those of our competitors. Deep scientific expertise, intellectual property protection and specialty equipment serve as barriers to entry in this space.

For our mRNA offerings, we compete with Aldevron LLC, Bio-synthesis Inc., and System Biosciences, LLC, among others. Based on the Industry Analysis, we believe we have a reputation for our expertise in the RNA space with talented scientists who are constantly pushing the frontier of RNA science. This scientific expertise and the required high-cost equipment serve as barriers to entry. In addition to our expertise, we believe our GMP cleanroom manufacturing process differentiates us from competitors.

For custom oligonucleotides, we compete with a number of manufacturers. Custom oligonucleotide providers include those that provide complex, highly modified oligonucleotides and those that provide less complex offerings. In the custom oligonucleotide space, complexity is based on the length of the sequence and level of modification to the phosphate backbone. Large manufacturers like Integrated DNA Technologies, Inc., Thermo Fisher and EMD Millipore Corporation ("Millipore Sigma") serve less complex customer needs while Maravai, LGC Biosearch Technologies, Inc. and GenScript Biotech Corporation serve more complex customer needs. In the custom oligonucleotide market, we have a reputation for accepting complex orders and delivering high purity products that reduce researcher re-work and save money. Quick turnaround times and the ability to produce at scale are essential requirements in this segment.

In the oligonucleotide synthesis inputs market, we compete against large distributor-manufacturers like Thermo Fisher and Millipore Sigma while also serving them as customers. Our Glen Research brand has a long history in this industry, which drives customer loyalty, and has a reputation for high-fidelity technical service, focusing on supplying and sourcing highly modified inputs for its customers.

Biologics Safety Testing

For drugs in early development, we compete against other bioprocess impurity kit providers such as BioGenes GmbH ("BioGenes") or Enzo Life Sciences, Inc. ("Enzo"). Competitors generally offer fewer expression platforms (as few as one or two) compared to our offering of 23 expression platforms and a total of 78 ELISA impurity detection kits. As a drug successfully moves forward to validation and approval stages, a customer may either continue with an off-the-shelf kit or they may begin the process to develop a custom assay that is tailored to meet their specific host cell and manufacturing process needs. During the entire drug development process, and especially during this decision, we are partners with the manufacturer and provide our expertise to help them make the best bioprocess quality control and testing-related decisions.

If a drug manufacturer continues with an off-the-shelf assay from development to validation and approval, they will generally stay with the incumbent kit provider due to the extensive validation they have conducted. For custom assay development, our

main competitors are BioGenes, Rockland Immunochemicals, Inc., and some CDMOs and CROs with custom assay development capabilities. The trend in recent years has been for CDMOs, CROs and large biopharmaceutical companies to focus on core competencies and outsource host cell protein assays or qualify off-the-shelf kits when possible.

Protein Detection

In the protein detection market, we compete against large life sciences manufacturers and niche tissue staining offerings. We compete in the research segment of this market against large life sciences manufacturers such as Thermo Fisher and Abcam plc, who compete across the value chain offering primary and secondary antibody detection, visual detection and labeling, slide processes and visualization and analysis. Additionally, we compete against niche tissue staining offerings such as Enzo and Jackson ImmunoResearch Laboratories, Inc. We are differentiated by our deep visual detection and labeling experience, our Vector Laboratories brand's sterling reputation established over more than 40 years, and the desire of our research customers to replicate past findings, many of which were completed using Vector Laboratories products.

Licenses and Collaborations

ProteinSimple Supply and Distribution Agreement

On August 12, 2019, we (through Cygnus Technologies) entered into a Supply and Distribution Agreement with ProteinSimple (the "ProteinSimple Agreement") for the supply of bioprocess impurity assays to be assembled in assay cartridges for use in automated analyzer instruments. Under the ProteinSimple Agreement, we supply to ProteinSimple, at no charge, certain reagents to be incorporated into ProteinSimple cartridges or sold directly by us. This collaboration with ProteinSimple is generally exclusive in the field of testing for bioprocess impurities using immunoassays on an automated analyzer for the United States, United Kingdom, Ireland and Europe.

The ProteinSimple Agreement contains non-exclusive licenses from each party to the other to permit the other party to fulfill its obligations and sell its products under the ProteinSimple Agreement. If any intellectual property is developed jointly or any intellectual property that covers both bioprocess impurity assays and automated immunoassay kits and instruments is developed solely by either party, we will own all intellectual property with respect to the bioprocess impurity assays and ProteinSimple will own all intellectual property with respect to automated immunoassay kits and instruments.

The ProteinSimple Agreement is in effect for an initial seven (7) year term with automatic renewal for successive two (2) year renewal terms unless either party elects not to renew. Beginning on the third anniversary of the date of the ProteinSimple Agreement, either Party may terminate the ProteinSimple Agreement on thirty (30) days' notice if Cygnus Technologies has not purchased certain minimum numbers of cartridge kits from ProteinSimple.

Broad Patent License Agreement

We (through TriLink BioTechnologies) entered into a Nonexclusive Patent License and Material Transfer Agreement with The Broad Institute, Inc. ("Broad") effective as of July 5, 2017, and amended on September 29, 2017 (the "Broad Patent License Agreement"). Broad, together with a consortium of educational institutions (including Harvard University and the Massachusetts Institute of Technology), owns and controls certain patent rights relating to genome editing technology, including the CRISPR-Cas9 gene editing processes and have a licensing program for use and commercialization of technologies and products covered by the underlying patent rights. Under the Broad Patent License Agreement, Broad grants to us a non-exclusive, royalty-bearing, non-transferable and non-sublicensable, worldwide license under the licensed patent rights to manufacture and sell products and to perform certain *in vitro* processes or services on a fee-for-service basis, in each case, solely as research tools for research purposes (excluding human, clinical or diagnostic uses). We must use diligent efforts to develop products, introduce products into the commercial market and make products reasonably available to the public. We are obligated to pay a mid-five figure annual license maintenance fee and royalties in the range of 5% to 10% on net sales of covered products and processes.

The term of the Broad Patent License Agreement extends through the expiration of the last to expire claim of any of the licensed patents. We are entitled to terminate the Broad Patent License Agreement for convenience at any time on at least three (3) months' written notice, in which case we must continue to pay license maintenance fees and royalties as noted above for the sale of products that are not covered by the specific claims of the licensed patent rights but are otherwise derived from such licensed patent rights or from products covered by such licensed patent rights. Broad may terminate the license for our uncured failure to make payments, for our uncured material breach or if we bring a patent challenge against any of the institutional rights holders.

LSU Patent License Agreement

We (through TriLink BioTechnologies) entered into a Patent License Agreement with the Board of Supervisors of Louisiana State University and Agricultural and Mechanical College and Dr. Edward Darzynkiewicz (collectively, "LSU") effective as of July 7, 2010 (the "LSU Patent License Agreement"). Under the LSU Patent License Agreement, LSU grants to us a non-exclusive, royalty-bearing license under an issued U.S. patent and patents that claim priority thereto, directed to mRNA capping technology to make and sell reagents and kits for research use only (excluding use in humans or for diagnostic or therapeutic purposes) in the United States. We are required to use commercially reasonable efforts to commercialize the licensed products throughout the life of the LSU Patent License Agreement. We are obligated to pay a low four-figure annual license maintenance fee and royalties in the range of 5% to 10% on net sales of licensed products.

We must pay royalties to LSU until the expiration of the last to expire licensed patents. We are entitled to terminate the LSU Patent License Agreement for convenience at any time on at least sixty (60) days' written notice, subject to paying in full all amounts due up to the date of termination and cessation of any exercise of the licensed rights thereafter. LSU may terminate the license for our uncured failure to make payments or our uncured material breach.

AmberGen Agreement

We (through Glen Research) entered into an Agreement with AmberGen, Inc. ("AmberGen"), dated May 11, 2000 (the "AmberGen Agreement") under which AmberGen has appointed us the exclusive distributor of AmberGen's proprietary photocleavable product offered under the name PC Phosphoramidite on a worldwide basis. We are limited to selling the product for research use only and are required to use good faith efforts to discontinue distribution to buyers making use of the product than purposes other than laboratory research.

We are entitled under the AmberGen Agreement to purchase product from AmberGen at AmberGen's cost to manufacture the product. On a monthly basis, we are required to remit to AmberGen 50% of the gross profits on product sales for which payments were received in the preceding month.

The AmberGen Agreement was initially in effect for a five-year term but is now in a series of automatic one-year renewal terms. Either party may terminate the AmberGen Agreement on six months' written notice or immediately for material breach of the other party or, subject to a cure period, for certain bankruptcy-related events.

BTI Biosearch Dyes Agreement

We (through Glen Research) are a party to a Commercial Supply and License Agreement with Biosearch Technologies, Inc. ("BTI"), dated June 29, 2004, as amended on November 8, 2004 (the "BTI Biosearch Dyes Agreement"), under which BTI agrees to supply us with certain BTI dyes and we are granted a worldwide, non-exclusive license to sell certain BTI dyes and to use BTI's product-related trademarks to do so. The BTI dyes can only be sold for the customer's internal research and development use and inclusion in commercial kits or any commercial application is prohibited unless the customer has obtained a valid commercial license from BTI. The rights granted do not include sales to customers for use in human *in vitro* or clinical diagnosis. We are required to pay a per unit price for the licensed BTI products.

The BTI Biosearch Dyes Agreement was originally in effect for a term of two years and is now in a series of annual year-to-year renewals. Either party has the right to opt-out of such renewals upon 90 days' notice prior to the next renewal. Either party can terminate the agreement for convenience at any time on six months' written notice. Either party can terminate the agreement for the other party's uncured material breach or insolvency.

Manufacturing and Supply

We occupy facilities in San Diego, California, Burlingame, California, Southport, North Carolina and Sterling, Virginia. Except for our Sterling facility, all our facilities are engaged in the manufacture of reagents.

Our San Diego facility, in particular, was designed and built by us in conjunction with the building owner to contain fully functional chemical and biological manufacturing operations from material receiving to product distribution and has its own loading dock, manufacturing gas delivery system, solvent delivery and waste system, ISO 8 and ISO 7 designated customer manufacturing suites and integrated building management systems for required site control.

We continue to invest in our San Diego facility with recent expansions allowing for the manufacture of plasmid DNA and creation of ISO Class 8 and ISO Class 7 clean rooms providing for an expansion of the scale at which we can manufacture CleanCap® and NTPs, supported by a pilot plant for development of large scale manufacturing processes. This investment has

allowed us to substantially increase our capacity for nucleic acid production and specifically CleanCap® meeting the growing demand from our customers without interruption or constraints.

Our Southport and Burlingame operations are engaged in the manufacture and processing of antibody, ELISA kits and related reagents. The facilities incorporate laboratory, manufacturing, bottling, shipping and waste handling capabilities. Our Sterling facility was designed to perform quality control, aliquoting, packaging and shipping and houses the appropriate space and systems.

Our supply chain relies on a network of specialized suppliers and transportation companies. We regularly review our supply chain for supplier quality and risks related to concentration of supply and we take appropriate action to manage these potential risks.

Government Regulation

We provide products used for basic research or as raw materials used by biopharmaceutical customers for further processing, and active pharmaceutical ingredients used for preclinical and clinical studies. The quality of our products is critical to researchers looking to develop novel vaccines and therapies and for biopharmaceutical customers who use our products as raw materials or who are engaged in preclinical studies and clinical trials. Biopharmaceutical customers are subject to extensive regulations by the Food and Drug Administration ("FDA") and similar regulatory authorities in other countries for conducting clinical trials and commercializing products for therapeutic, vaccine or diagnostic use. This regulatory scrutiny results in our customers imposing rigorous quality requirements on us as their supplier through supplier qualification processes and customer contracts.

Our nucleic acid and biologics safety testing segments produce materials used in research and biopharmaceutical production, clinical trial vaccines and vaccine support products. We produce materials in support of our customers' manufacturing businesses and to fulfill their validation requirements, as applicable. These customer activities are subject to regulation and consequently require these businesses to be inspected by the FDA and other national regulatory agencies under their respective cGMP regulations. These regulations result in our customers imposing quality requirements on us for the manufacture of our products, and maintain records of our manufacturing, testing and control activities. In addition, the specific activities of some of our businesses require us to hold specialized licenses for the manufacture, distribution and/or marketing of particular products.

All of our sites are subject to licensing and regulation, as appropriate under federal, state and local laws relating to:

- the surface and air transportation of chemicals, biological reagents and hazardous materials;
- the handling, use, storage and disposal of chemicals (including toxic substances), biological reagents and hazardous waste;
- the procurement, handling, use, storage and disposal of biological products for research purposes;
- the safety and health of employees and visitors to our facilities; and
- protection of the environment and general public.

Regulatory compliance programs at each of our businesses are managed by a dedicated group responsible for regulatory affairs and compliance, including the use of outside consultants. Our compliance programs are also managed by quality management systems, such as vendor supplier programs and training programs. Within each business, we have established Quality Management Systems ("QMS") responsible for risk based internal audit programs to manage regulatory requirements and client quality expectations. Our QMS program ensures that management has proper oversight of regulatory compliance and quality assurance, inclusive of reviews of our system practices to ensure that appropriate quality controls are in place and that a robust audit strategy confirms requirements for compliance and quality assurance.

Research Products

Our products and operations may be subject to extensive and rigorous regulation by the FDA and other federal, state, or local authorities, as well as foreign regulatory authorities. The FDA regulates, among other things, the research, development, testing, manufacturing, clearance, approval, labeling, storage, recordkeeping, advertising, promotion, marketing, distribution, post-market monitoring and reporting, and import and export of pharmaceutical drugs. Certain of our products are currently marketed as research use only ("RUO").

We believe that our products that are marketed as RUO products are exempt from compliance with GMP regulations under the FDCA. RUO products cannot make any claims related to safety, effectiveness or diagnostic utility and they cannot be intended for human clinical diagnostic use. 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. The FDA will

also evaluate the totality of the circumstances to determine if the product is intended for diagnostic purposes. If the 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 products that will require clearance or approval prior to commercialization.

We do not make claims related to safety or effectiveness and they are not intended for diagnostic or clinical use. However, the quality of our products is critical to meeting customer needs, and we therefore voluntarily follow the quality standards outlined by the International Organization for Standardization for quality management systems (ISO 9001:2015) for the design, development, manufacture, and distribution of our products. Some biopharmaceutical customers desire extra requirements including quality parameters and product specifications, which are outlined in customer-specific quality agreements. These products are further processed and validated by customers for their applications. Customers qualify us as part of their quality system requirements, which can include a supplier questionnaire and on-site audits. Customers requalify us on a regular basis to ensure our quality system, processes and facilities continue to meet their needs and we are meeting requirements outlined in relevant customer agreements.

Active Pharmaceutical Ingredients ("APIs") for Clinical Trials

We provide APIs to customers for use in preclinical studies through and including clinical trials. We hold a drug manufacturing license with the California Food and Drug Branch of the California Department of Public Health for manufacture of APIs for clinical use and are subject to inspection to maintain licensure. Manufacture of APIs for use in clinical trials is regulated under § 501(a)(2)(B) of the FDCA, but is not subject to the current GMP regulations in 21 CFR § 211 by operation of 21 CFR § 210. We follow the principles detailed in the International Council for Harmonisation ("ICH") Q7, Good Manufacturing Practice Guide for Active Pharmaceutical Ingredients (Section 19, APIs For Use in Clinical Trials) in order to comply with the applicable requirements of the FDCA, and the comparable GMP principles for Europe; European Community, Part II, Basic Requirements for Active Substances Used as Starting Materials (Section 19, APIs For Use in Clinical Trials). APIs are provided to customers under customer contracts that outline quality standards and product specifications. As products advance through the clinical phases, requirements become more stringent and we work with customers to define and agree on requirements and risks associated with their product.

Customers' biopharmaceutical products early in their development have a high failure rate and often do not advance through the clinical stages to commercialization. Our customers are required to follow regulatory pathways that are not always known, which may cause additional unforeseen requirements placed on us as their contract manufacturer and delays in advancing to the next stage of product development. We also provide novel compounds for cell and gene therapy applications, which result in additional challenges for our customers attempting to obtain regulatory approval given that this field is relatively new and regulations are evolving. Customer clinical trials rely on approval from institutional review boards ("IRBs") and patient and volunteer enrollment, which makes timelines unpredictable for advancing to the next stage in product development. Preclinical studies and clinical trials conducted by our customers are also expensive and data may be negative or inconclusive causing customers to abandon projects that were expected to continue. Regulatory requirements in both the United States and abroad are always evolving and compliance with future laws may require significant investment to ensure compliance.

Other Regulatory Requirements

Select agent and toxin. We have one product classified as a select agent and toxin. Pursuant to the Public Health Security and Bioterrorism Preparedness and Response Act of 2002, the United States Department of Health and Human Services ("HHS") and the United States Department of Agriculture ("USDA") have established regulatory requirements for the possession, use, and transfer of biological agents and toxins that have the potential to pose a severe threat to public health and safety, animal and plant health, and the safety of animal and plant products for their intended use. These requirements can be found at 42 CFR Part 73 (HHS), 7 CFR Part 33 1 (USDA-PPQ), and 9 CFR Part 121 (USDA-VS). The possession, use and transfer of the relevant biological agent and toxin in quantities greater than 1.0 gram is governed by the regulations of 42 CFR Part 73 (HHS), Possession, Use and Transfer of Select Agents and Toxins. Vector Laboratories is registered with the Center for Disease Control ("CDC") for these activities, is subject to inspection by the CDC and maintains an approved biosecurity plan. The regulations include specific requirements for safety (e.g. handling), security (e.g. access control, inventory control) and emergency response (e.g. addressing spills during manufacture or broken containers).

Environmental laws and regulations. We believe that our operations comply in all material respects with applicable laws and regulations concerning environmental protection. There have been no material effects upon our earnings or competitive position resulting from compliance with applicable laws or regulations enacted or adopted relating to the protection of the environment. Our capital and operating expenditures for pollution control in 2019 and 2020 were not material and are not expected to be material in 2021.

Intellectual Property

Our success depends in part on our ability to obtain and maintain intellectual property protection for our products and services, defend and enforce our intellectual property rights, preserve the confidentiality of our trade secrets, and operate without infringing, misappropriating or otherwise violating valid and enforceable intellectual property rights of others. We seek to protect the investments made into the development of our products and services by relying on a combination of patents, trademarks, copyrights, trade secrets, including know-how, and license agreements. We also seek to protect our proprietary products and services, in part, by requiring our employees, consultants, contractors and other third parties to execute confidentiality agreements and invention assignment agreements.

Patents. Our intellectual property strategy is focused on protecting through patents and other intellectual property rights our core products and services, including CleanCap®, and related instrumentation and applications. In addition, we protect our ongoing research and development into critical reagents for cell and gene therapy through patents and other intellectual property rights.

As of February 15, 2021, we solely owned 19 issued U.S. patents including two patents issued in December 2019, and one patent issued in February 2021, for certain of our CleanCap® products, two pending U.S. non-provisional patent applications, 29 issued foreign patents and 10 pending foreign patent applications and co-own two issued U.S. patents and one issued foreign patent with third parties, the details of which are set out in the tables below. The two foregoing U.S. patent applications are national stage filings of two PCT patent applications that we solely own. Our patent portfolio generally includes patents and patent applications relating to compositions and methods for the production of oligonucleotides, nucleic acids and mock viral particles. Issued U.S. patents in our portfolio of company-owned patents are expected to expire between 2021 and 2035. In addition, certain patents related to our SoluLINK products expired in 2020 and certain other patents related to such products are due to expire in 2021 and 2022.

The following patents and patent applications (including expected 20 year expiration dates) relate to our CleanCap® related products and technology.

Patent and Patent Application Numbers	Form of Ownership	Expected Expiration Date	Description
US 10,494,399, US 10,519,189, US 10,913,768, and foreign applications in certain jurisdictions claiming priority to PCT/US2016/052670	Owned	Sept. 20, 2036	Directed to compositions and methods for synthesizing 5'-capped RNAs

The following patents and patent applications (including expected 20 year expiration dates and any patent term adjustment) relate to our CleanTag® Library Prep related products and technology.

Patent Numbers	Form of Ownership	Expected Expiration Date	Description
US 8,728,725	Owned	Jan. 5, 2032	Directed to compositions and methods for ligation of nucleic acids
US 9,631,227	Owned	Nov. 10, 2030	Directed to compositions and methods for ligation of nucleic acids
AU Patent No. 2010270715	Owned	July 6, 2030	Directed to compositions and methods for ligation of nucleic acids
CA Patent No. 2,767,408	Owned	July 6, 2030	Directed to compositions and methods for ligation of nucleic acids
EP Patent No. 2451980 (validated in DE, ES, FR, GB, IT)	Owned	July 6, 2030	Directed to compositions and methods for ligation of nucleic acids
ES Patent No. 2521740	Owned	July 6, 2030	Directed to compositions and methods for ligation of nucleic acids
HK Patent No. 1220234	Owned	July 6, 2030	Directed to compositions and methods for ligation of nucleic acids
JP Patent No. 5903379	Owned	July 6, 2030	Directed to compositions and methods for ligation of nucleic acids
MX Patent No. 321180	Owned	July 6, 2030	Directed to compositions and methods for ligation of nucleic acids
NZ Patent No. 597535	Owned	July 6, 2030	Directed to compositions and methods for ligation of nucleic acids

The following patents and patent applications (including expected 20 year expiration dates and any patent term adjustment) relate to our CleanAmp® related products and technology.

Patent Numbers	Form of Ownership	Expected Expiration Date	Description
US 8,133,669	Owned	May 21, 2029	Directed to compositions and methods for nucleic acid replication
AU Patent No. 2009257815	Owned	May 21, 2029	Directed to compositions and methods for nucleic acid replication
CA Patent No. 2,725,239	Owned	May 21, 2029	Directed to compositions and methods for nucleic acid replication
CN Patent No. 102105481	Owned	May 21, 2029	Directed to compositions and methods for nucleic acid replication
EP Patent No. 2294076 (validated in DE, ES, FR, GB, IT)	Owned	May 21, 2029	Directed to compositions and methods for nucleic acid replication
ES Patent No. 2625938	Owned	May 21, 2029	Directed to compositions and methods for nucleic acid replication
GB Patent No. 2473778	Owned	May 21, 2029	Directed to compositions and methods for nucleic acid replication
HK Patent No. 1155456	Owned	May 21, 2029	Directed to compositions and methods for nucleic acid replication
IN Patent No. 318293	Owned	May 21, 2029	Directed to compositions and methods for nucleic acid replication
JP Patent No. 5712125	Owned	May 21, 2029	Directed to compositions and methods for nucleic acid replication
US 8,361,753	Owned	October 21, 2029	Directed to compositions and methods for nucleic acid amplification
AU Patent No. 2007268075	Owned	May 17, 2027	Directed to compositions and methods for nucleic acid amplification
CA Patent No. 2,653,841	Owned	May 17, 2027	Directed to compositions and methods for nucleic acid amplification
CN Patent No. 101517091	Owned	May 17, 2027	Directed to compositions and methods for nucleic acid amplification
DE Patent No. 602007013223	Owned	May 17, 2027	Directed to compositions and methods for nucleic acid amplification
EP Patent No. 2032714 (validated in DE, ES, FR, GB, IT)	Owned	May 17, 2027	Directed to compositions and methods for nucleic acid amplification
ES Patent No. 2360738	Owned	May 17, 2027	Directed to compositions and methods for nucleic acid amplification
HK Patent No. 1129045	Owned	May 17, 2027	Directed to compositions and methods for nucleic acid amplification
JP Patent No. 5558811	Owned	May 17, 2027	Directed to compositions and methods for nucleic acid amplification

The following patent (including expected 20 year expiration dates and any patent term adjustment) relates to our decanoic acid diester linker-related technology.

Patent Numbers	Form of Ownership	Expected Expiration Date	Description
US 6,320,041	Owned	April 13, 2021	Directed to compositions used for chemical joining molecules to oligonucleotide

The following patents and patent applications (including expected 20 year expiration dates and any patent term adjustment) relate to our SoluLINK® related products and technology.

Patent Numbers	Form of Ownership	Expected Expiration Date	Description
US 6,686,461	Owned	Feb. 28, 2021	Directed to methods and compositions for preparation, detection and immobilization of macromolecules including oligonucleotides
US 7,173,125	Owned	Jan. 29, 2022	Directed to methods and compositions for preparation, detection and immobilization of macromolecules including oligonucleotides
US 7,999,098	Owned	Jan. 29, 2022	Directed to methods and compositions for preparation, detection and immobilization of macromolecules including oligonucleotides
US 6,800,728	Owned	June 28, 2021	Directed to methods and compositions for crosslinking and immobilizing biomolecules, drugs and synthetic polymers
US 7,462,689	Owned	July 15, 2021	Directed to methods and compositions for crosslinking and immobilizing biomolecules, drugs and synthetic polymers
US 7,732,628	Owned	Sept. 6, 2023	Directed to methods and compositions for immobilizing biomolecules, drugs and synthetic polymers
US 7,102,024	Owned	Sept. 6, 2023	Directed to methods and compositions for immobilizing biomolecules
US 6,911,535	Owned	Mar. 31, 2022	Directed to methods for immobilizing biomolecules
US 8,541,555	Owned	April 8, 2031	Directed to methods and compounds used to label biomolecules
US 8,846,875	Owned	Feb. 11, 2031	Directed to methods, systems, and kits for preparing, purifying, and isolating oligonucleotide conjugates
EP Patent No. 1315699 (validated in FR, DE, GB)	Owned	Mar. 22, 2021	Directed to methods and compositions for crosslinking and immobilizing biomolecules, drugs and synthetic polymers
EP Patent No. 2295407 (validated in FR, DE, GB)	Owned	Mar. 22, 2021	Directed to methods and compositions for crosslinking and immobilizing biomolecules, drugs and synthetic polymers
EP Patent No. 2298736 (validated in FR, DE, GB)	Owned	Mar. 22, 2021	Directed to methods and compositions for crosslinking and immobilizing biomolecules, drugs and synthetic polymers

The following patents and patent applications (including expected 20 year expiration dates) relate to our immunofluorescence assay related products and technology.

Patent Application Numbers	Form of Ownership	Expected Expiration Date	Description
US Patent App. No. 15/970,100, and foreign applications in certain jurisdictions claiming priority to PCT/US2018/030799	Owned	May 3, 2038	Directed to kits and methods related to immunofluorescence assays
US Patent App. No. 16/195,208, and foreign applications in certain jurisdictions claiming priority to PCT/US2018/061807	Owned	Nov. 19, 2038	Directed to systems and methods for immunoassay detection

The following patents and patent applications (including expected 20 year expiration dates) relate to our immunofluorescence assay related products and technology.

Patent Numbers	Form of Ownership	Expected Expiration Date	Description
US 6,770,754	Owned	Nov. 29, 2021	Directed to compositions and methods related to oligonucleotide synthesis
US 7,491,817	Owned	Nov. 29, 2021	Directed to compositions and methods related to oligonucleotide synthesis
EP Patent No. 1404695 (validated in BE, CH, DE, FR, GB)	Owned	Nov. 29, 2021	Directed to compositions and methods related to oligonucleotide synthesis
EP Patent No. 2248820 (validated in BE, CH, DE, FR, GB)	Owned	Nov. 29, 2021	Directed to compositions and methods related to oligonucleotide synthesis

Patent Numbers	Form of Ownership	Expected Expiration Date	Description
US 8,394,948	Co-owned with Nelson Biotechnologies	Sept. 28, 2030	Directed to compositions and methods related to oligonucleotide synthesis

Patent Numbers	Form of Ownership	Expected Expiration Date	Description
US 7,144,995	Co-owned with Berry & Associates	June 1, 2024	Directed to compositions and methods related to fluorescent nitrogenous bases
EP Patent No. 1483280 (validated in CH, DE, FR, GB)	Co-owned with Berry & Associates	Mar. 6, 2023	Directed to compositions and methods related to fluorescent nitrogenous bases

PCT patent applications are not eligible to become an issued patent until, among other things, we file one or more national stage patent applications within, depending on the country, 30 to 32 months of the PCT application's priority date in the countries in which we seek patent protection. Moreover, we may own provisional patent applications in the future, and provisional patent applications are not eligible to become issued patents until, among other things, we file a non-provisional patent application within 12 months of filing of one or more of related provisional patent applications. If we do not timely file any national stage patent applications or non-provisional patent applications, we may lose our priority date with respect to our PCT patent applications or provisional patent applications and any patent protection on the inventions disclosed in such patent applications. While we intend to timely file national stage patent applications relating to our PCT patent applications and non-provisional patent applications relating to our provisional patent applications, we cannot predict whether any such patent applications will result in the issuance of patents that provide us with any competitive advantage.

Individual issued patents extend for varying periods depending on the date of filing of the patent application or the date of patent issuance and the legal term of patents in the countries in which they are obtained. Generally, utility patents issued for applications filed in the United States are granted a term of 20 years from the earliest effective filing date of a non-provisional patent application. The duration of foreign patents varies in accordance with provisions of applicable local law, but typically is also 20 years from the earliest effective filing date. As a result, our patent portfolio may not provide us with sufficient rights to exclude others from commercializing products similar or identical to ours.

Trademarks. Our trademark portfolio is designed to protect the brands of our current and future products and includes U.S. trademark registrations for our company name, Maravai, subsidiary names Cygnus® and TriLink® and various product names, such as CleanCap®.

Trade Secrets. We also rely on trade secrets, including know-how, unpatented technology and other proprietary information, to strengthen our competitive position. We have determined that certain technologies, such as the production of antibodies for biologics safety testing, are better kept as trade secrets, rather than pursuing patent protection. To prevent disclosure of trade secrets to others, it is our policy to enter into nondisclosure, invention assignment and confidentiality agreements with parties who have access to trade secrets, such as our employees, collaborators, outside scientific collaborators, consultants, advisors and other third parties. These agreements also provide that all inventions resulting from work performed for us or relating to our business and conceived or completed during the period of employment or assignment, as applicable, are our exclusive property. In addition, we take other appropriate precautions, such as physical and technological security measures, to guard against misappropriation of our proprietary information by third parties.

We intend to pursue additional intellectual property protection to the extent we believe it would advance our business objectives. Notwithstanding these efforts, there can be no assurance that we will adequately protect our intellectual property or provide any competitive advantage. We cannot provide any assurance that any patents will be issued from our pending or any future patent applications or that any issued patents will adequately protect our products or technology. Our intellectual property rights may be invalidated, held unenforceable, circumvented, narrowed or challenged. In addition, the laws of various foreign countries where our products are distributed may not protect our intellectual property rights to the same extent as laws in the United States. Furthermore, it may be difficult to protect our trade secrets. While we have confidence in the measures we take to protect and preserve our trade secrets, they may be inadequate and can be breached, and we may not have adequate remedies for violations of such measures. In addition, our trade secrets may otherwise become known or be independently discovered by competitors. Moreover, our invention assignment agreements with employees, collaborators, outside scientific collaborators, consultants, advisors and other third parties may not be self-executing or otherwise provide meaningful protection for our intellectual property rights. If we do not adequately protect our intellectual property, third parties, including our competitors, may be able to use our technologies to produce and market products that compete with us and erode our competitive advantage. For more information regarding risks related to intellectual property, please see "Risk Factors—Risks Related to our Intellectual Property."

Human Capital Resources

As of December 31, 2020, we had over 410 full-time employees. Among our employees, 41% identify as female and 59% identify as male. None of our employees is represented by a labor union, and none of our employees has entered into a collective bargaining agreement with us. We offer a highly competitive compensation and benefits program to attract and retain top talent.

Our talented employees drive our mission and share core values that both stem from and define our culture, which plays an invaluable role in our execution at all levels in our organization. Our culture is based on these shared core values which we believe contribute to our success and the continued growth of the organization. Our core values are used in candidate screening and in employee evaluations to help reinforce their importance in our organization:

- *Adaptability*. We stay agile, ready to shift or change our approach when challenges arise and open to new ideas and responsibilities.
- *Open Communication*. We focus on open source sharing with our focus on constant improvement as individuals and as an organization.
- *Quality Mindset*. We strive to eliminate errors with accurate work as a priority and seek opportunities to improve products/services.
- *Work Together*. We are accountable to our team and work to meet established deliverables with respect and appreciation of others' views.
- *Workplace Awareness*. We promote a safe and healthy work environment.
- *Reward*. We celebrate and recognize accomplishments, both individual and collectively.

Item 1A. Risk Factors

In addition to the other information in this report and our other filings with the SEC, you should carefully consider the risks and uncertainties described below, which could materially and adversely affect our business operations, financial condition and results of operations. The risks and uncertainties described below are not the only ones we face. Additional risks and uncertainties that we are unaware of, or that we currently believe are not material, may also become important factors that affect us.

Summary of Risk Factors

The following is a summary of the risk factors our business faces. The list below is not exhaustive, and investors should read this "Risk Factors" section in full. Some of the risks we face include:

- Until the 2020 fiscal year, we had incurred losses for each fiscal year since inception, we may incur losses in the future and we may not be able to generate sufficient revenue to maintain profitability.
- 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.
- Certain of our products are used by customers in the production of vaccines and therapies, some of which represent relatively new and still-developing modes of treatment. Unforeseen adverse events, negative clinical outcomes, or increased regulatory scrutiny of these and their financial cost may damage public perception of the safety, utility, or efficacy of these vaccines and therapies or other modes of treatment and may harm our customers' ability to conduct their business. Such events may negatively impact our revenue and have an adverse effect on our performance.
- We are dependent on our customers' spending on and demand for outsourced nucleic acid production, biologics safety testing and protein detection research products and services. A reduction in spending or demand could have a material adverse effect on our business, financial condition, results of operations, cash flows and prospects.
- We compete with life science, pharmaceutical and biotechnology companies who are substantially larger than we are and potentially capable of developing new approaches that could make our products, services and technology obsolete.
- If our products and services do not perform as expected or the reliability of the technology on which our products and services are based in questioned, we could experience lost revenue, delayed or reduced market acceptance of our products and services, increased costs and damage to our reputation.
- Our products are highly complex and are subject to quality control requirements.
- Our success depends on the market acceptance of our life science reagents. Our reagents may not achieve or maintain significant commercial market acceptance.
- Product liability lawsuits against us could cause us to incur substantial liabilities, limit sales of our existing products and limit commercialization of any products that we may develop.
- Our acquisitions expose us to risks that could adversely affect our business, and we may not achieve the anticipated benefits of acquisitions of businesses or technologies.
- We depend on a limited number of customers for a high percentage of our revenue. If we cannot maintain our current relationships with customers, fail to sustain recurring sources of revenue with our existing customers, or if we fail to enter into new relationships, our future operating results will be adversely affected.
- We rely on a limited number of suppliers or, in some cases, sole suppliers, for some of our raw materials and may not be able to find replacements or immediately transition to alternative suppliers.
- Our products could become subject to more onerous regulation by the FDA or other regulatory agencies in the future, which could increase our costs and delay or prevent commercialization of our products, thereby materially and adversely affecting our business, financial condition, results of operations, cash flows and prospects.
- If we are unable to obtain, maintain and enforce intellectual property protection for our current or future products, or if the scope of our intellectual property protection is not sufficiently broad, our ability to commercialize our products successfully and to compete effectively may be materially adversely affected.
- If we fail to comply with our obligations under any license agreements, disagree over contract interpretation, or otherwise experience disruptions to our business relationships with our licensors, we could lose intellectual property rights that are necessary to our business.
- Our existing indebtedness could adversely affect our business and growth prospects.

- Our principal asset is our interest in Maravai Topco Holdings, LLC ("Topco LLC"), and, accordingly, we depend on distributions from Topco LLC to pay our taxes and expenses, including payments under the Tax Receivable Agreement. Topco LLC's ability to make such distributions may be subject to various limitations and restrictions.
- Conflicts of interest could arise between our shareholders and Maravai Life Sciences Holdings, LLC ("MLSH 1"), which may impede business decisions that could benefit our shareholders.
- The Tax Receivable Agreement requires us to make cash payments to MLSH 1 and Maravai Life Sciences Holdings 2, LLC ("MLSH 2") in respect of certain tax benefits to which we may become entitled, and we expect that the payments we will be required to make will be substantial.
- Our organizational structure, including the Tax Receivable Agreement, confers certain benefits upon MLSH 1 and MLSH 2 that will not benefit the other common shareholders to the same extent as they will benefit MLSH 1 and MLSH 2.
- GTCR, LLC ("GTCR") controls us, and its interests may conflict with ours or yours in the future.
- Provisions of our corporate governance documents could make an acquisition of us more difficult and may prevent attempts by our shareholders to replace or remove our current management, even if beneficial to our shareholders.

A description of the risks and uncertainties associated with our business is described below, but these risks are not the only ones we face. Additional risks and uncertainties that we are unaware of, or that we currently believe are not material, may also become important factors that affect us. You should carefully consider the risks described below, together with the financial and other information contained in this Annual Report on Form 10-K. If any of the following risks occur, our business, financial condition, results of operations and prospects could be materially and adversely affected. In that event, the price of our Class A common stock could decline, and you could lose all or part of your investment.

Risks Related to Our Business and Strategy

Until the 2020 fiscal year, we had incurred losses for each fiscal year since inception, we may incur losses in the future and we may not be able to generate sufficient revenue to maintain profitability.

Until the 2020 fiscal year, we had incurred losses for each fiscal year since our inception. For the years ended December 31, 2018 and 2019, we incurred net losses of $16.9 million and $5.2 million, respectively. As of December 31, 2019, we had an accumulated deficit of $42.4 million. Although we generated net income of $78.8 million for the year ended December 31, 2020 and had retained earnings of $0.9 million as of December 31, 2020, we expect that our operating expenses will continue to increase as we grow our business and as a result of our becoming a public company, and we may be unable to maintain profitability for the fiscal year ending December 31, 2020 or any future period. Since our inception, we have financed our operations primarily through the incurrence of indebtedness, revenue from our products and services and the sale of our equity securities, including our November 2020 initial public offering. We will need to generate significant additional revenue to maintain profitability and we cannot be sure that we will remain profitable for any substantial period of time. We may never be able to generate sufficient revenue to maintain profitability and our recent and historical growth should not be considered indicative of 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.

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

- demand from our largest customers, which account for a significant percentage of our sales and orders, may not meet our expectations regarding volume and price in any given time period;
- the level of continued demand for COVID-19 vaccine related products and services which currently comprise a significant portion of our revenue, which may decrease as populations are vaccinated and the COVID-19 pandemic subsides;
- the level of demand for our other products and services, and which may vary significantly, and our ability to increase penetration in our existing markets and expand into new markets;

- customers accelerating, canceling, reducing or delaying orders as a result of developments related to their pre-clinical studies and clinical trials;
- impacts on us, our suppliers and our customers as a result of the COVID-19 pandemic;
- the relative reliability and robustness of our products and services;
- changes in governmental regulations or the regulatory posture toward our business;
- the volume and mix of the products and services we sell or changes in the production or sales costs related to our products and services;
- the success of our newer products, such as our CleanCap® and mRNA products, and the introduction of other new products or product enhancements by us or others in our industry;
- the timing and amount of expenditures that we may incur to acquire, develop or commercialize additional products, services and technologies or for other purposes, such as the expansion of our facilities;
- changes in governmental and academic funding of life sciences research and developments or changes that impact budgets, budget cycles or seasonal spending patterns of our customers;
- future accounting pronouncements or changes in our accounting policies;
- difficulties encountered by our commercial carriers in delivering our products, whether as a result of external factors such as weather or internal issues such as labor disputes;
- general market conditions and other factors, including factors unrelated to our operating performance or the operating performance of our competitors; and
- the other factors described in this "Risk Factors" section.

The impact of any one of the factors discussed above, or the cumulative effects of a combination of such factors, could result in significant fluctuations and unpredictability in our quarterly and annual operating results. As a result, comparisons of 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.

As a result of variability and unpredictability, we may also fail to meet the expectations of industry or financial analysts or investors for any period. If our revenue or operating results fall short of the expectations of analysts or investors or any guidance we may provide, or if the guidance we provide falls short of the expectations of analysts or investors, the price of our Class A common stock could decline substantially. Such a stock price decline could occur even when we have met or exceeded any previously publicly stated guidance we may have provided.

Certain of our products are used by customers in the production of vaccines and therapies, some of which represent relatively new and still-developing modes of treatment. Unforeseen adverse events, negative clinical outcomes, or increased regulatory scrutiny of these and their financial cost may damage public perception of the safety, utility, or efficacy of these vaccines and therapies or other modes of treatment and may harm our customers' ability to conduct their business. Such events may negatively impact our revenue and have an adverse effect on our performance.

Gene therapy and nucleic acid vaccines remain relatively new and are under active development, with only a few gene therapies and no nucleic acid vaccines approved to date by regulatory authorities. Public perception may be influenced by claims that gene therapy or nucleic acid vaccines are unsafe or ineffective, and gene therapy may not gain the acceptance of the public or the medical community. In addition, ethical, social, legal and financial concerns about gene therapy and nucleic acid vaccines could result in additional regulations or limitations or even prohibitions on certain gene therapies or vaccine-related products. More restrictive regulations or negative public perception could reduce certain of our customers' use of our products and services, which could negatively affect our revenue and performance. In addition, certain of the COVID-19 vaccine development programs that may incorporate our CleanCap® products are still in early stages of development. There can be no assurance that these vaccine programs will proceed to clinical trials or result in a commercial product, or that any resulting vaccine will incorporate our CleanCap® products.

A pandemic, epidemic, or outbreak of an infectious disease, such as COVID-19, has affected, and may continue to materially and adversely affect our business, financial condition, results of operations, cash flows and prospects.

In late 2019, COVID-19 surfaced in Wuhan, China. Since then, COVID-19 has spread to multiple other regions and countries, including the San Francisco Bay Area, where our protein detection business is located, the San Diego, California and Washington, D.C. areas, where our nucleic acid production business is located and the Wilmington, North Carolina area, where our biologics safety testing products business is located. The COVID-19 pandemic is evolving and to date has led to the implementation of various responses, including government imposed shelter-in-place orders, quarantines, travel restrictions and other public health safety measures, as well as reported adverse impacts on healthcare resources, facilities and providers in California, across the United States and in other countries. In response to the spread of COVID-19, and in accordance with direction from state and local government authorities, we have restricted access to our facilities mostly to personnel and third parties who must perform critical activities that must be completed on-site, limited the number of such personnel that can be present at our facilities at any one time, and requested that many of our personnel work remotely. In the event that government authorities were to further modify current restrictions, our employees conducting research and development or manufacturing activities may not be able to access our laboratory or manufacturing facilities and our core activities may be significantly limited or curtailed, possibly for an extended period of time.

As a result of the COVID-19 pandemic, or similar pandemics and outbreaks that may occur in the future, we have experienced and may in the future experience severe disruptions, including:

- interruption of or delays in receiving products and supplies from the third parties we rely on to, among other things, manufacture components to our products, due to staffing shortages, production slowdowns or stoppages and disruptions in delivery systems, which may impair our ability to manufacture and sell our products and services;
- limitations on our business operations by the local, state or federal government that could impact our ability to manufacture, sell or deliver our products and services;
- on-site visit limitations and prohibitions imposed by customers that could impact our ability to engage in pre-sales activities, and to provide post-sale activities, such as training, service and support;
- delays in customers' purchasing decisions and negotiations with customers and potential customers;
- business disruptions caused by workplace, laboratory and office closures and an increased reliance on employees working from home, travel limitations, cyber security and data accessibility limits, or communication or mass transit disruptions; and
- limitations on employee resources that would otherwise be focused on the conduct of our activities, including because of sickness of employees or their families or the desire of employees to avoid contact with large groups of people.

Any of these factors could severely impact our research and development activities, manufacturing business operations and sales or delay necessary interactions with local regulators, third-party vendors and other important contractors and customers. These and other factors arising from the COVID-19 pandemic could worsen in countries that are already experiencing significant levels of COVID-19 infections, could continue to spread to additional countries or could return to countries where the pandemic has been partially contained and could further adversely impact our ability to conduct our business generally and have a material adverse impact on our business, financial condition, results of operations, cash flows and prospects. For example, our protein detection segment experienced a decrease in sales for the second quarter of 2020 relative to the same period in 2019 due to stay-at-home orders in the San Francisco Bay Area and the closure of many academic laboratories that are the main customers of this segment and the reduced operations of other customers. Prolonged closures or shutdowns as a result of the COVID-19 pandemic would continue to affect sales of our protein detection segment adversely.

The extent to which the pandemic may negatively impact our consolidated operations and results of operations or those of our third-party manufacturers, suppliers, partners or customers will depend on future developments, which are highly uncertain and cannot be predicted with confidence, such as the ultimate geographic spread of the disease, the duration of the pandemic, the extent of travel restrictions, additional or modified government actions, new information that will emerge concerning the severity and impact of COVID-19 and actions to contain the pandemic or treat its impact, such as social distancing, quarantines, lock-downs or business closures.

We cannot presently predict the scope and severity of any potential business shutdowns or disruptions as a result of the COVID-19 pandemic. If we or any of the third parties with whom we engage were to experience shutdowns or other business disruptions, our ability to conduct our business in the manner and on the timelines presently planned could be materially and

negatively impacted, which could have a material adverse effect on our business, financial condition, results of operations, cash flows and prospects.

Changes in economic conditions could negatively impact our revenue and earnings.

Our reagents are sold primarily to biopharmaceutical and academic organizations developing novel vaccines and therapies and performing basic research. Research and development spending by our customers and the availability of government research funding can fluctuate due to changes in available resources, mergers of pharmaceutical and biotechnology companies, spending priorities, general economic conditions and institutional and governmental budgetary policies. Our biologics safety testing customers are biopharmaceutical companies, contract research organizations ("CROs"), contract development and manufacturing organizations ("CDMOs") and life science companies, which largely serve the biopharmaceutical industry. Our nucleic acid production customers are largely vaccine and therapeutic drug makers or diagnostics manufacturers, which rely in part on government healthcare-related policies and funding. Changes in government funding for certain research or reductions in overall healthcare spending could negatively impact us or our customers and, correspondingly, our sales to them. Currently, the U.S. and global economies are experiencing a period of economic downturn as a result of the COVID-19 pandemic. Other global economies have been slow to recover from past downturns. Any continued or further economic downturns or reductions or delays in governmental funding could cause customers to delay or forego purchases of our products and services. In addition, the majority of our customers' contracts can be terminated, delayed or reduced in scope upon short notice or no notice. Changes in the level of orders received and filled can cause fluctuations in our quarterly revenue and earnings.

We are dependent on our customers' spending on and demand for outsourced nucleic acid production, biologics safety testing and protein detection research products and services. A reduction in spending or demand could have a material adverse effect on our business, financial condition, results of operations, cash flows and prospects.

The success of our business depends primarily on the number and size of contracts with our customers, primarily pharmaceutical and biotechnology companies, for our products and services. Over the past several years, we have benefited from an increased demand for our products and services as a result of the continued growth of the global biologics market, increasing research and development budgets of our customers and greater degree of outsourcing by our customers. A slowing or reversal of any of these trends could have a significant adverse effect on the demand for our products and services.

In addition to these industry trends, our customers' willingness and ability to utilize our products and services are also subject to, among other things, their own financial performance, changes in their available resources, their decisions to acquire in-house manufacturing capacity, their spending priorities, their budgetary policies and practices and their need to develop new biological products, which, in turn, are dependent upon a number of factors, including their competitors' discoveries, developments and commercial manufacturing initiatives and the anticipated market, clinical and reimbursement scenarios for specific products and therapeutic areas. In addition, consolidation in the industries in which our customers operate may have an impact on our customers' spending as they integrate acquired operations, including research and development departments and associated budgets. If our customers reduce their spending on our products and services as a result of any of these or other factors, our business, financial condition, results of operations, cash flows and prospects would be materially and adversely affected.

We compete with life science, pharmaceutical and biotechnology companies who are substantially larger than we are and potentially capable of developing new approaches that could make our products, services and technology obsolete.

The market for pharmaceutical, reagent, therapeutic and diagnostic products and services is intensely competitive, rapidly evolving, significantly affected by new product introductions and other market activities by industry participants and subject to rapid technological change. We also expect increased competition as additional companies enter our market and as more advanced technologies become available. We compete with other providers of outsourced biologics products and services. We also compete with the in-house discovery, development and commercial manufacturing functions of pharmaceutical and biotechnology companies. Many of our competitors are large, well-capitalized companies with significantly greater resources and market share than we have. As a consequence, these competitors are able to spend more aggressively on product and service development, marketing, sales and other initiatives than we can. Many of these competitors also have:

- broader name recognition;
- longer operating histories and the benefits derived from greater economies of scale;
- larger and more established distribution networks;

- additional product and service lines and the ability to bundle products and services to offer higher discounts or other incentives to gain a competitive advantage;
- more experience in conducting research and development, manufacturing and marketing;
- more experience in entering into collaborations or other strategic partnership arrangements; and
- more financial, manufacturing and human resources to support product development, sales and marketing and patent and other intellectual property litigation.

These factors, among others, may enable our competitors to market their products and services at lower prices or on terms more advantageous to customers than we can offer. Competition may result in price reductions, reduced gross margins and loss of market share, any of which could have a material adverse effect on our business, financial condition, results of operations, cash flows and prospects. Additionally, our current and future competitors, including certain of our customers, may at any time develop additional products and services that compete with our products and services and new approaches by these competitors may make our products, services, technologies and methodologies obsolete or noncompetitive. We may not be able to compete effectively against these organizations.

In addition, to develop and market our new products, services, technologies and methodologies successfully, we must accurately assess and meet customers' needs, make significant capital expenditures, optimize our development and manufacturing processes to predict and control costs, hire, train and retain the necessary personnel, increase customer awareness and acceptance of our services, provide high-quality services in a timely manner, price our products and services competitively and effectively integrate customer feedback into our business planning. If we fail to create demand for our new products, services or technologies, our future business could be harmed.

If our products and services do not perform as expected or the reliability of the technology on which our products and services are based is questioned, we could experience lost revenue, delayed or reduced market acceptance of our products and services, increased costs and damage to our reputation.

Our success depends on the market's confidence that we can provide reliable, high-quality life science reagents. We believe that customers in our target markets are likely to be particularly sensitive to product defects and errors. Our reputation and the public image of our products, services and technologies may be impaired if our products or services fail to perform as expected.

Although our products are tested prior to shipment, defects or errors could nonetheless occur. Our operating results depend on our ability to execute and, when necessary, improve our quality management strategy and systems and our ability to effectively train and maintain our employee base with respect to quality management. A failure of our quality control systems could result in problems with facility operations or preparation or provision of products. In each case, such problems could arise for a variety of reasons, including equipment malfunction, failure to follow specific protocols and procedures, problems with raw materials or environmental factors and damage to, or loss of, manufacturing operations. Such problems could affect production of a particular batch or series of batches of products, requiring the destruction of such products or a halt of facility production altogether. Furthermore, some of the products that we manufacture are subsequently incorporated into products that are sold by other life sciences companies and we have no control over the manufacture and production of those products.

In addition, in the event we, or our suppliers, fail to meet required quality standards and if our products experience, or are perceived to experience, a material defect or error, our products could be recalled or we may be unable to timely deliver products to our customers, which in turn could damage our reputation for quality and service. In the past, certain of our custom mRNA and CleanCap® reagent products have been sold with insufficient capping efficiency or with incorrect transcription instructions. Additionally, several lots of our host cell protein enzyme-linked immunosorbent assay ("HCP") ("ELISA") biologics safety testing kits have experienced a possible instability drift and decrease in accuracy. Although we have taken steps to improve our quality review, product documentation and reference testing procedures, we cannot guarantee that we will not experience quality assurance issues with our products in the future. Any such failure could, among other things, lead to increased costs, delayed or lost revenue, delayed market acceptance, damaged reputation, diversion of development resources, legal claims, reimbursement to customers for lost drug product, starting materials and active pharmaceutical ingredients, other customer claims, damage to and possibly termination of existing customer relationships, increased insurance costs, time and expense spent investigating the cause and, depending on the cause, similar losses with respect to other batches or products, any of which could harm our business, financial condition, results of operations, cash flows and prospects. Such defects or errors could also narrow the scope of the use of our products, which could hinder our success in the market.

Even after any underlying concerns or problems are resolved, any lingering concerns in our target markets regarding our technology or any manufacturing defects or performance errors in our products or services could continue to result in lost revenue, delayed market acceptance, damage to our reputation and claims against us.

In addition, we may be unable to maintain the quality, reliability, robustness and expected turnaround times of our products and services to continue to satisfy customer demand as we grow. To effectively manage our growth, we must continue to improve our operational, manufacturing and quality control systems and processes and other aspects of our business and continue to effectively expand, train and manage our personnel. The time and resources required to improve our existing systems and procedures, implement new systems and procedures and to adequately staff such existing and new systems and procedures is uncertain, and failure to complete this in a timely and efficient manner could adversely affect our operations and negatively impact our business and financial results. We may need to purchase additional equipment, some of which can take several months or more to procure, set up and validate, establish new production processes and increase our personnel levels to meet increased demand. There can be no assurance that any of these increases in scale, personnel expansion or equipment or process enhancements will be successfully implemented, or that we will have adequate space, including in our laboratory and production facilities, to accommodate such required expansion. Failure to manage this growth or transition could result in delays in turnaround times, higher product costs, declining product quality, deteriorating customer service and slower responses to competitive challenges. A failure in any one of these areas could make it difficult for us to meet market expectations for our products and services and could damage our reputation and our business, financial condition, results of operations, cash flows and prospects could be adversely affected.

Our products are highly complex and are subject to quality control requirements.

Whether a product is produced by us or purchased from outside suppliers, it is subject to quality control procedures, including the verification of stability and performance and, for certain products, additional validation required by certain GMP that we voluntarily follow, European Conformity ("CE") marking and ISO 9001:2015 compliance, prior to final packaging. Certain of our products are manufactured following the voluntary GMP quality standards of the International Council for Harmonisation's GMP Guide, comparable GMP principles for the European Union and customer-specific requirements. We believe these products are exempt from compliance with the Food, Drug, and Cosmetic Act ("FDCA") and the current GMP ("cGMP") regulations of the Food and Drug Administration ("FDA"), as our products are further processed and incorporated into final drug products by our customers and we do not make claims related to their safety or effectiveness. In the event we, or our suppliers, produce products that fail to comply with required quality standards, we may incur delays in fulfilling orders, write-downs, damages resulting from product liability claims and harm to our reputation.

Our business could be adversely affected by disruptions at our sites.

We rely upon our internal manufacturing, packaging and distribution operations to produce many of the products we sell and our warehouse facilities to store products pending sale. Any significant disruption of those operations for any reason, such as labor unrest, power interruptions, fire, hurricanes, the COVID-19 pandemic, earthquakes or other events beyond our control, could adversely affect our sales and customer relationships and therefore adversely affect our business. We have significant operations in California, near major earthquake faults, which make us susceptible to earthquake risk.

If we are unable to manufacture in specific quantities, our operating results will be harmed.

Our revenue and other operating results depend in large part on our ability to manufacture and ship our products in sufficient quantities. Any interruptions we experience in the manufacturing or shipping of our products could delay our ability to recognize revenue in a particular quarter. Manufacturing problems can and do arise, and as demand for our products increases, any such problems could have an increasingly significant impact on our operating results. While we have not generally experienced problems with, or delays in, our production capabilities that resulted in delays in our ability to ship finished products, there can be no assurance that we will not encounter such problems in the future. We may not be able to quickly ship products and recognize anticipated revenue for a given period if we experience significant delays in the manufacturing process. In addition, we must maintain sufficient production capacity in order to meet anticipated customer demand, and we may be unable to offset the associated fixed costs if orders slow, which would adversely affect our operating margins. If we are unable to manufacture and ship our products consistently, in sufficient quantities and on a timely basis, our revenue, cash flow, gross margins and our other results of operations will be materially and adversely affected.

Natural disasters, geopolitical unrest, war, terrorism, public health issues or other catastrophic events could disrupt the supply, delivery or demand of products and services, which could negatively affect our operations and performance.

We are subject to the risk of disruption by earthquakes, hurricanes, floods and other natural disasters, fire, power shortages, geopolitical unrest, war, terrorist attacks and other hostile acts, public health issues, epidemics or pandemics, such as the COVID-19 pandemic, and other events beyond our control and the control of the third parties on which we depend. Any of these catastrophic events, whether in the United States or abroad, may have a significant negative impact on the global

economy, our employees, facilities, partners, suppliers, distributors or customers, and could decrease demand for our products and services, create delays and inefficiencies in our supply chain and make it difficult or impossible for us to deliver products and services to our customers.

In addition, a catastrophic event that results in damage to specific equipment that would be difficult to replace, the destruction or disruption of our research and production facilities or our critical business or information technology systems would severely affect our ability to conduct normal business operations and, as a result, our operating results would be adversely affected.

Future strategic transactions or acquisitions may require us to seek additional financing, which we may not be able to secure on favorable terms, if at all.

We plan to continue a strategy of growth and development for our business. To this end, we actively evaluate various strategic transactions on an ongoing basis, including licensing or acquiring complementary products, technologies or businesses that would complement our existing portfolio of products and services. In order to complete such strategic transactions, we may need to seek additional financing to fund these investments and acquisitions. Should we need to do so, we may not be able to secure such financing, or obtain such financing on favorable terms because of the volatile nature of the biotechnology marketplace. In addition, future acquisitions may require the issuance or sale of additional equity, or equity-linked securities, which may result in additional dilution to our shareholders. Further, on October 19, 2020, we entered into a new credit agreement (the "New Credit Agreement"), which contains a number of restrictive covenants that impose significant restrictions on our ability to make acquisitions or certain other investments.

If we are unable to continue to hire and retain skilled personnel, we will have trouble developing and marketing our products and services.

Our success depends largely upon the continued service of our management and scientific staff and our ability to attract, retain and motivate highly skilled technical, scientific, management and marketing personnel, who deliver high-quality and timely services to our customers and keep pace with cutting-edge technologies and developments in biologics. We also face significant competition in the hiring and retention of such personnel from other companies, other providers of outsourced biologics services, research and academic institutions, government and other organizations who have superior funding and resources. The loss of key personnel or our inability to hire and retain skilled personnel could materially adversely affect the development of our products and services and our business, financial condition, results of operations, cash flows and prospects.

Our success depends on the market acceptance of our life science reagents. Our reagents may not achieve or maintain significant commercial market acceptance.

Our commercial success is dependent upon our ability to continue to successfully market and sell our life science reagents. Our ability to achieve and maintain commercial market acceptance of our products and services and provide customers access to our life science reagents will depend on a number of factors, including:

- our ability to increase awareness of the capabilities of our technology and solutions;
- our customers' willingness to adopt new products, services and technologies;
- whether our products and services reliably provide advantages over legacy and other alternative technologies and are perceived by customers to be cost effective;
- our ability to execute on our strategy to scale-up our CleanCap® technology to meet increasing demand and provide channels to access our CleanCap® technology and life science reagents;
- the rate of adoption of our products and services by biopharmaceutical companies, academic institutions and others;
- the relative reliability and robustness of our products and services as a whole and the components of our life science offerings, including, for example, CleanCap®, our assays for detecting host cell proteins and research products for labeling and detecting proteins;
- our ability to develop new tools and solutions for customers;
- whether competitors develop and commercialize products and services that provide comparable features and benefits at scale;

- the impact of our investments in product innovation and commercial growth;
- negative publicity regarding our or our competitors' products resulting from defects or errors; and
- our ability to further validate our technology through research and accompanying publications.

We cannot assure you that we will be successful in addressing these criteria or other criteria that might affect the market acceptance of our products and services. If we are unsuccessful in achieving and maintaining market acceptance of our products and services, our business, financial condition, results of operations, cash flows and prospects could be adversely affected.

The market may not be receptive to our new products and services upon their introduction.

We expect a portion of our future revenue growth to come from introducing new products, including plasmid DNA. The commercial success of all of our products and services will depend upon their acceptance by the life science and biopharmaceutical industries. Some of the products and services that we are developing are based upon new technologies or approaches. As a result, there can be no assurance that these new products and services, even if successfully developed and introduced, will be accepted by customers. If customers do not adopt our new products, services and technologies, our results of operations may suffer and, as a result, the market price of our Class A common stock may decline.

It may be difficult for us to implement our strategies for revenue growth in light of competitive challenges.

We face significant competition across many of our product lines. In addition, consolidation trends in the pharmaceutical, biotechnology and diagnostics industries have served to create fewer customer accounts and to concentrate purchasing decisions for some customers, resulting in increased pricing pressure on us. Moreover, customers may believe that larger companies are better able to compete as sole source vendors, and therefore prefer to purchase from such businesses. Failure to anticipate and respond to competitors' actions may impact our future revenue and profitability.

Our estimates of market opportunity and forecasts of market growth may prove to be inaccurate, and even if the market in which we compete achieves the forecasted growth, our business could fail to grow at similar rates, if at all.

Addressable market estimates and growth forecasts are subject to significant uncertainty and are based on assumptions and estimates that may not prove to be accurate. These estimates and forecasts are based on a number of complex assumptions and third-party estimates and other business data, including assumptions and estimates relating to our ability to generate revenue from existing products and services and the development of new products and services. Our estimates and forecasts relating to the size and expected growth of our markets may prove to be inaccurate. Even if the markets in which we compete meet the size estimates and growth forecasted in this prospectus, our business could fail to grow at the rate we anticipate, if at all.

Product liability lawsuits against us could cause us to incur substantial liabilities, limit sales of our existing products and limit commercialization of any products that we may develop.

Our business exposes us to the risk of product liability claims that are inherent in the development, production, distribution, and sale of biotechnology products. We face an inherent risk of product liability exposure related to the use of certain of our products in our customers' human clinical trials and product liability lawsuits may allege that our products or services identified inaccurate or incomplete information or otherwise failed to perform as designed. We may also be subject to liability for errors in, a misunderstanding of or inappropriate reliance upon, the information we provide in the ordinary course of our business activities. If any of our products harm people due to our negligence, willful misconduct, unlawful activities or material breach, or if we cannot successfully defend ourselves against claims that our products caused injuries, we could incur substantial liabilities. Regardless of merit or eventual outcome, liability claims may result in the following, any of which could impact our business, financial condition, results of operations, cash flows and prospects:

- decreased demand for our products and any products that we may develop;
- injury to our reputation;
- costs to defend the related litigation;
- loss of revenue; and
- the inability to commercialize products that we may develop.

We maintain product liability insurance, but this insurance is subject to deductibles, limits and exclusions and may not fully protect us from the financial impact of defending against product liability claims or the potential loss of revenue that may result. Any product liability claim brought against us, with or without merit, could increase our insurance rates or prevent us from securing insurance coverage in the future.

We may be unable to efficiently manage growth as a larger and more geographically diverse organization.

Our strategic acquisitions, the continued expansion of our commercial sales operations and our organic growth have increased the scope and complexity of our business. As a result, we will face challenges inherent in efficiently managing a more complex business with an increased number of employees over large geographic distances, including the need to implement appropriate systems, policies, benefits and compliance programs. Our inability to manage successfully the geographically more diverse and substantially larger combined organization could materially adversely affect our operating results.

Opportunistic acquisitions may pose risks and challenges.

We have completed six acquisitions and several investments since April 2016 and, going forward, we may opportunistically pursue strategic acquisitions. However, we may be unable to continue to identify or complete promising acquisitions for many reasons, including competition among buyers, the high valuations of businesses in our industry, the need for regulatory and other approvals and the availability of capital. There can be no assurance that we will engage in any additional acquisitions or that we will be able to do so on terms that will enable us to realize the anticipated benefits. In addition, acquisitions financed with borrowings could increase our leverage and interest expense, which could make us more vulnerable to business downturns.

Our acquisitions expose us to risks that could adversely affect our business, and we may not achieve the anticipated benefits of acquisitions of businesses or technologies.

We have made in the past, and may make in the future, selected opportunistic acquisitions of complementary businesses, products, services or technologies. In April 2016, we acquired Vector Laboratories, which allowed our entry into the protein detection business. In September 2016, we acquired TriLink BioTechnologies, LLC ("TriLink BioTechnologies"), in December 2016 we acquired the assets of Solulink Incorporated ("Solulink") and in December 2017 we acquired Glen Research Corporation ("Glen Research"), which together have formed our nucleic acid business and production capabilities. In October 2016 we acquired Cygnus Technologies and in March 2020 we acquired MockV Solutions, Inc. which together constitute our biologics safety testing business.

Any acquisition involves numerous risks, uncertainties and operational, financial, and managerial challenges, including the following, any of which could adversely affect our business, financial condition, results of operations, cash flows and prospects:

- difficulties in integrating new operations, systems, technologies, products, services and personnel of acquired businesses effectively;
- problems maintaining uniform procedures, controls and policies with respect to our financial accounting systems;
- lack of synergies or the inability to realize expected synergies and cost-savings, including enhanced revenue, technology, human resources, cost savings, operating efficiencies and other synergies;
- difficulties in managing geographically dispersed operations, including risks associated with entering foreign markets in which we have no or limited prior experience;
- underperformance of any acquired technology, product, or business relative to our expectations and the price we paid;
- negative near-term impacts on financial results after an acquisition, including acquisition-related earnings charges;
- the potential loss of key employees, customers, and strategic partners of acquired companies;
- declining employee morale and retention issues affecting employees of businesses that we acquire, which may result from changes in compensation, or changes in management, reporting relationships, future prospects or the direction of the acquired business;
- claims by terminated employees and shareholders of acquired companies or other third parties related to the transaction;
- the assumption or incurrence of additional debt obligations or expenses, or use of substantial portions of our cash;

- the issuance of equity or equity-linked securities to finance or as consideration for any acquisitions that dilute the ownership of our shareholders;
- the issuance of equity securities to finance or as consideration for any acquisitions may not be an option if the price of our Class A common stock is low or volatile which could preclude us from completing any such acquisitions;
- any collaboration, strategic alliance and licensing arrangement may require us to relinquish valuable rights to our technologies or products, or grant licenses on terms that are not favorable to us;
- disruption of our ongoing operations and diversion of management's attention and company resources from existing operations of the business;
- inconsistencies in standards, controls, procedures, and policies;
- the impairment of intangible assets as a result of technological advancements, or worse-than-expected performance of acquired companies;
- assumption of, or exposure to, historical liabilities of the acquired business, including unknown contingent or similar liabilities that are difficult to identify or accurately quantify, litigation-related liabilities and regulatory compliance or accounting issues, and potential litigation or regulatory action arising from a proposed or completed acquisition;
- the need to later divest acquired assets at a loss if an acquisition does not meet our expectations; and
- risks associated with acquiring intellectual property, including potential disputes regarding acquired companies' intellectual property. In addition, the successful integration of acquired businesses requires significant efforts and expense across all operational areas, including sales and marketing, research and development, manufacturing, finance, legal, and information technologies.

There can be no assurance that any of the acquisitions we have made, or that we may make, will be successful or will be, or will remain, profitable. Our failure to successfully address the foregoing risks may prevent us from achieving the anticipated benefits from any past or future acquisition in a reasonable time frame, or at all.

Our ability to use net operating loss and tax credit carryforwards and certain built-in losses to reduce future tax payments is limited by provisions of the Internal Revenue Code, and it is possible that certain transactions or a combination of certain transactions may result in material additional limitations on our ability to use our net operating loss and tax credit carryforwards.

Sections 382 and 383 of the Internal Revenue Code of 1986, as amended, contain rules that limit the ability of a company that undergoes an ownership change, which is generally any change in ownership of more than 50% of its stock over a three-year period, to utilize its net operating loss and tax credit carryforwards and certain built-in losses recognized in years after the ownership change. These rules generally operate by focusing on ownership changes involving stockholders owning directly or indirectly 5% or more of the stock of a company and any change in ownership arising from a new issuance of stock by the company. Generally, if an ownership change occurs, the yearly taxable income limitation on the use of net operating loss and tax credit carryforwards and certain built-in losses is equal to the product of the applicable long-term, tax-exempt rate and the value of the company's stock immediately before the ownership change. As a result, following any such ownership change, we might be unable to offset our taxable income with losses, or our tax liability with credits, before such losses and credits expire, in which event we could incur larger federal and state income tax liabilities than we would have had we not experienced an ownership change.

We may be required to record a significant charge to earnings if our goodwill and other amortizable intangible assets, or other investments become impaired.

We are required under U.S. generally accepted accounting principles ("GAAP") to test goodwill for impairment at least annually and to review our goodwill, amortizable intangible assets and other assets acquired through merger and acquisition activity for impairment when events or changes in circumstance indicate the carrying value may not be recoverable. Factors that could lead to impairment of goodwill, amortizable intangible assets and other assets acquired via acquisitions include significant adverse changes in the business climate and actual or projected operating results (affecting our company as a whole or affecting any particular segment) and declines in the financial condition of our business. We may be required in the future to

record additional charges to earnings if our goodwill, amortizable intangible assets or other investments become impaired. Any such charge would adversely impact our consolidated financial results.

Changes in accounting principles and guidance could result in unfavorable accounting charges or effects.

We prepare our consolidated financial statements in accordance with GAAP. These principles are subject to interpretation by the SEC and various bodies formed to create and interpret appropriate accounting principles and guidance. A change in these principles or guidance, or in their interpretations, may have a material effect on our reported results, as well as our processes and related controls, and may retroactively affect previously reported results. For example, during February 2016, the Financial Accounting Standards Board issued ASU 2016-02, Leases (Topic 842). The updated standard requires the recognition of a liability for lease obligations and a corresponding right-of-use asset on the balance sheet, and disclosures of certain information regarding leasing arrangements. We are still assessing the full effects of Topic 842 on our consolidated financial statements but do expect the adoption to have a material impact on our financial statements and related footnote disclosures.

Our revenue recognition and other factors may impact our financial results in any given period and make them difficult to predict.

We recognize revenue when our performance obligations have been satisfied in an amount that reflects the consideration that we expect to receive in exchange for those performance obligations. Our revenue includes revenue from the sale of manufactured products, including products that can be purchased out of a catalog and custom manufactured products, and services, including custom antibody and assay development contracts, antibody affinity extraction and stability and feasibility studies, as well as certain licensing and royalty arrangements. The majority of our contracts include only one performance obligation, namely the delivery of products, both custom and catalog, and services. We also recognize revenue from other contracts that may include a combination of products and services, the provision of solely services, or from license fee arrangements which may be associated with the delivery of product. Our application of the revenue recognition accounting guidance with respect to the nature of future contractual arrangements could impact the forecasting of our revenue for future periods, as both the mix of products and services we will sell in a given period, as well as the size of contracts, is difficult to predict.

Furthermore, the presentation of our financial results requires us to make estimates and assumptions that may affect revenue recognition. In some instances, we could reasonably use different estimates and assumptions, and changes in estimates may occur from period to period. See "Management's Discussion and Analysis of Financial Condition and Results of Operations—Critical Accounting Policies and Estimates—Revenue Recognition."

Given the foregoing factors, comparing our revenue and operating results on a period-to-period basis may not be meaningful, and our past results may not be indicative of our future performance.

Fluctuations in our effective tax rate may adversely affect our results of operations and cash flows.

We are subject to a variety of tax liabilities, including federal, state, foreign and other taxes such as income, sales/use, payroll, withholding, and *ad valorem* taxes. Changes in tax laws or their interpretations could decrease our net income, the value of any tax loss carryforwards, the value of tax credits recorded on our balance sheet and our cash flows, and accordingly could have a material adverse effect on our business, financial condition, results of operations, cash flows and prospects. In addition, our tax liabilities are subject to periodic audits by the relevant taxing authority, which could increase our tax liabilities.

Our business is subject to a number of environmental risks.

Our manufacturing business involves the controlled use of hazardous materials and chemicals and is therefore subject to numerous environmental and safety laws and regulations and to periodic inspections for possible violations of these laws and regulations. In addition to these hazardous materials and chemicals, our facility in Burlingame, California also produces certain toxins for research use that can cause severe illness in humans. The costs of compliance with environmental and safety laws and regulations are significant. Any violations, even if inadvertent or accidental, of current or future environmental and safety laws or regulations and the cost of compliance with any resulting order or fine could adversely affect our operations.

Risks Related to Our Reliance on Third Parties

We depend on a limited number of customers for a high percentage of our revenue. If we cannot maintain our current relationships with customers, fail to sustain recurring sources of revenue with our existing customers, or if we fail to enter into new relationships, our future operating results will be adversely affected.

See the "Concentration of Credit Risk" paragraph in the Note 1 to the Consolidated Financial Statements in Item 8 of this Annual Report on Form 10-K for a tabular presentation of revenues from our largest customers as a percentage of total revenue for the years ended December 31, 2020, 2019 and 2018 and accounts receivable for our largest customers as a percentage of total accounts receivable for the years ended December 31, 2020 and 2019.

The revenue attributable to our top customers has fluctuated in the past and may fluctuate in the future, which could have a material adverse effect on our business, financial condition, results of operations, cash flows and prospects. In addition, the termination of these relationships, including following any failure to renew a long-term contract, could result in a temporary or permanent loss of revenue.

Our future success depends on our ability to maintain these relationships, to increase our penetration among these existing customers and to establish new relationships. We engage in conversations with other companies and institutions regarding potential commercial opportunities on an ongoing basis, which can be time consuming. There is no assurance that any of these conversations will result in a commercial agreement, or if an agreement is reached, that the resulting relationship will be successful. Speculation in the industry about our existing or potential commercial relationships can be a catalyst for adverse speculation about us, our products, our services and our technology, which can adversely affect our reputation and our business. In addition, if our customers order our products or services, but fail to pay on time or at all, our liquidity, financial condition, results of operations, cash flows and prospects could be materially and adversely affected.

We cannot assure investors that we will be able to further penetrate our existing markets or that our products or services will gain adequate market acceptance. Any failure to increase penetration in our existing markets would adversely affect our ability to improve our operating results.

We may enter into additional distribution arrangements and marketing alliances for certain products and services and any failure to successfully identify and implement these arrangements on favorable terms, if at all, may impair our ability to effectively distribute and market our products.

We may pursue additional arrangements regarding the sales and marketing and distribution of one or more of our products and services and our future revenue may depend, in part, on our ability to enter into and maintain arrangements with other companies having sales, marketing and distribution capabilities and the ability of such companies to successfully market and sell any such products and services. Any failure to enter into such arrangements and marketing alliances on favorable terms, if at all, could delay or impair our ability to distribute or market our products and services and could increase our costs of distribution and marketing. Any use of distribution arrangements and marketing alliances to commercialize our products and services will subject us to a number of risks, including the following:

- we may be required to relinquish important rights to our products;
- we may not be able to control the amount and timing of resources that our distributors or collaborators may devote to the distribution or marketing of our products;
- our distributors or collaborators may experience financial difficulties; and
- business combinations or significant changes in a collaborator's business strategy may adversely affect a collaborator's willingness or ability to complete its obligations under any arrangement.

We rely on a limited number of suppliers or, in some cases, sole suppliers, for some of our raw materials and may not be able to find replacements or immediately transition to alternative suppliers.

Certain of our raw materials are sourced from a limited number of suppliers and some materials, including a proprietary DNA reagent, certain packaging materials, specific cell lines for Cygnus Technologies' operations and certain raw materials used in our nucleic acid production products, as well as those raw materials sold under the Glen Research brand, are sole sourced. Delays or difficulties in securing these raw materials or other laboratory materials could result in an interruption in our production operations if we cannot obtain an acceptable substitute. Any such interruption could significantly affect our business, financial condition, results of operations, cash flows and prospects. While we may identify other suppliers, raw materials furnished by such replacement suppliers may require us to alter our production operations or perform extensive validations, which may be time consuming and expensive. There can be no assurance that we will be able to secure alternative materials and revalidate them without experiencing interruptions in our workflow. If we should encounter delays or difficulties in obtaining raw materials, our business, financial condition, results of operations, cash flows and prospects could be adversely affected.

We depend on a stable and adequate supply of quality raw materials from our suppliers, and price increases or interruptions of such supply could have an adverse impact on our business, financial condition, results of operations, cash flows and prospects.

Our operations depend upon our ability to obtain raw materials at reasonable prices. If we are unable to obtain the materials we need at a reasonable price, we may not be able to produce certain of our products at marketable prices or at all, which could have a material adverse effect on our results of operations.

Although we believe that we have stable relationships with our existing suppliers, we cannot assure you that we will be able to secure a stable supply of raw materials going forward. Our suppliers may not be able to keep up with our pace of growth or may reduce or cease their supply of raw materials to us at any time. In addition, we cannot assure you that our suppliers have obtained and will be able to obtain or maintain all licenses, permits and approvals necessary for their operations or comply with all applicable laws and regulations, and failure to do so by them may lead to interruption in their business operations, which in turn may result in shortages of raw materials supplied to us. Some of our suppliers are based overseas and therefore may need to maintain export or import licenses. If the supply of raw materials is interrupted, our business, financial condition, results of operations, cash flows and prospects may be adversely affected.

Because we rely heavily on third-party package-delivery services, a significant disruption in these services, damages or losses sustained during shipping or significant increases in prices could adversely affect our business, financial condition, results of operations, cash flows and prospects.

We ship a significant portion of our products to our customers through independent package delivery companies, such as FedEx, UPS and DHL. If one or more of these third-party package-delivery providers were to experience a major work stoppage, preventing our products from being delivered in a timely fashion or causing us to incur additional shipping costs we could not pass on to our customers, our costs could increase and our relationships with certain of our customers could be adversely affected. In addition, if one or more of these third-party package-delivery providers were to increase prices, and we were not able to find comparable alternatives or make adjustments in our delivery network, our profitability could be adversely affected. Furthermore, if one or more of these third-party package-delivery providers were to experience performance problems or other difficulties, it could negatively impact our operating results and our customers' experience. In the past, some of our products have sustained serious damage in transit such that they were no longer usable. Although we have taken steps to improve our packaging and shipping containers, there is no guarantee our products will not become damaged or lost in transit in the future. If our products are damaged or lost in transit, it may result in a substantial delay in the fulfillment of our customer's order and, depending on the type and extent of the damage, it may result in a substantial financial loss. 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 our services, which would adversely affect our business, financial condition, results of operations, cash flows and prospects.

Risks Related to Laws and Regulations

We are subject to stringent privacy laws, information security laws, regulations, policies and contractual obligations related to data privacy and security and changes in such laws, regulations, policies and contractual obligations could adversely affect our business, financial condition, results of operations, cash flows and prospects.

We are subject to data privacy and protection laws and regulations that apply to the collection, transmission, storage and use of proprietary information and personally-identifying information, which among other things, imposes certain requirements relating to the privacy, security and transmission of certain individually identifiable information.

Numerous other federal and state laws, including state security breach notification laws, state health information privacy laws and federal and state consumer protection laws, govern the collection, use, disclosure and security of personal information. These laws continue to change and evolve and are increasing in breadth and impact. Failure to comply with any of these laws and regulations could result in enforcement action against us, including fines, imprisonment of company officials and public censure, claims for damages by affected individuals, damage to our reputation and loss of goodwill, any of which could have a material adverse effect on our business, financial condition, results of operations, cash flows and prospects. Additionally, if we are unable to properly protect the privacy and security of personal information, we could be found to have breached our contracts.

Many states in which we operate have laws that protect the privacy and security of personal information. For example, the California Consumer Privacy Act of 2018 ("CCPA"), which increases privacy rights for California residents 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 law and others like it are as yet untested and may subject us to increased regulatory scrutiny, litigation, and overall risk. State laws are changing rapidly and there is discussion in Congress of a new federal data protection and privacy law to which we would become subject, if it is enacted.

Various foreign countries in which we operate also have, or are developing, laws that govern the collection, use, disclosure, security and cross-border transmission of personal information. The legislative and regulatory landscape for privacy and data protection continues to evolve, and there has been an increasing focus on privacy and data protection issues that have the potential to affect our business. For example, privacy requirements in the European Union (the "EU") govern the transfer of personal information from the European Economic Area to the United States. In the EU and the United Kingdom, the collection and use of personal data is governed by the provisions of the General Data Protection Regulation ("GDPR"), in addition to other applicable laws and regulations. The GDPR came into effect in May 2018, repealing and replacing the European Union Data Protection Directive, and imposing revised data privacy and security requirements on companies in relation to the processing of personal data of EU and United Kingdom data subjects. The GDPR, together with national legislation, regulations and guidelines of EU member states and the United Kingdom governing the processing of personal data, impose strict obligations with respect to, and restrictions on, the collection, use, retention, protection, disclosure, transfer and processing of personal data. The GDPR authorizes fines for certain violations of up to 4% of a company's total global annual turnover for the preceding financial year or €20 million, whichever is greater. Such fines are in addition to any civil litigation claims by data subjects. Brexit may also lead to further legislative and regulatory changes and increase our compliance costs. The United Kingdom has transposed the GDPR into domestic law, with a United Kingdom version of the GDPR that took effect in January 2021, after the end of the Brexit transitional period. This could have the result of exposing us to two parallel data privacy regimes in Europe, each of which potentially authorizes significant fines for certain violations. Other jurisdictions outside the EU are similarly introducing or enhancing privacy and data security laws, rules and regulations, which could increase our compliance costs and the risks associated with noncompliance. We cannot guarantee that we are, or will be, in compliance with all applicable international regulations as they are enforced now or as they evolve.

It is possible that these laws may be interpreted and applied in a manner that is inconsistent with our practices and our efforts to comply with the evolving data protection rules may be unsuccessful. We must devote significant resources to understanding and complying with this changing landscape. Failure to comply with federal, state and international laws regarding privacy and security of personal information could expose us to penalties under such laws, orders requiring that we change our practices, claims for damages or other liabilities, regulatory investigations and enforcement action, litigation and significant costs for remediation, any of which could adversely affect our business. Even if we are not determined to have violated these laws, government investigations into these issues typically require the expenditure of significant resources and generate negative publicity, which have a material adverse effect on our business, financial condition, results of operations, cash flows and prospects.

We are subject to export and import control laws and regulations that could impair our ability to compete in international markets or subject us to liability if we violate such laws and regulations.

We are subject to U.S. export controls and sanctions regulations that restrict the shipment or provision of certain products and services to certain countries, governments and persons. While we take precautions to prevent our products and services from being exported in violation of these laws, we cannot guarantee that the precautions we take will prevent violations of export control and sanctions laws. If we are found to be in violation of U.S. sanctions or export control laws, it could result in substantial fines and penalties for us and for the individuals working for us. We may also be adversely affected through other penalties, reputational harm, loss of access to certain markets, or otherwise. Complying with export control and sanctions regulations may be time consuming and may result in the delay or loss of sales opportunities or impose other costs. Any change in export or import regulations, economic sanctions or related legislation, or change in the countries, governments, persons or technologies targeted by such regulations, could result in our decreased ability to export or sell certain products and services to existing or potential customers in affected jurisdictions.

Changes in political, economic or governmental regulations may reduce demand for our products and services or increase our expenses.

We compete in many markets in which we and our customers must comply with federal, state, local and international regulations, such as environmental, health and safety and food and drug regulations. We develop, configure and market our products and services to meet customer needs created by those regulations. The U.S. and international healthcare industry is subject to changing political, economic and regulatory influences that could significantly affect the drug development process, research and development costs and the pricing and reimbursement for pharmaceutical products. Any significant change in

regulations could have an adverse effect on both our customers' business and our business, which could result in reduced demand for our products and services or increases in our expenses. For example, we provide products and services used for basic research, raw materials used by biopharmaceutical customers for further processing, and active pharmaceutical ingredients used for preclinical studies and clinical trials.

Changes in the FDA's regulation of the drug discovery and development process may have a negative impact on the ability of our customers to conduct and fund clinical trials, which could have a material adverse effect on the demand for the products and services we provide these customers. Additionally, the U.S. government and governments worldwide have increased efforts to expand healthcare coverage while at the same time curtailing and better controlling the increasing costs of healthcare. If cost-containment efforts limit our customers' profitability, they may decrease research and development spending, which could decrease the demand for our products and services and materially adversely affect our growth prospects. Any of these factors could harm our customers' businesses, which, in turn, could materially adversely hurt our business, financial condition, results of operations, cash flows and prospects.

We are subject to financial, operating, legal and compliance risk associated with global operations.

We engage in business globally, with approximately 47%, 41% and 40% of our revenue for the years ended December 31, 2020, 2019 and 2018, respectively, coming from outside the U.S. In addition, one of our strategies is to expand geographically, both through distribution and through direct sales. This subjects us to a number of risks, including international economic, political, and labor conditions; currency fluctuations; tax laws (including U.S. taxes on income earned by foreign subsidiaries); increased financial accounting and reporting burdens and complexities; unexpected changes in, or impositions of, legislative or regulatory requirements; failure of laws to protect intellectual property rights adequately; inadequate local infrastructure and difficulties in managing and staffing international operations; delays resulting from difficulty in obtaining export licenses for certain technology; tariffs, quotas and other trade barriers and restrictions; transportation delays; operating in locations with a higher incidence of corruption and fraudulent business practices; and other factors beyond our control, including terrorism, war, natural disasters, climate change and diseases.

The application of laws and regulations implicating global transactions is often unclear and may at times conflict. Compliance with these laws and regulations may involve significant costs or require changes in our business practices that result in reduced revenue and profitability. Non-compliance could also result in fines, damages, criminal sanctions, prohibited business conduct, and damage to our reputation. We incur additional legal compliance costs associated with our global operations and could become subject to legal penalties in foreign countries if we do not comply with local laws and regulations, which may be substantially different from those in the U.S.

We may expand our operations in countries with developing economies, where it may be common to engage in business practices that are prohibited by anti-corruption and anti-bribery laws and regulations that apply to us, such as the U.S. Foreign Corrupt Practices Act (FCPA), the U.S. Travel Act, and the UK Bribery Act 2010, which prohibit improper payments or offers of payment to foreign governments and political parties by us for the purpose of obtaining or retaining business. Although we implement policies and procedures designed to ensure compliance with these laws, there can be no assurance that all of our employees, contractors, distributors and agents, including those based in foreign countries where practices which violate such U.S. laws may be customary, will comply with our internal policies. Any such non-compliance, even if prohibited by our internal policies, could have an adverse effect on our business and result in significant fines or penalties.

Our products could become subject to more onerous regulation by the FDA or other regulatory agencies in the future, which could increase our costs and delay or prevent commercialization of our products, thereby materially and adversely affecting our business, financial condition, results of operations, cash flows and prospects.

We make certain of our products available to customers as research-use-only ("RUO") products. RUO products are regulated by the FDA as medical devices, and include *in vitro* diagnostic products in the laboratory research phase of development that are being shipped or delivered for an investigation that is not subject to the FDA's investigational device exemption requirements. Although medical devices are subject to stringent FDA oversight, products that are intended for RUO and are labeled as RUO are exempt from compliance with most FDA requirements, including premarket clearance or approval, manufacturing requirements, and others. A product labeled RUO but which is actually intended for clinical diagnostic use may be viewed by the FDA as adulterated and misbranded under the FDCA, and subject to FDA enforcement action. The FDA has indicated that when determining the intended use of a product labeled RUO, the FDA will consider the totality of the circumstances surrounding distribution and use of the product, including how the product is marketed and to whom. The FDA could disagree with our assessment that our products are properly marketed as RUO, or could conclude that products labeled as RUO are actually intended for clinical diagnostic use, and could take enforcement action against us, including requiring us to stop distribution of our products until we are in compliance with applicable regulations, which would reduce our revenue, increase our costs and adversely affect our business, prospects, results of operations and financial condition. In the event that

the FDA requires us to obtain marketing authorization of our RUO products in the future, there can be no assurance that the FDA will grant any clearance or approval requested by us in a timely manner, or at all.

Our raw material products are manufactured following the voluntary quality standards of ISO 9001:2015. Our GMP-grade raw material products follow ISO 9001:2015 standards, additional voluntary GMP quality standards and customer specific requirements. We believe these raw material products, including our GMP-grade raw material products, are exempt from compliance with the FDCA and the cGMP regulations of the FDA, as our products are further processed by our customers and we do not make claims related to their safety or effectiveness. We provide API products to customers for use in preclinical studies through and including clinical trials. Our API products are manufactured following the principles detailed in the International Council for Harmonisation (ICH) Q7, Good Manufacturing Practice Guide for Active Pharmaceutical Ingredients (Section 19, APIs For Use in Clinical Trials) in order to comply with the applicable requirements of the FDCA, and the comparable GMP principles for Europe; European Community, Part II, Basic Requirements for Active Substances Used as Starting Materials (Section 19, APIs For Use in Clinical Trials). Manufacture of APIs for use in clinical trials is regulated under § 501(a)(2)(B) of the FDCA, but is not subject to the current GMP regulations in 21 CFR § 211 by operation of 21 CFR § 210. Our API products are provided to customers under customer contracts that outline quality standards and product specifications. As products advance through the clinical phases, requirements become more stringent and we work with customers to define and agree on requirements and risks associated with their product.

The FDA could disagree with our assessment that our products are exempt from current GMP regulations. In addition, the FDA could conclude that the raw material and API products we provide to our customers are actually subject to the pharmaceutical or drug quality-related regulations for manufacturing, processing, packing or holding of drugs or finished pharmaceuticals, and could take enforcement action against us, including requiring us to stop distribution of our products until we are in compliance with applicable regulations, which would reduce our revenue, increase our costs and adversely affect our business, prospects, results of operations and financial condition. In the event that the FDA requires us to comply with FDA regulations, for our raw material and API products in the future, including the FDA's current GMP regulations, there can be no assurance that the FDA will find our operations are in compliance in a timely manner, or at all.

Our activities are and will continue to be subject to extensive government regulation, which is expensive and time consuming.

We are subject to various local, state, federal, foreign and transnational laws and regulations, and, in the future, any changes to such laws and regulations could adversely affect us.

We provide products and services used for basic research, raw materials and life science reagents used by biopharmaceutical customers for further processing, assays for biologics safety testing and active pharmaceutical ingredients used for preclinical studies and clinical trials. The quality of our products and services is critical to researchers looking to develop novel vaccines and therapies and for biopharmaceutical customers who use our products as raw materials or who are engaged in preclinical studies and clinical trials. Biopharmaceutical customers are subject to extensive regulations by the FDA and similar regulatory authorities in other countries for conducting clinical trials and commercializing products for therapeutic or diagnostic use. This regulatory scrutiny results in our customers imposing rigorous quality requirements on us as their supplier through supplier qualification processes and customer contracts.

Additionally, regulatory authorities and our customers may conduct scheduled or unscheduled periodic inspections of our facilities to monitor our regulatory compliance or compliance with our quality agreements with our customers. There are significant risks at each stage of the regulatory scheme for our customers.

Regulatory agencies may in the future take action against us or our customers for failure to comply with applicable regulations governing clinical trials and the development and testing of therapeutic products. Failure by us or by our customers to comply with the requirements of these regulatory authorities, including without limitation, remediating any inspectional observations to the satisfaction of these regulatory authorities, could result in warning letters, product recalls or seizures, monetary sanctions, injunctions to halt manufacture and distribution, restrictions on our operations, civil or criminal sanctions, or withdrawal of existing or denial of pending approvals, including those relating to products or facilities. In addition, such a failure could expose us to contractual or product liability claims, contractual claims from our customers, including claims for reimbursement for lost or damaged active pharmaceutical ingredients, as well as ongoing remediation and increased compliance costs, any or all of which could be significant.

We are also subject to a variety of federal, state, local and international laws and regulations that govern, among other things, the importation and exportation of products, the handling, transportation and manufacture of substances that could be classified as hazardous, and our business practices in the U.S. and abroad such as anti-corruption and anti-competition laws. Any noncompliance by us with applicable laws and regulations or the failure to maintain, renew or obtain necessary permits and licenses could result in criminal, civil and administrative penalties and could have an adverse effect on our results of operations.

Risks Related to Our Intellectual Property and Technology

If we are unable to obtain, maintain and enforce intellectual property protection for our current or future products, or if the scope of our intellectual property protection is not sufficiently broad, our ability to commercialize our products successfully and to compete effectively may be materially adversely affected.

Our success depends on our ability to obtain and maintain patent and other intellectual property protection in the United States and other countries with respect to our current and future proprietary products. We rely upon a combination of patents and trade secret protection to protect the intellectual property related to our technology, manufacturing processes, and products. Our commercial success depends in part on obtaining and maintaining patent and trade secret protection of our current and future products, if any, and the methods used to manufacture them, as well as successfully defending such patents and trade secrets against third-party challenges. Our ability to stop third parties from making, using, selling, offering to sell or importing our products is dependent upon the extent to which we have rights under valid and enforceable patents and other intellectual property that covers these activities.

The patent prosecution process is expensive and time consuming, and we may not be able to file and prosecute all necessary or desirable patent applications at a reasonable cost or in a timely manner or in all jurisdictions where protection may be commercially advantageous. It is also possible that we may fail to identify patentable aspects of our research and development output before it is too late to obtain patent protection. In addition, we or our collaborators may only pursue, obtain or maintain patent protection in a limited number of countries. There is no assurance that all potentially relevant prior art relating to our patents and patent applications has been found. We may be unaware of prior art that could be used to invalidate or narrow the scope of an issued patent or prevent our pending patent applications from issuing as patents. Because patent applications in the United States, Europe and many other non-U.S. jurisdictions are typically not published until 18 months after filing, or in some cases not at all, because publications of discoveries in scientific literature lag behind actual discoveries, and because we cannot be certain that we or our licensors were the first to make the inventions claimed in any of our owned or any in-licensed issued patents or pending patent applications, or that we or our licensors were the first to file for protection of the inventions set forth in our patents or patent applications. As a result, we may not be able to obtain or maintain protection for certain inventions. Even if patents do successfully issue, such patents may not adequately protect our intellectual property, provide exclusivity for our current or future products, prevent others from designing around our claims or otherwise provide us with a competitive advantage. We cannot offer any assurances about which, if any, patents will issue, the breadth of any such patents or whether any issued patents will be found invalid or unenforceable or will be threatened by third parties. In addition, third parties may challenge the validity, enforceability, ownership, inventorship or scope of any of our patents. Any successful challenge to any of our patents could deprive us of rights necessary for the successful commercialization of our current or future products and could impair or eliminate our ability to collect future revenue and royalties with respect to such products. If any of our patent applications with respect to our current or future products fail to result in issued patents, if their breadth or strength of protection is narrowed or threatened, or if they fail to provide meaningful exclusivity or competitive position, it could dissuade companies from collaborating with us or otherwise adversely affect our competitive position.

The patent positions of life science companies can be highly uncertain and involve complex legal and factual questions for which important legal principles remain unresolved. No consistent policy regarding the breadth of claims allowed in life science patents has emerged to date in the United States. The standards applied by the United States Patent and Trademark Office (the "USPTO") and foreign patent offices in granting patents are not always applied uniformly or predictably, and can change. Additionally, the laws of some foreign countries do not protect intellectual property rights to the same extent as the laws of the United States, and many companies have encountered significant problems in protecting and defending such rights in foreign jurisdictions. The legal systems of certain countries, particularly certain developing countries, do not favor the enforcement of patents and other intellectual property rights, particularly those relating to biotechnology, which could make it difficult for us to stop the infringement, misappropriation, or other violation of our patents or other intellectual property, including the unauthorized reproduction of our manufacturing or other know-how or the marketing of competing products in violation of our intellectual property rights generally. Any of these outcomes could impair our ability to prevent competition from third parties, which may have a material adverse effect on our business, financial condition, results of operations, cash flows and prospects.

Further, the existence of issued patents does not guarantee our right to practice the patented technology or commercialize products covered by such a patent. Third parties may have or obtain rights to patents which they may use to prevent or attempt to prevent us from practicing our patented technology or commercializing our patented products. If any of these other parties are successful in obtaining valid and enforceable patents, and establishing our infringement of those patents, we could be prevented from selling our products unless we were able to obtain a license under such third-party patents, which may not be available on commercially reasonable terms or at all. In addition, third parties may seek approval to market their own products similar to or otherwise competitive with our products. In these circumstances, we may need to defend or assert our patents, including by filing lawsuits alleging patent infringement. In any of these types of proceedings, a court or agency of competent jurisdiction may find our patents invalid or unenforceable. Our competitors and other third parties may also be able to

circumvent our patents by developing similar or alternative products in a non-infringing manner. Any of the foregoing could have a material adverse effect on our business, financial condition, results of operations, cash flows and prospects.

In addition, competitors may use our technologies in jurisdictions where we have not obtained or are unable to adequately enforce patent protection to develop their own products and further, may export otherwise infringing products to territories where we have patent protection, but enforcement is not as strong as that in the United States and Europe. These products may compete with our products, and our patents or other intellectual property rights may not be effective or sufficient to prevent them from competing with us. Proceedings to enforce our patent rights, whether or not successful, could result in substantial costs and divert our efforts and attention from other aspects of our business, could put our patents at risk of being invalidated or held unenforceable, or interpreted narrowly and our patent applications at risk of not issuing, and could provoke third parties to assert claims against us. We may not prevail in any lawsuits that we initiate and the damages or other remedies awarded, if any, may not be commercially meaningful. 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, acquire or license.

Intellectual property that we own or in-license may be subject to a reservation of rights by one or more third parties. For example, one of our patents is co-owned with third parties and some of our patent rights in the future may be co-owned with third parties. If we are unable to obtain an exclusive license to any such third-party co-owners' interest in such patent rights, such co-owners may be able to license their rights to other third parties, including our competitors, and our competitors could market competing products and technology. In addition, we may need the cooperation of any such co-owners of such patent rights in order to enforce such patent rights against third parties, and such cooperation may not be provided to us. Any of the foregoing could have a material adverse effect on our competitive position, business, financial conditions, results of operations, and prospects.

Moreover, the research resulting in certain of our patents and technology was funded in part by the U.S. government. As a result, the U.S. government has certain rights to such patent rights and technology, which include march-in rights. When new technologies are developed with government funding, in order to secure ownership of such patent rights, the recipient of such funding is required to comply with certain government regulations, including timely disclosing the inventions claimed in such patent rights to the U.S. government and timely electing title to such inventions. Additionally, the U.S. government generally obtains certain rights in any resulting patents, including a nonexclusive license authorizing the government to use the invention or to have others use the invention on its behalf. Accordingly, we or our licensors have granted the U.S. government a nonexclusive, nontransferable, irrevocable, paid-up license to practice or have practiced for or on behalf of the United States, the inventions described in the patents and patent applications relating to such inventions. If the U.S. government decides to exercise these rights, it is not required to engage us as its contractor in connection with doing so. The government's rights may also permit it to disclose our confidential information to third parties and to exercise march-in rights to use or allow third parties to use such government-funded technology. The government can exercise its march-in rights if it determines that action is necessary because we fail to achieve practical application of the government-funded technology, or because action is necessary to alleviate health or safety needs, to meet requirements of federal regulations, or to give preference to U.S. industry. In addition, our rights in such inventions may be subject to certain requirements to manufacture products embodying such inventions in the United States. If we fail to comply with those requirements, we could lose our ownership of or other rights to any patents subject to such regulations. Any exercise by the government of any of the foregoing rights or by any third party of its reserved rights could have a material adverse effect on our competitive position, business, financial condition, results of operations, and prospects.

Furthermore, patents have a limited lifespan. In the United States, the natural expiration of a patent is generally 20 years after its effective filing date. Various extensions may be available, however, the life of a patent and the protection it affords is limited. Given the amount of time required for the development, testing, regulatory review and approval of new products, our patents protecting such candidates might expire before or shortly after such candidates are commercialized. If we encounter delays in obtaining regulatory approvals, the period of time during which we could market a product under patent protection could be further reduced. Even if patents covering our future products are obtained, once such patents expire, we may be vulnerable to competition from similar products. The launch of a similar version of one of our products would likely result in an immediate and substantial reduction in the demand for our product. For example, certain patents related to our SoluLINK products expired in 2020 and certain other patents related to such products are due to expire in 2021 and 2022. As a result, our patent portfolio may not provide us with sufficient rights to exclude others from commercializing products similar or identical to ours. Any of the foregoing could have a material adverse effect on our business, financial condition, results of operations, cash flows and prospects.

Our internal computer systems, or those of our customers, collaborators or other contractors, have been and may in the future be subject to cyber-attacks or security breaches, which could result in a material disruption of our product development programs or otherwise adversely affect our business, financial condition, results of operations, cash flows and prospects.

Despite the implementation of security measures, our internal computer systems and those of our customers are vulnerable to damage from computer viruses and unauthorized access. Cyber-attacks are increasing in their frequency, sophistication and intensity, and have become increasingly difficult to detect. Cyber-attacks could include the deployment of harmful malware, ransomware, denial-of-service attacks, social engineering and other means to affect service reliability and threaten the confidentiality, integrity and availability of information. Cyber-attacks also could include phishing attempts or e-mail fraud to cause unauthorized payments or information to be transmitted to an unintended recipient. A material cyber-attack or security breach could cause interruptions in our operations and could result in a material disruption of our business operations, damage to our reputation, financial condition, results of operations, cash flows and prospects.

In the ordinary course of our business, we collect and store sensitive data, including, among other things, personally identifiable information about our employees, intellectual property, and proprietary business information. Any cyber-attack or security breach that leads to unauthorized access, use or disclosure of personal or proprietary information could harm our reputation, cause us not to comply with federal and/or state breach notification laws and foreign law equivalents and otherwise subject us to liability under laws and regulations that protect the privacy and security of personal information. In addition, we could be subject to risks caused by misappropriation, misuse, leakage, falsification or intentional or accidental release or loss of information maintained in the information systems and networks of our company and our vendors, including personal information of our employees, and company and vendor confidential data. In addition, outside parties have previously attempted and may in the future attempt to penetrate our systems or those of our vendors or fraudulently induce our personnel or the personnel of our vendors to disclose sensitive information in order to gain access to our data and/or systems or make unauthorized payments to third parties. Like other companies, we have on occasion experienced, and will continue to experience, data security incidents involving access to company data, unauthorized payments and threats to our data and systems, including malicious codes and viruses, phishing, business email compromise attacks, or other cyber-attacks. The number and complexity of these threats continue to increase over time. If a material breach of our information technology systems or those of our vendors occurs, the market perception of the effectiveness of our security measures could be harmed and our reputation and credibility could be damaged.

We could be required to expend significant amounts of money and other resources to respond to these threats or breaches and to repair or replace information systems or networks and could suffer financial loss or the loss of valuable confidential information. In addition, we could be subject to regulatory actions and/or claims made by individuals and groups in private litigation involving privacy issues related to data collection and use practices and other data privacy laws and regulations, including claims for misuse or inappropriate disclosure of data, as well as unfair or deceptive practices. Although we develop and maintain systems and controls designed to prevent these events from occurring, and we have a process to identify and mitigate threats, the development and maintenance of these systems, controls and processes is costly and requires ongoing monitoring and updating as technologies change and efforts to overcome security measures become increasingly sophisticated. Moreover, despite our efforts, the possibility of these events occurring cannot be eliminated entirely and there can be no assurance that any measures we take will prevent cyber-attacks or security breaches that could adversely affect our business, financial condition, results of operations, cash flows and prospects.

If we are unable to protect the confidentiality of our proprietary information, the value of our technology and products could be materially adversely affected.

We also may rely on trade secrets to protect our technology, especially where we do not believe patent protection is appropriate or obtainable. To maintain the confidentiality of trade secrets and other proprietary information, we enter into confidentiality agreements with our employees, consultants, contractors, collaborators, contract development and manufacturing organizations ("CDMOs"), contract research organizations ("CROs") and others upon the commencement of their relationships with us. These agreements require that all confidential information developed by the individual or entity or made known to the individual or entity by us during the course of the individual's or entity's relationship with us be kept confidential and not disclosed to third parties. Our agreements with employees as well as our personnel policies also generally provide that any inventions conceived by the individual in the course of rendering services to us shall be our exclusive property or that we may obtain full rights to such inventions at our election. However, trade secrets are difficult to protect. Although we use reasonable efforts to protect our trade secrets, our employees, consultants, contractors, collaborators, CDMOs, CROs and others may unintentionally or willfully disclose our information to competitors. We also face the risk that present or former employees could continue to hold rights to intellectual property used by us, demand the registration of intellectual property rights in their name, and seek payment of damages for our use of such intellectual property.

Enforcing a claim that a third party illegally obtained or is using any of our trade secrets is expensive and time consuming, and the outcome is unpredictable. We may not have adequate remedies in the event of unauthorized use or disclosure of our trade secrets or other proprietary information in the case of a breach of any such agreements and our trade secrets and other proprietary information could be disclosed to third parties, including our competitors. Many of our partners also collaborate with our competitors and other third parties. The disclosure of our trade secrets to our competitors, or more broadly, would

impair our competitive position and may materially harm our business, financial condition, results of operations, cash flows and prospects. Costly and time-consuming litigation could be necessary to enforce and determine the scope of our rights, and failure to maintain trade secret protection could adversely affect our competitive business position. The enforceability of confidentiality agreements may vary from jurisdiction to jurisdiction. Courts outside the United States are sometimes less willing to protect trade secrets. Moreover, our competitors may independently develop substantially equivalent or superior knowledge, methods and know-how, and the existence of our own trade secrets affords no protection against such independent discovery.

We may become involved in lawsuits to protect or enforce our patents, which could be expensive, time-consuming and unsuccessful and could result in a court or administrative body finding our patents to be invalid or unenforceable.

Even if the patent applications we own or license are issued, third parties may challenge or infringe upon our patents. To counter infringement, we may be required to file infringement claims, which can be expensive and time-consuming. In patent litigation in the United States, defendant counterclaims alleging invalidity or unenforceability are commonplace. Grounds for a validity challenge could be an alleged failure to meet any of several statutory requirements, including novelty, non-obviousness (or inventive step), written description or enablement. In addition, patent validity challenges may, under certain circumstances, be based upon non-statutory obviousness-type double patenting, which, if successful, could result in a finding that the claims are invalid for obviousness-type double patenting or the loss of patent term if a terminal disclaimer is filed to obviate a finding of obviousness-type double patenting. Grounds for an unenforceability assertion could be an allegation that someone connected with prosecution of the patent withheld information material to patentability from the USPTO, or made a misleading statement, during prosecution.

Third parties may raise similar claims before administrative bodies in the United States or abroad, even outside the context of litigation. Such mechanisms include re-examination, post-grant review, *inter partes* review, interference proceedings, derivation proceedings, and equivalent proceedings in foreign jurisdictions (e.g., opposition proceedings). Such proceedings could result in the revocation or cancellation of or amendment to our patents in such a way that they no longer cover our current or future products or provide any competitive advantage. The outcome following legal assertions of invalidity and unenforceability is unpredictable. If a third party were to prevail on a legal assertion of invalidity or unenforceability, we could lose part or all of the patent protection on one or more of our current or future products, which could result in our competitors and other third parties using our technology to compete with us. Such a loss of patent protection could have a material adverse impact on our business, financial condition, results of operations, cash flows and prospects.

Interference proceedings, or other similar enforcement and revocation proceedings, provoked by third parties or brought by us may be necessary to determine the priority of inventions with respect to our patents or patent applications. An unfavorable outcome could require us to cease using the related technology or to attempt to license rights to it from the prevailing party. Our business could be harmed if the prevailing party does not offer us a license on commercially reasonable terms. Our defense of litigation or interference proceedings may fail and, even if successful, may result in substantial costs and distract our management and other employees. We may not be able to prevent, alone or with our licensors, infringement, misappropriation or other violation of our intellectual property rights, particularly in countries where the laws may not protect those rights as fully as in the United States.

In an infringement proceeding, even one initiated by us, there is a risk that a court will decide that our patents are not valid and that we do not have the right to stop the other party from using the inventions they describe. There is also the risk that, even if the validity of such patents is upheld, the court will refuse to stop the other party on the ground that such other party's activities do not infringe our rights to these patents.

Some of our competitors may be able to sustain the costs of complex patent litigation more effectively than we can because they have substantially greater resources. In addition, 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. In addition, patent holding companies that focus solely on extracting royalties and settlements by enforcing patent rights may target us, especially as we gain greater visibility and market exposure as a public company.

An adverse outcome in a litigation or proceeding involving our patents could limit our ability to assert our patents against competitors, affect our ability to receive royalties or other licensing consideration from our licensees, and may curtail or preclude our ability to exclude third parties from making, using and selling similar or competitive products. Any of these occurrences could have a material adverse effect on our business, financial condition, results of operations, cash flows and prospects.

If we are sued for infringing, misappropriating, or otherwise violating intellectual property rights of third parties, such litigation could be costly and time consuming and could prevent or delay us from developing or commercializing our current or future products.

Our products may infringe on, or be accused of infringing on, one or more claims of an issued patent or may fall within the scope of one or more claims in a published patent application that may be subsequently issued and to which we do not hold a license or other rights.

Because patent applications in the United States and many foreign jurisdictions are typically not published until 18 months after filing, or in some cases not at all, and publications in the scientific literature often lag behind actual discoveries, we cannot be certain that others have not filed patent applications for technology covered by our issued patents or our pending applications, or that we were the first to invent the technology. Others, including our competitors, may have filed, and may in the future file, patent applications covering technology similar to ours. Any such patent application may have priority over our patent applications or patents, which could further require us to obtain rights to issued patents by others covering such technologies. If another party has filed a U.S. patent application on inventions similar to ours, we may have to participate in an interference proceeding declared by the USPTO to determine priority of invention in the United States. The costs of these proceedings could be substantial, and it is possible that such efforts would be unsuccessful if, unbeknownst to us, the other party had independently arrived at the same or similar invention prior to our own invention, resulting in a loss of our U.S. patent position with respect to such inventions.

Additionally, pending patent applications that have been published can, subject to certain limitations, be later amended in a manner that could cover our current or future products or the use of our current or future products. After issuance, the scope of patent claims remains subject to construction based on interpretation of the law, the written disclosure in a patent and the patent's prosecution history. Our interpretation of the relevance or the scope of a patent or a pending application may be incorrect. In addition, third parties may obtain patents in the future and claim that use of our technologies infringes upon these patents. These third parties could bring claims against us or our collaborators that would cause us to incur substantial expenses and, if successful against us, could cause us to pay substantial damages.

The life sciences industry has produced a proliferation of patents, and it is not always clear to industry participants, including us, which patents cover various types of products or methods of use. The coverage of patents is subject to interpretation by the courts, and the interpretation is not always uniform. If we are sued for patent infringement, we would need to demonstrate that our products or methods of use either do not infringe the patent claims of the relevant patent and/or that the patent claims are invalid or unenforceable, and we may not be able to do this. Proving invalidity, in particular, is difficult since it requires a showing of clear and convincing evidence to overcome the presumption of validity enjoyed by issued patents. Third parties have, and may in the future have, U.S. and non-U.S. issued patents and pending patent applications that may cover our current or future products. Such a third party may claim that we or our manufacturing or commercialization partners are using inventions covered by the third party's patent rights and may go to court or a tribunal to stop us from engaging in our normal operations and activities, including making or selling our current or future products. In the event that any of these patent rights were asserted against us, we believe that we have defenses against any such action, including that such patents would not be infringed by our current or future products and/or that such patents are not valid. However, if any such patent rights were to be asserted against us and our defenses to such assertion were unsuccessful, unless we obtain a license to such patents, we could be liable for damages, which could be significant and include treble damages and attorneys' fees if we are found to willfully infringe such patents, and we could be precluded from commercializing any future products that were ultimately held to infringe such patents, any of which could have a material adverse effect on our business, financial condition, results of operations, cash flows and prospects.

If we are found to infringe the patent rights of a third party, or in order to avoid potential claims, we or our collaborators may choose or be required to seek a license from a third party and be required to pay license fees or royalties or both. These licenses may not be available on reasonable terms, or at all. In particular, any of our competitors that control intellectual property that we are found to infringe may be unwilling to provide us a license under any terms. Even if we or our collaborators were able to obtain a license, the rights may be nonexclusive, which could result in our competitors gaining access to the same intellectual property. Ultimately, we could be prevented from commercializing a product, or be forced to cease some aspect of our business operations, if, as a result of actual or threatened patent infringement claims, we or our collaborators are unable to enter into licenses on acceptable terms. In addition, we could be found liable for monetary damages, including treble damages and attorneys' fees if we are found to have willfully infringed a patent. Further, if a patent infringement suit is brought against us or our third-party service providers and if we are unable to successfully obtain rights to required third-party intellectual property, we may be required to expend significant time and resources to redesign our current or future products, or to develop or license replacement technology, all of which may not be feasible on a technical or commercial basis, and may delay or require us to abandon our development, manufacturing or sales activities relating to our current or future products. A finding of infringement could prevent us from commercializing our future products or force us to cease some of our business operations, which could harm our business. Claims that we have misappropriated the confidential information or trade secrets of third parties could have

a similar negative impact on our business. Any of the foregoing could have a material adverse effect on our business, financial condition, results of operations, cash flows and prospects.

Intellectual property litigation and other proceedings could cause us to spend substantial resources and distract our personnel from their normal responsibilities.

Even if resolved in our favor, intellectual property litigation or other legal proceedings relating to our, our licensors' or other third parties' intellectual property claims may cause us to incur significant expenses and could distract our personnel from their normal responsibilities. Patent litigation and other proceedings may also absorb significant management time. If not resolved in our favor, litigation may require us to pay any portion of our opponents' legal fees. Such litigation or proceedings could substantially increase our operating losses and reduce the resources available for development activities or any future sales, marketing, or distribution activities. We may not have sufficient financial or other resources to conduct such litigation or proceedings adequately. Our competitors or other third parties may be able to sustain the cost of such litigation and proceedings more effectively than we can because of their substantially greater resources. Uncertainties resulting from our participation in patent litigation or other proceedings could have a material adverse effect on our ability to compete in the marketplace. Furthermore, because of the substantial amount of discovery required in certain jurisdictions 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. There could also be public announcements of the results of hearings, motions or other interim proceedings or developments. If securities analysts or investors perceive these results to be negative, the perceived value of our current or future products or intellectual property could be diminished. Accordingly, the market price of our Class A common stock may decline. Uncertainties resulting from the initiation and continuation of patent litigation or other proceedings could have a material adverse effect on our business, financial condition, results of operations, and prospects.

If we fail to comply with our obligations under any license agreements, disagree over contract interpretation, or otherwise experience disruptions to our business relationships with our licensors, we could lose intellectual property rights that are necessary to our business.

We rely, in part, on intellectual property and technology which we have in-licensed. We may also need to obtain additional licenses in the future to advance our research or allow commercialization of our future products and it is possible that we may be unable to do so at a reasonable cost or on reasonable terms, if at all. Moreover, such licenses may not provide exclusive rights to use such intellectual property and technology in all relevant fields of use and in all territories in which we may wish to develop or commercialize our future products.

In addition, our existing license agreements impose, and any future license agreements we enter into may impose, various development, commercialization, funding, milestone, royalty, diligence, sublicensing, insurance, patent prosecution and enforcement or other obligations on us. Our license agreements, and any future license agreement we enter into, may also impose restrictions on our ability to license certain of our intellectual property to third parties or to develop or commercialize certain current or future products or technologies. In spite of our best efforts, our counterparties may conclude that we have breached our obligations under our agreements, or that we have used the intellectual property licensed to us in an unauthorized manner, in which case, we may be required to pay damages and the counterparty may have the right to terminate the agreement. Any of the foregoing could result in us being unable to develop, manufacture and sell products that are covered by the licensed intellectual property or technology, or enable a competitor to gain access to the licensed intellectual property or technology.

We might not have the necessary rights or the financial resources to develop, manufacture or market our current or future products without the rights granted under our license agreements, and the loss of sales or potential sales in current or future products covered by such license agreements could have a material adverse effect on our business, financial condition, results of operations, cash flows and prospects.

Disputes may arise regarding intellectual property subject to license agreements, including:

- the scope of rights granted under the license agreement and other interpretation related issues;
- the extent to which our technology and processes infringe on intellectual property of the licensor that is not subject to the license agreement;
- the sublicensing of patent and other rights under our collaborative development relationships;
- our diligence obligations under the license agreement and what activities satisfy those diligence obligations;
- our financial obligations under the license agreement;

- the inventorship and ownership of inventions and know-how resulting from the joint creation or use of intellectual property by our licensors and us and our partners; and
- the priority of invention of patented technology.

In addition, the agreements under which we currently license intellectual property or technology to or from third parties are complex, and certain provisions in such agreements may be susceptible to multiple interpretations. The resolution of any contract interpretation disagreement that may arise could narrow what we believe to be the scope of our rights to the relevant intellectual property or technology, or increase what we believe to be our financial or other obligations under the relevant agreement, either of which could have a material adverse effect on our business, financial condition, results of operations, and prospects. Moreover, if disputes over intellectual property that we have licensed prevent or impair our ability to maintain our current licensing arrangements on commercially acceptable terms, we may be unable to successfully develop and commercialize the affected future products.

In some cases, we may not have primary control over prosecution, maintenance, enforcement and defense of patents and patent applications that we have in-licensed from third parties, and instead we rely on our licensors for these activities. We cannot be certain that such activities have been or will be conducted in compliance with applicable laws and regulations or in a manner consistent with the best interests of our business. If we do undertake any enforcement of our in-licensed patents or defense of any claims asserting the invalidity of such patents, such actions may be subject to the cooperation of our licensors or other third parties. If our licensors or other third parties fail to prosecute, maintain, enforce and defend intellectual property licensed to us, or lose their own rights to such intellectual property, the rights we have licensed may be impaired or eliminated and our ability to develop and commercialize any of our products that are subject to such rights could be adversely affected.

In-licensing or acquisition of third-party intellectual property is a competitive area and a number of more established companies are also pursuing strategies to in-license or acquire third-party intellectual property rights that we may consider attractive or necessary for our business. These companies may have a competitive advantage over us due to their size, cash resources and greater capabilities with respect to clinical development and commercialization. Furthermore, companies that perceive us as a competitor may be unwilling to assign or license rights to us. If we are unable to successfully obtain rights to required third-party intellectual property rights or maintain the existing intellectual property rights we have on reasonable terms or at all, we may have to abandon development of the relevant program or current or future product and our business, financial condition, results of operations, cash flows and prospects could suffer.

Changes to the patent law in the United States and other jurisdictions could increase the uncertainties and costs surrounding the prosecution of our patent applications and the enforcement or defense of our issued patents, thereby impairing our ability to protect our technologies and current or future products.

As is the case with other life sciences companies, our success is heavily dependent on intellectual property, particularly patents. Obtaining and enforcing patents in the life sciences industry involves both technological and legal complexity and is therefore costly, time consuming and inherently uncertain. Changes in either the patent laws or in interpretations of patent laws in the United States and other countries may increase the uncertainties and costs surrounding the prosecution of patent applications and the enforcement or defense of issued patents.

For example, the Leahy-Smith America Invents Act (the "America Invents Act"), was signed into law on September 16, 2011, and many of the substantive changes became effective on March 16, 2013. 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. Specifically, the America Invents Act reforms United States patent law in part by changing the U.S. patent system from a "first to invent" system to a "first inventor to file" system. Under a "first inventor to file" system, assuming the other requirements for patentability are met, the first inventor to file a patent application generally will be entitled to the patent on an invention regardless of whether another inventor was the first to invent the invention. This will require us to be cognizant going forward of the time from invention to filing of a patent application and be diligent in filing patent applications. Circumstances may arise that could prevent us from promptly filing patent applications on our inventions and allow third parties to file patents claiming our inventions before we are able to do so. The America Invents Act also includes a number of significant changes that affect the way patent applications will be prosecuted and may also affect patent litigation. These include allowing third-party submission of prior art to the USPTO during patent prosecution and additional procedures to attack the validity of a patent by the USPTO administered post grant proceedings, including reexamination proceedings, *inter partes* review, post grant review and derivation proceedings. These adversarial proceedings at the USPTO review patent claims without the presumption of validity afforded to U.S. patents in lawsuits in U.S. federal courts, and use a lower burden of proof than used in litigation in U.S. federal courts. Therefore, it is generally considered easier for a competitor or third party to have a

U.S. patent invalidated in a USPTO post-grant review or *inter partes* review proceeding than in a litigation in a U.S. federal court.

In addition, the patent positions of companies in the life sciences industry are particularly uncertain. Recent U.S. Supreme Court rulings have narrowed the scope of patent protection available in certain circumstances and weakened the rights of patent owners in certain situations. This combination of events has created uncertainty with respect to the validity and enforceability of patents, once obtained. Depending on future actions by the U.S. Congress, the federal courts, and the USPTO, the laws and regulations governing patents could change in unpredictable ways. In addition, the complexity and uncertainty of European patent laws have also increased in recent years. Complying with these laws and regulations could have a material adverse effect on our existing patent portfolio and our ability to protect and enforce our intellectual property in the future.

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

Periodic maintenance fees, renewal fees, annuity fees and various other governmental fees on patents and patent applications will be due to be paid to the USPTO and various government patent agencies outside the United States over the lifetime of our patents and patent applications and any patent rights we may own or license in the future. Additionally, the USPTO and various government patent agencies outside the United States require compliance with a number of procedural, documentary, fee payment and other similar provisions during the patent application process. In certain cases, an inadvertent lapse can be cured by payment of a late fee or by other means in accordance with rules applicable to the particular jurisdiction. However, there are situations in which noncompliance can result in abandonment or lapse of the patent or patent application, resulting in partial or complete loss of patent rights in the relevant jurisdiction. If we or our licensors fail to maintain the patents and patent applications covering or otherwise protecting our current or future products, it could have a material adverse effect on our business. In addition, to the extent that we have responsibility for taking any action related to the prosecution or maintenance of patents or patent applications in-licensed from a third party, any failure on our part to maintain the in-licensed intellectual property could jeopardize our rights under the relevant license and may have a material adverse effect on our business, financial condition, results of operations, cash flows and prospects.

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

Many of our employees were previously employed at universities or other life science, biotechnology or pharmaceutical companies, including our competitors or potential competitors. We try to ensure that our employees do not use the proprietary information or know-how of others in their work for us. We may, however, be subject to claims that we or these employees have inadvertently or otherwise used or disclosed intellectual property, trade secrets or other proprietary information of any such employee's former employer or that patents and applications we have filed to protect inventions of these individuals, even those related to one or more of our current or future products, are rightfully owned by their former or concurrent employer. Litigation may be necessary to defend against these claims. Even if we are successful in defending ourselves, such litigation could result in substantial costs to us or be distracting to our management. If we fail to defend any such claims, in addition to paying monetary damages, we may lose valuable intellectual property rights or personnel or we could be required to obtain a license from such third party to commercialize our technology or products. Such a license may not be available on an exclusive basis or on commercially reasonable terms or at all.

In addition, while we typically require our employees, consultants and independent contractors who may be involved in the development of intellectual property to execute agreements assigning such intellectual property to us, we may be unsuccessful in executing such an agreement with each party who in fact develops intellectual property that we regard as our own, or such agreements may be breached or alleged to be ineffective, and the assignment may not be self-executing, which may result in claims by or against us related to the ownership of such intellectual property or may result in such intellectual property becoming assigned to third parties. If we fail in enforcing or defending any such claims, in addition to paying monetary damages, we may lose valuable intellectual property rights. Even if we are successful in prosecuting or defending against such claims, litigation could result in substantial costs and be a distraction to our senior management and scientific personnel. Any of the foregoing could have a material adverse effect on our business, financial condition, results of operations, cash flows and prospects.

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

Filing, prosecuting, and defending patents on current or future products in all countries throughout the world would be prohibitively expensive, and the laws of foreign countries may not protect our rights to the same extent as the laws of the United States. Consequently, we may not be able to prevent third parties from practicing our inventions in 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. Third parties may use our technologies in jurisdictions where we have not obtained or are unable to adequately enforce patent protection to develop their own products and, further, may export otherwise infringing products to territories where we have patent protection but enforcement is not as strong as that in the United States. These products may compete with our products, and our patents or other intellectual property rights may not be effective or sufficient to prevent them from competing.

Many companies have encountered significant problems in protecting and defending intellectual property rights in foreign jurisdictions. The legal systems of certain countries, particularly certain developing countries, do not favor the enforcement of patents, trade secrets, and other intellectual property protection, particularly those relating to biotechnology products, which could make it difficult for us to stop the infringement of our patents or marketing of competing products in violation of our intellectual property and proprietary rights generally. Proceedings to enforce our intellectual property and proprietary rights in foreign jurisdictions could result in substantial costs and divert our efforts and attention from other aspects of our business, could put our patents at risk of being invalidated or interpreted narrowly, could put our patent applications at risk of not issuing, and could provoke third parties to assert claims against us. We may not prevail in any lawsuits that we initiate, and the damages or other remedies awarded, if any, may not be commercially meaningful. Accordingly, our efforts to enforce our intellectual property and proprietary rights around the world may be inadequate to obtain a significant commercial advantage from the intellectual property that we develop or license.

Many countries have compulsory licensing laws under which a patent owner may be compelled to grant licenses to third parties. In addition, many countries limit the enforceability of patents against government agencies or government contractors. In these countries, the patent owner may have limited remedies, which could materially diminish the value of such patent. If we or any of our licensors is forced to grant a license to third parties with respect to any patents relevant to our business, our competitive position may be impaired, and our business, financial condition, results of operations, cash flows and prospects may be adversely affected.

We rely on confidentiality agreements that, if breached, may be difficult to enforce and could have a material adverse effect on our business and competitive position.

Our policy is to enter agreements relating to the non-disclosure and non-use of confidential information with third parties, including our contractors, consultants, advisors and research collaborators, as well as agreements that purport to require the disclosure and assignment to us of the rights to the ideas, developments, discoveries and inventions of our employees and consultants while we employ them. However, these agreements can be difficult and costly to enforce. Moreover, to the extent that our contractors, consultants, advisors and research collaborators apply or independently develop intellectual property in connection with any of our projects, disputes may arise as to the proprietary rights to the intellectual property. If a dispute arises, a court may determine that the right belongs to a third party, and enforcement of our rights can be costly and unpredictable. In addition, we rely on trade secrets and proprietary know-how that we seek to protect in part by confidentiality agreements with our employees, contractors, consultants, advisors or others. Despite the protective measures we employ, we still face the risk that:

- these agreements may be breached;
- these agreements may not provide adequate remedies for the applicable type of breach; or
- our trade secrets or proprietary know-how will otherwise become known.

Any breach of our confidentiality agreements or our failure to effectively enforce such agreements would have a material adverse effect on our business and competitive position.

If our trademarks and trade names are not adequately protected, we may not be able to build name recognition in our markets of interest and our business, financial condition, results of operations, cash flows and prospects may be adversely affected.

Our trademarks or trade names may be challenged, infringed, circumvented or declared generic or determined to be infringing on other marks. We may not be able to protect our rights to these trademarks and trade names or may be forced to stop using these names or marks which we need for name recognition by potential partners or customers in our markets of interest. During

trademark registration proceedings, we may receive rejections. Although we would be given an opportunity to respond to those rejections, we may be unable to overcome such rejections. In addition, in the USPTO and in comparable agencies in many foreign jurisdictions, third parties are given an opportunity to oppose pending trademark applications and to seek to cancel registered trademarks. Opposition or cancellation proceedings may be filed against our trademarks, and our trademarks may not survive such proceedings. If we are unable to establish name recognition based on our trademarks and trade names, we may not be able to compete effectively and our business, financial condition, results of operations, cash flows and prospects may be adversely affected.

Intellectual property rights do not necessarily address all potential threats.

The degree of future protection afforded by our proprietary and intellectual property rights is uncertain because such rights offer only limited protection and may not adequately protect our rights or permit us to gain or keep our competitive advantage. For example:

- others may be able to develop products that are similar to, or better than, our current or future products in a way that is not covered by the claims of the patents we license or may own currently or in the future;
- we, or our licensing partners or current or future collaborators, might not have been the first to make the inventions covered by issued patents or pending patent applications that we license or may own currently or in the future;
- we, or our licensing partners or current or future collaborators, might not have been the first to file patent applications for certain of our or their inventions;
- our pending owned or in-licensed patent applications may not lead to issued patents;
- 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;
- our competitors or other third parties 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;
- it is possible that there are prior public disclosures that could invalidate our or our licensors' patents;
- the patents of third parties or pending or future applications of third parties, if issued, may have an adverse effect on our business;
- any patents that we obtain may not provide us with any competitive advantages or may ultimately be found not to be owned by us, invalid or unenforceable; or
- we may not develop additional proprietary technologies that are patentable.

Should any of these events occur, they could significantly harm our business, financial conditions, results of operations, cash flows and prospects.

Risks Related to Our Indebtedness

Our existing indebtedness could adversely affect our business and growth prospects.

As of December 31, 2020, we had total current and long-term indebtedness outstanding of approximately $534.6 million, including term loans of $550.0 million, no drawdowns under the Revolving Credit Facility (as defined herein) and unamortized debt issuance costs of $15.4 million. Our indebtedness, or any additional indebtedness we may incur, could require us to divert funds identified for other purposes for debt service and impair our liquidity position. If we cannot generate sufficient cash flow from operations to service our debt, we may need to refinance our debt, dispose of assets or issue equity to obtain necessary funds. We do not know whether we will be able to take any of these actions on a timely basis, on terms satisfactory to us or at all.

Our indebtedness, the cash flow needed to satisfy our debt and the covenants contained in the New Credit Agreement have important consequences, including:

- limiting funds otherwise available for financing our capital expenditures by requiring us to dedicate a portion of our cash flows from operations to the repayment of debt and the interest on this debt;
- limiting our ability to incur or prepay existing indebtedness, pay dividends or distributions, dispose of assets, engage in mergers and consolidations, make acquisitions or other investments and make changes in the nature of the business, among other things;
- making us more vulnerable to rising interest rates, as certain of our borrowings, including borrowings under the New Credit Agreement, bear variable rates of interest; and
- making us more vulnerable in the event of a downturn in our business.

Our level of indebtedness may place us at a competitive disadvantage to our competitors that are not as highly leveraged. Fluctuations in interest rates can increase borrowing costs. Increases in interest rates may directly impact the amount of interest we are required to pay and reduce earnings accordingly. In addition, tax laws, including the disallowance or deferral of tax deductions for interest paid on outstanding indebtedness, could have an adverse effect on our liquidity and our business, financial condition, results of operations, cash flows and prospects. Further, our New Credit Agreement contains customary affirmative and negative covenants and certain restrictions on operations that could impose operating and financial limitations and restrictions on us, including restrictions on our ability to enter into particular transactions and to engage in other actions that we may believe are advisable or necessary for our business.

We expect to use cash flow from operations to meet current and future financial obligations, including funding our operations, debt service requirements and capital expenditures. The ability to make these payments depends on our financial and operating performance, which is subject to prevailing economic, industry and competitive conditions and to certain financial, business, economic and other factors beyond our control.

Despite current indebtedness levels, we may incur substantially more indebtedness, which could further exacerbate the risks associated with our substantial indebtedness.

We may incur significant additional indebtedness in the future. We may also consider investments in joint ventures or acquisitions, which may increase our indebtedness. If new debt is added to our current indebtedness levels, the related risks that we face could intensify.

Variable rate indebtedness that we have incurred or may in the future incur will subject us to interest rate risk, which could cause our debt service obligations to increase significantly.

Certain of our borrowings, including certain borrowings under our New Credit Agreement, bear variable rates of interest. An increase in interest rates would increase our debt service obligations, which would have a negative impact on our net income and cash flows, including cash available for servicing our indebtedness.

The phase-out of the London Interbank Offered Rate ("LIBOR"), or the replacement of LIBOR with a different reference rate, may adversely affect interest rates.

Borrowings under our New Credit Agreement bear interest at rates determined using LIBOR as the reference rate. On July 27, 2017, the Financial Conduct Authority (the authority that regulates LIBOR) announced that it would phase out LIBOR by the end of 2021. It is unclear whether new methods of calculating LIBOR will be established such that it continues to exist after 2021, or if alternative rates or benchmarks will be adopted, and currently it appears highly likely that LIBOR will be discontinued or substantially modified by 2021. If LIBOR is unavailable, we may be required to pay interest on borrowings based on historical LIBOR, which may be higher than market rates prevailing at such time. Changes in the method of calculating LIBOR, or the replacement of LIBOR with an alternative rate or benchmark, may adversely affect interest rates and result in higher borrowing costs. This could have a material adverse effect on our business, financial condition, results of operations, cash flows and prospects. We cannot predict the effect of the potential changes to LIBOR or the establishment and use of alternative rates or benchmarks. Furthermore, we may need to renegotiate our New Credit Agreement or incur other indebtedness, and changes in the method of calculating LIBOR, or the use of an alternative rate or benchmark, may negatively impact the terms of such indebtedness.

We may not be able to generate sufficient cash flow to service all of our indebtedness and may be forced to take other actions to satisfy our obligations under such indebtedness, which may not be successful.

Our ability to make scheduled payments or to refinance outstanding debt obligations depends on our financial and operating performance, which will be affected by prevailing economic, industry and competitive conditions and by financial, business and other factors beyond our control. We may not be able to maintain a sufficient level of cash flow from operating activities to permit us to pay the principal, premium, if any, and interest on our indebtedness. Any failure to make payments of interest and principal on our outstanding indebtedness on a timely basis would likely result in a reduction of our creditworthiness, which would also harm our ability to incur additional indebtedness.

If our cash flows and capital resources are insufficient to fund our debt service obligations, we may be forced to reduce or delay capital expenditures and acquisitions, sell assets, seek additional capital or seek to restructure or refinance our indebtedness. Any refinancing of our indebtedness could be at higher interest rates and may require us to comply with more onerous covenants. Refinancings may not be successful and may not permit us to meet our scheduled debt service obligations. In the absence of such cash flows and resources, we could face substantial liquidity problems and might be required to sell material assets or operations to attempt to meet our debt service obligations. The financing documents governing our New Credit Agreement include certain restrictions on our ability to conduct asset sales and/or use the proceeds from asset sales for certain purposes. We may not be able to consummate these asset sales to raise capital or sell assets at prices and on terms that we believe are fair and any proceeds that we do receive may not be adequate to meet any debt service obligations then due. If we cannot meet our debt service obligations, the holders of our indebtedness may accelerate such indebtedness and, to the extent such indebtedness is secured, foreclose on our assets. In such an event, we may not have sufficient assets to repay all of our indebtedness.

The terms of the financing documents governing our New Credit Agreement restrict our current and future operations, particularly our ability to respond to changes or to take certain actions.

The financing documents governing our New Credit Agreement contain a number of restrictive covenants that impose significant operating and financial restrictions on us and may limit our ability to engage in acts that may be in our long-term best interests, including restrictions on our ability to:

- incur additional indebtedness;
- incur liens;
- merge, dissolve, liquidate, amalgamate, consolidate or sell all or substantially all of our assets;
- declare or pay certain dividends, payments or distribution or repurchase or redeem certain capital stock;
- permit our subsidiaries to enter into agreements restricting their ability to pay dividends, make loans, incur liens and sell assets; and
- make certain investments.

These restrictions could limit, potentially significantly, our operational flexibility and affect our ability to finance our future operations or capital needs or to execute our business strategy.

We may be unable to refinance our indebtedness.

We may need to refinance all or a portion of our indebtedness before maturity. We cannot assure you that we will be able to refinance any of our indebtedness on commercially reasonable terms or at all. There can be no assurance that we will be able to obtain sufficient funds to enable us to repay or refinance our debt obligations on commercially reasonable terms, or at all.

Our failure to raise additional capital or generate cash flows necessary to expand our operations and invest in new technologies in the future could reduce our ability to compete successfully and harm our competitive position and results of operations.

We may need to raise additional funds, and we may not be able to obtain additional debt or equity financing on favorable terms or at all. If we raise additional equity financing, our security holders may experience significant dilution of their ownership interests. If we engage in additional debt financing, we may be required to accept terms that restrict our ability to incur additional indebtedness, force us to maintain specified liquidity or other ratios or restrict our ability to pay dividends or make

acquisitions. If we need additional capital and cannot raise it on acceptable terms, or at all, we may not be able to, among other things:

- develop and enhance our product offerings;
- continue to expand our organization;
- hire, train and retain employees;
- respond to competitive pressures or unanticipated working capital requirements; or
- pursue acquisition opportunities.

In addition, if we issue additional equity to raise capital, your interest in us will be diluted.

Risks Related to Our Organizational Structure

Our principal asset is our interest in Maravai Topco Holdings LLC ("Topco LLC"), and, accordingly, we depend on distributions from Topco LLC to pay our taxes and expenses, including payments under the Tax Receivable Agreement. Topco LLC's ability to make such distributions may be subject to various limitations and restrictions.

We are a holding company and have no material assets other than our ownership of equity interests in Topco LLC. As such, we have no independent means of generating revenue or cash flow, and our ability to pay our taxes, satisfy our obligations under the Tax Receivable Agreement and pay operating expenses or declare and pay dividends, if any, in the future depends on the financial results and cash flows of Topco LLC and its subsidiaries and distributions we receive from Topco LLC. There can be no assurance that Topco LLC and its subsidiaries will generate sufficient cash flow to distribute funds to us or that applicable state law and contractual restrictions, including negative covenants in debt instruments of Topco LLC and its subsidiaries, will permit such distributions.

Topco LLC is treated as a partnership for U.S. federal income tax purposes and, as such, is not subject to any entity-level U.S. federal income tax. Certain wholly-owned subsidiaries of Topco LLC are taxed as corporations for U.S. federal and most applicable state, local income tax and foreign tax purposes. For U.S. federal income tax purposes, taxable income of Topco LLC is allocated to the LLC Unitholders of Topco LLC, including us. Accordingly, we incur income taxes on our distributive share of any net taxable income of Topco LLC. Under the terms of the Topco LLC operating agreement (the "LLC Operating Agreement"), Topco LLC is obligated to make tax distributions to LLC Unitholders, including us. In addition to tax and dividend payments, we also incur expenses related to our operations, including obligations to make payments under the Tax Receivable Agreement. Due to the uncertainty of various factors, we cannot estimate the likely tax benefits we may realize as a result of our purchase of LLC Units in Topco LLC (the "LLC Units") and LLC Unit exchanges, and the resulting amounts we are likely to pay out to LLC Unitholders pursuant to the Tax Receivable Agreement; however, we estimate that such payments may be substantial. Under the LLC Operating Agreement, tax distributions shall be made on a pro rata basis among the LLC Unitholders, and will be calculated without regard to any applicable basis adjustment under Section 743(b) of The Internal Revenue Code ("the Code").

We intend to cause Topco LLC to make cash distributions to the owners of LLC Units in amounts sufficient to (1) fund all or part of their tax obligations in respect of taxable income allocated to them and (2) cover our operating expenses, including payments under the Tax Receivable Agreement.

However, Topco LLC's ability to make such distributions may be subject to various limitations and restrictions, such as restrictions on distributions that would violate either any contract or agreement to which Topco LLC or its subsidiaries is then a party, including debt agreements, or any applicable law, or that would have the effect of rendering Topco LLC or its subsidiaries insolvent. In addition, recently enacted legislation that is effective for taxable years beginning after December 31, 2017 may impute liability for adjustments to a partnership's tax return on the partnership itself in certain circumstances, absent an election to the contrary. Topco LLC may be subject to material liabilities pursuant to this legislation and related guidance if, for example, its calculations of taxable income are incorrect. If we do not have sufficient funds to pay tax or other liabilities or to fund our operations, we may have to borrow funds, which could materially adversely affect our liquidity and financial condition and subject us to various restrictions imposed by any such lenders. To the extent that we are unable to make payments under the Tax Receivable Agreement, such payments generally will be deferred and will accrue interest until paid. Nonpayment for a specified period, however, may constitute a breach of a material obligation under the Tax Receivable Agreement and therefore accelerate payments due under the Tax Receivable Agreement, unless, generally, such nonpayment is due to a lack of sufficient funds.

Payments under the Tax Receivable Agreement will be based on the tax reporting positions we determine. Although we are not aware of any issue that would cause the IRS to challenge existing tax basis, a tax basis increase or other tax attributes subject to the Tax Receivable Agreement, if any subsequent disallowance of tax basis or other benefits were so determined by the IRS, we would not be reimbursed for any payments previously made under the applicable Tax Receivable Agreement (although we would reduce future amounts otherwise payable under such Tax Receivable Agreement). In addition, the actual state or local tax savings we realize may be different than the amount of such tax savings we are deemed to realize under the Tax Receivable Agreement, which will be based on an assumed combined state and local tax rate applied to our reduction in taxable income as determined for U.S. federal income tax purposes as a result of the tax attributes subject to the Tax Receivable Agreement. As a result, payments could be made under the Tax Receivable Agreement in excess of the tax savings we realize in respect of the attributes to which the Tax Receivable Agreement relate.

Conflicts of interest could arise between our shareholders and Maravai Life Sciences Holdings, LLC ("MLSH 1"), which may impede business decisions that could benefit our shareholders.

MLSH 1, which is controlled by GTCR, LLC ("GTCR") and is the only holder of LLC Units other than us, has the right to consent to certain amendments to the LLC Operating Agreement, as well as to certain other matters. MLSH 1 may exercise these voting rights in a manner that conflicts with the interests of our shareholders. Circumstances may arise in the future when the interests of MLSH 1 conflict with the interests of our shareholders. As we control Topco LLC, we have certain obligations to MLSH 1 as an LLC Unitholder in Topco LLC that may conflict with fiduciary duties our officers and directors owe to our shareholders. These conflicts may result in decisions that are not in the best interests of shareholders.

The Tax Receivable Agreement requires us to make cash payments to MLSH 1 and MLSH 2 in respect of certain tax benefits to which we may become entitled, and we expect that the payments we will be required to make will be substantial.

Pursuant to the Tax Receivable Agreement we are required to make cash payments to MLSH 1 and MLSH 2, collectively, equal to 85% of the tax benefits, if any, that we actually realize, or, in some circumstances, are deemed to realize, as a result of (i) certain increases in the tax basis of assets of Topco LLC and its subsidiaries resulting from purchases or exchanges of LLC Units, (ii) certain tax attributes related to the LLC Units held by the corporations that merged into our corporate structure as part of the Organizational Transactions (as discussed in Note 1 to our consolidated financial statements), Topco LLC and subsidiaries of Topco LLC that existed prior to our initial public offering and (iii) certain other tax benefits related to our entering into the Tax Receivable Agreement, including tax benefits attributable to payments that we make under the Tax Receivable Agreement. Any payments made by us to MLSH 1 and MLSH 2 under the Tax Receivable Agreement will generally reduce the amount of overall cash flow that might have otherwise been available to us. To the extent that we are unable to make payments under the Tax Receivable Agreement, such payments generally will be deferred and will accrue interest until paid. Nonpayment for a specified period, however, may constitute a breach of a material obligation under the Tax Receivable Agreement and therefore accelerate payments due under the Tax Receivable Agreement, unless, generally, such nonpayment is due to a lack of sufficient funds. Furthermore, our future obligation to make payments under the Tax Receivable Agreement could make us a less attractive target for an acquisition, particularly in the case of an acquirer that cannot use some or all of the tax benefits that may be deemed realized under the Tax Receivable Agreement. The payments under the Tax Receivable Agreement are also not conditioned upon MLSH 1 maintaining a continued ownership interest in Topco LLC.

The actual amount and timing of any payments under the Tax Receivable Agreement will vary depending upon a number of factors, including the timing of exchanges by MLSH 1, the amount of gain recognized by MLSH 1, the amount and timing of the taxable income we generate in the future and the federal tax rates then applicable.

We expect that the aggregate payments that we may make under the Tax Receivable Agreement will be substantial. Assuming no material changes in the relevant tax law, and that we earn sufficient taxable income to realize all tax benefits that are subject to the Tax Receivable Agreement, we expect that future payments under the Tax Receivable Agreement relating to the purchase by Maravai LifeSciences Holdings, Inc. of LLC Units from MLSH 1 to be approximately $389.5 million and to range over the next 15 years from approximately $3.4 million to $29.8 million per year and decline thereafter. As a result, we expect that aggregate payments under the Tax Receivable Agreement over this 15-year period will be approximately $336.9 million. These estimates are based on the initial public offering price of $27.00 per share of Class A common stock. Future payments in respect of subsequent exchanges or financing would be in addition to these amounts and are expected to be substantial. The foregoing numbers are merely estimates—the actual payments could differ materially. It is possible that future transactions or events could increase or decrease the actual tax benefits realized and the corresponding Tax Receivable Agreement payments. There may be a material negative effect on our liquidity if, as a result of timing discrepancies or otherwise, the payments under the Tax Receivable Agreement exceed the actual benefits we realize in respect of the tax attributes subject to the Tax Receivable Agreement and/or distributions to Maravai LifeSciences Holdings, Inc. by Topco LLC are not sufficient to permit Maravai LifeSciences Holdings, Inc. to make payments under the Tax Receivable Agreement after it has paid taxes.

Payments under the Tax Receivable Agreement will be based on the tax reporting positions that we determine. Although we are not aware of any issue that would cause the Internal Revenue Service ("IRS") to challenge a tax basis increase or the availability of tax attributes of the corporations merged into our corporate structure as part of the Organizational Transactions, if any, we will not be reimbursed for any cash payments previously made to MLSH 1 and MLSH 2 pursuant to the Tax Receivable Agreement if any tax benefits initially claimed by us are subsequently disallowed, in whole or in part, by the IRS or other applicable taxing authority. For example, if the IRS later asserts that we did not obtain a tax basis increase or disallows (in whole or in part) the availability of Net Operating Losses ("NOLs") due to a potential ownership change under Section 382 of the Internal Revenue Code ("IRC" or "the Code"), among other potential challenges, then we would not be reimbursed for any cash payments previously made to MLSH 1 and MLSH 2 pursuant to the Tax Receivable Agreement with respect to such tax benefits that we had initially claimed. Instead, any excess cash payments made by us pursuant to the Tax Receivable Agreement will be netted against any future cash payments that we might otherwise be required to make under the terms of the Tax Receivable Agreement. Nevertheless, any tax benefits initially claimed by us may not be disallowed for a number of years following the initial time of such payment or, even if challenged early, such excess cash payment may be greater than the amount of future cash payments that we might otherwise be required to make under the terms of the Tax Receivable Agreement. Accordingly, there may not be sufficient future cash payments against which to net. The applicable U.S. federal income tax rules are complex, and there can be no assurance that the IRS or a court will not disagree with our tax reporting positions. As a result, it is possible that we could make cash payments under the Tax Receivable Agreement that are substantially greater than our actual cash tax savings.

Under the Tax Receivable Agreement, we are required to provide MLSH 1 and MLSH 2 with a schedule setting forth the calculation of payments that are due under the TRA with respect to each taxable year in which a payment obligation arises within ninety (90) days after the extended due date of our U.S. federal income tax return for such taxable year. This calculation will be based upon the advice of our tax advisors. The calculation will become final thirty (30) days after it is provided assuming that no objections are made. Payments under the Tax Receivable Agreement will generally be made within five (5) business days after this schedule becomes final pursuant to the procedures set forth in the Tax Receivable Agreement, although interest on such payments will begin to accrue at a rate of London Interbank Offer Rate ("LIBOR") plus 100 basis points from the due date (without extensions) of such tax return. Any late payments that may be made under the Tax Receivable Agreement will continue to accrue interest at LIBOR plus 500 basis points until such payments are made, generally including any late payments that we may subsequently make because we did not have enough available cash to satisfy our payment obligations at the time at which they originally arose.

The amounts that we may be required to pay to MLSH 1 and MLSH 2 under the Tax Receivable Agreement may be accelerated in certain circumstances and may also significantly exceed the actual tax benefits that we ultimately realize.

The Tax Receivable Agreement provides that if (1) certain mergers, asset sales, other forms of business combination or other changes of control were to occur, (2) we breach any of our material obligations under the Tax Receivable Agreement or (3) at any time, we elect an early termination of the Tax Receivable Agreement, then the Tax Receivable Agreement will terminate and our obligations, or our successor's obligations, to make payments under the Tax Receivable Agreement would accelerate and become immediately due and payable. The amount due and payable in that circumstance is based on certain assumptions, including an assumption that we would have sufficient taxable income to fully utilize all potential future tax benefits that are subject to the Tax Receivable Agreement. We may need to incur debt to finance payments under the Tax Receivable Agreement to the extent our cash resources are insufficient to meet our obligations under the Tax Receivable Agreement as a result of timing discrepancies or otherwise.

As a result of a change in control, material breach or our election to terminate the Tax Receivable Agreement early, (1) we could be required to make cash payments to MLSH 1 and MLSH 2 that are greater than the specified percentage of the actual benefits we ultimately realize in respect of the tax benefits that are subject to the Tax Receivable Agreement and (2) we would be required to make an immediate cash payment equal to the anticipated future tax benefits that are the subject of the Tax Receivable Agreement discounted in accordance with the Tax Receivable Agreement, which payment may be made significantly in advance of the actual realization, if any, of such future tax benefits. In these situations, our obligations under the Tax Receivable Agreement could have a substantial negative impact on our liquidity and could have the effect of delaying, deferring or preventing certain mergers, asset sales, other forms of business combination, or other changes of control. There can be no assurance that we will be able to finance our obligations under the Tax Receivable Agreement.

Our organizational structure, including the Tax Receivable Agreement, confers certain benefits upon MLSH 1 and MLSH 2 that will not benefit the other common shareholders to the same extent as they will benefit MLSH 1 and MLSH 2.

Our organizational structure, including the Tax Receivable Agreement, confers certain benefits upon MLSH 1, as the only other LLC Unitholder in Topco LLC, and MLSH 2 that will not benefit the other holders of our Class A common stock to the same

extent. We have entered into a Tax Receivable Agreement with MLSH 1 and MLSH 2, which will provide for the payment by us to MLSH 1 and MLSH 2, collectively, of 85% of the amount of tax benefits, if any, that we actually realize, or in some circumstances are deemed to realize, as a result of (i) certain increases in the tax basis of assets of Topco LLC and its subsidiaries resulting from purchases or exchanges of LLC Units, (ii) certain tax attributes of certain of the entities (the "Blocker Entities) through which GTCR and other existing members of MLSH 1 and MLSH 2 held their ownership interests in MLSH 1, Topco LLC and subsidiaries of Topco LLC that existed prior to our initial public offering and (iii) certain other tax benefits related to our entering into the Tax Receivable Agreement, including tax benefits attributable to payments that we make under the Tax Receivable Agreement. Due to the uncertainty of various factors, we cannot estimate the likely tax benefits we will realize as a result of purchases of LLC Units and LLC Unit exchanges, and the resulting amounts we are likely to pay out to MLSH 1 and MLSH 2 pursuant to the Tax Receivable Agreement; however, we estimate that such payments may be substantial. Although we will retain 15% of the amount of such tax benefits, this and other aspects of our organizational structure may adversely impact the future trading market for the Class A common stock.

We may not be able to realize all or a portion of the tax benefits that are currently expected to result from the tax attributes covered by the Tax Receivable Agreement and from payments made under the Tax Receivable Agreement.

Our ability to realize the tax benefits that we currently expect to be available as a result of the attributes covered by the Tax Receivable Agreement, the payments made pursuant to the Tax Receivable Agreement, and the interest deductions imputed under the Tax Receivable Agreement all depend on a number of assumptions, including that we earn sufficient taxable income each year during the period over which such deductions are available and that there are no adverse changes in applicable law or regulations. Additionally, if our actual taxable income were insufficient or there were additional adverse changes in applicable law or regulations, we may be unable to realize all or a portion of the expected tax benefits and our cash flows and shareholders' equity could be negatively affected.

In certain circumstances, Topco LLC will be required to make distributions to us and MLSH 1 and the distributions may be substantial.

Topco LLC is treated as a partnership for U.S. federal income tax purposes and, as such, is not subject to U.S. federal income tax. Instead, taxable income is allocated to its members, including us. We intend to cause Topco LLC to make tax distributions quarterly to the LLC Unitholders in Topco LLC (including us), in each case on a pro rata basis based on Topco LLC's net taxable income and without regard to any applicable basis adjustment under Section 743(b) of the Code. Funds used by Topco LLC to satisfy its tax distribution obligations will not be available for reinvestment in our business. Moreover, these tax distributions may be substantial, and will likely exceed (as a percentage of Topco LLC's income) the overall effective tax rate applicable to a similarly situated corporate taxpayer. As a result, it is possible that we will receive distributions significantly in excess of our tax liabilities and obligations to make payments under the Tax Receivable Agreement. While our Board may choose to distribute such cash balances as dividends on our Class A common stock, they will not be required to do so, and may in their sole discretion choose to use such excess cash for any purpose depending upon the facts and circumstances at the time of determination. See "Dividend Policy."

Unanticipated changes in effective tax rates or adverse outcomes resulting from examination of our income or other tax returns could adversely affect our operating results and financial condition.

We are subject to income taxes in the U.S., Canada and the U.K. Our tax liabilities will be subject to the allocation of expenses in differing jurisdictions. Our future effective tax rates could be subject to volatility or adversely affected by a number of factors, including:

- changes in the valuation of our deferred tax assets and liabilities;
- expected timing and amount of the release of any tax valuation allowances;
- expiration of, or detrimental changes in, research and development tax credit laws; or
- changes in tax laws, regulations or interpretations thereof.

In addition, we may be subject to audits of our income, sales and other transaction taxes by U.S. federal, state and foreign authorities. Outcomes from these audits could have an adverse effect on our operating results and financial condition.

If we were deemed to be an investment company under the Investment Company Act of 1940, as amended (the "1940 Act"), applicable restrictions could make it impractical for us to continue our business as contemplated and could have a material adverse effect on our business, financial condition, results of operations, cash flows and prospects.

Under Sections 3(a)(1)(A) and (C) of the 1940 Act, a company generally will be deemed to be an "investment company" for purposes of the 1940 Act if it (1) is, or holds itself out as being, engaged primarily, or proposes to engage primarily, in the business of investing, reinvesting or trading in securities or (2) is engaged, or proposes to engage, in the business of investing, reinvesting, owning, holding or trading in securities and it owns or proposes to acquire investment securities having a value exceeding 40% of the value of its total assets (exclusive of U.S. government securities and cash items) on an unconsolidated basis. We do not believe that we are an "investment company," as such term is defined in either of those sections of the 1940 Act.

As the sole managing member of Topco LLC, we will control and manage Topco LLC. On that basis, we believe that our interest in Topco LLC is not an "investment security" under the 1940 Act. Therefore, we have less than 40% of the value of our total assets (exclusive of U.S. government securities and cash items) in "investment securities." However, if we were to lose the right to manage and control Topco LLC, interests in Topco LLC could be deemed to be "investment securities" under the 1940 Act.

We intend to conduct our operations so that we will not be deemed to be an investment company. However, if we were deemed to be an investment company, restrictions imposed by the 1940 Act, including limitations on our capital structure and our ability to transact with affiliates, could make it impractical for us to continue our business as contemplated and could have a material adverse effect on our business, financial condition, results of operations, cash flows and prospects.

Risks Related to Being a Public Company

We are obligated to develop and maintain proper and effective internal control over financial reporting in order to comply with Section 404 of the Sarbanes-Oxley Act. We may not complete our analysis of our internal control over financial reporting in a timely manner, or these internal controls may not be determined to be operating effectively, which may adversely affect investor confidence in us and, as a result, the value of our Class A common stock.

Our management is responsible for establishing and maintaining adequate internal control over financial reporting. Internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements in accordance with GAAP. Developing the system and processing documentation necessary to perform the evaluation needed to comply with Section 404 of the Sarbanes-Oxley Act is a costly and challenging process. If we are unable to assert that our internal control over financial reporting is effective, we could lose investor confidence in the accuracy and completeness of our financial reports, which could cause the price of our Class A common stock to decline, and we may be subject to investigation or sanctions by the SEC.

We will be required, pursuant to Section 404 of the Sarbanes-Oxley Act, to furnish a report by management on, among other things, the effectiveness of our internal control over financial reporting as of the end of the fiscal year 2022. This assessment will need to include disclosure of any material weaknesses identified by our management in our internal control over financial reporting. We will also be required to disclose changes made in our internal control and procedures on a quarterly basis. Further, we also expect that our independent registered public accounting firm will be required to report on the effectiveness of our internal control over financial reporting pursuant to Section 404 of the Sarbanes-Oxley Act for fiscal year 2022. Our independent registered public accounting firm may issue a report that is adverse in the event it is not satisfied with the level at which our controls are documented, designed or operating, which could cause the price of our Class A common stock to decline, and we may be subject to investigation or sanctions by the SEC.

Additionally, the existence of any material weakness or significant deficiency would require management to devote significant time and incur significant expense to remediate any such material weaknesses or significant deficiencies and management may not be able to remediate any such material weaknesses or significant deficiencies in a timely manner. The existence of any material weakness in our internal control over financial reporting could also result in errors in our financial statements that could require us to restate our financial statements, cause us to fail to meet our reporting obligations and cause shareholders to lose confidence in our reported financial information, all of which could materially and adversely affect our business and stock price.

To comply with these requirements, we may need to undertake various costly and time-consuming actions, such as implementing new internal controls and procedures and hiring accounting or internal audit staff, which may adversely affect our business, financial condition, results of operations, cash flows and prospects.

The requirements of being a public company may strain our resources and distract our management, which could make it difficult to manage our business, particularly after we are no longer an "emerging growth company."

We are subject to the reporting requirements of the Securities Exchange Act of 1934, as amended (the "Exchange Act") and the Sarbanes-Oxley Act, the listing requirements of NASDAQ and other applicable securities rules and regulations. Compliance with these rules and regulations has increased our legal and financial compliance costs and are expected to continue to increase in the future, making some activities more difficult, time-consuming or costly and increasing demand on our systems and resources, particularly after we are no longer an "emerging growth company." The Exchange Act requires that we file annual, quarterly and current reports with respect to our business, financial condition, results of operations, cash flows and prospects. The Sarbanes-Oxley Act requires, among other things, that we establish and maintain effective internal controls and procedures for financial reporting. Furthermore, the need to continue to establish the corporate infrastructure demanded of a public company may divert our management's attention from implementing our growth strategy, which could prevent us from improving our business, financial condition, results of operations, cash flows and prospects. We have made, and will continue to make, changes to our internal controls and procedures for financial reporting and accounting systems to meet our reporting obligations as a public company. However, the measures we take may not be sufficient to satisfy our obligations as a public company. In addition, these rules and regulations have increased our legal and financial compliance costs and have made, and will continue to make, some activities more time-consuming and costly. For example, these rules and regulations make it more difficult and more expensive for us to obtain director and officer liability insurance, and we may be required to incur substantial costs to maintain the same or similar coverage. These additional obligations could have a material adverse effect on our business, financial condition, results of operations, cash flows and prospects.

In addition, changing laws, regulations and standards relating to corporate governance and public disclosure are creating uncertainty for public companies, increasing legal and financial compliance costs and making some activities more time consuming. These laws, regulations and standards are subject to varying interpretations, in many cases due to their lack of specificity, and, as a result, their application in practice may evolve over time as new guidance is provided by regulatory and governing bodies. This could result in continuing uncertainty regarding compliance matters and higher costs necessitated by ongoing revisions to disclosure and governance practices. We intend to invest resources to comply with evolving laws, regulations and standards, and this investment may result in increased general and administrative expenses and a diversion of our management's time and attention from revenue-generating activities to compliance 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 their application and practice, regulatory authorities may initiate legal proceedings against us and there could be a material adverse effect on our business, financial condition, results of operations, cash flows and prospects.

Risks Related to Our Class A Common Stock

GTCR controls us, and its interests may conflict with ours or yours in the future.

Investment entities affiliated with GTCR control approximately 73% of the voting power of our outstanding common stock and therefore GTCR will control the vote of all matters submitted to a vote of our shareholders. This control will enable GTCR to control the election of the members of the Board and all other corporate decisions. Even when GTCR ceases to control a majority of the total voting power, for so long as GTCR continues to own a significant percentage of our Class A common stock, GTCR will still be able to significantly influence the composition of our Board and the approval of actions requiring shareholder approval. Accordingly, for such period of time, GTCR will have significant influence with respect to our management, business plans and policies, including the appointment and removal of our officers, decisions on whether to raise future capital and amending our charter and bylaws, which govern the rights attached to our Class A common stock. In particular, for so long as GTCR continues to own a significant percentage of our Class A common stock, GTCR will be able to cause or prevent a change of control of us or a change in the composition of our Board and could preclude any unsolicited acquisition of us. The concentration of ownership could deprive you of an opportunity to receive a premium for your shares of Class A common stock as part of a sale of us and ultimately might affect the market price of our Class A common stock.

We entered into a Director Nomination Agreement with GTCR that provides GTCR the right to nominate to the Board a number of designees equal to at least: (i) 100% of the total number of directors comprising the Board, so long as GTCR beneficially owns shares of Class A common stock and Class B common stock representing at least 40% of the total amount of shares of Class A common stock and Class B common stock it beneficially owned as of November 19, 2020, (ii) 40% of the total number of directors, in the event that GTCR beneficially owns shares of Class A common stock and Class B common stock representing at least 30% but less than 40% of the total amount of shares of Class A common stock and Class B common stock it owned as of November 19, 2020, (iii) 30% of the total number of directors, in the event that GTCR beneficially owns shares of Class A common stock and Class B common stock representing at least 20% but less than 30% of the total amount of shares of Class A common stock and Class B common stock it owned as of November 19, 2020, (iv) 20% of the total number of directors, in the event that GTCR beneficially owns shares of Class A common stock and Class B common stock representing at

least 10% but less than 20% of the total amount of shares of Class A common stock and Class B common stock it owns as of November 19, 2020 and (v) one director, in the event that GTCR beneficially owns shares of Class A common stock and Class B common stock representing at least 5% of the total amount of shares of Class A common stock and Class B common stock it owned as of November 19, 2020. The Director Nomination Agreement provides that GTCR may assign such right to a GTCR affiliate. The Director Nomination Agreement prohibits us from increasing or decreasing the size of our Board without the prior written consent of GTCR.

GTCR and its affiliates engage in a broad spectrum of activities, including investments in our industry generally. In the ordinary course of their business activities, GTCR and its affiliates may engage in activities where their interests conflict with our interests or those of our other shareholders, such as investing in or advising businesses that directly or indirectly compete with certain portions of our business or are suppliers or customers of ours. Our certificate of incorporation provides that none of GTCR, any of its affiliates or any director who is not employed by us (including any non-employee director who serves as one of our officers in both his or her director and officer capacities) or its affiliates has any duty to refrain from engaging, directly or indirectly, in the same business activities or similar business activities or lines of business in which we operate. GTCR also may pursue acquisition opportunities that may be complementary to our business, and, as a result, those acquisition opportunities may not be available to us. In addition, GTCR may have an interest in pursuing acquisitions, divestitures and other transactions that, in its judgment, could enhance its investment, even though such transactions might involve risks to you or may not prove beneficial.

We are a "controlled company" within the meaning of the rules of NASDAQ and, as a result, we qualify for and rely on exemptions from certain corporate governance requirements. You will not have the same protections as those afforded to shareholders of companies that are subject to such governance requirements.

GTCR controls a majority of the voting power of our outstanding common stock. As a result, we are a "controlled company" within the meaning of the corporate governance standards of NASDAQ. Under these rules, a company of which more than 50% of the voting power for the election of directors is held by an individual, group or another company is a "controlled company" and may elect not to comply with certain corporate governance requirements, including:

- the requirement that a majority of our Board consist of independent directors;
- the requirement that we have a nominating and corporate governance committee that is composed entirely of independent directors with a written charter addressing the committee's purpose and responsibilities;
- the requirement that we have a compensation committee that is composed entirely of independent directors with a written charter addressing the committee's purpose and responsibilities; and
- the requirement for an annual performance evaluation of the nominating and corporate governance and compensation committees.

We utilize these exceptions and do not have a majority of independent directors on our Board, our compensation and nominating committee does not consist entirely of independent directors and is not subject to annual performance evaluations, and we do not have a corporate governance committee. Accordingly, you will not have the same protections afforded to shareholders of companies that are subject to all of the corporate governance requirements of NASDAQ.

We are an "emerging growth company" and we have elected and comply with reduced public company reporting requirements, which could make our Class A common stock less attractive to investors.

We are an "emerging growth company," as defined in the JOBS Act. For as long as we continue to be an emerging growth company, we are eligible for certain exemptions from various public company reporting requirements. These exemptions include, but are not limited to, (i) not being required to comply with the auditor attestation requirements of Section 404 of the Sarbanes-Oxley Act, (ii) reduced disclosure obligations regarding executive compensation in our periodic reports, proxy statements and registration statements, and (iii) exemptions from the requirements of holding a nonbinding advisory vote on executive compensation and shareholder approval of any golden parachute payments not previously approved. We expect that we will cease to be an "emerging growth company" as of December 31, 2021. Until then, or such later date that we cease to be an "emerging growth company", we intend to rely on certain elections we have made with regard to the reduced disclosure obligations regarding executive compensation in this annual report on Form 10-K and our forthcoming proxy statement and may elect to take advantage of other reduced disclosure obligations in future filings. As a result, the information that we provide to holders of our Class A common stock may be different than you might receive from other public reporting companies in which you hold equity interests. We cannot predict if investors will find our Class A common stock less attractive as a result of

reliance on these exemptions. If some investors find our Class A common stock less attractive as a result of any choice we make to reduce disclosure, there may be a less active trading market for our Class A common stock and the market price for our Class A common stock may be more volatile.

The JOBS Act also permits an emerging growth company like us to take advantage of an extended transition period to comply with new or revised accounting standards applicable to public companies. We are electing to take advantage of this extended transition period for complying with new or revised accounting standards provided for by the JOBS Act. We will therefore comply with new or revised accounting standards when they apply to private companies. As a result, our consolidated financial statements may not be comparable with companies that comply with public company effective dates for accounting standards.

Provisions of our corporate governance documents could make an acquisition of us more difficult and may prevent attempts by our shareholders to replace or remove our current management, even if beneficial to our shareholders.

Our certificate of incorporation and bylaws and the Delaware General Corporation Law (the "DGCL") contain provisions that could make it more difficult for a third party to acquire us, even if doing so might be beneficial to our shareholders. Among other things:

- these provisions allow us to authorize the issuance of undesignated preferred stock, the terms of which may be established and the shares of which may be issued without shareholder approval, and which may include supermajority voting, special approval, dividend, or other rights or preferences superior to the rights of shareholders;
- these provisions provide for a classified board of directors with staggered three-year terms;
- these provisions provide that, at any time when GTCR controls, in the aggregate, less than 40% of the outstanding shares of our Class A common stock, directors may only be removed for cause, and only by the affirmative vote of holders of at least 66⅔% in voting power of all the then-outstanding shares of our stock entitled to vote thereon, voting together as a single class;
- these provisions prohibit shareholder action by written consent from and after the date on which GTCR controls, in the aggregate, less than 35% in voting power of our stock entitled to vote generally in the election of directors;
- these provisions provide that for as long as GTCR controls, in the aggregate, at least 50% in voting power of our stock entitled to vote generally in the election of directors, any amendment, alteration, rescission or repeal of our bylaws by our shareholders will require the affirmative vote of a majority in voting power of the outstanding shares of our capital stock and at any time when GTCR controls, in the aggregate, less than 50% in voting power of all outstanding shares of our stock entitled to vote generally in the election of directors, any amendment, alteration, rescission or repeal of our bylaws by our shareholders will require the affirmative vote of the holders of at least 66⅔% in voting power of all the then-outstanding shares of our stock entitled to vote thereon, voting together as a single class; and
- these provisions establish advance notice requirements for nominations for elections to our Board or for proposing matters that can be acted upon by shareholders at shareholder meetings; provided, however, at any time when GTCR controls, in the aggregate, at least 10% in voting power of our stock entitled to vote generally in the election of directors, such advance notice procedure will not apply to GTCR.

We will opt out of Section 203 of the DGCL, which generally prohibits a Delaware corporation from engaging in any of a broad range of business combinations with any interested shareholder for a period of three years following the date on which the shareholder became an interested shareholder. However, our certificate of incorporation contains a provision that provides us with protections similar to Section 203, and will prevent us from engaging in a business combination with a person (excluding GTCR and any of its direct or indirect transferees and any group as to which such persons are a party) who acquires at least 85% of our Class A common stock for a period of three years from the date such person acquired such common stock, unless board or shareholder approval is obtained prior to the acquisition. These provisions 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 you and other shareholders to elect directors of your choosing and cause us to take other corporate actions you desire, including actions that you may deem advantageous, or negatively affect the trading price of our Class A common stock. In addition, because our Board is responsible for appointing the members of our management team, these provisions could in turn affect any attempt by our shareholders to replace current members of our management team.

These and other provisions in our certificate of incorporation, bylaws and Delaware law could make it more difficult for shareholders or potential acquirers to obtain control of our Board or initiate actions that are opposed by our then-current Board, including actions to delay or impede a merger, tender offer or proxy contest involving our company. The existence of these provisions could negatively affect the price of our Class A common stock and limit opportunities for you to realize value in a corporate transaction.

Our certificate of incorporation will designate the Court of Chancery of the State of Delaware as the exclusive forum for certain litigation that may be initiated by our shareholders and the federal district courts of the United States as the exclusive forum for litigation arising under the Securities Act, which could limit our shareholders' ability to obtain a favorable judicial forum for disputes with us.

Pursuant to our certificate of incorporation, unless we consent in writing to the selection of an alternative forum, the Court of Chancery of the State of Delaware will be the sole and exclusive forum for any claims in state court for (1) any derivative action or proceeding brought on our behalf, (2) any action asserting a claim of breach of a fiduciary duty owed by any of our directors, officers or other employees to us or our shareholders, (3) any action asserting a claim against us arising pursuant to any provision of the DGCL, our certificate of incorporation or our bylaws or (4) any other action asserting a claim against us that is governed by the internal affairs doctrine; provided that for the avoidance of doubt, the forum selection provision that identifies the Court of Chancery of the State of Delaware as the exclusive forum for certain litigation, including any "derivative action," will not apply to suits to enforce a duty or liability created by the Securities Act, the Exchange Act or any other claim for which the federal courts have exclusive jurisdiction. Our certificate of incorporation will also provide that, unless we consent in writing to the selection of an alternative forum, the federal district courts of the United States shall be the exclusive forum for the resolution of any complaint asserting a cause of action arising under the Securities Act. Our certificate of incorporation will further provide that any person or entity purchasing or otherwise acquiring any interest in shares of our capital stock is deemed to have notice of and consented to the provisions of our certificate of incorporation described above. The forum selection provisions in our certificate of incorporation may have the effect of discouraging lawsuits against us or our directors and officers and may limit our shareholders' ability to obtain a favorable judicial forum for disputes with us. If the enforceability of our forum selection provisions were to be challenged, we may incur additional costs associated with resolving such challenge. While we currently have no basis to expect any such challenge would be successful, if a court were to find our forum selection provisions to be inapplicable or unenforceable with respect to one or more of these specified types of actions or proceedings, we may incur additional costs associated with having to litigate in other jurisdictions, which could have an adverse effect on our business, financial condition, results of operations, cash flows and prospects and result in a diversion of the time and resources of our employees, management and board of directors.

Our operating results and stock price may be volatile.

Our quarterly operating results are likely to fluctuate in the future. In addition, securities markets worldwide have experienced, and are likely to continue to experience, significant price and volume fluctuations, including as a result of the COVID-19 pandemic. This market volatility, as well as general economic, market or political conditions, could subject the market price of our Class A common stock to wide price fluctuations regardless of our operating performance. Our operating results and the trading price of our Class A common stock may fluctuate in response to various factors, including:

- market conditions in our industry or the broader stock market;
- actual or anticipated fluctuations in our quarterly financial and operating results;
- introduction of new products or services by us or our competitors;
- issuance of new or changed securities analysts' reports or recommendations;
- sales, or anticipated sales, of large blocks of our stock;
- additions or departures of key personnel;
- regulatory or political developments;
- litigation and governmental investigations;
- changing economic conditions;
- investors' perception of us;
- events beyond our control such as weather, war and health crises such as the COVID-19 pandemic; and

- any default on our indebtedness.

These and other factors, many of which are beyond our control, may cause our operating results and the market price and demand for our Class A common stock to fluctuate substantially. Fluctuations in our quarterly operating results could limit or prevent investors from readily selling their shares of Class A common stock and may otherwise negatively affect the market price and liquidity of our shares of Class A common stock. In addition, in the past, when the market price of a stock has been volatile, holders of that stock have sometimes instituted securities class action litigation against the company that issued the stock. If any of our shareholders brought a lawsuit against us, we could incur substantial costs defending the lawsuit. Such a lawsuit could also divert the time and attention of our management from our business, which could significantly harm our profitability and reputation.

A significant portion of our total outstanding shares of Class A common stock are subject to restrictions on resale but may be sold into the market in the near future. This could cause the market price of our Class A common stock to drop significantly, even if our business is doing well.

Sales of a substantial number of shares of our Class A common stock in the public market could occur at any time. These sales, or the perception in the market that the holders of a large number of shares of Class A common stock intend to sell shares, could reduce the market price of our Class A common stock. As of December 31, 2020, we had 96,646,515 outstanding shares of Class A common stock, 27,646,515 of which are subject to restrictions on resale including those associated with lock-up agreements executed in connection with our initial public offering and those imposed by federal securities laws. All of these shares of Class A common stock will, however, be able to be resold after the expiration of the lock-up period, as well as pursuant to customary exceptions thereto or upon the waiver of the lock-up agreement by the representatives on behalf of the underwriters, subject to restrictions imposed by federal securities laws. We also intend to register shares of Class A common stock that we may issue under our equity compensation plans. Once we register these shares, they can be freely sold in the public market upon issuance. As restrictions on resale end, and as new shares are issued pursuant to our equity compensation plans, the market price of our stock could decline if the holders of those shares sell them or are perceived by the market as intending to sell them.

Because we have no current plans to pay regular cash dividends on our Class A common, you may not receive any return on investment unless you sell your Class A common stock for a price greater than that which you paid for it.

We do not anticipate paying any regular cash dividends on our Class A common stock. Any decision to declare and pay dividends in the future will be made at the discretion of our Board and will depend on, among other things, our results of operations, financial condition, cash requirements, contractual restrictions and other factors that our Board may deem relevant. In addition, our ability to pay dividends is, and may be, limited by covenants of existing and any future outstanding indebtedness we or our subsidiaries incur. Therefore, any return on investment in our Class A common stock is solely dependent upon the appreciation of the price of our Class A common stock on the open market, which may not occur. See "Dividend Policy" for more detail.

We may issue shares of preferred stock in the future, which could make it difficult for another company to acquire us or could otherwise adversely affect holders of our Class A common stock, which could depress the price of our Class A common stock.

Our certificate of incorporation authorizes us to issue one or more series of preferred stock. Our Board has the authority to determine the preferences, limitations and relative rights of the shares of preferred stock and to fix the number of shares constituting any series and the designation of such series, without any further vote or action by our shareholders. Our preferred stock could be issued with voting, liquidation, dividend and other rights superior to the rights of our Class A common stock. The potential issuance of preferred stock may delay or prevent a change in control of us, discouraging bids for our Class A common stock at a premium to the market price, and materially adversely affect the market price and the voting and other rights of the holders of our Class A common stock.

Item 1B. Unresolved Staff Comments

None.

Item 2. Properties

Our corporate headquarters are in San Diego, California, where we occupy approximately 118,000 square feet of leased space. We completed construction of the facility in 2020. In addition to housing our headquarters, the facility serves as the principal

hub of operations for our nucleic acid production business and was purpose built to expand the capacity of this business segment while adding specialized capabilities in the form of clean rooms, air handling, waste and solvent handling, and GMP capabilities.

Our other facilities are in Burlingame, California, Southport, North Carolina and Sterling, Virginia. Across all of our facilities we have approximately 140,000 square feet of lab and production space. All facilities are leased. Our facility in Burlingame is subject to a lease that terminates in June 2022, at which time we intend to relocate the operations. A summary of our facilities is listed below.

We own a 3,000 square foot facility in Peterborough, United Kingdom, which previously housed our local sales office. The building is being marketed for sale.

Location	Approx. Square Footage	Products Produced	Lease Term
San Diego, CA	119,000	TriLink BioTechnologies branded reagents	May 2030
Burlingame, CA	65,000	Vector Laboratories branded reagents	June 2022
Southport, NC	20,000	Cygnus Technologies branded reagents	July 2027
Sterling, VA	21,000	Glen Research branded reagents	April 2025

Item 3. Legal Proceedings

From time to time, we may be involved in various legal proceedings and subject to claims that arise in the ordinary course of business. Although the results of litigation and claims are inherently unpredictable and uncertain, we are not currently a party to any legal proceedings the outcome of which, if determined adversely to us, are believed to, either individually or taken together, have a material adverse effect on our business, operating results, cash flows or financial condition. Regardless of the outcome, litigation has the potential to have an adverse impact on us because of defense and settlement costs, diversion of management resources, and other factors. See “Risk Factors—Risks Related to Our Intellectual Property—Intellectual property litigation and other proceedings could cause us to spend substantial resources and distract our personnel from their normal responsibilities” and “Risk Factors—Risks Related to Our Intellectual Property—If we are sued for infringing, misappropriating, or otherwise violating intellectual property rights of third parties, such litigation could be costly and time consuming and could prevent or delay us from developing or commercializing our current or future products.”

Item 4. Mine Safety Disclosures

None.

Part II.

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

Market Information

Our Class A common stock trades on The Nasdaq Global Select Market under the symbol "MRVI" since November 20, 2020. Prior to that date there was no public market for our Class A common stock.

Our Class B common stock are not listed nor traded on any stock exchange.

Stock Performance Graph

The following graph shows the total stockholder's return on an investment of $100 in cash at market close on November 20, 2020 (the first day of trading of our common stock), through December 31, 2020 for (i) our Class A common stock, (ii) the Nasdaq Composite Index and (iii) the Nasdaq Biotechnology Index. Pursuant to applicable Securities and Exchange Commission rules, all values assume reinvestment of pre-tax amount of all dividends; however, no dividends have been declared on our Class A common stock to date. The stockholder return shown in the graph below may not be indicative of future stock price performance, and we do not make or endorse any predictions as to future stockholder return. This graph shall not be deemed "soliciting material" or be deemed "filed" for purposes of Section 18 of the Securities Exchange Act of 1934 as amended, or Exchange Act, or otherwise subject to the liabilities under that Section, and shall not be deemed to be incorporated by reference into any of our filings under the Securities Act of 1933, as amended, or Securities Act, whether made before or after the date hereof and irrespective of any general incorporation language in any such filing.

Holders of Common Stock

As of March 17, 2021, there were two holders of record of our Class A common stock. As of March 17, 2021, there was one holder of record of our Class B common stock.

Dividend Policy

We currently intend to retain all available funds and any future earnings to fund the development and growth of our business and to repay indebtedness and, therefore, we do not anticipate paying any cash dividends in the foreseeable future. Additionally, because we are a holding company, our ability to pay dividends on our Class A common stock may be limited by restrictions on

the ability of our subsidiaries to pay dividends or make distributions to us. Any future determination to pay dividends will be at the discretion of our Board, subject to compliance with covenants in current and future agreements governing our and our subsidiaries' indebtedness, including our new credit agreement (the "New Credit Agreement") entered into in October, 2020, and will depend on our results of operations, financial conditions, capital requirements and other factors that our Board deems relevant.

Unregistered Sales of Equity Securities

During the fiscal year ended December 31, 2020, we had the following unregistered securities transactions:

1. On August 25, 2020, we issued 1,000 shares of common stock to MLSH 1 for $0.01 per share in connection with our formation.
2. On November 19, 2020, we issued 28,965,664 shares of Class A common stock to MLSH 2 as partial consideration for the Blocker Mergers.
3. On November 19, 2020, we issued 168,654,981 shares of Class B common stock to MLSH 1 in exchange for LLC units in Topco LLC (the "LLC Units").

The issuances of the securities described above were exempt from registration under the Securities Act of 1933, as amended (the "Securities Act") under Section 4(a)(2) of the Securities Act as transactions by an issuer not involving any public offering.

Use of Proceeds

On November 24, 2020 we closed the initial public offering ("IPO") of our Class A common stock pursuant to a Registration Statement on Form S-1 (File No. 333-249733), which was declared effective on November 19, 2020.

Under the Registration Statement, we sold an aggregate of 69,000,000 shares of Class A common stock, including 9,000,000 shares of Class A common stock purchased by the underwriters on November 24, 2020 pursuant to the underwriters' option to purchase additional shares at the initial public offering price of $27.00 per share. We received net proceeds of approximately $1.8 billion after deducting underwriting discounts and commissions, of which $1.5 billion was used to purchase 59,526,715 of LLC Units in Topco LLC (the "LLC Units"), $208.1 million was used to pay Maravai Life Sciences Holdings 2 ("MLSH 2") as consideration for the Blocker Mergers, and $33.7 million was used to acquire 1,319,148 outstanding shares of Class A common stock from MLSH 2 upon the underwriters' exercise to purchase additional shares.

In turn, Topco LLC applied the proceeds received from us to repay $50.0 million of outstanding indebtedness under the New Credit Agreement, paid expenses incurred in related to the IPO and certain organizational transactions ("Organizational Transactions").

There has been no material change in the use of proceeds as described in our prospectus, dated November 19, 2020, filed with the SEC on November 23, 2020 pursuant to Rule 424(b) under the Securities Act.

Issuer Purchases of Equity Securities

During the fiscal year ended December 31, 2020, we purchased shares of our equity securities of any class that we have registered pursuant to Section 12 of the Exchange Act in the following transaction:

On November 24, 2020, we redeemed 1,319,148 shares of our Class A common stock from MLSH 1 in connection with the underwriters' exercise of their option to purchase additional shares in our IPO for $27 per share, less the per share amounts associated with underwriting discounts and commissions in our IPO, as set forth in the use of proceeds described in our IPO prospectus.

Equity Compensation Plan Information

The following table sets forth information as of December 31, 2020 regarding shares of our Class A common stock that may be issued under the Company's equity compensation plan, consisting of our 2020 Omnibus Incentive Plan (the "2020 Plan) and our 2020 Employee Stock Purchase Plan (the "ESPP").

Plan Category	Number of securities to be issued upon exercise of outstanding options, warrants and rights (a)	Weighted-average exercise price of outstanding options, warrants and rights	Number of securities available for future issuance under equity compensation plans (excluding securities reflected in column (a))
Equity compensation plans approved by security holders [1] [2] [3]	1,585,312	$ 25.77	30,914,477
Total	1,585,312	$ 25.77	30,914,477

(1) Includes our 2020 Omnibus Incentive Plan and 2020 Employee Stock Purchase Plan

(2) Includes 5,152,413 shares that remain available for purchase under the 2020 Employee Stock Purchase Plan and 25,762,064 shares of common stock that remain available for grant under the 2020 Omnibus Incentive Plan. The 2020 Omnibus Incentive Plan provides for an automatic increase in the number of shares reserved for issuance thereunder on January 1 of each calendar year during the term of the Plan, equal to the lesser of (a) 4.0% of the aggregate number of shares and shares of Class B common stock outstanding on the final day of the immediately preceding calendar year and (b) such smaller number of shares as determined by the Board. The 2020 Employee Stock Purchase Plan also provides for an automatic increase in the number of shares reserved for issuance thereunder on January 1 of each calendar year during the term of the plan, equal to the lesser of (a) 1.25% of the aggregate number of shares and shares of Class B common stock outstanding on the final day of the immediately preceding calendar year and (b) such smaller number of shares as is determined by the Board.

(3) The weighted average exercise price includes restricted stock unit awards that can be exercised for no consideration. The weighted average exercise price excluding these restricted stock units is $26.98.

Item 6. Selected Financial Data

The Company has applied the amendment to Regulation S-K Item 301 which became effective on February 10, 2021.

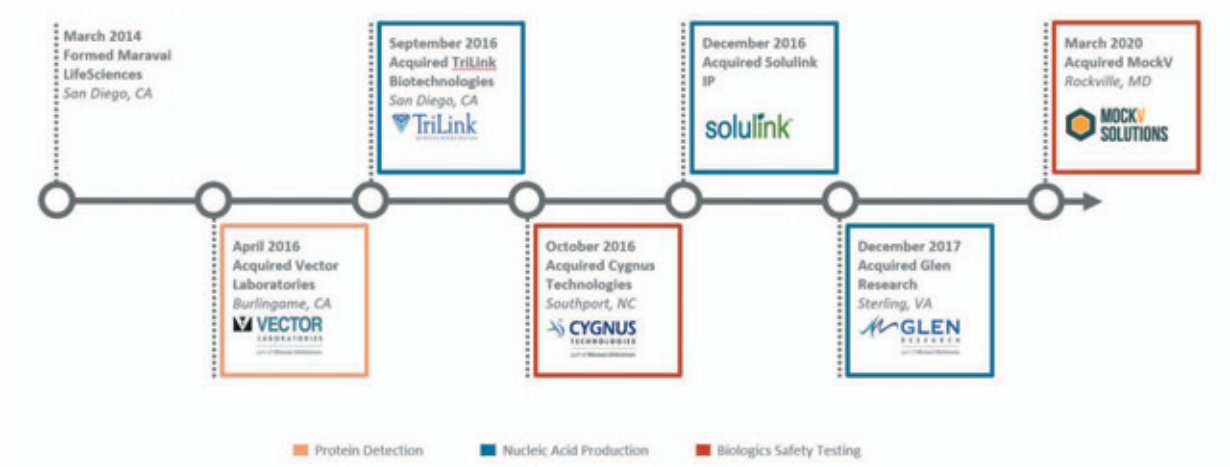
Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations

You should read the following discussion and analysis of financial condition and results of operations together with the section titled "Selected Consolidated Financial Data" and our audited consolidated financial statements and related notes included elsewhere in this Annual Report on Form 10-K. This discussion and analysis reflects our historical results of operations and financial position, and contain forward-looking statements that involve risks and uncertainties. Our actual results could differ materially from those discussed in or implied by these forward-looking statements. Factors that could cause or contribute to such differences include, but are not limited to, those discussed in the section titled "Risk Factors." Please also see the section titled "Forward Looking Statements." We were incorporated in August 2020 and, pursuant to the organizational transactions described in Note 1 to our consolidated financial statements, became a holding company whose principal asset is a controlling equity interest in Topco LLC. As the sole managing member of Topco LLC, we operate and control the business and affairs of Topco LLC and its subsidiaries. Accordingly, we consolidate Topco LLC in our consolidated financial statements and report a non-controlling interest related to the portion of Topco LLC not owned by us. Because the organizational transactions were considered transactions between entities under common control, the consolidated financial statements for periods prior to the organizational transactions and the initial public offering have been adjusted to combine the previously separate entities for presentation purposes. Unless otherwise noted or the context otherwise requires, references in this Annual Report on Form 10-K to "we," "us" or "our" refer to Maravai LifeSciences Holdings, Inc. and its subsidiaries.

Overview

We are a leading life sciences company providing critical products to enable the development of drug therapies, diagnostics, novel vaccines and support research on human diseases. Our more than 5,200 customers as of December 31, 2020 include the top 20 global biopharmaceutical companies ranked by research and development expenditures according to industry consultants, and many other emerging biopharmaceutical and life sciences research companies, as well as leading academic research institutions and *in vitro* diagnostics companies. Our products address the key phases of biopharmaceutical development and include complex nucleic acids for diagnostic and therapeutic applications, antibody-based products to detect impurities during the production of biopharmaceutical products, and products to detect the expression of proteins in tissues of various species.

We have and will continue to build a transformative life sciences products company by acquiring businesses and accelerating their growth through capital infusions and industry expertise. Biomedical innovation is dependent on a reliable supply of reagents in the fields of nucleic acid production, biologics safety testing and protein labeling. From inventive startups to the world's leading biopharmaceutical, vaccine, diagnostics and gene and cell therapy companies, these customers turn to us to solve their complex discovery challenges and help them streamline and scale their supply chain needs beginning from research and development through clinical trials to commercialization.



Our primary customers are biopharmaceutical companies who are pursuing novel research and product development programs. Our customers also include a range of government, academic and biotechnology institutions.

As of December 31, 2020, we employed a team of over 410 employees, approximately 20% of whom have advanced degrees. We primarily utilize a direct sales model for our sales to our customers in North America. Our international sales, primarily in Europe and Asia Pacific, are sold through a combination of third-party distributors as well as via a direct sales model. The percentage of our total revenue derived from customers in North America was 52.9%, 58.7% and 59.9% for the years ended December 31, 2020, 2019 and 2018, respectively.

We generated revenue of $284.1 million, $143.1 million and $123.8 million for the years ended December 31, 2020, 2019 and 2018, respectively.

Total revenue by segment was $206.3 million in Nucleic Acid Production, $54.9 million in Biologics Safety Testing and $22.9 million in Protein Detection for the year ended December 31, 2020, compared to $72.6 million, $44.4 million and $26.1 million, respectively, for the year ended December 31, 2019. Total revenue by segment was $60.0 million in Nucleic Acid Production, $38.5 million in Biologics Safety Testing and $25.3 million in Protein Detection for the year ended December 31, 2018.

Our research and development efforts are geared towards meeting our customers' needs. We incurred research and development expenses of $9.3 million, $3.6 million and $4.5 million for the years ended December 31, 2020, 2019 and 2018, respectively. We intend to continue to invest in research and development and new products and technologies to support our customers' needs for the foreseeable future.

We focus a substantial portion of our resources supporting our core business segments. We are actively pursuing opportunities to expand our customer base both domestically and internationally by fostering strong relationships with both existing and new customers and distributors. Our management team has experience working with biopharmaceutical, vaccine, diagnostics and gene and cell therapy companies as well as academic and research scientists. We also intend to continue making investments in our overall infrastructure and business segments to support our growth. We incurred aggregate selling, general, and administrative expenses of $94.2 million, $48.4 million and $41.2 million for the years ended December 31, 2020, 2019 and 2018, respectively.

Since our inception in 2016, we have incurred net losses in each year up to December 31, 2019. For the year ended December 31, 2020, we reported net income of $89.0 million. Our net losses were $5.2 million and $16.9 million for the years ended December 31, 2019 and 2018, respectively. We expect our expenses will increase in connection with our ongoing activities, as we:

- attract, hire and retain qualified personnel;
- invest in processes and infrastructure to enable manufacturing automation;

- support research and development to introduce new products and services;
- market and sell new and existing products and services;
- protect and defend our intellectual property;
- acquire businesses or technologies to support the growth of our business; and
- function as a public company.

Key Factors Affecting Our Results of Operations and Future Performance

We believe that our financial performance has been, and in the foreseeable future will continue to be, primarily driven by a number of factors as described below, each of which presents growth opportunities for our business. These factors also pose important challenges that we must successfully address in order to sustain our growth and improve our results of operations. Our ability to successfully address these challenges is subject to various risks and uncertainties, including those described under the heading "Risk Factors."

Drug Development Pipelines

Our financial performance has largely been driven by our customers accelerating their drug development pipelines for cell, gene and RNA therapies. A key factor to our future success will be our ability to provide good manufacturing practices ("GMP") grade nucleic acids and associated pre-clinical and non-GMP compounds to these customers. Our GMP-grade nucleic acids are manufactured following certain voluntary GMP quality standards and customer specific requirements. We believe these products, including "GMP-grade" materials, are exempt from compliance with the current GMP regulations of the U.S. Food and Drug Administration ("FDA"). See "Business—Government Regulation." The mRNA and gene editing therapeutics that many of our customers are developing are early in their lifecycle. We expect to see an increase in demand for our GMP-grade nucleic acids to the extent that our customers have success in their early-phase clinical trials of these therapeutics. New FDA policies, and plans for maximizing the use of expedited programs, may advance the development of cell and gene therapies. Additionally, the COVID-19 pandemic has both fostered increased interest in mRNA as a therapeutic modality for this virus and directed significant resources to developing a base of knowledge for mRNA.

Demand for Outsourced GMP-grade RNA

We believe that growing numbers of RNA therapeutics companies expect to outsource production of pre-clinical and GMP-grade RNA to trusted business partners. Companies are often driven to outsource due to the complex nature of the manufacturing process, faster speeds to market, recent availability of high-quality contract development and manufacturing organizations ("CDMO") partners, an influx of inexperienced and virtual biopharmaceutical companies, the need for redundancy of clinical and commercial supply and recent moves to onshore critical supply chains. We offer a number of products and services to meet this demand for outsourced pre-clinical and GMP-grade RNA.

Demand for Outsourced Biologics Safety Testing Products and Assay Development Services

We believe that many biopharmaceutical companies rely on outsourced providers for their biologics safety testing products and assay development needs. Once process development has been completed, biopharmaceutical companies avoid changing biologics safety testing products or providers for fear of affecting the regulatory approval pathway of their therapeutic products. This supports revenue growth for the biologics safety testing products that have been adopted by these companies. We also have long-standing relationships with many of our customers, which are bolstered by the regulatory demands on our customers and the "designed-in" nature of our products and services. A successful partnership with a customer related to the development of their drug leads to repeat business as customers become comfortable with our products. The drug approval process risk is reduced when regulatory bodies are familiar with an impurity detection product vendor and most biopharmaceutical customers are not willing to risk a regulatory issue related to biologics safety testing for their drug program on an unproven vendor. It is therefore critical to our success that our products and services be "designed-in" at the outset, especially to the most promising product candidates.

COVID-19 Considerations

In late 2019, COVID-19 surfaced in Wuhan, China. Since then, COVID-19 has spread to multiple other regions and countries, including the San Francisco Bay Area, where our Protein Detection business is located, the San Diego, California area, where our Nucleic Acid Production business is located, and the Wilmington, North Carolina area, where our Biologics Safety Testing products business is located. The COVID-19 pandemic continues to evolve, and to date has led to the implementation of

various responses, including government imposed shelter-in-place orders, quarantines, travel restrictions and other public health safety measures, as well as reported and continued adverse impacts on healthcare resources, facilities and providers, in California, across the United States and in many other countries throughout the world. In response to the spread of COVID-19, and in accordance with direction from state and local government authorities, we have been and continue to restrict access to our facilities mostly to personnel and third parties who must perform critical activities that are required to be completed on-site, limit the number of such personnel that can be present at our facilities at any one time, and request that some of our personnel work remotely. In the event that government authorities were to further modify current restrictions, our employees conducting research and development, or manufacturing activities may not be able to access our laboratory or manufacturing space, and our core activities may be significantly limited or curtailed, possibly for an extended period of time.

As a result of the COVID-19 pandemic, we have experienced and may continue to experience in the future severe disruptions, including:

- interruption of or delays in receiving products and supplies from the third parties we rely on to, among other things, manufacture components of our products, due to staffing shortages, production slowdowns or stoppages and disruptions in delivery systems, which may impair our ability to manufacture and sell our products and provide our services;
- limitations on our business operations by the local, state, or federal government that could impact our ability to manufacture, sell or deliver our products and services;
- on-site visit limitations and prohibitions imposed by customers that could impact our ability to engage in pre-sales activities, and to provide post-sale activities, such as training and service and support;
- delays in customers' purchasing decisions and negotiations with customers and potential customers;
- business disruptions caused by workplace, laboratory and office closures and an increased reliance on employees working from home, travel limitations, cyber security and data accessibility limits, or communication or mass transit disruptions; and
- limitations on employee resources that would otherwise be focused on the conduct of our activities, including because of sickness of employees or their families or the desire of employees to avoid contact with large groups of people.

Any of these factors could severely impact our research and development activities, manufacturing business operations and sales, or delay necessary interactions with local regulators, third-party vendors and other important contractors and customers. These and other factors arising from the COVID-19 pandemic could worsen in countries that are already afflicted with COVID-19, could continue to spread to additional countries, or could return to countries where the pandemic has been partially contained, and could further adversely impact our ability to conduct our business generally and have a material adverse impact on our consolidated operations and financial condition and results. For example, our Protein Detection segment experienced a decline in sales during the second quarter of 2020 relative to the same period in 2019 due to stay-at-home orders in the San Francisco Bay Area and the closure of many academic laboratories that are the main customers of this segment and the reduced operations of other customers. Prolonged or repeated closures or shutdowns as a result of the COVID-19 pandemic could continue to affect sales of our protein detection segment adversely. For the year ended December 31, 2020, several of our product categories have experienced accelerated growth, notably our CleanCap® and oligonucleotide products. We expect the positive impact of COVID-19 on our growth to sustain in the longer term as the entire mRNA category benefited from lessons learned during the COVID-19 pandemic. We expect research in other therapeutic categories to experience increased growth as research conducted for COVID-19 diffuses more broadly into other vaccines and therapies.

The extent to which the pandemic may negatively impact our consolidated operations and results of operations, or those of our third-party manufacturers, suppliers, partners or customers will depend on future developments, which are highly uncertain and cannot be predicted with confidence, such as the ultimate geographic spread of the disease, the duration of the pandemic, the extent of travel restrictions, additional or modified government actions, new information that will emerge concerning the severity and impact of COVID-19 and actions to contain the pandemic or treat its impact, such as social distancing, quarantines, lockdowns or business closures.

We have responded to the pandemic by leveraging our deep product portfolio and general scientific expertise to develop robust COVID-19-related product and service offerings providing critical support for the development of therapeutics, vaccines and diagnostics. We expect that our ongoing efforts to utilize our portfolio of products and services to enable solutions for this evolving pandemic will offset the impact of our customer site closures; however, negative impacts may persist.

We remain fully operational as we abide by local COVID-19 safety regulations across the world. To achieve this, we have had and continue to have many employees working remotely and have adopted significant protective measures for our employees on site, including conducting weekly COVID-19 testing, staggered shifts, social distancing and hygiene best practices

recommended by the Centers for Disease Control and Prevention (the "CDC") and local public health officials. In addition, we have taken additional steps to monitor and strengthen our supply chain to maintain an uninterrupted supply of our critical products and services.

How We Assess Our Business

We consider a variety of financial and operating measures in assessing the performance of our business. The key measures we use to determine how our business is performing are revenue and Adjusted EBITDA.

Adjusted EBITDA is a non-GAAP financial measure that we define as net income (loss) adjusted for interest expense, provision for income taxes, depreciation, amortization and equity-based compensation expenses. Adjusted EBITDA reflects further adjustments to eliminate the impact of certain items, including certain non-cash and other items, that we do not consider representative of our ongoing operating performance. We also present Adjusted Free Cash Flow, which is a non-GAAP measure that we define as Adjusted EBITDA less capital expenditures.

Management uses Adjusted EBITDA to evaluate the financial performance of our business and the effectiveness of our business strategies. We present Adjusted EBITDA and Adjusted Free Cash Flow because we believe they are frequently used by analysts, investors and other interested parties to evaluate companies in our industry and they facilitate comparisons on a consistent basis across reporting periods. Further, we believe they are helpful in highlighting trends in our operating results because they exclude items that are not indicative of our core operating performance. Adjusted EBITDA is also a component of the financial covenant under our newly refinanced debt (the "New Credit Agreement") that governs our ability to access more than $63.0 million in aggregate letters of credit obligations and outstanding borrowings under our newly refinanced revolving credit facility (the "New Revolving Credit Facility"). In addition, if we borrow more than $63.0 million, we are required to maintain a specified net leverage ratio. See *"—Liquidity and Capital Resources—Sources of Liquidity—Debt Covenants"* for a discussion of this financial covenant.

Adjusted EBITDA and Adjusted Free Cash Flow have limitations as analytical tools and you should not consider them in isolation, or as substitutes for analysis of our results as reported under GAAP. We may in the future incur expenses similar to the adjustments in the presentation of Adjusted EBITDA. In particular, we expect to incur meaningful share-based compensation expense in the future. Other limitations include that Adjusted EBITDA and Adjusted Free Cash Flow do not reflect:

- all expenditures or future requirements for capital expenditures or contractual commitments;
- changes in our working capital needs;
- provision for income taxes, which may be a necessary element of our costs and ability to operate;
- the costs of replacing the assets being depreciated, which will often have to be replaced in the future;
- the non-cash component of employee compensation expense; and
- the impact of earnings or charges resulting from matters we consider not to be reflective, on a recurring basis, of our ongoing operations.

In addition, Adjusted EBITDA and Adjusted Free Cash Flow may not be comparable to similarly titled measures used by other companies in our industry or across different industries.

Components of Results of Operations

Revenue

Our revenue consists of product and services revenue and, to a much lesser extent, revenue from royalties attributable to the out-licensing of our proprietary biological assets intellectual property that we may develop. We generated total consolidated revenue of $284.1 million, $143.1 million and $123.8 million for the years ended December 31, 2020, 2019 and 2018, respectively, through the following segments: (i) Nucleic Acid Production, (ii) Biologics Safety Testing and (iii) Protein Detection.

Nucleic Acid Production Segment

Our Nucleic Acid Production segment focuses on the manufacturing and sale of highly modified nucleic acids products to support the needs of customers' research, therapeutic and vaccine programs. This segment also provides research products for labeling and detecting proteins in cells and tissue samples.

Biologics Safety Testing Segment

Our Biologics Safety Testing segment focuses on manufacturing and selling biologics safety and impurity tests and assay development services that are utilized by our customers in their biologic drug manufacturing activities.

Protein Detection Segment

Our Protein Detection segment products, which include a portfolio of labeling and visual detection reagents, are purchased by our scientific research customers for their tissue-based protein detection and characterization needs.

Cost of Revenue

Cost of revenue associated with our products primarily consists of manufacturing related costs incurred in the production process, including personnel and related costs, equity-based compensation from awards issued by both MLSH 1 and one of our subsidiaries, and stock options and restricted stock units ("RSUs") we have issued, inventory write-downs, costs of materials, labor and overhead, packaging and delivery costs and allocated costs, including facilities, information technology, depreciation, and amortization of intangibles. Cost of revenue associated with our services primarily consists of personnel and related costs, equity-based compensation awards, cost of materials and allocated costs, including facilities and information technology costs. Costs of services were not material to the years ended December 31, 2020, 2019 and 2018.

We expect cost of revenue to increase in future periods as our revenue grows.

Operating Expenses

Research and development. Research and development costs primarily consist of salaries, benefits, incentive compensation, equity-based compensation from awards issued by both MLSH 1 and one of our subsidiaries as well as equity-based compensation from stock options and RSUs issued by us, cost of supplies, in-process research and development costs from asset acquisitions and allocated facilities costs for employees engaged in research and development of products and services. We expense all research and development costs in the period in which they are incurred. Payment made prior to the receipt of goods or services to be used in research and development are recognized as prepaid assets until the goods are received or services are rendered.

We plan to continue to support our research and development efforts, including meeting our customers' needs.

Selling, general and administrative. Our selling, general and administrative expenses primarily consist of salaries, benefits and equity-based compensation from awards issued by both MLSH 1 and one of our subsidiaries as well as stock-based compensation from stock options and RSUs issued by us to employees in our commercial sales functions, marketing, executive, accounting and finance, legal and human resource functions as well as travel expenses, professional services fees, such as consulting, audit, tax and legal fees, general corporate costs and allocated costs, including facilities, information technology and amortization of intangibles.

We expect that our selling, general and administrative expenses will continue to increase, primarily due to increased headcount to support anticipated growth in the business, costs incurred in increasing our presence globally and increases in marketing activities to drive awareness and adoption of our products and services, and due to incremental costs associated with operating as a public company.

Interest Expense

Interest expense consist of interest costs and the related amortization of the debt discount and deferred issuance costs on our outstanding debt.

Loss on Extinguishment of Debt

Loss on extinguishment of debt represent the write-off of remaining unamortized debt discount and deferred issuance costs on previously outstanding debt when we engage in refinancing activities.

Non-Controlling Interests

As of December 31, 2019 and 2018, Topco LLC held a 70% ownership interest in MLSC Holdings, LLC ("MLSC") with the remaining 30% being recorded as non-controlling interests in our consolidated financial statements. On September 16, 2020,

Topco LLC entered into various agreements with current investors in MLSC, the parent of Cygnus Technologies, to repurchase 43,264 MLSC Class B preferred units and 18,387,206 MLSC common units from the investors for approximately $120.0 million. Additionally, the agreements provided that the remaining 16,736 MLSC Class B preferred units and 7,112,794 MLSC common units held by the investors party to the agreements were subject to exchange into a variable number of common units of MLSH 1 with a total fixed value of approximately $46.4 million. The repurchase for cash consideration and exchange into common units of MLSH 1 was completed leading up to and as a part of the initial public offering. As of December 31, 2020, Topco LLC holds a 100% ownership interest in MLSC.

In connection with the IPO certain organizational transactions were effected (the "Organizational Transactions") whereby the Company was appointed as the sole managing member of Topco LLC pursuant to the amended and restated Topco LLC operating agreement (the "LLC Operating Agreement"). Because we manage and operate the business and control the strategic decisions and day-to-day operations of Topco LLC and also have a substantial financial interest in Topco LLC, we have consolidated the assets, liabilities, non-controlling interest and financial results of Topco LLC into our consolidated financial statements. A portion of our consolidated net income (loss) is allocated to the non-controlling interest to reflect the entitlement of the non-controlling interest holders to Topco LLC's net income (loss). As of December 31, 2020, we hold 37.5% of the outstanding LLC Units of Topco LLC, and 62.5% of the outstanding LLC Units of Topco LLC is held by MLSH 1. Therefore, we report non-controlling interests based on LLC Units of Topco LLC held by MLSH 1 on our consolidated balance sheets as of December 31, 2020. Income or loss attributed to the non-controlling interests is based on the LLC Units outstanding during the period and is presented on the consolidated statements of operations and consolidated statements of comprehensive income.

Income Tax Expense (Benefit)

As a result of our ownership of LLC Units in Topco LLC, we are subject to U.S. federal, state and local income taxes with respect to our allocable share of any taxable income of Topco LLC and will be taxed at the prevailing corporate tax rates.

Results of Operations

The results of operations presented below should be reviewed in conjunction with the consolidated financial statements and notes included elsewhere in this Annual Report on Form 10-K.

	Year Ended December 31,			2020 over 2019 Change	2019 over 2018 Change
	2020	2019	2018		
in thousands, except per share and per unit data					
Revenue	$ 284,098	$ 143,140	$ 123,833	98.5 %	15.6 %
Operating expenses:					
Cost of revenue [1]	79,649	66,849	60,765	19.1 %	10.0 %
Research and development [1]	9,304	3,627	4,499	156.5 %	(19.4)%
Selling, general and administrative [1]	94,245	48,354	41,194	94.9 %	17.4 %
Change in estimated fair value of contingent consideration	—	322	939	*	(65.7)%
Gain on sale and leaseback transaction	(19,002)	—	—		
Total operating expenses	164,196	119,152	107,397	37.8 %	10.9 %
Income from operations	119,902	23,988	16,436	399.8 %	45.9 %
Other expense	(38,206)	(29,841)	(32,934)	28.0 %	(9.4)%
Income (loss) before income taxes	81,696	(5,853)	(16,498)	*	(64.5)%
Income tax expense (benefit)	2,880	(652)	417	*	(256.4)%
Net income (loss)	$ 78,816	$ (5,201)	$ (16,915)	*	(69.3)%
Net loss attributable to non-controlling interests	(10,156)	(731)	(12,443)	*	(94.1)%
Net income (loss) attributable to Maravai LifeSciences Holdings, Inc.	$ 88,972	$ (4,470)	$ (4,472)	*	— %
Net income (loss) per Class A common share/unit attributable to Maravai LifeSciences Holdings, Inc. [2]:					
Basic	$ 7.43	$ (0.03)	$ (0.07)		
Diluted	$ 2.36	$ (0.03)	$ (0.07)		
Weighted average number of Class A common shares/ units outstanding [2]:					
Basic	10,351,137	253,916,941	253,916,941		
Diluted	28,907,979	253,916,941	253,916,941		
Non-GAAP measures [2]:					
Adjusted EBITDA	$ 169,165	$ 62,014	$ 53,000		
Adjusted Free Cash Flow	$ 141,767	$ 42,101	$ 49,263		

* Not meaningful

(1) Includes equity-based compensation expense as follows:

	Year Ended December 31,			2020 over 2019 Change	2019 over 2018 Change
in thousands	2020	2019	2018		
Cost of revenue	$ 282	$ 22	$ 38	1181.8 %	(42.1)%
Research and development	131	211	297	(37.9)%	(29.0)%
Selling, general and administrative	24,216	1,446	1,786	1574.7 %	(19.0)%
Total equity-based compensation expense	$ 24,629	$ 1,679	$ 2,121	1366.9 %	(20.8)%

(2) Net income (loss) per unit for periods prior to our IPO have been retrospectively adjusted to give effect to the unit split on November 11, 2020 as described in Note 1 to our consolidated financial statements. These periods have not been retrospectively adjusted to give effect to the Organizational Transactions described in Note 1 to our consolidated financial statements and the 69,000,000 shares of Class A common stock sold in our IPO. Additionally, basic net income per Class A common stock for the

year ended December 31, 2020, has been calculated by dividing net income for the period, adjusted for preferred unit dividends attributable to MLSC Holdings, LLC ("MLSC") non-controlling interests and net income (loss) attributable to non-controlling interests, by the weighted average Class A common stock outstanding during the period. Diluted net income (loss) per Class A common share/LLC unit gives effect to the potentially dilutive securities by application of the treasury stock method or if-converted method, as applicable.

Revenue

Consolidated revenue by segment was as follows:

	Year Ended December 31,			2020 over 2019	2019 over 2018	Percentage of Revenue		
in thousands	**2020**	**2019**	**2018**	**Change**	**Change**	**2020**	**2019**	**2018**
Revenue								
Nucleic Acid Production	$ 206,320	$ 72,602	$ 60,057	184.2 %	20.9 %	72.6 %	50.8 %	48.5 %
Biologics Safety Testing	54,897	44,416	38,492	23.6 %	15.4 %	19.3 %	31.0 %	31.1 %
Protein Detection	22,881	26,122	25,284	(12.4)%	3.3 %	8.1 %	18.2 %	20.4 %
Total revenue	$ 284,098	$ 143,140	$ 123,833	98.5 %	15.6 %	100.0 %	100.0 %	100.0 %

Comparison of Years Ended December 31, 2020 and 2019

Total revenue was $284.1 million for the year ended December 31, 2020 compared to $143.1 million for the year ended December 31, 2019, representing an increase of $141.0 million, or 98.5%.

Nucleic Acid Production revenue increased from $72.6 million for the year ended December 31, 2019 to $206.3 million for the year ended December 31, 2020, representing an increase of $133.7 million, or 184.2% . The increase in Nucleic Acid Production was driven by increased demand for our proprietary CleanCap® analogs, which principally serve the growing mRNA vaccine and therapeutic markets, ongoing demand for highly modified RNA products, particularly mRNA, and increased demand for molecular diagnostic test components.

Biologics Safety Testing revenue increased from $44.4 million for the year ended December 31, 2019 to $54.9 million for the year ended December 31, 2020, representing an increase of $10.5 million, or 23.6%. The increase was driven by higher demand and consumption of our products as a result of increased COVID-19 related diagnostic needs, coupled with continued increase in the number of bioproduction programs and customers that use our catalog of HCP ELISA and other impurity and contaminant kits.

Protein Detection revenue decreased from $26.1 million for the year ended December 31, 2019 to $22.9 million for the year ended December 31, 2020, representing a change of $3.2 million, or 12.4%. The decrease was primarily due to prolonged research laboratory closures as a result of the COVID-19 pandemic.

2019 compared to 2018

Total revenue was $143.1 million for the year ended December 31, 2019 compared to $123.8 million for the year ended December 31, 2018, representing an increase of $19.3 million, or 15.6%.

Nucleic Acid Production revenue increased from $60.1 million for the year ended December 31, 2018 to $72.6 million for the year ended December 31, 2019, representing an increase of $12.5 million, or 20.9%. The increase in Nucleic Acid Production was driven by increased demand for highly modified RNA products, particularly mRNA, as well as increased demand for our proprietary CleanCap® analogs, which principally serve the growing mRNA vaccine and therapeutic markets.

Biologics Safety Testing revenue increased from $38.5 million for the year ended December 31, 2018 to $44.4 million for the year ended December 31, 2019, representing an increase of $5.9 million, or 15.4%. The increase was driven by a continued increase in the number of bioproduction programs and customers that use our catalog of HCP ELISA kits.

Protein Detection revenue increased from $25.3 million for the year ended December 31, 2018 to $26.1 million for the year ended December 31, 2019, representing an increase of $0.8 million, or 3.3%. The increase was driven by strong sales for lectins and glycobiology reagents, histology reagents and blocking reagents.

Adjusted EBITDA and Segment Information

Management has determined that adjusted earnings before interest, tax, depreciation, and amortization is the profit or loss measure used to make resource allocation decisions and evaluate segment performance. Adjusted EBITDA assists management

in comparing the segment performance on a consistent basis for purposes of business decision-making by removing the impact of certain items that management believes do not directly reflect the core operations and, therefore, are not included in measuring segment performance. Corporate costs are managed on a standalone basis and not allocated to segments.

We do not allocate assets to our reportable segments as they are not included in the review performed by our Chief Operating Decision Maker for purposes of assessing segment performance and allocating resources.

Excluding approximately $0.3 million associated with a building in the United Kingdom, all of our long-lived assets are located within the United States. In February 2021, the Company entered into an agreement to sell the facility. See *Note 16 - Subsequent Events* within the audited consolidated financial statements.

Following is financial information relating to the operating segments (in thousands):

For the year ended December 31, 2020	Nucleic Acid Production	Biologics Safety Testing	Protein Detection	Corporate	Eliminations	Total
Revenue	$ 207,597	$ 54,897	$ 22,881	$ —	$ (1,277)	$ 284,098
Adjusted EBITDA	$ 133,822	$ 44,516	$ 9,225	$ (18,189)	$ (209)	$ 169,165

For the year ended December 31, 2019	Nucleic Acid Production	Biologics Safety Testing	Protein Detection	Corporate	Eliminations	Total
Revenue	$ 72,602	$ 44,416	$ 26,122	$ —	$ —	$ 143,140
Adjusted EBITDA	$ 22,229	$ 36,371	$ 14,603	$ (11,189)	$ —	$ 62,014

For the year ended December 31, 2018	Nucleic Acid Production	Biologics Safety Testing	Protein Detection	Corporate	Eliminations	Total
Revenue	$ 60,057	$ 38,492	$ 25,284	$ —	$ —	$ 123,833
Adjusted EBITDA	$ 16,751	$ 31,199	$ 13,846	$ (8,796)	$ —	$ 53,000

Comparison of Years Ended December 31, 2020 and 2019

Inter-segment revenue was $1.3 million for the year ended December 31, 2020 and represents intersegment revenue between Nucleic Acid Production and Protein Detection segments. There was no intersegment revenue for the year ended December 31, 2019. The inter-segment sales and related gross margin on inventory recorded at the end of the period are eliminated for consolidation purposes in the Eliminations column. Internal selling prices for intersegment sales are consistent with the segment's normal retail price offered to external parties. There was no commission expense recognized for intersegment sales for the year ended December 31, 2020.

Comparison of Years Ended December 31, 2019 and 2018

There was no inter-segment activity for the years ended December 31, 2019 and 2018. All of the revenue for each segment is from external customers.

A reconciliation of Adjusted EBITDA to net income (loss), the most directly comparable GAAP measure, is set forth below:

	Year Ended December 31,		
in thousands	**2020**	**2019**	**2018**
Net income (loss)	$ 78,816	$ (5,201)	$ (16,915)
Add:			
Amortization	20,320	20,274	20,122
Depreciation	5,593	3,810	2,225
Interest expense	30,740	29,959	27,399
Income tax expense (benefit)	2,880	(652)	417
EBITDA	138,349	48,190	33,248
Acquisition contingent consideration (a)	—	322	939
Acquisition integration costs (b)	3,857	6,170	7,529
Amortization of purchase accounting inventory step-up (c)	—	1,856	2,967
Acquired in-process research and development costs (d)	2,881	—	—
Equity-based compensation (e)	24,629	1,679	2,121
GTCR management fees (f)	680	523	574
Gain on sale and leaseback transaction (g)	(19,002)	—	—
Merger and acquisition related expenses (h)	395	3,274	—
Financing costs (i)	9,784	—	—
Loss on extinguishment of debt (j)	7,592	—	5,622
Adjusted EBITDA	$ 169,165	$ 62,014	$ 53,000

(a) Refers to the change in fair value and settlement of earn-out payments related to a 2017 acquisition.

(b) Refers to incremental costs incurred to execute and integrate completed acquisitions.

(c) Refers to a non-cash charge related to the amortization expense of the step-up of inventory from purchase price accounting.

(d) Refers to in-process research and development charge associated with the acquisition of MockV Solutions, Inc.

(e) Refers to non-cash expense associated with equity-based compensation.

(f) Refers to cash fees paid to GTCR, pursuant to the advisory services agreement that was terminated in connection with our IPO.

(g) Refers to the gain on the sale of our Burlingame, California facility, which was leased back to the Company in 2020.

(h) Refers to diligence, legal, accounting, tax and consulting fees incurred associated with acquisitions that were not consummated.

(i) Refers to transaction costs related to our IPO and the refinancing of our long-term debt that are not capitalizable or cannot be offset against proceeds from such transactions.

(j) Refers to non-operating cash expense incurred on extinguishment of debt.

Adjusted Free Cash Flow

Adjusted Free Cash Flow, which is a non-GAAP measure that we define as Adjusted EBITDA less capital expenditures, is set forth below (in thousands):

	Year Ended December 31,		
	2020	**2019**	**2018**
Adjusted EBITDA	169,165	$ 62,014	$ 53,000
Capital expenditures [(a)]	(27,398)	(19,913)	(3,737)
Adjusted Free Cash Flow	$ 141,767	$ 42,101	$ 49,263

(a) We define capital expenditures as purchases of property and equipment, which are included in cash flows from investing activities, and accounts payable and accrued expenses and other current liabilities.

Costs of Revenue

in thousands	Year Ended December 31, 2020	2019	2018	2020 over 2019 Change	2019 over 2018 Change	Percentage of Revenue 2020	2019	2018
Cost of revenue	$ 79,649	$ 66,849	$ 60,765	19.1 %	10.0 %	28.0 %	46.7 %	49.1 %

Comparison of Years Ended December 31, 2020 and 2019

Cost of revenue increased by $12.8 million from $66.8 million for the year ended December 31, 2019 to $79.6 million for the year ended December 31, 2020, or 19.1%. The increase in cost of revenue was primarily attributable to an increase in direct product costs resulting from higher revenue, increases in personnel costs associated with overall growth and expansion of the Company, and higher overall supplies and materials costs.

Comparison of Years Ended December 31, 2019 and 2018

Cost of revenue increased by $6.1 million from $60.8 million for the year ended December 31, 2018 to $66.8 million for the year ended December 31, 2019, or 10.0%. The increase in cost of revenue was primarily attributable to an increase in direct product costs resulting from higher revenue, personnel costs, and supplies and materials costs, as margins were generally consistent.

Research and Development

in thousands	Year Ended December 31, 2020	2019	2018	2020 over 2019 Change	2019 over 2018 Change	Percentage of Revenue 2020	2019	2018
Research and development	$ 9,304	$ 3,627	$ 4,499	256.5 %	(19.4)%	3.3 %	2.5 %	3.6 %

Comparison of Years Ended December 31, 2020 and 2019

Research and development expenses increased by $5.7 million from $3.6 million for the year ended December 31, 2019 to $9.3 million for the year ended December 31, 2020, or 256.5%. The increase was primarily attributable to an increase in supplies and materials costs of $1.4 million, a $2.9 million increase in in-process research and development costs related to an asset acquisition, and $0.8 million increase in personnel costs due to increases in headcount.

Comparison of Years Ended December 31, 2019 and 2018

Research and development expenses decreased by $0.9 million from $4.5 million for the year ended December 31, 2018 to $3.6 million for the year ended December 31, 2019, or 19.4%. The decrease was primarily attributable to a $0.6 million decrease in personnel cost due to a reduction in headcount and a $0.3 million decrease in facilities and information technology allocation.

Selling, General and Administrative

in thousands	Year Ended December 31, 2020	2019	2018	2020 over 2019 Change	2019 over 2018 Change	Percentage of Revenue 2020	2019	2018
Selling, general and administrative	$ 94,245	$ 48,354	$ 41,194	94.9 %	17.4 %	33.2 %	33.8 %	33.3 %

Comparison of Years Ended December 31, 2020 and 2019

Selling, general and administrative expenses increased by $45.9 million from $48.4 million for the year ended December 31, 2019 to $94.2 million for the year ended December 31, 2020, or 94.9%. The increase was primarily due to a $22.8 million increase in equity-based compensation expense primarily from the modification of certain MLSH 1 incentive units, the vesting of certain MLSH 1 incentive units upon our IPO, and the modification of unvested MLSC incentive units in connection with the repurchase of the MLSC non-controlling interest, a $14.5 million increase in professional service costs, and a $7.2 million increase in salaries and related expense predominantly due to an increase in headcount and bonuses. Professional services for the year ended December 31, 2020 including nonrecurring costs on acquisition activity and costs associated with preparing for the Company's initial public offering.

Selling, general and administrative expense were $41.2 million for the year ended December 31, 2018 compared to $48.4 million for the year ended December 31, 2019, representing an increase of $7.2 million, or 17.4%. The increase was due to a $2.5 million increase in personnel costs as we increased our headcount, a $0.9 million increase in facility and information technology costs to support our increase in headcount, a $2.4 million increase in reimbursable expenses passed through from GTCR associated with certain business development activities (See "Related Party Transactions") offset partially by a decrease in professional services costs of $1.1 million. Professional services in 2018 included non-recurring non-capitalized costs in connection with our debt refinancing and with certain system implementations.

Other Income (Expense)

	Year Ended December 31,			2020 over 2019	2019 over 2018	Percentage of Revenue		
in thousands	2020	2019	2018	Change	Change	2020	2019	2018
Other income (expense):								
Interest expense	$ (30,740)	$ (29,959)	$ (27,399)	2.6 %	9.3 %	(10.8)%	(20.9)%	(22.1)%
Loss on extinguishment of debt	$ (7,592)	$ —	$ (5,622)	— %	(100.0)%	(2.7)%	— %	(4.5)%
Other income	$ 126	$ 118	$ 87	6.8 %	35.6 %	— %	0.1 %	0.1 %
Total other income (expense)	$ (38,206)	$ (29,841)	$ (32,934)	28.0 %	(9.4)%	(13.4)%	(20.8)%	(26.6)%

Comparison of Years Ended December 31, 2020 and 2019

Other expense was $29.8 million for the year ended December 31, 2019 compared to $38.2 million for the year ended December 31, 2020, representing an increase of $8.4 million, or 28.0%. The increase in expense was primarily attributable to the loss of extinguishment of debt of $7.6 million recognized in the year ended December 31, 2020 and an increase of interest expense of $0.8 million due to the increase in long-term debt.

Comparison of Years Ended December 31, 2019 and 2018

Other expense was $32.9 million for the year ended December 31, 2018 compared to $29.8 million for the year ended December 31, 2019, representing a decrease of $3.1 million, or 9.4%. The decrease was primarily attributable to a non-recurring loss on extinguishment of debt of $5.6 million recorded for the year ended December 31, 2018 in connection with the entry into the First Lien Credit Agreement and Second Lien Credit Agreement to refinance existing indebtedness, offset by $2.6 million increase in interest expense.

Relationship with GTCR, LLC ("GTCR")

Prior to our initial public offering, we utilized GTCR for certain services pursuant to an advisory services agreement. Under this agreement, GTCR provided us with financial and management consulting services in the areas of corporate strategy, budgeting for future corporate investments, acquisition and divestiture strategies, and debt and equity financings. The advisory services agreement provided that we pay a $0.1 million quarterly management fee to GTCR for these services. We also reimbursed GTCR for out-of-pocket expenses incurred while providing these services. The advisory services agreement also provided that certain of our subsidiaries pay placement fees to GTCR of 1.0% of the gross amount of debt or equity financings. In connection with our IPO, this advisory services agreement was terminated. As GTCR continues to have representation on our Board of Directors, we will continue to pay GTCR for any direct reimbursable expenses related to their Board activities.

We paid GTCR $4.4 million, $0.6 million, and $0.6 million in each of the years ended December 31, 2020, 2019, and 2018, respectively, for services in connection with the advisory services agreement. We may continue to engage GTCR from time to time, subject to compliance with our related party transactions policy. The higher fees paid to GTCR in 2020 is driven by the $3.7 million placement fee paid in connection with our debt refinancing in October, 2020.

During the year ended December 31, 2018, $52.0 million of capital distributions were made to the Class A unit holders of MLSC, including GTCR. During the year ended December 31, 2020, we paid $96.7 million of distributions to MLSH 1.

Pursuant to our IPO, we entered into a tax receivable agreement with MLSH 1, who is primarily owned by GTCR, and MLSH 2. The Tax Receivable Agreement ("TRA") provides for the payment by us to MLSH 1 and MLSH 2, collectively, of 85.0% of the amount of tax benefits, if any, that we actually realize, or in some circumstances are deemed to realize, as a result of the Organizational Transactions and IPO. Payment obligations under the TRA are not conditioned upon any Topco LLC unitholders maintaining a continued ownership interest in us or Topco LLC and the rights of MLSH 1 and MLSH 2 under the TRA are assignable. There is no maximum term for the TRA and the TRA will continue until all tax benefits have been utilized or expired unless we exercise our right to terminate the TRA for an agreed-upon amount.

No payments were made to MLSH 1 or MLSH 2 pursuant to the TRA during 2020. As of December 31, 2020, our liability under the TRA was $389.5 million.

Liquidity and Capital Resources

Overview

As of December 31, 2020, we had cash of $236.2 million, retained earnings of $0.9 million, and net income of $78.8 million for the fiscal year ended December 31, 2020. We also had positive cash flow from operations of $152.2 million.

We have relied on revenue derived from product and services sales and equity and debt financings to fund our operations to date, including the refinance of our existing $400.0 million debt facilities with a new $780.0 million facility (see Note 7 to the audited consolidated financial statements), which provided for the full repayment of $363.0 million of pre-existing debt and accrued interest under the previous outstanding senior secured credit facilities, the repurchase of MLSC incentive units and MLSC non-controlling interests of $9.1 million and $120.0 million, respectively, and to allow for an $88.6 million distribution to MLSH 1 for various incentive unit holders of MLSH 1, which represented a return of capital in Topco LLC.

Our principal uses of cash have been to fund operations, acquisitions and capital expenditures, as well as make distributions to MLSH 1 under the pre-IPO and Organizational Transactions structure, interest payments and mandatory principal payments on our long-term debt.

We plan to utilize our existing cash on hand, together with cash generated from operations, primarily to fund our commercial and marketing activities associated with our products and services, continued research and development initiatives, and ongoing investments into our manufacturing facilities to create efficiencies and build capacity.

To the extent revenue from sales in our three business segments continues to grow, we expect our accounts receivable and inventory balances to increase. Any increase in accounts receivable and inventory may not be completely offset by increases in accounts payable and accrued expenses, which could result in greater working capital requirements. Moreover, we have and will continue to incur additional costs associated with operating as a public company, including expenses related to legal, accounting, regulatory, exchange listing and SEC compliance matters.

Our future capital requirements will depend on many factors including, but not limited to, our ability to successfully develop and launch new products and services, and to achieve a level of sales adequate to support our cost structure. If we are unable to execute on our business plan and adequately fund operations, or if the business plan requires a level of spending in excess of cash resources, we may seek additional equity, equity-linked or debt financing. If additional financings are required from outside sources, we may not be able to raise additional capital on terms acceptable to us or at all. If we are unable to raise additional capital when desired, our business, financial condition, results of operations and prospects could be adversely affected.

As a result of our ownership of LLC units in Topco LLC (the “LLC Units”), the Company is subject to U.S. federal, state and local income taxes with respect to its allocable share of any taxable income of Topco LLC and is taxed at the prevailing corporate tax rates. In addition to tax expenses, we also will incur expenses related to our operations and we will be required to make payments under the Tax Receivable Agreement with MLSH 1 and MLSH 2. Due to the uncertainty of various factors, we cannot precisely quantify the likely tax benefits we will realize as a result of LLC Unit exchanges and the resulting amounts we are likely to pay out to LLC Unitholders of Topco LLC pursuant to the Tax Receivable Agreement; however, we estimate that such payments may be substantial. Assuming no changes in the relevant tax law, and that we earn sufficient taxable income to realize all tax benefits that are subject to the Tax Receivable Agreement, we expect that future payments under the Tax Receivable Agreement relating to the purchase by the Company of LLC Units from MLSH 1 and the tax attributes received from MLSH 2 in connection with the IPO to be approximately $389.5 million and to range over the next 15 years from approximately $3.4 million to $29.8 million per year and decline thereafter. Future payments in respect of subsequent exchanges or financings would be in addition to these amounts and are expected to be substantial. The foregoing numbers are merely estimates and the actual payments could differ materially. We expect to fund these payments using cash on hand and cash generated from operations.

As a result of a change of control, material breach, or our election to terminate the TRA early, (1) we could be required to make cash payments to MLSH 1 and MLSH 2 that are greater than the specified percentage of the actual benefits we ultimately realize in respect of the tax benefits that are subject to the TRA and (2) we will be required to make an immediate cash payment equal to the present value of the anticipated future tax benefits that are the subject of the TRA, which payment may be made significantly in advance of the actual realization, if any, of such future tax benefits. In these situations, our obligations under the TRA could have a material adverse effect on our liquidity and could have the effect of delaying, deferring or preventing certain mergers, asset sales, other forms of business combination, or other changes of control. There can be no assurance that we will be able to finance our obligations under the TRA.

In addition to payments to be made under the TRA, we are also required to make tax distributions to the non-controlling interest holders of Topco LLC for the portion of income passing through to them from Topco LLC.

Sources of Liquidity

Since our inception, we have financed our operations primarily from the issuance of capital units, borrowings under long-term debt agreements and, to a lesser extent, cash flow from operations.

Our total debt outstanding of $550.0 million at December 31, 2020, was comprised of our term loan under our New Credit Agreement.

New Credit Agreement

On October 19, 2020, Maravai Intermediate Holdings, LLC ("Intermediate"), a wholly-owned subsidiary of ours, along with its subsidiaries Vector Laboratories, TriLink BioTechnologies and Cygnus Technologies (together with Intermediate, the "Borrowers") entered into the New Credit Agreement with lending institutions, including affiliates of certain of the underwriters, for term-loan borrowings (the "New Term Loan") totaling $600.0 million to refinance our outstanding senior secured credit facilities and to allow for a distribution to our members. The New Credit Agreement also provided for a revolving credit facility (the "New Revolving Credit Facility") of $180.0 million for letters of credit and loans to be used for working capital and other general corporate financing purposes. Borrowings under the New Credit Agreement are unconditionally guaranteed by Topco LLC, a wholly owned subsidiary of ours, along with the existing and future material domestic subsidiaries of Topco LLC (subject to certain exceptions) as specified in the respective guaranty agreements, and are secured by a lien and security interest in substantially all of the assets of existing and future material domestic subsidiaries of Topco LLC that are loan parties.

The New Term Loan becomes repayable in quarterly payments of $1.5 million beginning on March 31, 2021, with all remaining outstanding principal due on October 19, 2027. The New Term Loan includes prepayment provisions that allow the us, at their option, to repay all or a portion of the principal amount at any time. The New Revolving Credit Facility allows the us to repay and borrow from time to time until October 19, 2025, at which time all amounts borrowed must be repaid. Subject to certain exceptions and limitations, we are required to repay borrowings under the New Term Loan and New Revolving Credit Facility with the proceeds of certain occurrences, such as the incurrence of debt, certain equity contributions, and certain asset sales or dispositions.

Borrowings under the New Credit Agreement bear interest (a) initially, at our option, either (i) at the Base Rate plus 3.25% per annum or (ii) the Adjusted Eurocurrency Rate plus 4.25% per annum and (b) after delivery of the compliance certificate for the fiscal quarter ending March 31, 2021, at our option, either at (i) the Base Rate plus the applicable margin of 3.25% per annum with a stepdown to 3.00% based on Intermediate's first lien net leverage ratio or (ii) the Adjusted Eurocurrency Rate plus the margin of 4.25% per annum with a stepdown to 4.00% based on Intermediate's first lien net leverage ratio. Interest rates will also decrease an additional 0.25% in any period if the Company's credit ratings issued by Moody's and S&P are B2 or better and B or better, respectively. The Base Rate is defined as the greatest of (i) the rate last quoted by The Wall Street Journal as the "Prime Rate" in the United States, (ii) the NYFRB Rate plus 0.50% per annum, (iii) the Adjusted Eurocurrency Rate for a one month interest period plus 1.00% per annum, (iv) solely with respect to the initial term loans, 2.00% per annum and (v) for any loans that are not initial term loans, 1.00% per annum. The "Adjusted Eurocurrency Rate" is defined as the greater of (a) with respect to the initial term loans the greater of (i) the Eurocurrency Rate for such interest period multiplied by the Statutory Reserve Rate (as such term is defined in the New Credit Agreement), and (ii) 1.00% and (b) with respect to the revolving loans, the greater of (i) the Eurocurrency Rate for such interest period multiplied by the Statutory Reserve Rate (as such term is defined in the New Credit Agreement), and (ii) 0%. The "Eurocurrency Rate" is defined as the London Inter-bank Offered Rate ("LIBOR") as displayed by Reuters (which if negative will be deemed to be 0.00%) or, if LIBOR is unavailable, a rate based on historical LIBOR, as determined by the administrative agent under the New Credit Agreement.

Accrued interest under the New Credit Agreement is payable by us (a) quarterly in arrears with respect to Base Rate loans, (b) at the end of each interest rate period (or at each three-month interval in the case of loans with interest periods greater than three months) with respect to Eurocurrency Rate loans, (c) on the date of any repayment or prepayment and (d) at maturity (whether by acceleration or otherwise). An annual commitment fee is applied to the daily unutilized amount under the New Revolving Credit Facility at 0.375% per annum, with one stepdown to 0.25% per annum based on Intermediate's first lien net leverage ratio.

Debt Covenants

The New Credit Agreement includes a financial covenant that requires that, if as of the end of any fiscal quarter the aggregate amount of letters of credit obligations and borrowings under the New Revolving Credit Facility outstanding as of the end of such fiscal quarter (excluding cash collateralized letters of credit obligations and letter of credit obligations in an aggregate amount not in excess of $5.0 million at any time outstanding and for the first four fiscal quarters ending after October 19, 2020, borrowings of revolving credit loans made on October 19, 2020) exceed 35% of the aggregate amount of all Revolving Credit Commitments in effect as of such date, then the net leverage ratio of Intermediate shall not be greater than 8.00 to 1.00. For purposes of this covenant, the net leverage ratio is calculated by dividing outstanding first lien indebtedness (net of cash) by Adjusted EBITDA over the preceding four fiscal quarters.

The New Credit Agreement also contains negative and affirmative covenants in addition to the financial covenant, including covenants that restrict our ability to, among other things, incur or prepay certain indebtedness, pay dividends or distributions, dispose of assets, engage in mergers and consolidations, make acquisitions or other investments, and make changes in the nature of the business. The New Credit Agreement contains certain events of default, including, without limitation, nonpayment of principal, interest or other obligations, violation of the covenants, insolvency, court ordered judgments, and certain changes of control. The New Credit Agreement also requires the Company to provide audited consolidated financial statements to the lenders no later than 120 days after year-end.

The New Credit Agreement contained one financial covenant (consolidated first lien leverage ratio) measured as of the last day of each fiscal quarter. As of December 31, 2020, we were in compliance with these covenants.

The New Credit Agreement also requires mandatory prepayments upon certain excess cash flow, subject to certain step-downs and threshold levels as defined and set forth in the terms of the New Credit Agreement to commence with the fiscal year ending December 31, 2021.

At December 31, 2020, interest rate on the New Term loan was 5.25%.

Tax Receivable Agreement

The purchase of LLC Units by us in connection with our IPO resulted in the acquisition by us of a proportionate share of the existing tax basis of the assets of Topco LLC and its flow-through subsidiaries. Topco LLC (and each of its subsidiaries classified as a partnership for U.S. federal income tax purposes) had in place for the IPO transaction an election under Section 754 of the U.S. Internal Revenue Code of 1986, as amended (the "Code"). Accordingly, such purchase of LLC Units by us resulted in an adjustment in the tax basis of the assets of Topco LLC and its flow-through subsidiaries reflected in the proportionate share of such assets treated as acquired by us.

In addition, MLSH 1 may from time to time (subject to the terms of the Exchange Agreement) exercise a right to exchange LLC Units for shares of our Class A common stock on a one-for-one basis, or, at our election, for cash from a substantially concurrent public offering or private sale (based on the price of our Class A common stock in such public offering or private sale). We intend to treat such acquisitions of LLC Units as direct purchases of LLC Units from MLSH 1 for U.S. federal income and other applicable tax purposes, regardless of whether such LLC Units are surrendered by MLSH 1 to Topco LLC for redemption or sold to us upon the exercise of our election to acquire such LLC Units directly. Topco LLC (and each of its subsidiaries classified as a partnership for U.S. federal income tax purposes) intends to have in place an election under Section 754 of the Code effective for each taxable year in which an exchange of LLC Units for Class A common stock or cash occurs. As a result, an exchange of LLC Units is expected to result in (1) an increase in our proportionate share of the existing tax basis of the assets of Topco LLC and its flow-through subsidiaries and (2) an adjustment in the tax basis of the assets of Topco LLC and its flow-through subsidiaries reflected in that proportionate share.

Any increases in our share of tax basis as a result of the purchase of LLC Units or LLC Unit exchanges will generally have the effect of reducing the amounts that we would otherwise be obligated to pay thereafter to various tax authorities. Such basis increases may also decrease gains (or increase losses) on future dispositions of certain assets to the extent tax basis is allocated to those assets.

In connection with the completion of our IPO we also entered into a Tax Receivable Agreement with MLSH 1 and MLSH 2. The Tax Receivable Agreement provides for the payment by us to MLSH 1 and MLSH 2, collectively, of 85% of the amount of tax benefits, if any, that we actually realize, or in some circumstances are deemed to realize from exchanges of LLC Units (together with the corresponding shares of Class B common stock) for Class A common stock, as a result of (i) certain increases in the tax basis of assets of Topco LLC and its subsidiaries resulting from purchases or exchanges of LLC Units, (ii) certain tax attributes of the entities acquired from MLSH 1 and MLSH 2 in connection with the Organizational Transactions ("the Blocker Entities"), Topco LLC and subsidiaries of Topco LLC that existed prior to this offering and (iii) certain other tax benefits related to our entering into the Tax Receivable Agreement, including tax benefits attributable to payments that we make under the Tax Receivable Agreement (collectively, the "Tax Attributes"). The payment obligations under the Tax Receivable Agreement are not conditioned upon any LLC Unitholder maintaining a continued ownership interest in us or Topco LLC and

the rights of MLSH 1 and MLSH 2 under the Tax Receivable Agreement are assignable. We expect to benefit from the remaining 15% of the tax benefits, if any, that we may actually realize.

Under the TRA, we are required to provide MLSH 1 and MLSH 2 with a schedule setting forth the calculation of payments that are due under the TRA with respect to each taxable year in which a payment obligation arises within ninety (90) days after the extended due date of our U.S. federal income tax return for such taxable year. This calculation will be based upon the advice of our tax advisors. The calculation will become final thirty (30) days after it is provided assuming that no objections are made. Payments under the TRA will generally be made within five (5) business days after this schedule becomes final pursuant to the procedures set forth in the TRA, although interest on such payments will begin to accrue at a rate of LIBOR plus 100 basis points from the due date (without extensions) of such tax return. Any late payments that may be made under the TRA will continue to accrue interest at LIBOR plus 500 basis points until such payments are made, generally including any late payments that we may subsequently make because we did not have enough available cash to satisfy our payment obligations at the time at which they originally arose.

The payment obligations under the TRA are obligations of Maravai LifeSciences Holdings, Inc. and not of Topco LLC. Although the actual timing and amount of any payments that may be made under the TRA will vary, we expect that the aggregate payments that we will be required to make to MLSH 1 and MLSH 2 will be substantial. Any payments made by us under the TRA will generally reduce the amount of overall cash flow that might have otherwise been available to us or to Topco LLC and, to the extent that we are unable to make payments under the TRA for any reason, the unpaid amounts will be deferred and will accrue interest until paid by us. We anticipate funding ordinary course payments under the Tax Receivable Agreement from cash flow from operations of Topco LLC and its subsidiaries, available cash and/or available borrowings under the New Credit Agreement.

The TRA provides that if (1) certain mergers, asset sales, other forms of business combination, or other changes of control were to occur, (2) we materially breach any of our material obligations under the TRA or (3) we elect an early termination of the TRA, then the TRA will terminate and our obligations, or our successor's obligations, under the TRA will accelerate and become due and payable, based on certain assumptions, including an assumption that we would have sufficient taxable income to fully utilize all potential future tax benefits that are subject to the TRA and, to the extent applicable, that any LLC Units that have not been exchanged are deemed exchanged for the fair market value of our Class A common stock at the time of termination.

Payments under the TRA will be based on the tax reporting positions that we determine. Although we are not aware of any issue that would cause the IRS to challenge a tax basis increase or the availability of Blocker Entities' NOLs, if any, we will not be reimbursed for any cash payments previously made to MLSH 1 and MLSH 2 pursuant to the TRA if any tax benefits initially claimed by us are subsequently disallowed, in whole or in part, by the IRS or other applicable taxing authority. For example, if the IRS later asserts that we did not obtain a tax basis increase or disallows (in whole or in part) the availability of NOLs due to a potential ownership change under Section 382 of the Code, among other potential challenges, then we would not be reimbursed for any cash payments previously made to MLSH 1 and MLSH 2 pursuant to the TRA with respect to such tax benefits that we had initially claimed. Instead, any excess cash payments made by us pursuant to the TRA will be netted against any future cash payments that we might otherwise be required to make under the terms of the TRA. Nevertheless, any tax benefits initially claimed by us may not be disallowed for a number of years following the initial time of such payment or, even if challenged early, such excess cash payment may be greater than the amount of future cash payments that we might otherwise be required to make under the terms of the TRA. Accordingly, there may not be sufficient future cash payments against which to net. The applicable U.S. federal income tax rules are complex, and there can be no assurance that the IRS or a court will not disagree with our tax reporting positions. As a result, it is possible that we could make cash payments under the TRA that are substantially greater than our actual cash tax savings.

As of December 31, 2020, our liability under the TRA was $389.5 million.

Cash Flows

The following table summarizes our cash flows for the periods presented:

(in thousands)	Year Ended December 31, 2020	2019	2018
Net cash (used in) provided by:			
Operating activities	$ 152,187	$ 24,115	$ (186)
Investing activities	6,068	(17,148)	(3,451)
Financing activities	53,212	(4,167)	(9,167)
Effects of exchange rate changes on cash	17	34	(69)
Net increase (decrease) in cash	$ 211,484	$ 2,834	$ (12,873)

Operating Activities

Net cash provided by operating activities for the year ended December 31, 2020 was $152.2 million, which was primarily attributable to a net income of $78.8 million, non-cash depreciation and amortization of $25.8 million, non-cash amortization of deferred financing costs of $1.8 million, non-cash equity-based compensation of $24.6 million, loss on debt financing of $7.6 million, and $2.9 million of acquired in-process research and development, partially offset by a decrease in deferred income taxes of $5.5 million, the gain on a sale and leaseback transaction of $19.0 million, costs incurred for line of credit refinancing of $3.2 million, and the net cash inflow from the change in our operating assets and liabilities of $35.9 million.

Net cash provided by operating activities for the year ended December 31, 2019 was $24.1 million, which was primarily attributable to a net loss of $5.2 million, non-cash depreciation and amortization of $24.1 million, non-cash amortization of deferred financing costs of $1.7 million, non-cash equity-based compensation of $1.7 million, a net cash inflow from the change in our operating assets and liabilities of $2.3 million, partially offset by a decrease in deferred income taxes of $1.2 million. The net change in our operating assets and liabilities reflects a decrease in accounts receivable of $1.9 million, a decrease in prepaid expenses and other current assets of $2.0 million, offset by an increase in accounts payable and accrued liabilities of $6.0 million.

Net cash used in operating activities for the year ended December 31, 2018 was $0.2 million, which was primarily attributable to a net loss of $16.9 million, non-cash depreciation and amortization of $22.3 million, non-cash amortization of deferred financing costs of $1.5 million, non-cash unit-based compensation of $2.1 million, non-cash loss on debt refinancing of $5.6 million, an increase in deferred income taxes of $0.3 million, partially offset by a net cash outflow from the change in our operating assets and liabilities of $15.8 million. The net change in our operating assets and liabilities reflects a decrease of approximately $15.9 million, which was primarily attributable to the payment of an earn-out liability associated with the compensatory cost of a legacy acquisition of a business of $14.5 million.

Investing Activities

Net cash provided by investing activities for the year ended December 31, 2020 was $6.1 million primarily attributable to the proceeds from the sale and leaseback of our Burlingame, California facility of $34.5 million, net of cash outflows of $23.6 million for property and equipment and a cash outflow of $3.0 million associated with the purchase of MockV Solutions, Inc. of which $2.9 million was considered in-process research and development.

Net cash used in investing activities for the year ended December 31, 2019 was $17.1 million, which was primarily attributable to purchases of property and equipment of $17.1 million due to higher capital expenditures related to the build out of our manufacturing facility in San Diego, California.

Net cash used in investing activities for the year ended December 31, 2018 was $(3.5) million, primarily attributable to purchases of property and equipment of $3.5 million.

Financing Activities

Net cash provided by financing activities for the year ended December 31, 2020 was $53.2 million, which was primarily attributable to a $1.8 billion of proceeds from the issuance of common stock sold in the Company's initial public offering, net of offering cost, and $609.0 million from the proceeds of borrowing long-term debt, net of discount. Specifically, the proceeds from the initial public offering of $1.8 billion were offset by the following cash outflows related to the Organizational Transactions:

- the purchase of Topco LLC units from MLSH 1 of $1.4 billion,
- the sale of Class B common stock to MLSH 1 of $1.7 million
- the repurchase of Class A common stock from MLSH 2 of $33.7 million,

- the purchase of Blocker Entities from MLSH 2 of $208.1 million,
- principal repayment of longer-term debt of $50.0 million,
- and tax distribution by Topco LLC to MLSH 1 of $8.2 million.

The proceeds from the new borrowings of long-term debt of $609.0 million were offset by principal repayment of long-term debt of $360.0 million, payment to purchase the non-controlling interest in MLSC of $120.0 million, payment of financing costs of $9.3 million, and a distribution to MLSH 1 prior to the IPO of $88.6 million, and the repurchase of vested MLSC incentive units of $9.1 million. Net cash used also included a portion of a $2.0 million payment of contingent consideration of $1.4 million.

Net cash used in financing activities for the year ended December 31, 2019 was $4.2 million, which was primarily attributable to principal repayments of long-term debt of $2.5 million and a portion of a $2.0 million payment of contingent consideration of $1.3 million.

Net cash used in financing activities for the year ended December 31, 2018 was $9.2 million, which was primarily attributable to net proceeds of $310.6 million from long-term debt borrowings offset by the repayment of the previous long-term debt agreement of $255.0 million, a distribution to our member of $52.1 million, financing costs incurred of $6.7 million, and payment of contingent consideration of $5.8 million.

Contractual Obligations and Commitments

The following table summarizes our contractual obligations and commitments as of December 31, 2020:

	Payments due by period				
(in thousands)	**Total**	**1 year**	**2-3 years**	**4-5 years**	**5+ years**
Capital lease commitments [1]	$ 75	$ 50	$ 25	$ —	$ —
Lease facility financing obligations [2]	48,200	4,126	9,662	10,180	24,232
Operating leases [3]	14,936	2,777	4,398	2,475	5,286
Debt obligations [4]	550,000	6,000	12,000	12,000	520,000
TRA payments [5]	389,546	—	25,378	44,316	319,852
Total	$ 1,002,757	$ 12,953	$ 51,463	$ 68,971	$ 869,370

(1) Represents capital lease commitments. See Note 6 to the "Notes to Consolidated Financial Statements" for additional information.

(2) Represents lease facility financing obligations. See Note 6 to the "Notes to Consolidated Financial Statements" for additional information.

(3) Represents operating leases including the ground lease for our San Diego Facility and Southport Facility. See Note 6 to the "Notes to Consolidated Financial Statements" for additional information.

(4) Represents long-term debt principal maturities, excluding interest. See Note 7 to the "Notes to Consolidated Financial Statements" for additional information.

(5) Reflects the estimated timing of TRA payments as of December 31, 2020. Such payments could be due later than estimated depending on the timing of our use of the underlying tax attributes. See "Risk Factors-Risks Related to Our Organizational Structure" and Note 12 to our consolidated financial statements for additional information regarding our liability under the TRA.

Tax distributions are required under the terms of the Topco LLC Agreement. As of December 31, 2020, we have made tax distributions equal to the estimated obligation due for 2020. See Note 12 to our audited consolidated financial statements for additional information regarding tax distributions.

The New Credit Agreement requires mandatory prepayments upon certain excess cash flow, subject to certain step-downs and threshold levels as defined and set forth in the terms of the New Credit Agreement, to commence with the fiscal year ending December 31, 2021.

Off-Balance Sheet Arrangements

As of December 31, 2020, we did not have any relationships with unconsolidated entities or financial partnerships, such as entities often referred to as structured finance or special purpose entities established for the purpose of facilitating off-balance sheet arrangements or other contractually narrow or limited purposes.

Critical Accounting Policies and Estimates

We have prepared our consolidated financial statements in accordance with GAAP. Our preparation of these consolidated financial statements requires us to make estimates and assumptions that affect the reported amounts of assets, liabilities, revenue, expenses and related disclosures in the consolidated financial statements. Our estimates are based on historical experience and on various other assumptions that we believe are reasonable under the circumstances, the results of which form the basis for making judgments about the carrying value of assets and liabilities that are not readily apparent from other sources. Actual results could differ from these estimates under different assumptions or conditions and any such difference may be material.

While our significant accounting policies are described in more detail in Note 1 to our consolidated financial statements, we believe the following discussion addresses our most critical accounting policies, which are those that are most important to our consolidated financial condition and results of operations and require our subjective and complex judgments and estimates used in the preparation of our consolidated financial statements.

Revenue Recognition

We recognize revenue primarily from the sale of manufactured products, including products that can be purchased out of a catalogue and custom manufactured products, and the performance of services, including custom antibody and assay development contracts, antibody affinity extraction and stability and feasibility studies, which often result in the generation of report deliverables. We also have certain licensing and royalty arrangements. Our customers are primarily life science research pharmaceutical and biotechnology companies.

We also sell to global and regional distribution partners and original equipment manufacturer ("OEM") customers who incorporate our products into their products under their own brands.

Revenue is recognized when control of promised goods or services is transferred to a customer in an amount that reflects the consideration to which the entity expects to be entitled in exchange for those goods or services. To determine revenue recognition for our arrangements with customers, we perform the following five steps: (i) identify the contract(s) with a customer; (ii) identify the performance obligations in the contract; (iii) determine the transaction price; (iv) allocate the transaction price to the performance obligations in the contract; and (v) recognize revenue when (or as) the entity satisfies a performance obligation. The majority of our contracts include only one performance obligation. A performance obligation is a promise in a contract to transfer a distinct good or service to the customer and is defined as the unit of account for revenue recognition. We also recognize revenue from other contracts that may include a combination of products and services, the provision of solely services, or from license fee arrangements which may be associated with the delivery of product. Where there is a combination of products and services, we account for the promises as individual performance obligations if they are concluded to be distinct. Performance obligations are considered distinct if they are both capable of being distinct and distinct within the context of the contract. In determining whether performance obligations meet the criteria for being distinct, we consider a number of factors, such as the degree of interrelation and interdependence between obligations, and whether or not the good or service significantly modifies or transforms another good or service in the contract. As a practical expedient, we do not adjust the transaction price for the effects of a significant financing component if, at contract inception, the period between customer payment and the transfer of goods or services is expected to be one year or less. Contracts with customers are evaluated on a contract-by-contract basis as contracts may include multiple types of goods and services as described below.

Nucleic Acid Production

Nucleic Acid Production revenue is generated from the manufacture and sale of highly modified, complex nucleic acids products to support the needs of our customers' research, therapeutic and vaccine programs. The primary offering of products include: CleanCap®, mRNA and oligonucleotide contracts typically consist of a single performance obligation. We also sell nucleic acid products for labeling and detecting proteins in cells and tissue samples research. We recognize revenue from these products in the period in which the performance obligation is satisfied by transferring control to the customer. Revenue for nucleic acid catalog products is recognized at a point in time, generally upon shipment to the customer. Revenue for contracts for certain custom nucleic acid products, with an enforceable right to payment and a reasonable margin for work performed to date, is recognized over time, based on a cost-to-cost input method over the manufacturing period.

Biologics Safety Testing

Our Biologics Safety Testing revenue is associated with the sale of bioprocess impurity detection kit products. We also enter into contracts that include custom antibody development, assay development, and antibody affinity extraction services. These products and services enable the detection of impurities and contaminants that occur in the manufacturing of biologic drugs and other therapeutics. We recognize revenue from the sale of bioprocess impurity detection kits in the period in which the performance obligation is satisfied by transferring control to the customer. Custom antibody development contracts consist of a single performance obligation, typically with an enforceable right to payment and a reasonable margin for work performed to date. Revenue is recognized utilizing a cost-based input method over the term of the contract. Where an enforceable right to payment does not exist, revenue is recognized at a point in time when control is transferred to the customer. Revenue associated with assay development service contracts, which generally occur over a short period of time and consist of a single performance obligation, is recognized at a point in time when a successful antigen test and report is provided to the customer. Affinity extraction services consist of a single performance obligation to perform the extraction service and provide a summary report to the customer. Revenue is recognized either over time or at a point in time depending on contractual payment terms with the customer.

Protein Detection

We also manufacture and sell protein labeling and detection reagents used by researchers in protein labeling and detection. The contracts to sell these catalog products consist of a single performance obligation to deliver the reagent products. Revenue from these contracts is recognized at a point in time, generally upon shipment of the product to the customer.

We recognize royalty revenue related to certain out-licensing and royalty arrangements in the period the sales or usage occur using third-party evidence to estimate the amount to be recorded. To date this revenue has not been material to the consolidated financial statements.

We have elected the practical expedient to not disclose the unfulfilled performance obligations for contracts with an original term of one year or less. We had no material unfulfilled performance obligations for contracts with an original term greater than one year as of December 31, 2020 or 2019.

We accept returns only if the products do not meet customer specifications and historically, our volume of product returns has not been significant. Further, no warranties are provided for promised goods and services other than assurance type warranties.

Revenue for an individual contract is recognized at the related transaction price, which is the amount we expect to be entitled to in exchange for transferring the products and/or services. The transaction price for product sales, which excludes sales taxes we collect, is calculated at the contracted product selling price. The transaction price for a contract with multiple performance obligations is allocated to the separate performance obligations on a relative standalone selling price basis. Standalone selling prices for products are determined based on the prices charged to customers, which are directly observable. Standalone selling price of services are mostly based on time and materials. Generally, payments from customers are due when goods and services are transferred. As most contracts contain a single performance obligation, the transaction price is representative of the standalone selling price charged to customers. Revenue is recognized only to the extent that it is probable that a significant reversal of the cumulative amount recognized will not occur in future periods. For the years ended December 31, 2020 and 2019, variable consideration has not been material. For arrangements where the anticipated period between timing of transfer of goods and services and the timing of payment is one year or less, we have elected to not assess whether a significant financing component exists.

We have elected to account for shipping and handling activities related to contracts with customers as costs to fulfill the promise to transfer the associated products. Accordingly, revenue for shipping and handling is recognized at the same time that the related product revenue is recognized.

Contract assets are generated when contractual billing schedules differ from revenue recognition timing and we record contract receivable when we have an unconditional right to consideration. Contract liabilities are recorded when cash payments are received or due in advance of performance.

Applying the practical expedient, we recognize the incremental costs of obtaining contracts as an expense when incurred when the amortization period of the assets that otherwise would have been recognized is one year or less. These costs are included in sales and marketing and general and administrative expenses. The costs to fulfill the contracts are determined to be immaterial and are recognized as an expense when incurred.

Prior to January 1, 2019, revenue from the sale of products and services was recognized when all of the following conditions were met: (1) there was persuasive evidence of an arrangement; (2) the product or service had been delivered to the customer; (3) the collection of the fees was reasonably assured; and (4) the amount of fees to be paid by the customer was fixed or determinable.

When an arrangement involved multiple elements, the multiple elements, referred to as deliverables, were evaluated to determine whether they represent separate units of accounting. We performed this evaluation at the inception of an arrangement and as each item was delivered in the arrangement. Generally, we accounted for a deliverable separately if the delivered item has standalone value to the customer and delivery or performance of the undelivered item or service was probable and substantially in our control.

When multiple elements could be separated into separate units of accounting, arrangement consideration was allocated at the inception of the arrangement, based on each unit's relative selling price, and recognized based on the method most appropriate for that unit.

Inventory

Our inventories consist of raw materials, work in process and finished goods. Inventories are stated at the lower of cost (weighted average cost) or net realizable value. Inventory costs include materials, direct labor and manufacturing overhead, which are related to the purchase or production of inventories. We review our inventory at least quarterly for excess and obsolete inventory based on our estimates of expected sales volumes, production capacity and expiration of raw materials, work-in-process and finished products. Expected sales volumes are determined based on internal sales forecasts that consider both historical and projected sales. We write down inventory that has become obsolete, inventory that has a cost basis in excess of its expected net realizable value, and inventory in excess of expected manufacturing requirements. Any write-downs of inventories are charged to cost of revenue.

A change in the estimated timing or amount of demand for our products could result in additional provisions for excess inventory quantities on hand. Any significant unanticipated changes in demand or unexpected quality failures could have a significant impact on the value of inventory and reported operating results. During all periods presented in the accompanying consolidated financial statements, there have been no material adjustments related to a revised estimate of inventory valuations.

Goodwill

Goodwill represents the excess of consideration transferred over the estimated fair value of assets acquired and liabilities assumed in a business combination. We conduct a goodwill impairment analysis in the fourth quarter of each year, and more frequently if changes in facts and circumstances indicate that the fair value of our reporting units may be less than carrying amount. Accounting guidance also permits an optional qualitative assessment for goodwill on a reporting unit by reporting unit basis to determine whether it is more likely than not that the carrying value of a reporting unit exceeds its fair value. If, after this qualitative assessment, we determine that it is not more likely than not that the fair value of a reporting unit is less than its carrying amount, then no further quantitative testing would be necessary. A quantitative assessment is performed if the qualitative assessment results in a more likely than not determination or if a qualitative assessment is not performed. The quantitative assessment considers whether the carrying amount of a reporting unit exceeds its fair value, in which case an impairment charge is recorded to the extent the reporting unit's carrying value exceeds its fair value but not to exceed the carrying value of goodwill.

Within the quantitative impairment test, the fair value of the given reporting unit was determined using both an income approach and market approach. The income approach is a valuation technique under which we estimated future cash flows using the protein detection reporting unit's financial forecast from the perspective of an unrelated market participant. Using historical trending and internal forecasting techniques, we projected revenue and applied our fixed and variable cost experience rates to the projected revenue to arrive at the future cash flows. A terminal value was then applied to the projected cash flow stream. Future estimated cash flows were discounted to their present value to calculate the estimated fair value. The discount rate used was the value-weighted average of our estimated cost of capital derived using both known and estimated customary market metrics. In determining the estimated fair value of the protein detection reporting unit, we were required to estimate a number of factors, including projected operating results, terminal growth rates, economic conditions, anticipated future cash flows, the discount rate and the allocation of shared or corporate items. Our market approach model estimates the fair value of the protein detection reporting unit based on market prices paid in actual precedent transactions of similar businesses and market multiples of guideline public companies. This impairment assessment is sensitive to changes in forecasted cash flows, as well as our selected discount rate. Changes in the reporting unit's results, forecast assumptions and estimates could materially affect the estimation of its fair value.

To analyze goodwill for impairment, we must assign our goodwill to individual reporting units. Identification of reporting units includes an analysis of the components that comprise each of our operating segments, which considers, among other things, the manner in which we operate our business and the availability of discrete financial information. Components of an operating segment are aggregated to form one reporting unit if the components have similar economic characteristics. We periodically review our reporting units to ensure that they continue to reflect the manner in which we operate our business.

In periods prior to 2020, we had three reporting units, Nucleic Acid Production, Biologics Safety Testing, and Protein Detection, with such reporting units being aligned with our segments. However, during the year ended December 31, 2020, we determined that our Nucleic Acid Production segment contained two reporting units that should no longer be combined as a reporting unit due to a lack of economic similarities primarily driven by changes in margins realized by these reporting units. These reporting units continue to be considered as one segment for purposes of segment reporting, as our CODM continues to review financial results and making operating decisions at the Nucleic Acid Production level. The Company performed a quantitative goodwill impairment analysis on each of its four reporting units during the fourth quarter of 2020 and concluded that the fair value of each reporting unit exceeded its carrying value and therefore that it was more-likely-than-not that the fair value of goodwill exceeded its carrying value.

We have not recognized any goodwill impairment in any of the periods presented.

Leases, Deferred Rent and Lease Facility Financing Accounting

We rent our office space and facilities under non-cancelable operating lease agreements and recognize related rent expense on a straight-line basis over the term of the lease. Our lease agreements contain rent holidays, scheduled rent increases and renewal options. Rent holidays and scheduled rent increases are included in the determination of rent expense to be recorded ratably over the lease term. We do not assume renewals in its determination of the lease term unless they are deemed to be reasonably assured at the inception of the lease. We begin recognizing rent expense on the date that we obtain the legal right to use and control the leased space. Deferred rent consists of the difference between cash payments and the recognition of rent expense on a straight-line basis for the buildings we occupy.

Funding of leasehold improvements by our landlord is accounted for as a tenant improvement allowance and recorded as current and non-current deferred rent liabilities and amortized on a straight-line basis as a reduction of rent expense over the term of the lease.

In certain arrangements, we are involved in the construction of improvements to buildings we are leasing. To the extent we are involved with the structural improvements of the construction project or take construction risk, we are considered to be the owner of the building and related improvements for accounting purposes during the construction period. Therefore, we record the fair value of the building subject to the lease within property and equipment on the balance sheet, plus the amount of building improvements incurred and funded by us and/or the landlord as of the balance sheet date. We also record a corresponding lease financing obligation on our balance sheet representing the amounts financed by the lessor for the building and lessor financed improvements. Lessor financed improvement incentives due but not yet received are recorded as prepaid expense and other current assets on the balance sheet.

Once construction is completed, we consider the requirements for sale-leaseback accounting treatment, including evaluating whether all risks of ownership have been transferred back to the landlord, as evidenced by a lack of our continuing involvement in the leased property. If we conclude the arrangement does not qualify for sale-leaseback accounting treatment, the building and improvements remain on our balance sheet and are subject to depreciation and assessment of impairment. We bifurcate our lease payments into a portion allocated to the lease financing obligation and a portion allocated to the parcel of land on which the building has been built. The portion of the lease payments allocated to the land is treated for accounting purposes as operating lease payments, and therefore is recorded as rent expense in the consolidated statements of operations and comprehensive loss. The portion of the lease payments allocated to the lease financing obligation is further bifurcated into a portion allocated to interest expense and a portion allocated to reduce the lease financing obligation.

The interest rate used for the lease financing obligation represents our estimated incremental borrowing rate at the inception of the lease, adjusted to reduce any built-in loss. The initial recording of these assets and liabilities is classified as non-cash investing and financing items, respectively, for purpose of the consolidated statements of cash flows.

The most significant estimates used by us in accounting for the lease financing transaction and the impact of these estimates are as follows:

- *Incremental borrowing rate*. We estimate our incremental borrowing rate as the rate we would have incurred to borrow, based on our credit quality at the inception of the lease over a similar term, the funds necessary to purchase the leased building subject to the financing lease transaction. The incremental borrowing rate is used in determining allocating our rental payments between interest expense and a reduction of the outstanding lease financing obligation.
- *Land capitalization rate*. The land capitalization rate is the rate of return on the land underlying the lease properly considering expected income that the land would be expected to generate. The land lease capitalization rate is estimated using comparable market data for land capitalization rates for similar properties. The land capitalization rate is used in determining allocating our rental payments between interest expense and a reduction of the outstanding lease financing obligation.

- *Fair value of leased building and underlying land.* The fair value of a leased building and underlying land subject to the lease financing transaction is based on comparable market data for similar properties as of the lease inception date. The fair value of the underlying land is used in determining allocating our rental payments between interest expense and a reduction of the outstanding lease financing obligation.

In July 2018, we entered into a non-cancelable lease for a new manufacturing facility (the "San Diego Facility Lease") and subsequently took possession of the space. The scope of the tenant improvements did not qualify under the lease accounting guidance as "normal tenant improvements" and we were the deemed owner of the leased building during the construction period for accounting purposes. In 2019, construction on the facility was substantially completed and the leased property was placed into service. We determined that the completed construction project did not qualify for sale-leaseback accounting due to non-recourse financing we provided to the lessor for reimbursed construction costs and has instead been accounted for as a financing transaction. The leased building for the San Diego Facility Lease and related improvements remains on our consolidated balance sheet as of December 31, 2020 and rental payments associated with the lease have been allocated to operating lease expense for the ground underlying the leased building and principal and interest payments on the lease financing obligation.

Equity-Based Compensation

Incentive Units

Prior to the Organizational Transactions, unit-based awards had been granted by MLSH 1 and also by one of our subsidiaries to certain executives and employees of our subsidiaries in the form of non-vested incentive units ("Incentive Units"). No Incentive Units have been granted subsequent to the Organizational Transactions. We recognize compensation expense for MLSH 1 awards in our consolidated financial statements as MLSH 1 is considered to be the economic interest holder in Topco, LLC. Compensation expense for the Incentive Units is recognized over their requisite service period. All awards of Incentive Units were measured based on the fair value of the award on the date of grant. We recognize compensation expense for these awards over the requisite service period. Forfeitures are recognized when they occur. Equity-based compensation expenses are classified in the consolidated statements of operations based on the departments of the related employees. These Incentive Units are subject to service, market or performance conditions. For Incentive Units subject to performance conditions, we evaluate the probability of achieving each performance condition at each reporting date and recognize expense over the requisite service period when it is deemed probable that a performance condition will be met using the accelerated attribution method over the requisite service period. During the year ended December 31, 2020, MLSH 1 performance-based Incentive Units vested as their performance condition was satisfied upon the completion of the IPO. Of these performance-based Incentive Units, certain units were modified to allow for vesting subsequent to the termination of the employment for two employees before the awards were deemed probable of vesting. The calculation of the incremental equity-based compensation expense was based on the new fair value of the award measured as of the date of modification. As a result of the modification and based on the performance condition being satisfied, the Company recognized an incremental equity-based compensation expense of $16.7 million for the year ended December 31, 2020.

Stock Options and Restricted Stock Units

We began to grant stock options and restricted stock units ("RSUs") out of our 2020 Omnibus Incentive Plan (the "2020 Plan") in the fourth quarter of 2020. For awards that vest subject to the satisfaction of service requirements, compensation expense is measured based on the fair value of the award on the date of grant and is recognized as expense on a straight-line basis over the requisite service period, which is generally four years.

The fair value of RSUs is determined based on the number of shares granted and the quoted market price of our Series A common stock on the date of grant. The fair value of stock options is estimated on the date of grant using the Black-Scholes option pricing model ("Black-Scholes Model"). The fair value of option awards as determined by the Black-Scholes Model are affected by our stock price as well as other assumptions. These assumptions include, but are not limited to, the expected term, the expected Class A common stock price volatility, the risk-free interest rate and the expected dividend yield. We have, due to insufficient historical data, used the "simplified method" to determine the expected term of stock options granted with a service condition. If any of the assumptions used in the Black-Scholes Model change significantly, equity-based compensation expense may differ materially in the future from that recorded in the current period.

We expect to continue to grant stock options to purchase our Class A common stock and other equity awards in the future, and to the extent that we do, our actual stock-based compensation expense recognized in future periods will likely increase.

Incentive Units Valuation

As there has been no public market for the Incentive Units granted by MLSH 1 or by our subsidiary, the grant date fair value of Incentive Unit awards has been determined by our board of directors with the assistance of management and an independent third-party valuation specialist. We believe our board of directors has the relevant experience and expertise to determine the fair value of these Incentive Units. The grant date fair value of Incentive Units was determined first by estimating our aggregate equity value using a weighting of discounted cash flows, comparable public companies, and comparable-transactions valuation methodologies. An Option-Pricing Method, which utilizes certain assumptions including volatility, time to liquidation, a risk-free interest rate, was then used to allocate our total equity value to our different classes of equity according to their rights and preferences. A discount for lack of marketability was then applied to determine the Incentive Unit's values to account for their lack of liquidity. In determining the fair value of the Incentive Units, the methodologies used to estimate the enterprise values were performed using methodologies, approaches, and assumptions consistent with the American Institute of Certified Public Accountants Accounting and Valuation Guide, Valuation of Privately-Held-Company Equity Securities Issued as Compensation ("AICPA Accounting and Valuation Guide"). The assumptions we use in the valuation model are based on future expectations combined with management's judgment. In the absence of a public trading market, our board of directors, with input from management, exercised significant judgment and considered numerous objective and subjective factors to determine the fair value of the Incentive Units as of the date of each award, including the following factors:

- independent valuations performed at periodic intervals by an independent third-party valuation firm;
- our operating and financial performance, forecasts and capital resources;
- current business conditions;
- the hiring of key personnel;
- the status of research and development efforts;
- the likelihood of achieving a liquidity event for these incentive units, such as an initial public offering or sale of our company, given prevailing market conditions;
- any adjustment necessary to recognize a lack of marketability for the Incentive Units;
- trends and developments in our industry;
- the market performance of comparable publicly traded technology companies; and
- the U.S. and global economic and capital market conditions.

The dates of our valuation reports, which were prepared on a periodic basis, were not contemporaneous with the grant dates of these Incentive Unit awards. Therefore, we considered the amount of time between the valuation report date and the grant date to determine whether to use the latest Incentive Unit valuation report for the purposes of determining the fair value of these Incentive Units for financial reporting purposes. If Incentive Units were granted a short period of time preceding the date of a valuation report, we assessed the fair value of such Incentive Unit award used for financial reporting purposes after considering the fair value reflected in the subsequent valuation report and other facts and circumstances on the date of grant as described below. The additional factors considered when determining any changes in fair value between the most recent valuation report and the grant dates included, when available, the prices paid in recent transactions involving these Incentive Units, as well as our operating and financial performance, current industry conditions and the market performance of comparable publicly traded companies. There were significant judgments and estimates inherent in these valuations, which included assumptions regarding our future operating performance, the time to completing an initial public offering or other liquidity event and the determinations of the appropriate valuation methods to be applied. If we had made different estimates or assumptions, our equity-based compensation expense, net income (loss) and net income (loss) attributable to Maravai LifeSciences Holdings, Inc. could have been significantly different from those reported in this Form 10-K.

In valuing these Incentive Units, the Board of Directors determined the enterprise values of our business by taking a weighted combination of the value indications using the income approach and the market comparable approach valuation methods.

Income Approach

The income approach estimates value based on the expectation of future cash flows a company will generate, such as cash earnings, cost savings, tax deductions and the proceeds from disposition. These future cash flows are discounted to their present values using a discount rate derived from an analysis of the cost of capital of comparable publicly traded companies in our industry or similar lines of business as of each valuation date. This weighted-average cost of capital discount rate ("WACC"), is adjusted to reflect the risks inherent in the business. The WACC used for these valuations was determined to be reasonable and

appropriate given our debt and equity capitalization structure at the time of each respective valuation. The income approach also assesses the residual value beyond the forecast period and is determined by taking the projected residual cash flow for the final year of the projection and applying a terminal exit multiple. This amount is then discounted by the WACC less the long-term growth rate.

Market Comparable Approach

The market comparable approach estimates value based on a comparison of the subject company to comparable public companies in a similar line of business. From the comparable companies, a representative market multiple is determined which is applied to our financial metrics to estimate the value of our parent or our subsidiary. To determine our peer group of companies, we considered life sciences tools companies and selected those most similar to us based on various factors, including, but not limited to, financial risk, company size, geographic diversification, profitability, growth characteristics and stage of life cycle.

In some cases, we considered the amount of time between the valuation date and the award grant date to determine whether to use the latest valuation determined pursuant to one of the methods described above or to use a valuation calculated by management between the two valuation dates.

Once we determined an enterprise value, we utilized the Black-Scholes Model to allocate the enterprise value to each class of ownership within equity. Black-Scholes Model values these call options on the respective enterprise values allocated to each class of ownership, with exercise prices based on their liquidation preferences, participation rights and strike prices. This method is generally preferred when future outcomes are difficult to predict and dissolution or liquidation is not imminent.

Income Taxes

We are subject to U.S. federal and state income taxes. We are the controlling member of Topco, LLC, which has been, and will continue to be, treated as a partnership for U.S. federal and state income tax purposes. Topco LLC's wholly-owned U.S. subsidiary, Maravai Life Sciences, Inc. ("Maravai Inc.") and its subsidiaries, are taxpaying entities in the U.S., Canada, and the U.K. Topco LLC's other subsidiaries are treated as pass-through entities for federal and state income tax purposes. The income or loss generated by these entities is not taxed at the LLC level. As required by U.S. tax law, income or loss generated by these LLCs passes through to their owners. As such, our tax provision consists solely of the activities of Maravai Inc. and its subsidiaries, as well as our share of income generated by Topco LLC. We anticipate this structure to remain in existence for the foreseeable future.

We account for income taxes under the asset and liability method of accounting. We recognize deferred tax assets and liabilities for the future tax consequences attributable to differences between the financial statement carrying amounts of existing assets and liabilities and their respective tax bases, as well as for operating loss and tax credit carryforwards. We measure deferred tax assets and liabilities using enacted tax rates expected to apply to taxable income in the years in which we expect to recover or settle those temporary differences. We recognize the effect of a change in tax rates on deferred tax assets and liabilities in the results of operations in the period that includes the enactment date. We reduce the measurement of a deferred tax asset, if necessary, by a valuation allowance if it is more likely than not that we will not realize some or all of the deferred tax asset.

The realizability of the Company's deferred tax asset related to its investment in Topco LLC depends on the Company receiving allocations of tax deductions for its tax basis in the investment and on the Company generating sufficient taxable income to fully offset such deductions. We believe it is more likely than not that the Company will generate sufficient taxable income in the future to fully realize any deductions allocated to it from Topco LLC associated with the reversal of its tax basis as of December 31, 2020. However, a portion of the deferred tax asset may only be realizable through the sale or liquidation of the investment and our ability to generate sufficient capital gains. As such, a valuation allowance of $13.3 million has been recorded as of December 31, 2020 to reflect the deferred tax asset that is more likely than not to not be realized.

We account for uncertain tax positions by recognizing the financial statement effects of a tax position only when, based upon technical merits, it is more likely than not that the position will be sustained upon examination.

Significant judgment is required in determining the accounting for income taxes. In the ordinary course of business, many transactions and calculations arise where the ultimate tax outcome is uncertain. Our judgments, assumptions and estimates relative to the accounting for income taxes take into account current tax laws, our interpretation of current tax laws, and possible outcomes of future audits conducted by foreign and domestic tax authorities. Although we believe that our estimates are reasonable, the final tax outcome of matters could be different from our assumptions and estimates used when determining the accounting for income taxes. Such differences, if identified in future periods, could have a material effect on the amounts recorded in our consolidated financial statements.

Payable to Related Parties Pursuant to Tax Receivable Agreement

In connection with the completion of our IPO we entered into a TRA with MLSH 1 and MLSH 2. The TRA provides for the payment by us to MLSH 1 and MLSH 2, collectively, of 85% of the amount of tax benefits, if any, that we actually realize, or in some circumstances are deemed to realize from exchanges of LLC Units (together with the corresponding share of Class B Common stock), as a result of (i) certain increases in the tax basis of assets of Topco LLC and its subsidiaries resulting from purchases or exchanges of LLC Units, (ii) increase in the tax basis of assets of Topco LLC received form LLC Units held by entities acquired from MLSH 1 and MLSH 2 in connection with the Organizational Transactions ("the Blocker Entities"), Topco LLC and subsidiaries of Topco LLC that existed prior to this offering and (iii) certain other tax benefits related to our entering into the TRA, including tax benefits attributable to payments that we make under the TRA (collectively, the "Tax Attributes"). The payment obligations under the TRA are not conditioned upon any LLC Unitholder maintaining a continued ownership interest in us or Topco LLC and the rights of MLSH 1 and MLSH 2 under the TRA are assignable. We expect to benefit from the remaining 15% of the tax benefits, if any, that we may actually realize.

We accrue a liability for the payable to related parties for the TRA and a reduction to stockholders' equity, when it is deemed probable that the Tax Attributes will be used to reduce our taxable income, as the contractual percentage of the benefit of Tax Attributes that we expected to receive over a period of time. The current portion, if any, of the liability is the amount estimated to be paid within one year of the balance sheet date. For purposes of estimating the value of the payable to related parties for the TRA, the tax benefit deemed realized by us and payable to MLSH 1 and MLSH 2 is computed by taking 85% of the difference between undiscounted forecasted cash income tax liability over the term of benefit of the Tax Attributes and the forecasted amount of such taxes that we would have been required to pay had there been no Tax Attributes (i.e. a with-and-without analysis); provided that, for purposes of determining the tax benefit with respect to state and local income taxes, use simplifying assumptions. The TRA will generally apply to each of our taxable years, beginning with the taxable year that the TRA is entered into. There is no maximum term for the TRA and the TRA will continue until all such tax benefits have been utilized or expired unless we exercise our right to terminate the TRA for an agreed-upon amount equal to the estimated present value of the remaining payments to be made under the agreement (calculated with certain assumptions, including as to utilization of the Tax Attributes). We may record additional liabilities under the TRA when LLC Units of Topco LLC are exchanged in the future and as our estimates of the future utilization of the tax benefits change. If, due to a change in facts, these tax attributes are not utilized in future years, it is reasonably possible no amounts would be paid under the TRA. In this scenario, the reduction of the liability under the TRA would result in a benefit to our consolidated statement of operations. Subsequent adjustments to the payable to related parties for the TRA based on changes in anticipated future taxable income are recorded in our consolidated statement of operations.

The actual Tax Attributes, as well as any amounts paid to MLSH 1 and MLSH 2 under the TRA, will vary depending on a number of factors, including:

- the timing of any future exchanges—for instance, the increase in any tax deductions will vary depending on the fair value, which may fluctuate over time, of the depreciable or amortizable assets of Topco LLC and its flow-through subsidiaries at the time of each exchange;

- the price of shares of our Class A common stock at the time of any future exchanges—the increases and adjustments in our proportionate share of the existing tax basis of the assets of Topco LLC and its flow-through subsidiaries that are directly related to the price of shares of our Class A common stock at the time of future exchanges;

- the extent to which such exchanges are taxable—if an exchange is not taxable for any reason, increased tax deductions as a result of legacy IRC Section 754 election in place at Topco LLC will not be available to generate payments under the TRA;

- the amount and timing of our income—the TRA generally will require us to pay 85% of the tax benefits as and when those benefits are treated as realized by us under the terms of the TRA. If we do not have taxable income in a particular taxable year, we generally will not be required (absent a change of control or other circumstances requiring an early termination payment) to make payments under the TRA for that taxable year because no tax benefits will have been actually realized. Nevertheless, any tax benefits that do not result in realized tax benefits in a given taxable year will likely generate tax attributes that may be utilized to generate tax benefits in future (and possibly previous) taxable years. The utilization of any such tax attributes will result in payments under the TRA; and

- applicable tax rates—the tax rates in effect at the time a tax benefit is recognized.

The payment obligations under the TRA are obligations of Maravai LifeSciences Holdings, Inc. and not of Topco LLC. Although the actual timing and amount of any payments that may be made under the TRA will vary, we expect that the

aggregate payments that we will be required to make to MLSH 1 and MLSH 2 will be substantial. Any payments made by us under the TRA will generally reduce the amount of overall cash flow that might have otherwise been available to us or to Topco LLC and, to the extent that we are unable to make payments under the TRA for any reason, the unpaid amounts will be deferred and will accrue interest until paid by us. We anticipate funding ordinary course payments under the TRA from cash flow from operations of Topco LLC and its subsidiaries, available cash and/or available borrowings under the New Credit Agreement.

Assuming no material changes in the relevant tax law, and that we earn sufficient taxable income to realize all tax benefits that are subject to the TRA, we expect that future payments under the Tax Receivable Agreement relating to the purchase by us of LLC Units from MLSH 1 in connection with this offering to be approximately $389.5 million and to range over the next 15 years from approximately $3.4 million to $29.8 million per year and decline thereafter. These estimates are based on the initial public offering price of $27.00 per share of Class A common stock. Future payments in respect of subsequent exchanges or financing would be in addition to these amounts and are expected to be substantial. The foregoing numbers are merely estimates and actual payments could differ materially. It is possible that future transactions or events could increase or decrease the actual tax benefits realized and the corresponding TRA payments. There may be a material negative effect on our liquidity if, as a result of timing discrepancies or otherwise, the payments under the TRA exceed the actual benefits we realize in respect of the tax attributes subject to the TRA and/or distributions to us by Topco LLC are not sufficient to permit us to make payments under the TRA after we have paid taxes.

The term of the TRA commenced upon the completion of our IPO and will continue until all such tax benefits have been utilized or expire, unless we exercise our rights to terminate the agreements or payments under the agreements are accelerated in the event we materially breach any of our material obligations under the agreements.

JOBS Act Accounting Election

We are an "emerging growth company" within the meaning of the JOBS Act. The JOBS Act permits an emerging growth company like us to take advantage of an extended transition period to comply with new or revised accounting standards applicable to public companies. We are electing to use this extended transition period and we will therefore comply with new or revised accounting standards on the earlier of (i) when they apply to private companies; or (ii) when we lose our emerging growth company status. As a result, our financial statements may not be comparable with companies that comply with public company effective dates for accounting standards. We also intend to rely on other exemptions provided by the JOBS Act, including not being required to comply with the auditor attestation requirements of Section 404(b) of the Sarbanes-Oxley Act unless we cease to be an emerging growth company.

We will remain an emerging growth company until the earliest of (1) December 31, 2025, (2) the last day of the fiscal year in which we have total annual gross revenue of at least $1.07 billion, (3) the last day of the fiscal year in which we are deemed to be a "large accelerated filer" as defined in Rule 12b-2 under the Exchange Act, which would occur if the market value of our Class A common stock held by non-affiliates exceeded $700.0 million as of the last business day of the second fiscal quarter of such year or (4) the date on which we have issued more than $1.0 billion in non-convertible debt securities during the prior three-year period.

Recent Accounting Pronouncements

See Note 1 of notes to the consolidated financial statements for a discussion of recent accounting standards and pronouncements.

Item 7A. Quantitative and Qualitative Disclosures About Market Risk

Interest Rate Risk

As of December 31, 2020, our primary exposure to interest rate risk was associated with our variable rate long-term debt. The New Credit Agreement bear interest subject to the Base Rate or the Adjusted Eurocurrency Rate. Interest rates can fluctuate for a number of reasons, including changes in the fiscal and monetary policies or geopolitical events or changes in general economic conditions. This could adversely affect our cash flows.

As of December 31, 2019, we had four interest rate cap agreements with a financial institution to manage our variable interest rate risk on a portion of our credit borrowings under the First Lien Credit Agreement and Second Lien Credit Agreement. All four interest rate caps expired during 2020. As of December 31, 2020, we did not have any interest rate cap agreements in place.

We had $550.0 million of outstanding borrowings under our long-term debt facilities as of December 31, 2020. For the year ended December 31, 2020, the effect of a hypothetical 100 basis point increase or decrease in overall interest rates would have changed our interest expense by approximately $4.1 million.

We had cash of $236.2 million as of December 31, 2020. Our cash is held in demand deposits and is not subject to market risk.

Foreign Currency Risk

The majority of our revenue is denominated in U.S. dollars; however, approximately 47.1% of our revenue was derived from international sales for the year ended December 31, 2020, primarily in Europe and Asia Pacific. However, only our sales in the United Kingdom are denominated in local currency. Our remaining international sales are denominated in the U.S. dollar. Our expenses are generally denominated in the currencies in which they are incurred, which is primarily in the United States and, to a lesser extent, the United Kingdom. As we expand our presence in international markets, to the extent we are required to enter into agreements denominated in a currency other than the U.S. dollar, results of operations and cash flows may increasingly be subject to fluctuations due to changes in foreign currency exchange rates and may be adversely affected in the future due to changes in foreign exchange rates. To date, we have not entered into any hedging arrangements with respect to foreign currency risk. As our international operations grow, we will continue to reassess our approach to manage our risk relating to fluctuations in currency rates.

Item 8. Financial Statements and Supplementary Data

INDEX TO CONSOLIDATED FINANCIAL STATEMENTS

REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

To the Stockholders and the Board of Directors of Maravai LifeSciences Holdings, Inc.

Opinion on the Financial Statements

We have audited the accompanying consolidated balance sheets of Maravai LifeSciences Holdings, Inc. (the Company) as of December 31, 2020 and 2019, the related consolidated statements of operations, comprehensive income (loss), changes in stockholders' / member's equity and cash flows for each of the three years in the period ended December 31, 2020, 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, 2020 and 2019, and the results of its operations and its cash flows for each of the three years in the period ended December 31, 2020, in conformity with U.S. generally accepted accounting principles.

Basis for Opinion

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

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

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

/s/ Ernst & Young LLP

We have served as the Company's auditor since 2016.

Redwood City, California
March 22, 2021

MARAVAI LIFESCIENCES HOLDINGS, INC.

CONSOLIDATED BALANCE SHEETS

(in thousands, except shares and unit amounts and par value)

	December 31,	
	2020	**2019**
Assets		
Current assets:		
Cash	$ 236,184	$ 24,700
Accounts receivable, net	51,018	18,030
Inventory	33,301	14,202
Prepaid expenses and other current assets	11,095	3,620
Total current assets	331,598	60,552
Property and equipment, net	101,305	94,311
Goodwill	224,275	224,275
Intangible assets, net	177,656	197,853
Deferred tax assets	431,699	—
Other assets	4,158	805
Total assets	$ 1,270,691	$ 577,796
Liabilities and stockholders'/member's equity		
Current liabilities:		
Accounts payable	$ 8,171	$ 7,478
Accrued expenses and other current liabilities	38,546	18,743
Deferred revenue	78,061	841
Current portion of long-term debt	6,000	2,500
Total current liabilities	130,778	29,562
Long-term debt, less current portion	528,614	334,783
Deferred tax liabilities	8,609	14,697
Lease facility financing obligation, less current portion	56,167	52,919
Payable to related parties pursuant to a Tax Receivable Agreement	389,546	—
Other long-term liabilities	2,231	1,208
Total liabilities	1,115,945	433,169
Commitments and contingencies (Note 6)		
Stockholders' / member's equity		
Member's equity	—	183,910
Class A common stock, $0.01 par value - 500,000,000 shares authorized; 96,646,515 shares issued and outstanding as of December 31, 2020	966	—
Class B common stock, $0.01 par value - 300,000,000 shares authorized; 160,974,129 shares issued and outstanding as of December 31, 2020	1,610	—
Additional paid-in capital	85,125	—
Accumulated other comprehensive loss	(44)	(133)
Retained earnings (accumulated deficit)	854	(42,381)
Total stockholders' / member's equity attributable to Maravai LifeSciences Holdings, Inc.	88,511	141,396
Non-controlling interests	66,235	3,231
Total stockholders' / member's equity	154,746	144,627
Total liabilities and stockholders' / member's equity	$ 1,270,691	$ 577,796

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

MARAVAI LIFESCIENCES HOLDINGS, INC.

CONSOLIDATED STATEMENTS OF OPERATIONS

(in thousands, except share and unit amounts and per share and per unit amounts)

	Year Ended December 31,		
	2020	**2019**	**2018**
Revenue	$ 284,098	$ 143,140	$ 123,833
Operating expenses:			
Cost of revenue	79,649	66,849	60,765
Research and development	9,304	3,627	4,499
Selling, general and administrative	94,245	48,354	41,194
Change in estimated fair value of contingent consideration	—	322	939
Gain on sale and leaseback transaction	(19,002)	—	—
Total operating expenses	164,196	119,152	107,397
Income from operations	119,902	23,988	16,436
Other income (expense):			
Interest expense	(30,740)	(29,959)	(27,399)
Loss on extinguishment of debt	(7,592)	—	(5,622)
Other income	126	118	87
Income (loss) before income taxes	81,696	(5,853)	(16,498)
Income tax expense (benefit)	2,880	(652)	417
Net income (loss)	78,816	(5,201)	(16,915)
Net (loss) attributable to non-controlling interests	(10,156)	(731)	(12,443)
Net income (loss) attributable to Maravai LifeSciences Holdings, Inc.	$ 88,972	$ (4,470)	$ (4,472)
Net income (loss) per Class A common share/unit attributable to Maravai LifeSciences Holdings, Inc.:			
Basic	$ 7.43	$ (0.03)	$ (0.07)
Diluted	$ 2.36	$ (0.03)	$ (0.07)
Weighted average number of Class A common shares/units outstanding:			
Basic	10,351,137	253,916,941	253,916,941
Diluted	28,907,979	253,916,941	253,916,941

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

MARAVAI LIFESCIENCES HOLDINGS, INC.

CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME (LOSS)

(in thousands)

	Year Ended December 31,		
	2020	**2019**	**2018**
Net income (loss)	$ 78,816	$ (5,201)	$ (16,915)
Other comprehensive income (loss):			
Foreign currency translation adjustments	(44)	34	(69)
Total other comprehensive income (loss)	78,772	(5,167)	(16,984)
Comprehensive loss attributable to non-controlling interests	(10,156)	(731)	(12,443)
Total comprehensive income (loss) attributable to Maravai LifeSciences Holdings, Inc.	$ 88,928	$ (4,436)	$ (4,541)

The accompanying notes are an integral part of the consolidated financial statements

MARAVAI LIFESCIENCES HOLDINGS, INC.

CONSOLIDATED STATEMENTS OF CHANGES IN STOCKHOLDERS'/MEMBER'S EQUITY

(in thousands)

	Member's Equity	Class A Common Stock		Class B Common Stock		Additional Paid In Capital	Retained Earnings	Accumulated Other Comprehensive Income (Loss)	Non-controlling Interest	Total Stockholders' /Member's Equity
		Shares	Amount	Shares	Amount					
January 1, 2018	$ 199,614	—	$ —	—	$ —	$ —	$ —	$ (98)	$ 15,428	$ 214,944
Distribution to non-controlling interest holder	(52,056)	—	—	—	—	—	—	—	—	(52,056)
Repurchase of incentive units	(9)	—	—	—	—	—	—	—	—	(9)
Equity-based compensation	1,495	—	—	—	—	—	—	—	626	2,121
Net loss	(4,470)	—	—	—	—	—	—	—	(731)	(5,201)
Foreign currency translation adjustment	—	—	—	—	—	—	—	(69)	—	(69)
December 31, 2018	144,572	—	—	—	—	—	—	(167)	3,611	148,016
Cumulative effect of adoption of ASC 606	326	—	—	—	—	—	—	—	—	326
Repurchase of incentive units	(227)	—	—	—	—	—	—	—	—	(227)
Equity-based compensation	1,328	—	—	—	—	—	—	—	351	1,679
Net loss	(4,470)								(731)	(5,201)
Foreign currency translation adjustment	—	—	—	—	—	—	—	34	—	34
December 31, 2019	141,529	—	—	—	—	—	—	(133)	3,231	144,627
Activity prior to initial public offering ("IPO") and related Organizational Transactions:										
Repurchase of MLSC Holdings, LLC ("MLSC") incentive units	(9,140)	—	—	—	—	—	—	—	—	(9,140)
Distributions to non-controlling interests holders	(88,880)	—	—	—	—	—	—	—	—	(88,880)
Unit-based compensation	1,793	—	—	—	—	—	—	—	1,483	3,276
Net income	88,118	—	—	—	—	—	—	—	98	88,216
Purchase of non-controlling interests in MLSC	(161,615)	—	—	—	—	—	—	—	(4,812)	(166,427)
Foreign currency translation adjustment	—	—	—	—	—	—	—	(1)	—	(1)
Effects of the IPO and related Organizational Transactions:										
Effects of Organizational Transactions	28,195	28,966	289	160,974	1,610	(200,390)	—	114	10,236	(159,946)
Issuance of Class A common stock in connection with the IPO, net of issuance costs of $108,571	—	69,000	690	—	—	1,753,742	—	—	—	1,754,432

	Member's Equity	Class A Common Stock		Class B Common Stock		Additional Paid In Capital	Retained Earnings	Accumulated Other Comprehensive Income (Loss)	Non-controlling Interest	Total Stockholders' /Member's Equity
		Shares	Amount	Shares	Amount					
Acquisition of preexisting LLC Units from MLSH 1	—	—	—	—	$ —	(1,421,760)	$ —	$ (29)	(2,538)	(1,424,327)
Non-controlling interest adjustment for purchase of LLC Units from Topco LLC with proceeds from IPO	$ —	—	$ —	—	$ —	$ (58,940)	$ —	$ (1)	$ 58,941	$ —
Repurchase and retirement of Class A common from MLSH 2	—	(1,319)	(13)	—	—	(33,645)	—	—	—	(33,658)
Equity-based compensation	—	—	—	—	—	2,980	—	—	17,407	20,387
Net loss	—	—	—	—	—	—	(3,044)	—	(17,787)	(20,831)
Recognition of impact of entering into Tax Receivable Agreement	—	—	—	—	—	42,776	—	—	—	42,776
Activity subsequent to the initial public offering and related Organizational Transactions:										
Equity-based compensation	—	—	—	—	—	362	—	—	604	966
Net income	—	—	—	—	—	—	3,898	—	7,533	11,431
Foreign currency translation adjustment	—	—	—	—	—	—	—	6	10	16
Tax distribution to non-controlling interest holder	—	—	—	—	—	—	—	—	(8,171)	(8,171)
December 31, 2020	$ —	96,647	$ 966	160,974	$ 1,610	$ 85,125	$ 854	$ (44)	$ 66,235	$ 154,746

The accompanying notes are an integral part of the consolidated financial statements

MARAVAI LIFESCIENCES HOLDINGS, INC.

CONSOLIDATED STATEMENTS OF CASH FLOWS

(in thousands)

	Year Ended December 31,		
	2020	**2019**	**2018**
Operating activities			
Net income (loss)	$ 78,816	$ (5,201)	$ (16,915)
Adjustments to reconcile net loss to net cash (used in) provided by operating activities:			
Depreciation	5,517	3,810	2,225
Amortization of intangible assets	20,320	20,274	20,122
Change in provision for doubtful accounts	233	(152)	(415)
Amortization of deferred financing costs	1,825	1,734	1,498
Equity-based compensation expense	24,629	1,679	2,121
Loss on long-term debt refinancing	7,592	—	5,622
Deferred income taxes	(5,464)	(1,159)	317
Change in estimated fair value of contingent consideration	—	322	939
Gain on sale and leaseback transaction	(19,002)	—	—
Acquired and in-process research and development costs	2,881	—	—
Non-cash interest expense recognized on lease facility financing obligation	1,289	—	—
Financing costs incurred for line of credit	(3,239)	—	—
Other	897	518	141
Changes in operating assets and liabilities:			
Accounts receivable	(33,144)	(1,888)	(4,146)
Inventory	(19,099)	106	2,311
Prepaid expenses and other assets	(5,518)	(1,983)	(696)
Other assets	—	—	(570)
Accounts payable	1,176	2,470	(871)
Accrued expenses and other current liabilities	17,777	3,505	3,123
Earn-out liability	—	—	(14,547)
Other long-term liabilities	(2,519)	—	354
Deferred revenue	77,220	80	(799)
Net cash provided by (used in) operating activities	152,187	24,115	(186)
Investing activities			
Cash paid for asset acquisition, net of cash acquired	(3,024)	—	—
Working capital adjustment for acquisition in prior year	—	—	160
Acquisition of patents	—	—	(70)
Purchases of property and equipment	(25,408)	(17,148)	(3,541)
Proceeds from sale of building	34,500	—	—
Net cash provided by (used in) investing activities	6,068	(17,148)	(3,451)
Financing activities			
Distributions to non-controlling interests holders	(97,051)	—	(52,056)
Proceeds from borrowings of long-term debt, net of discount	609,000	—	310,630
Financing costs incurred for long-term debt	(9,295)	—	(6,711)
Repurchase of incentive units	(9,140)	(227)	(9)
Principal repayments of long-term debt	(411,875)	(2,500)	(254,987)
Payment of contingent consideration	(1,439)	(1,300)	(5,819)
Payments made on facility financing lease obligation and capital lease	(201)	(140)	(215)
Payment for non-controlling interests in MLSC	(120,005)	—	—
Payment to MLSH 2 for Blocker Mergers	(208,053)	—	—
Proceeds from issuance of Class A common stock sold in IPO, net of offering costs	1,757,245	—	—

	Year Ended December 31,		
	2020	2019	2018
Proceeds from issuance of Class B common stock sold to MLSH 1	1,687	—	—
Purchase of LLC Units from MLSH 1	(1,424,324)	—	—
Repurchase of Class A common stock from MLSH 2	(33,658)	—	—
Proceeds from employee stock purchase plan	321	—	—
Net cash provided by (used in) financing activities	53,212	(4,167)	(9,167)
Effects of exchange rate changes on cash	17	34	(69)
Net increase (decrease) in cash, and restricted cash	211,484	2,834	(12,873)
Cash, beginning of period	24,700	21,866	34,739
Cash, end of period	$ 236,184	$ 24,700	$ 21,866
Supplemental cash flow information			
Cash paid for interest	$ 28,916	$ 28,728	$ 25,678
Cash paid for income taxes	$ 5,006	$ 802	$ 97
Supplemental disclosures of non-cash investing and financing activities			
Property and equipment included in accounts payable and accrued expenses	$ 1,990	$ 2,765	$ 196
Financing cost deducted from long-term debt proceeds	$ 6,000	$ —	$ 3,800
Building and improvements capitalized under lease financing transaction	$ 700	$ 51,200	$ 15,374
Property and equipment under new capital lease	$ —	$ 15	$ 87
Exchange of units for MLSC non-controlling interests	$ 46,422	$ —	$ —
Exchange of Class A common stock for the Blocker Mergers	$ 782,073	$ —	$ —
Recognition of deferred tax assets from Organizational Transactions	$ 441,984	$ —	$ —
Recognition of liabilities under Tax Receivable Agreement	$ 389,546	$ —	$ —
IPO issuance costs included in accounts payable and accrued expenses	$ 2,816	$ —	$ —
Receivable from lessor funded financing	$ 1,987	$ —	$ —

The accompanying notes are an integral part of the consolidated financial statements

1. Organization and Significant Accounting Policies

Description of Business

Maravai LifeSciences Holdings, Inc. (the "Company", and together with its consolidated subsidiaries, "Maravai", "we", "us", "our") was formed as a Delaware corporation in August 2020 for the purpose of facilitating an initial public offering ("IPO") of its Class A common stock, facilitate certain organizational transactions and to operate the business of Maravai Topco Holdings, LLC ("Topco LLC") and its consolidated subsidiaries.

We are a leading life sciences company providing critical products to enable the development of drug therapies, diagnostics, novel vaccines and support research on human diseases. Our products address the key phases of biopharmaceutical development and include complex nucleic acids for diagnostic and therapeutic applications, antibody-based products to detect impurities during the production of biopharmaceutical products, and products to detect the expression of proteins in tissues of various species.

The Company is headquartered in San Diego, California and has three principal businesses: Nucleic Acid Production, Biologics Safety Testing, and Protein Detection. Our Nucleic Acid Production business manufactures and sells products used in the fields of gene therapy, vaccines, nucleoside chemistry, oligonucleotide therapy and molecular diagnostics, including reagents used in the chemical synthesis, modification, labelling and purification of deoxyribonucleic acid ("DNA") and ribonucleic acid ("RNA"). Our core Nucleic Acid Production offerings include messenger ribonucleic acid ("mRNA"), long and short oligonucleotides, our proprietary CleanCap® capping technology and oligonucleotide building blocks. Our Biologics Safety Testing business sells highly specialized analytical products for use in biologic manufacturing process development, including custom product-specific development antibody and assay development services. Our Protein Detection business sells innovative labeling and detection reagents for researchers in immunohistochemistry.

Organizational Transactions and Initial Public Offering

In November 2020, the Company completed its initial public offering ("IPO") and sold 69,000,000 shares of Class A common stock at a public offering price of $27.00 per share and received proceeds of $1.8 billion, net of underwriting discounts and commissions, which the Company used to purchase 55,823,011 previously-issued and 3,703,704 newly-issued LLC units in Topco LLC to pay Maravai Life Sciences Holdings 2 ("MLSH 2") as consideration for certain organizational transactions that occurred before the IPO.

Immediately prior to, and in connection with, the completion of our IPO, the Company completed a series of organizational transactions ("Organizational Transactions"), including:

- The amendment and restatement of Topco LLC's operating agreement (the "New LLC Operating Agreement") to, among other things, (i) modify Topco LLC's capital structure by replacing the membership interests held by Topco LLC's existing owners with a new class of Topco LLC units (the "LLC Units") and (ii) appoint the Company as the sole managing member of Topco LLC.

- Amend and restate the Company's certificate of incorporation to among other things, authorize the Company to issue two classes of common stock: Class A common stock and Class B common stock.

- The issuance of shares of the Company's Class B common stock to Maravai Life Sciences Holdings, LLC ("MLSH 1") which was Topco LLC's pre-IPO owner on a one-to-one basis with the number of LLC Units owned; and

- The acquisition, by merger, of two members of Topco LLC ("the Blocker Entities"), for which we issued 28,965,664 shares of Class A common stock and paid cash of $208.1 million as consideration ("the Blocker Mergers")

The Company is the sole managing member of Topco LLC, which operates and controls TriLink Biotechnologies, LLC, Glen Research, LLC, Vector Laboratories, Inc., MockV Solutions, LLC and Cygnus Technologies, LLC ("Cygnus") and their respective subsidiaries. MLSH 1 is the only other member of Topco LLC. Although we have a minority economic interest, we have sole voting power in, and control the management of, Topco LLC. As a result, we consolidate Topco LLC financial results and report a non-controlling interest related to the portion of Topco LLC not owned by us. As of December 31, 2020, we owned approximately 38% of Topco LLC.

The Organizational Transactions were considered transactions between entities under common control. As a result, the consolidated financial statements for periods prior to the IPO and the Organizational Transactions have been adjusted to combine the previously separate entities for presentation purposes.

Basis of Presentation

The Company operates and controls all of the business and affairs of Topco LLC, and through Topco LLC and its subsidiaries, conducts its business. Because we manage and operate the business and control the strategic decisions and day-to-day operations of Topco LLC and also have a substantial financial interest in Topco LLC, we consolidate the financial results of Topco LLC, and a portion of our net income is allocated to the non-controlling interests in Topco LLC held by MLSH 1.

All significant intercompany transactions and accounts between the businesses comprising the Company have been eliminated in the accompanying consolidated financial statements.

Our audited consolidated financial statements are presented in U.S. dollars. They have been prepared in accordance with accounting principles generally accepted in the United States of America ("U.S. GAAP") pursuant to the rules and regulations of the Securities and Exchange Commission ("SEC").

Variable Interest Entities

The Company consolidates all entities that it controls through a majority voting interest or as the primary beneficiary of a variable interest entity ("VIE"). In determining whether the Company is the primary beneficiary of an entity, the Company applies a qualitative approach that determines whether it has both (1) the power to direct the economically significant activities of the entity and (2) the obligation to absorb losses of, or the right to receive benefits from, the entity that could potentially be significant to that entity. The Company's determination about whether it should consolidate such VIEs is made continuously as changes to existing relationships or future transactions may result in a consolidation event.

Unit Split

On November 11, 2020, Topco LLC's member approved an amendment to its operating agreement to increase the authorized common units from 1,000 to 253,916,941 and effect a 253,916.941-for-1 split of its common units. All of the unit and per unit information included in the accompanying consolidated financial statements has been adjusted to reflect the split.

Use of Estimates

The preparation of consolidated financial statements in accordance with GAAP requires the Company to make judgements, estimates and assumptions that affect the reported amounts of assets, liabilities, equity, revenue and expenses, and related disclosures. These estimates form the basis for judgments the Company makes about the carrying values of assets and liabilities that are not readily apparent from other sources. The Company bases its estimates and judgments on historical experience and on various other assumptions that the Company believes are reasonable under the circumstances. These estimates are based on management's knowledge about current events and expectations about actions the Company may undertake in the future. Significant estimates include, but are not limited to, revenue recognition, the net realizable value of inventory, expected future cash flows including growth rates, discount rates, terminal values and other assumptions and estimates used to evaluate the recoverability of long-lived assets, estimated fair values of intangible assets and goodwill and the payable to related parties pursuant to the Tax Receivable Agreement, amortization methods and periods, valuation of intangible assets, the fair value of leased buildings and other assumptions associated with lease financing transactions, the estimated fair value of our long-term debt, equity-based compensation, the valuation of incentive units, allowance for doubtful accounts, and accounting for income taxes and assessment of valuation allowances. Actual results could differ materially from those estimates.

Revenue Recognition

The Company generates revenue from the sale of products and services and the performance of services in the fields of nucleic acid production, biologics safety testing, and protein detection. Revenue is recognized when control of promised goods or services is transferred to a customer in an amount that reflects the consideration to which the entity expects to be entitled in exchange for those goods or services. To determine revenue recognition for its arrangements with customers, the Company performs the following five steps: (i) identify the contract(s) with a customer; (ii) identify the performance obligations in the contract; (iii) determine the transaction price; (iv) allocate the transaction price to the performance obligations in the contract; and (v) recognize revenue when (or as) the entity satisfies a performance obligation. The majority of the Company's contracts include only one performance obligation. A performance obligation is a promise in a contract to transfer a distinct good or service to the customer and is defined as the unit of account for revenue recognition. The Company also recognizes revenue from other contracts that may include a combination of products and services, the provision of solely services, or from license fee arrangements which may be associated with the delivery of product. Where there is a combination of products and services, the Company accounts for the promises as individual performance obligations if they are concluded to be distinct. Performance obligations are considered distinct if they are both capable of being distinct and distinct within the context of the contract. In

determining whether performance obligations meet the criteria for being distinct, the Company considers a number of factors, such as the degree of interrelation and interdependence between obligations, and whether or not the good or service significantly modifies or transforms another good or service in the contract. As a practical expedient, we do not adjust the transaction price for the effects of a significant financing component if, at contract inception, the period between customer payment and the transfer of goods or services is expected to be one year or less. Contracts with customers are evaluated on a contract-by-contract basis as contracts may include multiple types of goods and services as described below.

Nucleic Acid Production

Nucleic Acid Production revenue is generated from the manufacture and sale of highly modified, complex nucleic acids products to support the needs of our of customers' research, therapeutic and vaccine programs. The primary offering of products include; CleanCap®, mRNA, and specialized oligonucleotides. Contracts typically consist of a single performance obligation. We also sell nucleic acid products for labeling and detecting proteins in cells and tissue samples research. The Company recognizes revenue from these products in the period in which the performance obligation is satisfied by transferring control to the customer. Revenue for nucleic acid catalog products is recognized at a single point in time, generally upon shipment to the customer. Revenue for contracts for certain custom nucleic acid products, with an enforceable right to payment and a reasonable margin for work performed to date, is recognized over time, based on a cost-to-cost input method over the manufacturing period.

Biologics Safety Testing

The Company's Biologics Safety Testing revenue is associated with the sale of bioprocess impurity detection kit products. We also enter into contracts that include custom antibody development, assay development and antibody affinity extraction services. These products and services enable the detection of impurities that occur in the manufacturing of biologic drugs and other therapeutics. The Company recognizes revenue from the sale of bioprocess impurity detection kits in the period in which the performance obligation is satisfied by transferring control to the customer. Custom antibody development contracts consist of a single performance obligation, typically with an enforceable right to payment and a reasonable margin for work performed to date. Revenue is recognized over time based on a cost-to-cost input method over the contract term. Where an enforceable right to payment does not exist, revenue is recognized at a point in time when control is transferred to the customer. Assay development service contracts consist of a single performance obligation, revenue is recognized at a point in time when a successful antigen test and report is provided to the customer. Affinity extraction services, which generally occur over a short period of time, consist of a single performance obligation to perform the extraction service and provide a summary report to the customer. Revenue is recognized either over time or at a point in time depending on contractual payment terms with the customer.

The Company also has certain licensing and royalty arrangements with an immaterial amount of revenue.

Protein Detection

The Company also manufactures and sells protein labeling and detection reagents to customers that are used for basic research and development. The contracts to sell these catalog products consist of a single performance obligation to deliver the reagent products. Revenue from these contracts is recognized at a point in time, generally upon shipment of the final product to the customer.

We recognize royalty revenue related to certain out-licensing and royalty arrangements in the period the sales or usage occur using third-party evidence to estimate the amount to be recorded. To date this revenue has not been material to the consolidated financial statements.

The Company has elected the practical exemption to not disclose the unfulfilled performance obligations for contracts with an original length of one year or less. The Company had no material unfulfilled performance obligations for contracts with an original length greater than one year at December 31, 2020 and 2019, respectively.

The Company accepts returns only if the products do not meet customer specifications and historically, the Company's volume of product returns has not been significant. Further, no warranties are provided for promised goods and services other than assurance type warranties.

Revenue for an individual contract is recognized at the related transaction price, which is the amount the Company expects to be entitled to in exchange for transferring the products and/or services. The transaction price for product sales is calculated at the contracted product selling price. The transaction price for a contract with multiple performance obligations is allocated to the separate performance obligations on a relative standalone selling price basis. Standalone selling prices for products are determined based on the prices charged to customers, which are directly observable. Standalone selling price of services are

mostly based on time and materials. Generally, payments from customers are due when goods and services are transferred. As most contracts contain a single performance obligation, the transaction price is representative of the standalone selling price charged to customers. Revenue is recognized only to the extent that it is probable that a significant reversal of the cumulative amount recognized will not occur in future periods. Variable consideration has not been material to our consolidated financial statements.

Sales taxes

Sales taxes collected by the Company are not included in the transaction price as revenue they are ultimately remitted to a governmental authority.

Shipping and handling costs

The Company has elected to account for shipping and handling activities related to contracts with customers as costs to fulfill the promise to transfer the associated products. Accordingly, revenue for shipping and handling is recognized at the same time that the related product revenue is recognized.

Contract costs

The Company recognizes the incremental costs of obtaining contracts as an expense when incurred when the amortization period of the assets that otherwise would have been recognized is one year or less. These costs are included in sales and marketing and general and administrative expenses. The costs to fulfill the contracts are determined to be immaterial and are recognized as an expense when incurred.

Contract balances

Contract assets are generated when contractual billing schedules differ from revenue recognition timing and the Company records contract receivable when it has an unconditional right to consideration. Contract assets balances, which are included in prepaid and other current assets, totaled $0.2 million and $0.8 million as of December 31, 2020 and 2019, respectively.

Contract liabilities include billings in excess of revenue recognized, such as customer deposits and deferred revenue. Customer deposits, which are included in accrued expenses, are recorded when cash payments are received or due in advance of performance. Deferred revenue is recorded when the Company has unsatisfied performance obligations. Total contract liabilities were $79.2 million and $1.0 million as of December 31, 2020 and 2019, respectively. Contract liabilities are expected to be recognized into revenue within the next twelve months.

Disaggregation of Revenue

The following tables summarize the revenue by segment and region for the periods presented (in thousands):

For the year ended December 31, 2020	Nucleic Acid Production	Biologics Safety Testing	Protein Detection	Total
North America	$ 115,216	$ 21,787	$ 13,343	$ 150,346
Europe, the Middle East and Africa	69,637	14,862	5,606	90,105
Asia Pacific	21,444	17,946	3,783	43,173
Latin and Central America	23	302	149	474
Total revenue	$ 206,320	$ 54,897	$ 22,881	$ 284,098

For the year ended December 31, 2019	Nucleic Acid Production	Biologics Safety Testing	Protein Detection	Total
North America	$ 49,757	$ 18,984	$ 15,284	$ 84,025
Europe, the Middle East and Africa	15,975	12,102	6,805	34,882
Asia Pacific	6,843	12,964	3,784	23,591
Latin and Central America	27	366	249	642
Total revenue	$ 72,602	$ 44,416	$ 26,122	$ 143,140

For the year ended December 31, 2018	Nucleic Acid Production	Biologics Safety Testing	Protein Detection	Total
North America	$ 44,883	$ 14,900	$ 14,393	$ 74,176
Europe, the Middle East and Africa	9,880	11,443	6,522	27,845
Asia Pacific	5,249	11,928	4,097	21,274
Latin and Central America	45	221	272	538
Total revenue	$ 60,057	$ 38,492	$ 25,284	$ 123,833

The following table provides a disaggregation of revenue for the years ended December 31, 2020 and 2019, based on the pattern of revenue recognition (in thousands):

	2020	2019
Revenue recognized at a point in time	$ 272,231	$ 133,091
Revenue recognized over time	11,867	10,049
Total revenue	$ 284,098	$ 143,140

Prior to January 1, 2019, revenue from the sale of products and services was recognized when all of the following conditions were met: (1) there was persuasive evidence of an arrangement; (2) the product had been delivered to the customer; (3) the collection of the fees was reasonably assured; and (4) the amount of fees to be paid by the customer was fixed or determinable.

When an arrangement involved multiple elements, the multiple elements, referred to as deliverables, were evaluated to determine whether they represent separate units of accounting. The Company performed this evaluation at the inception of an arrangement and as each item was delivered in the arrangement. Generally, the Company accounted for a deliverable separately if the delivered item has standalone value to the customer and delivery or performance of the undelivered item or service was probable and substantially in the Company's control.

When multiple elements could be separated into separate units of accounting, arrangement consideration was allocated at the inception of the arrangement, based on each unit's relative selling price, and recognized based on the method most appropriate for that unit.

Product sales

Revenue for manufacturing of products was recognized upon the delivery of the products in accordance with the terms of the contract, which specify transfer of title and risk of loss. Payments received from customers in advance of manufacturing their products was recorded as deferred revenue until the products were delivered.

Service revenue

The Company also enters into custom antibody and assay development contracts with customers. The Company performs a number of acts under these contracts for which the pattern of performance cannot be discerned and therefore the Company recognizes service revenue on a straight-line basis over the contractual term or expected term of the arrangement, whichever is longer. Payments received in advance of performing these services was recognized as deferred revenue. Revenue recognized at any point in time is limited to cash received and amounts contractually due.

Shipping and Handling Costs

Shipping and handling costs, which are charged to customers, are included in revenue. Shipping and handling charges included in revenue were approximately $3.3 million, $3.2 million and $2.8 million for the years ended December 31, 2020, 2019, and 2018, respectively. Freight and supplies costs directly associated with shipping products to customers are included as a component of cost of revenue.

Research and Development

Research and development ("R&D") expenses include personnel costs, including salaries, benefits and equity-based compensation for laboratory personnel, and costs of supplies. R&D costs are expensed as incurred. Payments made prior to the receipt of goods or services to be used in R&D are recognized as prepaid assets until the goods are received or services are rendered.

Advertising Costs

The Company expenses advertising costs as incurred. Advertising costs incurred were approximately $1.2 million, $1.1 million and $0.6 million during the years ended December 31, 2020, 2019 and 2018, respectively.

Equity-Based Compensation

Stock-Based Compensation

On November 19, 2020, in connection with the IPO, the Company's board of directors adopted the 2020 Omnibus Incentive Plan (the "2020 Plan"). We have subsequently granted stock options to purchase shares of our Class A commons stock as well as restricted stock units ("RSUs") from the 2020 Plan. The Company measures stock-based compensation at fair value on the grant date of the award. The fair value of RSUs is determined based on the number of shares granted and the quoted market price of the Company's Class A common stock on the date of grant. For equity awards that vest subject to the satisfaction of service requirements, compensation expense is measured based on the fair value of the award on the date of grant and expense is recognized on a straight-line basis over the requisite service period, which is typically four years. We account for forfeitures as they occur. Stock-based compensation is classified in the accompanying consolidated statements of operations based on the function to which the related services are provided.

The Company estimates the fair value of stock option grants using the Black-Scholes option pricing model. The assumptions used in estimating the fair value of these awards, such as expected term, expected dividend yield, volatility and risk-free interest rate, represent management's best estimates and involve inherent uncertainties and the application of management's judgment. If actual results are not consistent with the Company's assumptions and judgments used in making these estimates, the Company may be required to increase or decrease compensation expense, which could be material to the Company's consolidated results of operations.

Unit-Based Compensation

Prior to the IPO, MLSH 1 had granted unit-based awards to certain executives of Topco LLC who are also executives of the Company in the form of non-vested units. Topco LLC's controlled subsidiary, MLSC, also granted unit-based awards only to certain employees of its subsidiaries (collectively, the "Incentive Units"). All awards of Incentive Units were measured based on the fair value of the award on the date of grant. The Company recognizes compensation expense for MLSH 1 awards in its consolidated financial statements as MLSH 1 is considered to be the economic interest holder in Topco LLC. Compensation expense for the Incentive Units is recognized over their requisite service period. Forfeitures are recognized when they occur. These Incentive Units are subject to service, market and performance conditions. For Incentive Units subject to performance conditions, the Company evaluates the probability of achieving each performance condition at each reporting date and recognizes expense over the requisite service period when it is deemed probable that a performance condition will be met using the accelerated attribution method over the requisite service period. Upon the completion of the IPO all of the Incentive Units subject to a performance and market condition vested (see Note 10).

The grant date fair value of Incentive Unit awards was determined by the Company's Board of Directors with the assistance of management and an independent third-party valuation specialist. The grant date fair value of Incentive Units was determined first by estimating an aggregate equity value using a weighting of discounted cash flows, comparable public companies, and comparable-transactions valuation methodologies. An Option-Pricing Method, which utilizes certain assumptions including volatility, time to liquidation, a risk-free interest rate, and an assumption for a discount for lack of marketability, was then used to allocate the total enterprise values to the different classes of ownership according to their rights and preferences. In

determining the fair value of the Incentive Units, the methodologies used to estimate the enterprise values were performed using methodologies, approaches, and assumptions consistent with the American Institute of Certified Public Accountants Accounting and Valuation Guide, Valuation of Privately-Held-Company Equity Securities Issued as Compensation ("AICPA Accounting and Valuation Guide").

Income Taxes

We are subject to U.S. federal and state income taxes. We are the controlling member of Topco LLC, which has been, and will continue to be, treated as a partnership for U.S. federal and state income tax purposes. Topco LLC's wholly-owned U.S. subsidiary, Maravai Life Sciences, Inc. ("Maravai Inc.") and its subsidiaries, are taxpaying entities in the U.S., Canada, and the U.K. Topco LLC's other subsidiaries are treated as pass-through entities for federal and state income tax purposes. The income or loss generated by these entities is not taxed at the LLC level. As required by U.S. tax law, income or loss generated by these LLCs passes through to their owners. As such, our tax provision consists solely of the activities of Maravai Inc. and its subsidiaries, as well as our share of income generated by Topco LLC.

We account for income taxes under the asset and liability method of accounting. Current income tax expense or benefit represents the amount of income taxes expected to be payable or refundable for the current year. We recognize deferred tax assets and liabilities for the future tax consequences attributable to differences between the financial statement carrying amounts of existing assets and liabilities and their respective tax bases, as well as for operating loss and tax credit carryforwards. We measure deferred tax assets and liabilities using enacted tax rates expected to apply to taxable income in the years in which we expect to recover or settle those temporary differences. We recognize the effect of a change in tax rates on deferred tax assets and liabilities in the results of operations in the period that includes the enactment date. We reduce the measurement of a deferred tax asset, if necessary, by a valuation allowance if it is more likely than not that we will not realize some or all of the deferred tax asset.

The Company's tax positions are subject to income tax audits. We account for uncertain tax positions by recognizing the financial statement effects of a tax position only when, based upon technical merits, it is more likely than not that the position will be sustained upon examination. Significant judgment is required in determining the accounting for income taxes. In the ordinary course of business, many transactions and calculations arise where the ultimate tax outcome is uncertain. Our judgments, assumptions and estimates relative to the accounting for income taxes take into account current tax laws, our interpretation of current tax laws, and possible outcomes of future audits conducted by foreign and domestic tax authorities. Although we believe that our estimates are reasonable, the final tax outcome of matters could be different from our assumptions and estimates used when determining the accounting for income taxes. Such differences, if identified in future periods, could have a material effect on the amounts recorded in our consolidated financial statements. Interest and penalties related to unrecognized tax benefits are recognized in income tax expense in the accompanying consolidated statements of operations and comprehensive income (loss). The provision for income taxes includes the effects of any accruals that the Company believes are appropriate, as well as any related net interest and penalties.

On March 18, 2020, the Families First Coronavirus Response Act ("FFCR Act"), and on March 27, 2020, the Coronavirus Aid, Relief, and Economic Security Act ("CARES Act") were each enacted in response to the COVID-19 pandemic. The FFCR Act and the CARES Act contain numerous income tax provisions relating to refundable payroll tax credits, deferment of employer side social security payments, net operating loss carryback periods, alternative minimum tax credit refunds, modifications to the net interest deduction limitations and technical corrections to tax depreciation methods for qualified improvement property.

On June 29, 2020, Assembly Bill 85 ("A.B. 85") was signed into California law. A.B. 85 provides for a three-year suspension of the use of net operating losses for medium and large businesses and a three-year cap on the use of business incentive tax credits to offset no more than $5.0 million of tax per year. A.B. 85 suspends the use of net operating losses for taxable years 2020, 2021 and 2022 for certain taxpayers with taxable income of $1.0 million or more. The carryover period for any net operating losses that are suspended under this provision will be extended. A.B. 85 also requires that business incentive tax credits including carryovers may not reduce the applicable tax by more than $5.0 million for taxable years 2020, 2021 and 2022.

The FFCR Act and A.B. 85 did not have a material impact on the Company's consolidated financial statements as of December 31, 2020; however, the Company continues to examine the impacts the FFCR Act and A.B. 85 may have on its business, results of operations, financial condition, liquidity and related disclosures. During the year-ended December 31, 2020, the Company released $1.3 million of valuation allowance on its interest expense carryforward due to the increase in limitation provided by the CARES Act (see Note 12).

Payables to Related Parties Pursuant to the Tax Receivable Agreement

In connection with the completion of our IPO we entered into a TRA with MLSH 1 and MLSH 2. The TRA provides for the payment by us to MLSH 1 and MLSH 2, collectively, of 85% of the amount of tax benefits, if any, that we actually realize, or in some circumstances are deemed to realize from exchanges of LLC Units (together with the corresponding shares of Class B common stock) for Class A common stock, as a result of (i) certain increases in the tax basis of assets of Topco LLC and its subsidiaries resulting from purchases or exchanges of LLC Units, (ii) certain tax attributes of the Organization Transactions and (iii) certain other tax benefits related to our entering into the TRA, including tax benefits attributable to payments that we make under the TRA (collectively, the "Tax Attributes"). The payment obligations under the TRA are not conditioned upon any LLC Unitholder maintaining a continued ownership interest in us or Topco LLC and the rights of MLSH 1 and MLSH 2 under the TRA are assignable. We expect to benefit from the remaining 15% of the tax benefits, if any, that we may actually realize.

We accrue a liability for the payable to related parties for the TRA and a reduction to stockholders' equity, when it is deemed probable that the Tax Attributes will be used to reduce our taxable income, as the contractual percentage of the benefit of Tax Attributes that we expected to receive over a period of time. The current portion, if any, of the liability is the amount estimated to be paid within one year of the consolidated balance sheet date. For purposes estimating the value of the payable to related parties for the TRA, the tax benefit deemed realized by us and payable to MLSH 1 and MLSH 2 is computed by taking 85% of the difference of between our undiscounted forecasted cash income tax liability over the term of benefit of the Tax Attributes and the forecasted amount of such taxes that we would have been required to pay had there been no Tax Attributes. The TRA applies to each of our taxable years, beginning with the taxable year that the TRA is entered into. There is no maximum term for the TRA and the TRA will continue until all such tax benefits have been utilized or expired unless we exercise our right to terminate the TRA for an agreed-upon amount equal to the estimated present value of the remaining payments to be made under the agreement. We may record additional liabilities under the TRA when LLC Units of Topco LLC are exchanged in the future and as our estimates of the future utilization of the tax benefits change. If, due to a change in facts, these tax attributes are not utilized in future years, it is reasonably possible no amounts would be paid under the TRA. In this scenario, the reduction of the liability under the TRA would result in a benefit to our consolidated statement of operations. Subsequent adjustments to the payable to related parties for the TRA based on changes in anticipated future taxable income are recorded in our consolidated statement of operations.

Non-Controlling Interests

Non-controlling interests represent the portion of profit or loss, net assets and comprehensive loss of our consolidated subsidiaries that is not allocable to the Company based on our percentage of ownership of such entities. Non-controlling interests consist of the following:

- Until November, 2020 Topco LLC held a 70% ownership interest in MLSC Holdings, LLC ("MLSC") through its consolidated subsidiaries with the remaining 30% being recorded as non-controlling interests in our consolidated financial statements as of December 31, 2019. MLSC net income or loss was attributed to the non-controlling interests using an attribution method, similar to the hypothetical liquidation at book value method, based on the distribution provisions of the MLSC Amended and Restated Limited Liability Company Agreement ("MLSC LLC Agreement"). In November 2020, and before the closing of the IPO, Topco LLC repurchased all of the outstanding non-controlling interests in MLSC for $166.4 million (see Note 11).
- In November 2020, based on the Organizational Transactions described above, we became the sole managing member of Topco LLC. As of December 31, 2020, we hold approximately 38% of the outstanding LLC Units of Topco LLC, and approximately 62% of the outstanding LLC Units of Topco LLC are held by MLSH 1. Therefore, we report non-controlling interests based on LLC Units of Topco LLC held by MLSH 1 on our consolidated balance sheet as of December 31, 2020. Income or loss attributed to the non-controlling interest in Topco LLC is based on the LLC Units outstanding during the period for which the income or loss is generated and is presented on the consolidated statements of operations and consolidated statements of comprehensive income (loss).

MLSH 1 is entitled to exchange LLC Units, together with an equal number of shares of our Class B common stock (together referred to as "Paired Interests"), for shares of Class A common stock on a one-for-one basis or, at our election, for cash, from a substantially concurrent public offering or private sale (based on the price of our Class A common stock in such public offering or private sale). As such, future exchanges of Paired Interests by MLSH 1 will result in a change in ownership and reduce or increase the amount recorded as non-controlling interests and increase or decrease additional paid-in-capital when Topco LLC has positive or negative net assets, respectively. For the year ended December 31, 2020 MLSH 1 had not exchanged any Paired Interests.

During the year ended December 31, 2018, $52.0 million of capital distributions were made to certain legacy unit holders of MLSC Holdings, LLC ("MLSC"), the parent entity of Cygnus. The 2018 distribution was treated as a preferred return of capital

per the terms of the MLSC limited liability company agreement (the "MLSC LLC Agreement"). There were no such distributions made during the year ended December 31, 2019. A tax distribution of $0.3 million was made to the non-controlling interest holders of MLSC during the year ended December 31, 2020.

Segment Information

The Company operates in three reportable segments. Operating segments are defined as components of an enterprise about which separate financial information is evaluated regularly by the chief operating decision maker in deciding how to allocate resources and assessing performance. The Company's chief operating decision maker ("CODM"), its Chief Executive Officer, allocates resources and assesses performance based upon discrete financial information at the segment level. Substantially all of our long-lived assets are located in the United States.

Cash

Cash consists of deposits held at financial institutions.

Accounts Receivable and Allowance for Doubtful Accounts

Accounts receivable primarily consist of amounts due from customers for product sales and services. Estimated allowances for doubtful accounts are provided for based on an evaluation of potential uncollectible accounts. The Company evaluates accounts receivable to determine collectability. Judgments and estimates are involved in performing this evaluation, which are based on the Company's assessment of a customer's ability to pay, credit quality of the customer, age of the receivable balance and current economic conditions. As of December 31, 2020 and 2019, the allowance for doubtful accounts was approximately $0.4 million and $0.1 million, respectively. Write-offs of accounts receivable and recoveries were not significant during either 2020 or 2019.

To manage credit risk certain Company subsidiaries require select customers to prepay for product prior to shipment. Such prepayments approximated $1.1 million and $0.2 million as of December 31, 2020 and 2019, respectively, and were recorded within accrued expenses and other current liabilities and subsequently recognized as revenue upon shipment.

Inventory

Inventories consist of raw materials, work in process and finished goods. Inventories are stated at the lower of cost (weighted average cost) or net realizable value. Inventory costs include materials, direct labor and manufacturing overhead, which are related to the purchase or production of inventories. The Company regularly monitors for excess and obsolete inventory based on its estimates of expected sales volumes, production capacity and expiration of raw materials, work-in-process and finished products excess and obsolete inventories and reduces the carrying value of inventory accordingly. The Company writes down inventory that has become obsolete, inventory that has a cost basis in excess of its expected net realizable value, and inventory in excess of expected manufacturing requirements. Any write-downs of inventories are charged to cost of revenue.

A change in the estimated timing or amount of demand for the Company's products could result in reduction to the recorded value of inventory quantities on hand. Any significant unanticipated changes in demand or unexpected quality failures could have a significant impact on the value of inventory and reported operating results. During all periods presented in the accompanying consolidated financial statements, there have been no material adjustments related to a revised estimate of our inventory valuations.

Property and Equipment

Property and equipment are stated at cost, less accumulated depreciation. Depreciation is computed using the straight-line method over the following estimated useful lives:

Assets	Useful Lives
Buildings	20-35 years
Building improvements	5-15 years
Furniture, fixtures, equipment and software	3-11 years

Leasehold improvements are amortized over the shorter of the related lease term or useful life.

Maintenance and repairs are charged to operations when incurred, while betterments or renewals are capitalized. When property and equipment are sold or otherwise disposed of, the asset account and related accumulated depreciation account are relieved, and any gain or loss is included in the results of operations.

The Company is considered to be an owner lessee of certain buildings (Notes 5 and 6). The leased buildings are being depreciated over the lease term to a residual value that will approximate the remaining lease financing obligation at the end of the lease.

Internal-Use Software Costs

The Company capitalizes costs for acquired or developed software for internal use. Costs related to preliminary project activities and post implementation activities are expensed as incurred. Once it is probable the project will be completed, and the software will be used to perform the function intended, internal and external costs, if direct and incremental, are capitalized until the application is substantially complete and ready for use. Capitalized costs are included in property and equipment within furniture, fixtures, equipment, and software. The Company capitalized approximately $0.9 million and $0.7 million of software development costs in each of the years ended December 31, 2020 and 2019, respectively, and recognized amortization expense of $0.4 million, $0.2 million, and an insignificant amount for the years ended December 31, 2020, 2019, and 2018, respectively.

Goodwill

Goodwill represents the excess of consideration transferred over the estimated fair value of assets acquired and liabilities assumed in a business combination. The Company conducts a goodwill impairment analysis at least annually and more frequently if changes in facts and circumstances indicate that the fair value of the Company's reporting units may be less than carrying amount. In performing each annual impairment assessment and any interim impairment assessment, the Company determines if it should qualitatively assess whether it is more likely than not that the fair value of goodwill is less than its carrying amount (the qualitative impairment test). If the Company concludes it is more likely than not that the fair value of the reporting unit is less than its carrying amount, or elect not to use the qualitative impairment test, a quantitative impairment test is performed The Company annual or interim quantitative impairment testing is performed by comparing the estimated fair value of the reporting unit to its carrying value. An impairment charge is recognized for the amount by which the carrying amount exceeds the reporting unit's fair value, not to exceed the carrying value of goodwill.

Intangible Assets

The Company's finite-lived intangible assets represent purchased intangible assets and primarily consist of trade names, customer relationships, patents, and developed technology. Certain criteria are used in determining whether intangible assets acquired in a business combination must be recognized and reported separately. Finite-lived intangible assets are initially recognized at fair value, are subject to amortization and are subsequently stated at amortized cost. The Company's finite-lived intangible assets are amortized using a method that reflects the pattern in which the economic benefits of the intangible assets are consumed or otherwise used. If that pattern cannot be reliably determined, the intangible assets are amortized using the straight-line method over their estimated useful lives and are tested for impairment along with other long-lived assets. Amortization related to patents and developed technology is allocated to cost of revenue whereas amortization associated with trade names and customer relationships is allocated to selling, general and administrative expenses.

Impairment of Long-Lived and Intangible Assets

The Company periodically reviews long-lived assets, including property and equipment and finite-lived intangible assets, to determine whether current events or circumstances indicate that such carrying amounts may not be recoverable. If such facts or circumstances are determined to exist, an estimate of the undiscounted future cash flows of these assets is compared to the carrying value the assets to determine whether impairment exists. If the assets are determined to be impaired, the loss is measured based on the difference between the fair value and carrying value of the assets. No impairment loss was recognized for long-lived or finite-lived intangible assets during the years ended either December 31, 2020, 2019 or 2018.

Contingent Consideration

Contingent consideration relates to the potential payment for an acquisition that is contingent upon the achievement of the acquired entity meeting certain performance milestones. Contingent consideration resulting from the acquisition of a business is recorded at fair value on the acquisition date. Such contingent consideration is re-measured to its estimated fair value at each reporting date with the change in fair value recognized as an operating expense in the Company's consolidated statement of

operations. Subsequent changes in the fair value of the contingent consideration are classified as an adjustment to cash flows from operating activities in the consolidated statement of cash flows because the change in fair value was is an input in determining net loss. Cash paid in settlement of contingent consideration liabilities are classified as cash flows from financing activities up to the acquisition date fair value with any excess classified as cash flows from operating activities.

Changes in the fair value of contingent consideration liabilities associated with the acquisition of a business can result from updates to assumptions such as the expected timing or probability of achieving customer related performance targets, specified sales milestones, changes in projected revenue or changes in discount rates. Significant judgment is used in determining those assumptions as of the acquisition date and for each subsequent reporting period. Therefore, any changes in the fair value will impact the Company's results of operations in such reporting period thereby resulting in potential variability in the Company's operating results until such contingencies are resolved.

In 2017, the Company acquired Glen Research Corporation as an acquisition of a business. The purchase agreement called for contingent consideration of up to $4.0 million to be paid out upon the achievement of defined 2018 and 2019 revenue targets which were subsequently achieved. The change in fair value of this contingent consideration during 2019 and 2018, was approximating $0.3 million and $0.9 million, respectively. The first $2.0 million was paid to former owners of Glen Research Corporation during 2019, and the remaining $2.0 million, was paid to these former owners during 2020.

Debt Issuance Costs

Costs incurred in connection with obtaining new debt financing are deferred and amortized over the life of the related financing. If such financing is settled or replaced prior to maturity with debt instruments that have substantially different terms, the settlement is treated as an extinguishment and the unamortized costs are charged to gain or loss on extinguishment of debt. If such financing is settled or replaced with debt instruments from the same lender that do not have substantially different terms, the new debt agreement is accounted for as a modification for the prior debt agreement and the unamortized costs remain capitalized, the new original issuance discount costs are capitalized, and any new third-party costs are charged to expense. Deferred costs are recognized as a direct reduction in the carrying amount of the debt instrument on the consolidated balance sheets and are amortized to interest expense over the term of the related debt using the effective interest method.

Foreign Currency

The Company translates the assets and liabilities of its non-U.S. dollar denominated functional currency subsidiaries into U.S. dollars using exchange rates in effect at the end of each period. Revenue and expenses for its foreign subsidiaries are translated using rates that approximate those in effect during the period. Translation gains and losses are recognized in accumulated other comprehensive income (loss) within stockholders'/member's equity on the consolidated balance sheets. Foreign currency transaction gains and losses are included in net income or loss for the period. Foreign currency losses have not been material for the years ended December 31, 2020, 2019 or 2018.

Accumulated Other Comprehensive Loss

Comprehensive income (loss) and its components encompass all changes in equity other than those with stockholders or member. Comprehensive income (loss) for the Company consists of foreign currency translation adjustments. There were no reclassifications out of accumulated other comprehensive loss during the periods presented.

Fair Value of Financial Instruments

The Company defines fair value as the amount 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. The Company follows accounting guidance that has a three-level hierarchy for fair value measurements based upon the transparency of inputs to the valuation of the asset or liability as of the measurement date. Instruments with readily available actively quoted prices, or for which fair value can be measured from actively quoted prices in an orderly market, will generally have a higher degree of market price transparency and a lesser degree of judgment used in measuring fair value. The three levels of the hierarchy are defined as follows:

Level 1—Observable inputs that reflect quoted prices (unadjusted) for identical assets or liabilities in active markets;

Level 2—Include other inputs that are directly or indirectly observable in the marketplace; and

Level 3—Unobservable inputs which are supported by little or no market activity.

As of December 31, 2020 and 2019, the carrying value of current assets and liabilities approximates fair value due to the short maturities of these instruments. The fair values of the Company's long-term debt approximate carrying value, excluding the

effect of unamortized debt discount, as it is based on borrowing rates currently available to the Company for debt with similar terms and maturities (Level 2 inputs).

During 2017, the Company entered into two interest rate cap agreements to manage a portion of its variable interest rate risk on its then current borrowings. During 2018, in connection with the Company's debt refinancing, the Company entered into two additional interest rate cap agreements, bringing its total to four agreements as of December 31, 2019. The contracts entitled the Company to receive from the counterparty at specified dates the amount, if any, by which a specified market rate exceeds the cap strike interest rate, applied to the contracts notional principal amount of approximately $262.0 million. No principal payments were exchanged. The interest rate cap agreements have not been designated as a hedging relationship and were recognized on the consolidated balance sheet at fair value within non-current assets with changes in fair value recognized in the consolidated statements of operations and comprehensive income (loss). The fair value of the interest rate caps as of December 31, 2019 and 2018 were insignificant and all four interest rate cap agreements matured during 2020.

Leases, Deferred Rent, and Lease Facility Financing Obligation

The Company rents its office space and facilities under non-cancelable operating lease agreements and recognizes the related rent expense on a straight-line basis over the term of the lease. The Company's lease agreements contain rent holidays, scheduled rent increases, and renewal options. Rent holidays and scheduled rent increases are included in the determination of rent expense to be recorded ratably over the lease term. The Company does not assume renewals in its determination of the lease term unless they are deemed to be reasonably assured at the inception of the lease. The Company begins recognizing rent expense on the date that it obtains the legal right to use and control the leased space. Deferred rent consists of the difference between cash payments and the recognition of rent expense on a straight-line basis for the buildings the Company occupies.

In certain arrangements, the Company is involved in the construction of improvements to buildings it is leasing. To the extent the Company is involved with the structural improvements of the construction project or takes construction risk, the Company is considered to be the owner of the building and related improvements for accounting purposes during the construction period. The Company records the fair value of the building and related landlord and lessee funded improvements subject to the lease within property and equipment on the consolidated balance sheet. The Company also records a corresponding construction payable obligation on its consolidated balance sheet representing the amounts financed by the lessor for the building and lessor financed improvements. Once a construction project is complete, the Company considers the requirements for sale-leaseback accounting treatment. If the Company concludes the arrangement does not qualify for sale-leaseback accounting treatment, the building and related improvements remain on the Company's consolidated balance sheet and are subject to depreciation and assessment of impairment.

For such arrangements, at both pre and post the construction period, the Company bifurcates its lease payments into a portion allocated to the building and a portion allocated to the parcel of land on which the building has been built considering their respective fair values. The land lease portion of the lease payments allocated to the land is treated for accounting purposes as operating lease payments, and therefore is recorded as rent expense in the consolidated statements of operations. The portion of the lease payments allocated to the building is further bifurcated into a portion allocated to interest expense and a portion allocated to reduce the lease financing obligation. The interest rate used for the lease financing obligation represents the Company's estimated incremental borrowing rate at the inception of the lease, adjusted to reduce any built-in loss.

The fair value of the leased property, less its expected residual value, is depreciated over the term of the lease. At the conclusion of the lease term, the Company will de-recognize both the then carrying values of the asset and lease facility financing obligation with any differences between the book value of the asset and remaining lease facility financing obligation being recognized in operations at that time. These differences are not expected to be material.

Concentration of Credit Risk

Financial instruments that potentially subject the Company to significant concentrations of credit risk consist principally of cash and accounts receivable. The Company maintains the majority of its cash balances at multiple financial institutions that management believes are of high-credit quality and financially stable. Cash is deposited with major financial institutions in excess of Federal Deposit Insurance Corporation ("FDIC") insurance limits. The Company believes it is not exposed to significant credit risk due to the financial strength of the depository institutions in which the cash is held. The Company provides credit, in the normal course of business, to international and domestic distributors and customers, which are geographically dispersed. The Company attempts to limit its credit risk by performing ongoing credit evaluations of its customers and maintaining adequate allowances for potential credit losses.

The following table summarizes revenue from each of our customers who individually accounted for 10% or more of our total revenue or accounts receivable for the periods presented:

	Revenue			Accounts Receivable, net	
	Year Ended December 31,				
	2020	2019	2018	December 31, 2020	December 31, 2019
BioNTech SE	16.7 %	*	*	*	*
Pfizer, Inc.	14.2 %	*	*	45.1 %	*
CureVac	*	*	*	12.8 %	*
Thermo Fisher Scientific, Inc.	*	10.4 %	*	— %	10.5 %
Ultragenyx Pharmaceutical, Inc.	*	*	*	— %	10.8 %

*Less than 10%

For the year ended December 31, 2020, substantially all of the revenue recorded for BioNTech SE and Pfizer, Inc. were generated by our Nucleic Acid Production segment. The Company continues to experience significant revenue growth in our Nucleic Acid Production segment driven primarily by sales of CleanCap® related products that represents a significant portion of the Company's total revenue in fiscal year 2020. For the year ended December 31, 2019, 43.2%, 30.1%, and 26.7%, of revenue recorded for Thermo Fisher Scientific, Inc. were generated by our Nucleic Acid Production, Biologics Safety Testing, and Protein Detection segments, respectively.

Net Income (Loss) per Class A Common Share/Unit Attributable to Maravai LifeSciences Holdings, Inc.

Basic net income (loss) per Class A Common share/unit attributable to Maravai LifeSciences Holdings, Inc. is computed by dividing net income (loss) attributable to us by the weighted average number of Class A Common shares/units outstanding during the period. The non-controlling interest, for historical periods prior to the IPO, is calculated pursuant to the terms of the MLSC LLC Agreement on a fully-distributed basis, taking into account the various classes of equity of MLSC, including the cumulative yields on MLSC's preferred units. Diluted net income (loss) per Class A Common share/unit is calculated by giving effect to all potential weighted average dilutive LLC incentive units for historical periods prior to the IPO and stock options, restricted stock units, and Topco LLC Units, that together with an equal number of shares of our Class B common stock (together referred to as "Paired Interests") are convertible into shares of our Class A Common stock, for the period after the IPO. For historical periods prior to the IPO, the weighted average number of common units outstanding during the period and the potential dilutive common unit equivalents is determined under the two-class method. The dilutive effect of outstanding awards, if any, is reflected in diluted earnings per share/unit by application of the treasury stock method or if-converted method, as applicable. In periods in which the Company reports a net loss attributable to Maravai LifeSciences Holdings, Inc. diluted net loss per Class A Common share/unit attributable to the Company since dilutive equity instruments are not assumed to have been issued if their effect is anti-dilutive. The Company reported a net loss attributable to Maravai LifeSciences Holdings, Inc. for the years ended December 31, 2019 and 2018.

Emerging Growth Company Status

The Company is an emerging growth company, as defined in the Jumpstart Our Business Startups Act of 2012 ("JOBS Act"). Under the JOBS Act, emerging growth companies can delay adopting new or revised accounting standards issued subsequent to the enactment of the JOBS Act, until such time as those standards apply to private companies. The Company has elected to use this extended transition period for complying with new or revised accounting standards that have different effective dates for public and private companies until the earlier of the date that it (i) is no longer an emerging growth company or (ii) affirmatively and irrevocably opts out of the extended transition period provided in the JOBS Act. As a result, these consolidated financial statements may not be comparable to companies that comply with the new or revised accounting pronouncements as of public company effective dates.

Recently Adopted Accounting Pronouncements

In June 2018, the Financial Accounting Standards Board ("FASB") issued Accounting Standards Update ("ASU") 2018-07, *Compensation—Stock Compensation (Topic 718):Improvements to Nonemployee Share-Based Payment Accounting* ("ASU 2018-07"). ASU 2018-07 simplifies the accounting for share-based payment transactions in which a grantor acquires goods or services to be used or consumed in operations from a nonemployee. This standard was effective for annual periods beginning after December 15, 2019. The Company's adoption of this standard as of January 1, 2020 did not have a material impact on the Company's consolidated financial statements.

In August 2018, the FASB issued ASU 2018-13, *Fair Value Measurement (Topic 820)—Changes to the Disclosure Requirements for Fair Value Measurement* ("ASU 2018-13") removed the following disclosure requirements: (1) the amount of and reasons for transfers between Level 1 and Level 2 of the fair value hierarchy; (2) the policy for timing of transfers between

levels; and (3) the valuation processes for Level 3 fair value measurements. Additionally, this update added the following disclosure requirements: (1) the changes in unrealized gains and losses for the period included in other comprehensive income and loss for recurring Level 3 fair value measurements held at the end of the reporting period; (2) the range and weighted average of significant unobservable inputs used to develop Level 3 fair value measurements. For certain unobservable inputs, an entity may disclose other quantitative information (such as the median or arithmetic average) in lieu of the weighted average if the entity determines that other quantitative information would be a more reasonable and rational method to reflect the distribution of unobservable inputs used to develop Level 3 fair value measurements. The Company's adoption of this standard as of January 1, 2020 did not have a material impact on the Company's consolidated financial statements.

In December 2019, the FASB issued ASU 2019-12, *Income Taxes (Topic 740): Simplifying the Accounting for Income Taxes* ("ASU 2019-12"), which 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 guidance is effective for fiscal years beginning after December 31, 2021, and interim periods within fiscal years beginning after December 15, 2022. Early adoption is permitted. The Company early adopted ASU 2019-12 effective January 1, 2020. ASU 2019-12 removes the exception to the incremental approach for intra-period tax allocation in the event of a loss from continuing operations and income or gain from other items such as other comprehensive income. The exception previously resulted in allocating a tax benefit to continuing operations and tax expense to other items, even when tax expense may have been zero.

Under the simplification, no tax expense or benefit will be recorded to continuing operations. The Company has an immaterial minimum state tax liability in California and no franchises tax liability. These amounts were recorded above-the-line prior to adoption of ASU 2019-12. ASU 2019-12 requires non-income tax-based state franchise taxes to be recorded above-the-line. The other provisions within ASU 2019-12 are not applicable to the Company. The adoption of this ASU did not have a material impact on the Company's consolidated financial statements.

In July 2017, the FASB issued ASU 2017-11, *Earnings Per Share (Topic 260)*, *Distinguishing Liabilities from Equity (Topic 480) and Derivatives and Hedging (Topic 815): I. Accounting for Certain Financial Instruments with Down Round Features; II. Replacement of the Indefinite Deferral for Mandatorily Redeemable Financial Instruments of Certain Nonpublic Entities and Certain Mandatorily Redeemable Noncontrolling Interests with a Scope Exception* ("ASU 2017-11"). Part I of this update addresses the complexity of accounting for certain financial instruments with down round features. Down round features are features of certain equity-linked instruments (or embedded features) that result in the strike price being reduced on the basis of the pricing of future equity offerings. Current accounting guidance creates cost and complexity for entities that issue financial instruments (such as warrants and convertible instruments) with down round features that require fair value measurement of the entire instrument or conversion option. Part II of this update addresses the difficulty of navigating Topic 480, Distinguishing Liabilities from Equity, because of the existence of extensive pending content in the FASB Accounting Standards Codification. This pending content is the result of the indefinite deferral of accounting requirements about mandatorily redeemable financial instruments of certain nonpublic entities and certain mandatorily redeemable non-controlling interests. The amendments in Part II of this update do not have an accounting effect. The amendments in Part I of this update were effective for fiscal years beginning after December 15, 2019. The Company's adoption of Part I of this standard on January 1, 2020 did not have a material impact on the audited consolidated financial statements.

In January 2017, the FASB adopted ASU 2017-04, *Intangibles-Goodwill and Other (Topic 350): Simplifying the Test for Goodwill Impairment* ("ASU 2017-04") which simplifies how an entity is required to test goodwill for impairment by eliminating Step 2 from the goodwill impairment test. Step 2 measures a goodwill impairment loss by comparing the implied fair value of a reporting unit's goodwill with the carrying amount of that goodwill. The implied fair value for a reporting unit is determined in the same manner as the amount of goodwill recognized in a business acquisition of the reporting unit. Under the amendments in ASU 2017-04, an entity shall recognize an impairment charge for the amount by which the carrying amount of a reporting unit exceeds its fair value; however, the loss recognized should not exceed the total amount of goodwill allocated to that reporting unit. The updated guidance requires adoption on a prospective basis. ASU 2017-04 is currently effective for the Company beginning January 1, 2022. Early adoption is permitted for goodwill impairment tests performed on testing dates after January 1, 2017. The Company early adopted ASU 2017-04 for its 2020 annual impairment test. The adoption of this ASU did not have a material impact on the audited consolidated financial statements.

Recently Issued Accounting Pronouncements Not Yet Adopted

In February 2016, the FASB issued ASU 2016-02, *Leases* ("Topic 842"), which supersedes the guidance in ASC 840, *Leases*. The new standard, as amended by subsequent ASUs on Topic 842 and recent extensions issued by the FASB in response to COVID-19, requires lessees to apply a dual approach, classifying leases as either finance or operating leases based on the principle of whether or not the lease is effectively a financed purchase by the lessee. This classification will determine whether lease expense is recognized based on an effective interest method or on a straight-line basis over the term of the lease. A lessee

is also required to record a right-of-use asset and a lease liability for all leases with a term of greater than 12 months regardless of their classification. Leases with a term of 12 months or less will be accounted for similar to existing guidance for operating leases today. The Company plans to adopt this standard using the modified retrospective approach with a cumulative effect adjustment to retained earnings at the beginning of the period of adoption. The Company will also adopt certain practical expedients provided by Topic 842. As a result of the Company having elected the extended transition period for complying with new or revised accounting standards pursuant to Section 107(b) of the JOBS Act, and assuming the Company continues to be considered an Emerging Growth Company, Topic 842 will be effective for the Company on January 1, 2022. The Company is currently assessing its inventory of leases but has not yet determined the full effects of Topic 842 on its consolidated financial statements but does expect the adoption of Topic 842 will have a material impact on the Company's consolidated financial statements and related notes to the recognition of right of use ("ROU") assets and lease liabilities on the Company's consolidated balance sheets, but it will not have a material impact on the Company's operations. The adoption of Topic 842 will also result in enhanced disclosures.

In June 2016, the FASB issued ASU 2016-13*, Financial Instruments-Credit Losses (Topic 326): Measurement of Credit Losses on Financial Instruments* which has been subsequently amended ("ASU 2016-13"). ASU 2016-13 revises the measurement of credit losses for most financial instruments measured at amortized cost, including trade receivables, from an incurred loss methodology to an expected loss methodology which results in earlier recognition of credit losses. Under the incurred loss model, a loss is not recognized until it is probable that the loss-causing event has already occurred. The new standard introduces a forward-looking expected credit loss model that requires an estimate of the expected credit losses over the life of the instrument by considering all relevant information including historical experience, current conditions, and reasonable and supportable forecasts that affect collectability. In addition, this standard also modifies the impairment model for available-for-sale debt securities, which are measured at fair value, by eliminating the consideration for the length of time fair value has been less than amortized cost when assessing credit loss for a debt security and provides for reversals of credit losses through income upon credit improvement. ASU 2016-13, is effective for the Company's January 1, 2023, with early adoption permitted. The Company is currently assessing the impact of adopting this standard on its consolidated financial statements and disclosures.

In August 2018, the FASB issued ASU 2018-15, *Intangibles—Goodwill and Other—Internal-Use Software (Subtopic 350-40): Customer's Accounting for Implementation Costs Incurred in a Cloud Computing Arrangement That Is a Service Contract* ("ASU 2018-15"). The ASU aligns the requirements for capitalizing implementation costs incurred in a hosting arrangement that is a service contract with the requirements for capitalizing implementation costs incurred to develop or obtain internal-use software. This new standard also requires customers to expense the capitalized implementation costs of a hosting arrangement that is a service contract over the term of the hosting arrangement. This ASU is effective for years beginning after December 15, 2020, with early adoption permitted. The Company has not yet determined the potential effects of this ASU on its consolidated financial statements.

In October 2018, the FASB issued ASU 2018-17, *Consolidation (Topic 810): Targeted Improvements to the Related Party Guidance for Variable Interest Entities*. ASU 2018-17 changes how entities evaluate decision-making fees under the variable interest entity guidance. To determine whether decision-making fees represent a variable interest, an entity considers indirect interests held through related parties under common control on a proportional basis, rather than in their entirety. This guidance is effective for fiscal years, beginning after December 15, 2020 and interim periods within fiscal years beginning after December 15, 2021, with early adoption permitted. All entities are required to apply the amendments in this ASU retrospectively with a cumulative-effect adjustment to retained earnings at the beginning of the earliest period presented. The Company is currently evaluating the impact this standard will have on its consolidated financial statements and disclosures.

In August 2020, the FASB issued ASU 2020-06, *Debt - Debt with Conversion and Other Options (Subtopic 470-20) and Derivatives and Hedging-Contracts in Entity's Own Equity (Subtopic 815-40) - Accounting for Convertible Instruments and Contracts in an Entity's Own Equity* ("ASU 2020-06"), which simplifies the accounting for convertible instruments, amends the guidance on derivative scope exceptions for contracts in an entity's own equity, and modifies the guidance on diluted earnings per share calculation as a result of these changes. The standard is effective for the Company for annual reporting periods beginning after December 15, 2023. The Company is currently evaluating the impact the adoption of this standard may have on its consolidated financial statements.

In March, 2020 the FASB issued ASU 2020-04, *Reference Rate Reform (Topic 848) ("Update 2020-04")*, for facilitation of the effects of reference rate reform on financial reporting. This update provides optional guidance for a limited period of time to help ease the potential burden in accounting for, or recognizing the effects of, reference rate reform on financial reporting. The amendments in the guidance provide optional expedients and exceptions for applying GAAP to contracts, hedging relationships, and other transactions affected by reference rate form if certain criteria are met. The amendments apply to contracts, hedging relationships, and other transactions that reference London inter-bank Offered Rate ("LIBOR") or another reference rate expected to be discontinued because of reference rate reform. When elected, the optional expedients for contract modifications are applied consistently for all eligible contracts or eligible transactions within the relevant areas of GAAP. This guidance was effective upon issuance and may generally be applied through December 31, 2022. We are currently evaluating

our contracts and we do not expect that the adoption of this guidance will have a material impact on our consolidated financial statements and disclosures.

2. Acquisitions

Mock V

In March 2020, the Company acquired all of the outstanding shares of MockV Solutions, Inc. ("MockV"), a private entity, for $3.0 million, inclusive of acquisition costs of $0.2 million. The MockV technology acquired is a novel, proprietary viral clearance prediction tool that includes a non-infectious "mock virus particle" mimicking the physicochemical properties of live virus that may be present endogenously in the drug substance or introduced during bioproduction and will expand the Company biologics safety testing offerings. The transaction was accounted for as an asset acquisition as the acquired set of assets and activities did not meet the definition of a business. In connection with this acquisition, the Company acquired developed technology, an in-process research and development asset ("IPR&D"), an assembled workforce, and an insignificant amount of working capital balances. The relative fair value attributed to the acquired developed technology, assembled workforce, and working capital balances was insignificant. The IPR&D acquired was allocated a value of $2.9 million and the Company recognized a charge of $2.9 million related to the IPR&D as a component of research and development on the consolidated statement of operations because the technology had not yet reached technological feasibility and had no alternative future use. The Company must also make contingent cash payments (the "Earn-Outs") of up to $9.0 million to the sellers of MockV based upon the achievement of long-term revenue targets. The Earn-Outs were determined to be contingent consideration that was not subject to derivative accounting and will be recognized when the contingency is resolved, and the consideration becomes paid or payable.

As the Company had no tax basis in the acquired IPR&D asset, and the acquired IPR&D asset was expensed prior to the measurement of any deferred taxes, no deferred taxes were recognized for the initial transaction.

In November 2020, MockV was converted into a single member LLC and was deemed liquidated for income tax purposes.

3. Goodwill and Intangible Assets

The Company's goodwill of $224.3 million as of December 31, 2020 and 2019 respectively, represents the excess of purchase consideration over the fair value of assets acquired and liabilities assumed. In periods prior to 2020, the Company had three reporting units, Nucleic Acid Production, Biologics Safety Testing, and Protein Detection, with such reporting units being aligned with our segments. However, during the year ended December 31, 2020, the Company determined that our Nucleic Acid Production segment contained two reporting units that should no longer be combined as a reporting unit due to a lack of economic similarities primarily driven by changes in margins realized by these reporting units. These reporting units continue to be considered as one segment for purposes of segment reporting, as our CODM continues to review financial results and making operating decisions at the Nucleic Acid Production level. The Company performed a quantitative goodwill impairment analysis on each of its four reporting units during the fourth quarter of 2020 and concluded that the fair value of each reporting unit exceeded its carrying value and therefore that it was more-likely-than-not that the fair value of goodwill exceeded its carrying value. During 2019, given the lack of any triggering events being identified indicating that the fair value of the goodwill may be impaired, the Company completed its qualitative goodwill impairment analysis for the nucleic acid production and biologics safety testing reporting units during the fourth quarter of 2019 and concluded it was not more-likely-than-not that the fair value of goodwill exceeded its carrying value and no further testing was required. Having identified triggering events for the Protein Detection reporting unit, the Company performed a quantitative analysis and also concluding that it was not more-likely-than-not that the fair value of goodwill exceeded its carrying value and no further testing was required. The qualitative impairment test was elected for these two reporting units because of the growth in revenue and cashflows in excess of our initial projections. The Company has not recognized any goodwill impairment in any of the periods presented.

The following is a rollforward of the Company's goodwill by segment (in thousands):

	Nucleic Acid Production	Biologics Safety Testing	Protein Detection	Total
December 31, 2020	$ 32,838	$ 119,928	$ 71,509	$ 224,275
December 31, 2019	32,838	119,928	71,509	224,275

During the year ended December 31, 2020, there was no change in the recorded segment goodwill balances.

Intangible assets are being amortized on a straight-line basis, which reflects the expected pattern in which the economic benefits of the intangible assets are being obtained, over an estimated useful life ranging from 5 to 15 years.

The components of finite-lived intangible assets and accumulated amortization are as follows:

	As of December 31, 2020				
	Gross Carrying Amount	Accumulated Amortization	Net Carrying Amount	Estimated Useful Life	Weighted Average Remaining Amortization Period
		(in thousands)		(in years)	(in years)
Trade Names	$ 11,490	$ 5,384	$ 6,106	5-15	6.3
Patents and Developed Technology	169,404	52,809	116,595	5-14	9.5
Customer Relationships	83,323	28,368	54,955	10-14	8.8
Total	$ 264,217	$ 86,561	$ 177,656		9.1

	As of December 31, 2019				
	Gross Carrying Amount	Accumulated Amortization	Net Carrying Amount	Estimated Useful Life	Weighted Average Remaining Amortization Period
		(in thousands)		(in years)	(in years)
Trade Names	$ 11,490	$ 4,093	$ 7,397	5-15	7.3
Patents and Developed Technology	169,313	40,134	129,179	5-14	10.5
Customer Relationships	83,290	22,013	61,277	10-14	9.8
Total	$ 264,093	$ 66,240	$ 197,853		10.1

The Company recognized $12.7 million, $12.2 million and $12.1 million of amortization expense from intangible assets directly linked with revenue generating activities within cost of revenue in the consolidated statement of operations for the years ended December 31, 2020, 2019, and 2018, respectively. Amortization expense for intangible assets that are not directly related to sales generating activities of $7.6 million, $8.0 million and $8.0 million was recorded as selling, general and administrative expenses for each of the years ended December 31, 2020, 2019, and 2018, respectively.

As of December 31, 2020, the estimated future amortization expense for finite-lived intangible assets is as follows (in thousands):

2021	$ 20,079
2022	19,428
2023	19,230
2024	19,230
2025	19,230
Thereafter	80,459
Total estimated amortization expense	$ 177,656

4. Fair Value Measurements

There were no assets or liabilities measured at fair value on a recurring basis as of December 31, 2020 or 2019.

The Company assesses the fair value of contingent consideration to be settled in cash related to acquisitions using probability weighted models for the various contractual earn-outs. These are Level 3 measurements. Significant unobservable inputs used in the estimated fair values of these contingent consideration liabilities include probabilities of achieving customer related performance targets, specified sales milestones, changes in projected revenue and risk adjusted discount rates.

The following table provides a reconciliation of liabilities measured at fair value on a recurring basis using significant unobservable inputs (Level 3) for the year ended December 31, 2019 (in thousands):

	Contingent Consideration
Balance at January 1, 2019	$ 3,678
Change in fair value	322
Settlement	(2,000)
Transfer out of Level 3 fair value hierarchy	(2,000)
Balance at December 31, 2019	$ —

During the year ended December 31, 2019, upon the achievement of the maximum liability threshold of $4.0 million, as defined in the purchase agreement for Glen Research Corporation, the total contingent purchase consideration was no longer based on significant unobservable inputs and was reclassified out of Level 3 fair value hierarchy to accrued expenses.

5. Balance Sheet Components

Inventory

Inventory consists of the following at December 31 (in thousands):

	2020	2019
Raw materials	$ 11,112	$ 5,037
Work in process	18,333	6,083
Finished goods	3,856	3,082
Total inventory	$ 33,301	$ 14,202

Property and equipment

Property and equipment consists of the following at December 31 (in thousands):

	2020	2019
Land	$ 818	$ 8,516
Buildings	2,129	7,685
Buildings capitalized under lease finance obligations	61,202	61,202
Leasehold improvements	1,637	2,990
Furniture, fixtures, and equipment	23,157	12,887
Software	2,632	1,742
Total	91,575	95,022
Less accumulated depreciation	(10,647)	(8,099)
Total	80,928	86,923
Construction in-progress	20,377	7,388
Total property and equipment, net	$ 101,305	$ 94,311

Depreciation expense totaled approximately $5.6 million, $3.8 million, $2.2 million for the years ended December 31, 2020, 2019, and 2018, respectively, and includes depreciation expense related to the Company's capital leases.

Accrued expenses and other current liabilities

Accrued expenses consisted of the following at December 31 (in thousands):

	2020	2019
Employee related	$ 18,448	$ 7,660
Professional services	7,670	3,199
Sales and use tax liability	2,896	3,030
Consideration payable	—	2,000
Other	9,532	2,854
Total accrued expenses and other current liabilities	$ 38,546	$ 18,743

6. Commitments and Contingencies

Lease Commitments

The Company leases five facilities, including office, laboratory and manufacturing space under long-term non-cancelable operating leases. The leased facilities have initial terms of two to twelve years, and two leases have multiple five-year renewal terms and the other leases having three-year and five-year renewal terms. The Company also has capital leases for office equipment within initial terms of two to three years expiring in 2023.

Rent expense for each of the years ended December 31, 2020, 2019, and 2018 were approximately $3.2 million, $2.5 million, and $2.0 million, respectively. For the year ended December 31, 2020, reported rent expense is net of approximately $1.4 million of deferred gain being recognized over the life of the lease associated with the Company's sale leaseback arrangement for its Burlingame, California facility.

In January 2020, the Company completed the sale of land, building and related building improvements specific to its facility in Burlingame, California for approximately $34.5 million in cash. Simultaneously, with the close of the transaction, the Company leased the property for a two-and-a-half-year period, resulting in a total of $3.3 million in new lease obligations through December 31, 2021. The Company's sale of the building and immediate leaseback of the facility qualified for sale-leaseback accounting. The lease was evaluated and classified as an operating lease. Given the Company was considered to retain more than a minor part but less than substantially all of the use of the property, the present value of the minimum lease payment over the lease term of $3.1 million was required to be deferred and recognized as a reduction of rent expense over the life of the lease. Net of the $3.1 million in deferred gain, the Company recognized a net gain on the sale of the asset of $19.0 million during the year ended December 31, 2020. In August 2020, the Company executed a six-month extension for the leased property, including escalating rent payments, with total incremental lease payments associated with the extension of $1.8 million. The unamortized deferred gain at the time of the modification, approximating $2.0 million, will be amortized on a prospective basis over the extended lease term. Upon execution of the amendment inclusive of escalating rent payments, expense is being recognized on a straight-line basis and the difference between the recognized rent expense and the amounts paid under the lease are being recorded as deferred rent included in other short-term and long-term liabilities on the consolidated balance sheet as of December 31, 2020.

In July 2018, the Company entered into a lease for a new manufacturing facility (the "San Diego Facility Lease"). The lease included tenant improvement provisions for construction prior to occupancy. Construction on this new manufacturing facility began in 2018 and Company evaluated the extent of its financial and operational involvement in the tenant improvements of the new facility related to the San Diego Facility Lease to determine whether it was considered the owner of the construction project. The Company concluded that it was deemed to be the owner of the facility for accounting purposes (even though it did not meet the definition for legal purposes) during the construction period which began in 2018 and was completed in 2019. In 2019, upon completion of the construction, the Company evaluated the lease and concluded that the completed construction project failed to qualify for sale and leaseback accounting and has accounted for the lease as a financing lease transaction. The leased building and related improvements remain on the Company's balance sheet as of December 31, 2019 and rental payments associated with the San Diego Facility Lease have been allocated to operating lease expense for the ground underlying the leased building and principal and interest payments on the lease facility financing obligation. The Company recorded the fair value of the building asset and improvements, which was estimated to be $59.0 million and the related lease facility financing obligation of $51.2 million. The difference between the gross asset value and the lease facility financing obligation represents the approximate $8.0 million of building improvement costs reimbursed by the Company.

In September 2020, the Company amended its San Diego Facility lease agreement to provide for additional manufacturing and office space. The amended lease agreement provides for tenant improvements for construction prior to occupancy of $2.7 million, rent concessions, and escalating rent payments over the life of the lease which now expires in May 2023. The total future minimum lease payments under the amended lease agreement are $57.1 million, with an option to renew subject to certain conditions. Similar to the original lease, once construction is completed on the expansion, the 2020 amended lease is

being accounted for as an increase to the financing lease transaction with rental payments allocated between principal and interest on the lease facility financing obligation. As of December 31, 2020, the anticipated tenant improvement allowance has been recorded as a component of the lease facility financing obligation a $2.0 million receivable for lessor-funded financing within prepaid and other current assets, and $0.7 million in construction in progress for costs incurred to date as the Company has earned the right to this portion of the tenant allowance as of December 31, 2020. Additionally, during 2020, the Company incurred incremental building improvement costs for the initially leased space. As of December 31, 2020, the Company has recognized $20.4 million and $1.7 million in construction in progress and accrued expenses, respectively, within the consolidated balance sheet specific to this facility.

The Company recognizes payments under the lease agreement as a reduction of the lease facility financing obligation using the effective interest method and the ground rent as operating lease expense as reflected in the schedule below. Payments on the San Diego Facility Lease obligation for the year ended December 31, 2020, 2019, and 2018 were approximately $2.3 million and $0.9 million, $0.9 million, respectively. For the years ended December 31, 2020, 2019 and 2018 the Company recognized rent expense associated with the ground lease for the San Diego Facility Lease of approximately $0.8 million, $0.8 million, and $0.4 million, respectively, in the consolidated statement of operations.

The Company is also considered to be the accounting owner of its Southport, North Carolina leased facility (the "Southport Facility")

In 2017, the Company amended its initial lease with the former related party landlord (Note 14) to include the lease of additional space as well as an adjustment of the base rent for the existing space. The Company continues to recognize payments under the amended lease agreement as a reduction of the facility financing obligation using the effective interest method and the ground rent as operating lease expense as notes in the schedule below. As a result of the amendment, the Company anticipates the repayment of the financing obligation by September 2024. The fair value of the leased property established at acquisition continues to be depreciated over the building's estimated useful life of thirty-five years. Payments on these lease obligations for the years ended December 31, 2020, 2019 and 2018 were approximately $0.3 million, respectively. For the years ended December 31, 2020, 2019 and 2018, rent expense associated with the ground lease for the Southport Facility was not significant.

As of December 31, 2020, minimum annual payments under the Company's non-cancelable lease agreements, capital lease agreements, and lease financing obligations were follows (in thousands):

	Capital Leases	Lease Facility Financing Obligations	Operating Leases
2021	$ 50	$ 4,126	$ 2,777
2022	25	4,648	3,062
2023	—	5,014	1,336
2024	—	5,109	1,371
2025	—	5,071	1,104
2025 and beyond	—	24,232	5,286
Total minimum payments	75	48,200	14,936
Less: amount representing interest	(16)	(27,830)	
Present value of future minimum lease payments	59	20,370	
Residual value of lease facility financing obligation	—	36,547	
Less: short-term capital lease and lease facility financing obligations	(36)	(750)	
Long-term capital lease and lease facility financing obligations	$ 23	$ 56,167	

Operating leases in the table above includes future minimum lease payments for the ground lease for the Southport and San Diego Facilities and Vector sale-leaseback. Future minimum lease payments for the Vector sale-leaseback for fiscal years 2021 and 2022 are $1.6 million and $1.8 million, respectively.

Legal Proceedings

The Company is involved in various legal proceedings arising in the normal course of business. The Company accrues for a loss contingency when it determines that it is probable, after consultation with counsel, that a liability has been incurred and the amount of such loss can be reasonably estimated. The Company believes that the results of any such contingencies, either

individually or in the aggregate, will not have a material adverse effect on the Company's consolidated financial position, results of operations or cash flows.

Indemnification Agreements

In the ordinary course of business, we may provide indemnification of varying scope and terms to vendors, lessors, customers and other parties with respect to certain matters including, but not limited to, losses arising out of breach of such agreements or from intellectual property infringement claims made by third parties. These indemnities include indemnities to our directors and officers to the maximum extent permitted under applicable state laws. The maximum potential amount of future payments that we could be required to make under these indemnification agreements is, in many cases, unlimited. We have not incurred any material costs as a result of such indemnifications and are not currently aware of any indemnification claims.

7. Long-Term Debt

2020 Credit Agreements

In October 2020, Maravai Intermediate Holdings, LLC ("Intermediate"), a wholly-owned subsidiary of Topco LLC, along with its subsidiaries (the "New Borrowers"), entered into a credit agreement (the "New Credit Agreement") to refinance existing $400.0 million long-term debt with a new $780.0 million facility. The New Credit Agreement provides for a First Lien Term Loan (the "New First Lien Term Loan") of $600.0 million, maturing October 2027, and a Revolving Credit Facility (the New Revolving Credit Facility") for up to $180.0 million in funding. The New Credit Agreement amended and restated the Company's prior credit agreement as of August 2018 (the "First and Second Lien Credit Agreements"). In November 2020, the Company repaid $50.0 million of principal balance of the New First Lien Term Loan using proceeds from the IPO.

Borrowings under the New Credit Agreement bear interest (a) initially, at our option, either (i) at the Base Rate plus 3.25% per annum or (ii) the Adjusted Eurocurrency Rate plus 4.25% per annum and (b) after delivery of the compliance certificate for the fiscal quarter ending March 31, 2021, at our option, either at (i) the Base Rate plus the applicable margin of 3.25% per annum with a stepdown to 3.00% based on Intermediate's first lien net leverage ratio or (ii) the Adjusted Eurocurrency Rate plus the margin of 4.25% per annum with a stepdown to 4.00% based on Intermediate's first lien net leverage ratio. Interest rates will also decrease an additional 0.25% in any period if the Company's credit ratings issued by Moody's and S&P are B2 or better and B or better, respectively. The Base Rate is defined as the greatest of (i) the rate last quoted by The Wall Street Journal as the "Prime Rate" in the United States, (ii) the Federal Reserve Bank of New York Rate ("NYFRB") plus 0.50% per annum, (iii) the Adjusted Eurocurrency Rate for a one month interest period plus 1.00% per annum, (iv) solely with respect to the initial term loans, 2.00% per annum and (v) for any loans that are not initial term loans, 1.00% per annum. The "Adjusted Eurocurrency Rate" is defined as the greater of (a) with respect to the initial term loans the greater of (i) the Eurocurrency Rate for such interest period multiplied by the Statutory Reserve Rate (as such term is defined in the New Credit Agreement), and (ii) 1.00% and (b) with respect to the revolving loans, the greater of (i) the Eurocurrency Rate for such interest period multiplied by the Statutory Reserve Rate (as such term is defined in the New Credit Agreement), and (ii) 0%. The "Eurocurrency Rate" is defined as the London Inter-bank Offered Rate ("LIBOR") as displayed by Reuters (which if negative will be deemed to be 0%) or, if LIBOR is unavailable, a rate based on historical LIBOR, as determined by the administrative agent under the New Credit Agreement.

The New Term Loan contains prepayment provisions that allow for, at the Company's option, to prepay all or a portion of the principal amount at any time. Subject to certain exceptions and limitations and reinvestment rights, the Company is required to repay borrowings under the New Term Loan and New Revolving Credit Facility with the proceeds of certain occurrences, such as the incurrence of debt and certain asset sales or dispositions. The New Credit Agreement also requires mandatory prepayments to be calculated commencing with the fiscal year ending December 31, 2021 upon certain excess cash flow as defined in the terms of the agreement.

The New Term Loan becomes repayable in quarterly payments of $1.5 million beginning on March 31, 2021, with all remaining outstanding principal due at maturity in October 2027. All outstanding amounts drawn under the New Revolving Credit Facility will become due at maturity in October 2025.

Accrued interest under the New Credit Agreement is generally payable quarterly in arrears on the date of any repayment or prepayment and at maturity. In addition to paying interest on outstanding principal under the New Credit Agreement we are required to pay a commitment fee to the lenders under the New Revolving Credit Facility for any unutilized commitments at 0.375% per annum, with one stepdown to 0.25% per annum based on Intermediate's first lien net leverage ratio calculation.

As of December 31, 2020, the interest rate on the New Term Loan was 5.25% per annum.

The New Credit Agreement also provides for a $20.0 million dollar letters of credit limit, which remained unused as of December 31, 2020.

Borrowings under the New Credit Agreement are unconditionally guaranteed by Topco LLC, together with the existing and future material domestic subsidiaries of Topco LLC (subject to certain exceptions), as specified in the respective guaranty agreements. Borrowings under the New Credit Agreement are also secured by a first-priority lien and security interest in substantially all of the assets (subject to certain exceptions) of existing and future material domestic subsidiaries of Topco LLC that are loan parties.

The accounting related to entering into the New Credit Agreement and using the proceeds to pay off the First and Second Lien Credit Agreements were evaluated on a creditor-by-creditor basis to determine whether each transaction should be accounted for as a modification or extinguishment. Certain creditors under the First and Second Lien Credit Agreements did not participate in this refinancing transaction and ceased being creditors of the Company and the repayment of their related outstanding debt balances has been accounted for as an extinguishment of debt. Proceeds of borrowings from new lenders were accounted for as a new debt financing. The Company recorded a loss on extinguishment of debt of $7.6 million in the accompanying consolidated statement of operations for the year ended December 31, 2020. For the remainder of the creditors, this transaction was accounted for as a modification because the present value of cash flows between the two term loans before and after the transaction was less than 10% on a creditor-by-creditor basis. As part of the refinancing, the Company incurred $15.8 million of various costs, of which $6.0 million related to an original issuance discount, and were all capitalized in the accompanying balance sheet within long-term debt, and are subject to amortization over the term of the refinanced debt as an adjustment to interest expense using the effective interest method.

We also incurred $3.5 million of financing-related fees related to the New Revolving Credit Facility. As of December 31, 2020, $3.4 million of such unamortized debt issuance costs are recorded as an asset within Other Assets our consolidated balance sheet as the there is no balance outstanding related to the New Revolving Credit Facility.

The New Credit Agreement contains certain covenants, including, among other things, covenants limiting our ability to incur or prepay existing certain indebtedness, pay dividends or distributions, dispose of assets, engage in mergers and consolidations, make acquisitions or other investments and make changes in the nature of the business. Additionally, the Credit Facility also requires us to maintain a certain net leverage ratio. All obligations under the Credit Facility are unconditionally guaranteed by the assets of substantially all of our subsidiaries. The Company was in compliance with these covenants as of December 31, 2020.

First and Second Lien Credit Agreement

In August 2018, Maravai Intermediate Holdings, LLC ("Intermediate"), a wholly-owned subsidiary of ours, along with its subsidiaries (together with Intermediate, the "Borrowers") entered into a first lien credit agreement (the "First Lien Credit Agreement") with leading institutions for term loan borrowings (the "First Lien Term Loan") totaling $250.0 million and a second lien credit agreement (the "Second Lien Credit Agreement") for term loan borrowings (the "Second Lien Term Loan") totaling $100.0 million, to refinance a combined debt agreement entered into in 2017, including repayment of all outstanding senior secured credit facilities and senior subordinated notes outstanding and to allow for a $52.0 million distribution to our members. The First Lien Credit Agreement also provided for a revolving credit facility (the "Revolving Credit Facility") of $50.0 million for letters of credit and loans to be used for working capital and other general corporate financing purposes, of which $15.0 million was drawn down in March 2020 to provide financing for the acquisition of MockV and other operating uses. Borrowings under the First Lien Credit Agreement and the Second Lien Credit Agreement were unconditionally guaranteed by Topco LLC and the existing and future material domestic subsidiaries of Topco LLC (subject to certain exceptions as specified in the respective guaranty agreements, and are secured by a lien and security interest in substantially all of the assets of existing and future material domestic subsidiaries of Topco LLC that are loan parties).

The refinancing of the previous debt was accounted for as a modification and also as an extinguishment of the related outstanding debt balances and resulted in a $5.6 million loss on extinguishment of debt in the accompanying consolidated statement of operations for the year ended December 31, 2018 and $1.7 million was related to the modified debt and immediately expensed to interest in the accompanying consolidated statement of operations for the year ended December 31, 2018.

Borrowings under the First Lien Credit Agreement bore interest at variable rates as defined in the respective agreements that could be elected at our option. At December 31, 2019, the interest rates on the First Lien Term Loan and Second Lien Term Loan were 6.063% and 9.740%, respectively.

Accrued interest under the First Lien Credit Agreement was generally payable quarterly in arrears on the date of any repayment or prepayment and at maturity. An annual commitment fee was applied to the daily unutilized amount under the Revolving Credit Facility at 0.50% per annum, with one stepdown to 0.375% per annum based on Intermediate's first lien net leverage ratio calculation.

Long-term debt consisted of the following at December 31 (in thousands):

	2020	2019
New First Lien Term Loan	$ 550,000	$ —
First Lien Term Loan	—	246,875
Second Lien Term Loan	—	100,000
Unamortized debt issuance costs	(15,386)	(9,592)
Total long-term debt	534,614	337,283
Less: current portion	(6,000)	(2,500)
Total long-term debt, less current portion	$ 528,614	$ 334,783

There were no balances outstanding on the Company's New Revolving Credit Facility as of December 31, 2020. There were no balances outstanding on the Company's Revolving Credit Facility as of December 31, 2019.

As of December 31, 2020, the aggregate future principal maturities of the Company's debt obligations for each of the next five years, based on contractual due dates, were as follows (in thousands):

2021	$ 6,000
2022	6,000
2023	6,000
2024	6,000
2025	6,000
Thereafter	520,000
Total debt	$ 550,000

8. Stockholders' / Member's Equity

Prior to the Organizational Transactions, Topco LLC had established a single class of common units with MLSH 1 as its sole member. Topco LLC was authorized to issue up to 253,916,941 common units. All authorized 253,916,941 common units were issued and outstanding prior to the Organizational Transactions. MLSH 1 as the member, was not obligated to make capital contributions to Topco LLC. Topco LLC's profits and losses were allocated to MLSH 1 as determined by the Board of Directors. Topco LLC's common units have no conversion rights, special preferences or redemption rights. No capital contributions were received by Topco LLC from MLSH 1 in 2019 or 2018.

Prior to the Organizational Transactions, a distribution was made by Topco LLC to MLSH 1 in the amount of $88.6 million, with a subsequent distribution of $8.2 million in December 2020, totaling $96.7 million of distributions for the year ended December 31, 2020. A distribution of $52.1 million was made by Topco LLC to MLSH 1 for the year ended December 31, 2018. There were no distributions made to MLSH 1 during the year ended December 31, 2019.

Amendment and Restatement of Certificate of Incorporation

In connection with the Organizational Transactions, the Company's certificate of incorporation was amended and restated to, among other things, provide for the (i) authorization of 500,000,000 shares of Class A common stock with a par value of $0.01 per share; (ii) authorization of 300,000,000 shares of Class B common stock with a par value of $0.01 per share; (iii) authorization of 50,000,000 shares of preferred stock with a par value of $0.01 per share.

Holders of Class A and Class B common stock are entitled to one vote per share. Except as otherwise required in the Certificate of Incorporation or by applicable law, the holders of Class A common stock and Class B common stock shall vote together as a single class on all matters on which stockholders are generally entitled to vote. Holders of the Class A common stock are entitled to receive dividends, and upon the Company's dissolution or liquidation, after payment in full of all amounts required to be paid to creditors and to the holders of preferred stock having liquidation preferences, if any, the holders of shares of Class A and common stock will be entitled to receive the Company's pro rata remaining assets available for distribution. Holders of Maravai's Class B common stock are not entitled to receive dividends and will not be entitled to receive any distributions upon dissolution or liquidation of Maravai. Holders of Class A and Class B common stock do not have preemptive or subscription rights. As of December 31, 2020, no preferred stock was outstanding.

We are required to, at all times, maintain (i) a one-to-one ratio between the number of shares of Class A common stock outstanding and the number of LLC Units owned by us and (ii) a one-to-one ratio between the number of shares of Class B common stock owned by the MLSH 1 and the number of LLC Units owned by the MLSH 1. We may issue shares of Class B

common stock only to the extent necessary to maintain these ratios. Shares of Class B common stock are transferable only together with an equal number of LLC Units if we, at the election of a MLSH 1, exchange LLC Units for shares of Class A common stock. All Class B common stock that is transferred shall be automatically retired and cancelled and shall no longer be outstanding.

In November 2020, we received $1.7 million from MLSH 1 for the issuance of 168,654,981 shares of Class B common stock.

Recapitalization of Topco LLC

Topco LLC's Board of Directors adopted the amended and restated Topco LLC's operating agreement in November 2020 to, among other things, appoint us as Topco LLC's sole managing member and to provide that Topco LLC's members would not have voting rights or any other control or authority over Topco LLC or its business. The amended and restated operating agreement also revised the tax rate applicable to the tax distributions that Topco LLC is required to make to the holders of LLC Units, including us, as described in Note 12.

Blocker Mergers

As described in Note 1, pursuant to the Blocker Mergers, we acquired the Blocker Entities (together with 37,119,801 LLC Units held by the Blocker Entities), by merger, from MLSH 2. We issued an aggregate of 28,965,664 shares of Class A common stock and paid $208.1 million in cash to MLSH 2 in consideration of the Blocker Mergers. Upon consummation of the Blocker Mergers, we recognized the acquired LLC Units at carrying value, as these transactions are considered to be between entities under common control. There were no tax attributes acquired from the Blocker Entities as they had been fully utilized prior to the mergers.

Repurchase of Class A Common Stock From MLSH 2

In November 2020, we repurchased 1,319,148 shares of Class A common stock from MLSH 2 for $33.7 million. These shares were immediately retired.

Initial Public Offering

In November 2020, the Company completed an initial public offering of 69,000,000 shares of common stock, inclusive of the 9,000,000 shares of Class A common stock purchased by underwriters pursuant to the underwriters' option to purchase additional shares at the initial public offering price, less underwriting discounts and commissions. The Company received net proceeds from the IPO of approximately $1.8 billion after deducting underwriting discounts and commissions, which was used to purchase 55,823,011 of previously-issued and 3,703,704 of newly-issued Topco LLC Units for approximately $94.5 million.

9. Net Income (Loss) Per Class A Common Share/Unit Attributable to Maravai LifeSciences Holdings, Inc.

Net income (loss) per unit for periods prior to our IPO have not been retrospectively adjusted to give effect to the Organizational Transactions described in Note 1 and the 69,000,000 shares of Class A common stock sold in our IPO. Additionally, basic net income per Class A common stock for the year ended December 31, 2020, has been calculated by dividing net income for the period, adjusted for preferred unit dividends attributable to MLSC non-controlling interests and net income (loss) attributable to non-controlling interests, by the weighted average Class A common stock outstanding during the period. Diluted net income (loss) per Class A common share/unit gives effect to potentially dilutive securities by application of the treasury stock method or if-converted method, as applicable. Diluted net income per share of Class A common stock attributable to the Company is computed by adjusting the net income and the weighted-average number of shares of Class A common stock outstanding to give effect to potentially diluted securities.

Prior to the Organizational Transactions, the members' equity of MLSC was comprised of Class A and Class B preferred units, MLSC Incentive Units and MLSC common units, each with participation rights. The MLSC preferred units were entitled to cumulative dividends of 8.0% compounded annually, up to an additional 4.0%, also compounded annually, to the extent of remaining unallocated earnings. The preferred unitholders of MLSC were required, however, to share a portion of the additional 4.0% in dividends with the holders of MLSC Incentive Units based on a formula defined in the MLSC LLC Agreement. The Company determined that vested MLSC Incentive Units and MLSC Class A and B preferred units were participating securities under the two-class method at the MLSC subsidiary level, however, they do not have a contractual obligation to share in losses, and therefore no undistributed losses have been allocated to them. MLSH 1 Incentive Units are granted by the parent of the Company, and as a result, do not represent potential common units of the Company.

In September 2020, the Company entered into a Sale and Rollover Agreement and repurchased a majority of the outstanding MLSC Class B preferred units as well as entering into an agreement that resulted in an exchange of the remaining MLSC Class B preferred units and MLSC common units into 69,599 of MLSH 1 common units in November 2020 upon the IPO. Included

in the preferred unit dividends attributable to non-controlling interests line item for the year ended December 31, 2020, is a $10.2 million deemed dividend representing the excess of the fair value of the Class B preferred units, determined as of the date of the Sale and Rollover Agreement, over their related carrying value. In September 2020, the Company also agreed and subsequently repurchased all MLSC Incentive Units, however, such incentive units remained outstanding until October 2020, and had the potential to be dilutive to earnings per unit until they were repurchased.

Prior to the Organizational Transactions and IPO, basic net loss per common unit attributable to our member for the years ended December 31, 2019 and 2018 is based on the weighted average number of common units outstanding during the period. Diluted net loss per common unit is computed by adjusting the net loss and the weighted-average number of common units outstanding to give effect to potentially dilutive securities.

	Year Ended December 31,		
	2020	2019	2018
	(in thousands, except share and unit amounts and per share and per unit amounts)		
Net income (loss) per Class A common share/unit:			
Numerator—basic:			
Net income (loss)	$ 78,816	$ (5,201)	$ (16,915)
Less: preferred unit dividends attributable to the MLSC non-controlling interests	(15,270)	(5,681)	(5,260)
Add: loss attributable to common non-controlling interests	13,342	2,396	4,444
Net income (loss) attributable to Maravai LifeSciences Holdings, Inc.—basic	76,888	(8,486)	(17,731)
Numerator—diluted:			
Net income (loss) attributable to Maravai LifeSciences Holdings, Inc.—basic	76,888	(8,486)	(17,731)
Net income (loss) effect of dilutive securities:			
Effect of the assumed conversion of Class B common stock	(8,802)	—	—
Net income (loss) attributable to Maravai LifeSciences Holdings, Inc.—diluted	68,086	(8,486)	(17,731)
Denominator—basic:			
Weighted average Class A common shares/units outstanding—basic (1)	10,351,137	253,916,941	253,916,941
Net income (loss) per Class A common share/unit—basic	$ 7.43	$ (0.03)	$ (0.07)
Denominator—diluted:			
Weighted average Class A common shares/units outstanding—basic [(1)]	10,351,137	253,916,941	253,916,941
Weighted average effect of dilutive securities:			
Effect of dilutive restricted stock units	457	—	—
Effect of the assumed conversion of Class B common stock	18,556,385	—	—
Weighted average Class A common shares/units outstanding—diluted [(1)]	28,907,979	253,916,941	253,916,941
Net income (loss) per Class A common share/unit—diluted	$ 2.36	$ (0.03)	$ (0.07)

(1) Amounts for the year ended December 31, 2020 represent shares of Class A common stock outstanding. Amounts for the years ended December 31, 2019 and 2018 represent Topco LLC units outstanding.

Shares of Class B common stock do not share in the earnings or losses of the Company, and are therefore not participating securities. As such, a separate presentation of basic and diluted net income (loss) per share for Class B common stock under the two-class method has not been presented.

The following table presents potentially dilutive securities excluded from the computation of diluted net income (loss) per share/unit for the periods presented because their effect would have been anti-dilutive for the years ended December 31:

	2020	2019	2018
Time-based incentive units	—	11,396,000	11,556,000
Performance-based incentive units	—	2,849,000	2,849,000
Stock options	1,534,700	—	—
Shares estimated to be purchased under employee stock purchase plan	51,490	—	—
	1,586,190	14,245,000	14,405,000

10. Equity Incentive Plans

Stock-Based Compensation

In November 2020, in connection with the IPO, the Company's board of directors adopted the 2020 Omnibus Incentive Plan (the "2020 Plan"). The 2020 Plan provided that the initial aggregate number of shares of Class A common stock reserved and available for issuance was 25,762,064 shares of Class A common stock, and provides for an automatic increase in the number of shares reserved for issuance thereunder on January 1 of each of the first 10 calendar years during the term of the 2020 Plan, by the lesser of (i) 4% of the total number of shares of Class A common stock outstanding on each December 31 immediately prior to the date of increase or (ii) such number of shares of Class A common stock determined by our board of directors or compensation committee. Shares of Class A common stock subject to an award that expires or is cancelled, forfeited, exchanged, settled in cash or otherwise terminated without delivery of shares and shares withheld to pay the exercise price of, or to satisfy the withholding obligations with respect to, an award will again be available for delivery pursuant to other awards under the 2020 Plan.

All awards granted under the 2020 Plan are intended to be treated as (i) stock options, including incentive stock options ("ISOs"), (ii) stock appreciation rights ("SARs"), (iii) restricted share awards ("RSAs"), (iv) restricted stock units ("RSUs"), (v) dividend equivalents, or (vi) other stock or cash awards as may be determined by the plan's administrator from time to time. The term of each option award shall be no more than 10 years from the date of grant. The exercise price of a stock option shall not be less than 100% (or, in the case of an ISO granted to a ten percent stock holder, 110%) of the fair market value of the shares on the date of grant. As of December 31, 2020, only stock options and restricted stock units have been issued.

Stock Options

The following table summarizes information related to stock options:

	Number of Stock Options (in thousands)	Weighted Average Exercise Price per Stock Option	Weighted Average Remaining Contractual Life (Years)	Aggregate Intrinsic Value (in thousands)
Balance as of December 31, 2019	—		—	—
Granted	1,535	$ 26.98		
Cancelled	(21)	27.00		
Balance as of December 31, 2020	1,514	$ 26.98	9.9	$ 1,621

No stock options were exercised or exercisable during the year ended December 31, 2020.

The Company uses the Black-Scholes option pricing model to estimate the fair value of each option grant on the date of grant or any other measurement date. The assumptions and estimates are as follows:

- *Expected term* - The expected term represents the period that stock-based awards are expected to be outstanding. Our historical share option exercise information is limited due to a lack of sufficient data points and does not provide a reasonable basis upon which to estimate an expected term.
- *Expected volatility* - The expected volatility was derived from the historical stock volatilities of peer public companies within our industry that are considered to be comparable to our business over a period equivalent to the expected term of the stock-based awards, since there has been no trading history of our stock.
- *Risk-free interest rate* - The risk-free interest rate is based on the U.S. Treasury yield curve in effect at the date of grant for zero-coupon U.S. Treasury notes with maturities approximately equal to the stock-based awards' expected term.
- *Expected dividend yield* - The expected dividend yield is zero as we have no plans to make dividend payments.

The following table sets forth the weighted average assumptions used in estimating the grant date fair value of the awards granted:

	Year Ended December 31, 2020
Expected volatility	59.0 %
Risk-free interest rate	0.5 %
Expected term (in years)	6.1
Expected dividend yield	— %

Stock-based compensation expense related to stock options was $0.6 million for the year ended December 31, 2020.

As of December 31, 2020, the total unrecognized stock-based compensation related to stock options was $21.4 million, which is expected be recognized over a weighted-average period of approximately 3.89 years.

Restricted Stock Units

The Company began granting restricted stock unit awards to non-employee directors during 2020. The following table summarizes RSU activity:

	Restricted Stock Units	Weighted Average Fair Value per RSU at Grant Date
Balance as of December 31, 2019	—	
Granted	71,112	27.00
Balance as of December 31, 2020	71,112	$ 27.00

Stock-based compensation expense related to RSUs was $0.1 million for the year ended December 31, 2020.

As of December 31, 2020, the total unrecognized equity-based compensation related to RSUs was $1.8 million, which is expected be recognized over a weighted-average period of approximately 2.9 years.

Unit-Based Compensation

Prior to the IPO, the Company's parent, MLSH 1, granted unit-based awards ("MLSH 1 Incentive Units") to certain executives of the Company in the form of non-vested units. Our controlled subsidiary, MLSC, granted unit-based awards ("MLSC Incentive Units") only to certain employees of its subsidiaries.

MLSC Incentive Units

Topco LLC's majority-owned subsidiary during the periods preceding the Organizational Transactions and wholly-owned subsidiary subsequent to the Organizational Transactions, issued incentive units (the "MLSC Incentive Units") to its employees. The MLSC Incentive Units were subject to either a combination of service, market or performance vesting conditions. Vested MLSC Incentive Units were treated as common units for purposes of distributions.

Awards which vested based solely on a service condition provide for cliff-vesting over five years. The MLSC Incentive Units that included performance conditions tied to the achievement of certain cash distribution multiples provided for full vesting upon meeting the performance condition. The performance conditions that would allow the MLSC Incentive Units to vest was never deemed to be probable for any of the periods presented.

All vested MLSC Incentive Units were subject to repurchase for fair value at MLSC's option upon a voluntary or involuntary separation event that was not deemed to be for cause and only after seven months have passed since the separation event. No MLSC Incentive Units were granted in 2020 or 2019. In September 2020, Topco LLC entered into agreements (the "Repurchase Agreements") to repurchase all outstanding MLSC Incentive Units, including the 1,500,000 MLSC Incentive Units held by the President of Cygnus, a subsidiary of MLSC. As part of the Repurchase Agreements, Topco LLC accelerated the vesting of all remaining unvested time-based MLSC Incentive Units and also removed the performance condition associated with the performance-based MLSC Incentive Units. The Company has accounted for the acceleration of the vesting on the time-based MLSC Incentive Units under settlement accounting, which resulted in the recognition of all remaining unrecognized compensation cost. Such accelerated compensation cost totaled $0.4 million. The Company has accounted for the removal of the performance condition and the ensuing acceleration of the vesting of the 249,000 performance-based MLSC Incentive Units as an improbable-to-probable modification, which provides for pre-measurement of the related compensation cost at the fair value of these incentive units as of the date of the Agreements. The total compensation cost recognized for these performance-based MLSC Incentive Units approximated $0.8 million. Topco LLC paid $9.1 million to settle the Repurchase Agreements in October 2020.

MLSC Incentive Unit activity during the periods indicated is as follows:

	Number of Unvested MLSC Incentive Units	Weighted Average Grant Date Fair Value Per Unit
Balance as of December 31, 2019	821,400	$ 0.88
Vested	(821,400)	0.88
Balance as of December 31, 2020	—	

Unit-based compensation expense for the fiscal years ended December 31, 2020, 2019 and 2018 was approximately $1.5 million, $0.4 million and $0.6 million, respectively.

There were no MLSC Incentive Units outstanding as of December 31, 2020.

The total fair value of the MLSC Incentive Units that vested in 2020, 2019 and 2018 was approximately $0.9 million, $0.6 million, and $0.6 million, respectively. No MLSC Incentive Units were available for grant as of December 31, 2020.

MLSH 1 Incentive Units

Prior to the Organizational Transactions, Topco LLC entered into agreements with certain executives and board members whereby those employees and board members were granted incentive units in MLSH 1. All MLSH 1 Incentive Unit awards were subject to a market condition which is subject to the achievement of a certain investment return threshold that increased on a compounding basis annually and a service condition subject to their continued employment. Certain MLSH 1 Incentive Unit awards contained a performance condition tied to the achievement of certain cash distribution multiples. The MLSH 1 Incentive Unit awards that include market and service conditions provide for cliff-vesting generally over four or five years. The MLSH 1 Incentive Unit awards that include market and performance conditions provide for full vesting upon meeting the performance condition. The fair value of MLSH 1 Incentive Unit awards was measured at the grant date and recognized as expense over the requisite service period for the awards.

During the years ended December 31, 2019 and 2018, all MLSH 1 Incentive Unit awards with performance conditions were subject to the achievement of defined cash distribution multiples. No compensation cost was recorded for the MLSH 1 Incentive Unit awards with performance conditions during these periods, as achieving the cash distribution multiples performance condition associated with these awards was still not considered probable.

In November 2020, and before the IPO, MLSH 1 Incentive Unit awards were modified to allow for vesting subsequent to the termination of the employment for two employees (i.e. improbable-probable modification). The calculation of the incremental equity-based compensation expense was based on the new fair value of the award measured as of the date of modification. As a result of the modification and based on the performance condition being satisfied, the Company recognized an incremental equity-based compensation expense of $16.7 million for the year ended December 31, 2020. Upon the IPO, the performance condition was met for certain MLSH 1 Incentive Units and the Company recorded an additional $3.5 million of equity-based compensation expense.

During the year ended December 31, 2020, a total of 62,000 MLSH 1 Incentive Unit awards were granted, none of which included performance condition vesting. During the year ended December 31, 2019, a total of 169,500 MLSH 1 Incentive Unit awards were granted of which 34,500 included performance condition vesting. All vested MLSH 1 Incentive Unit awards are subject to repurchase for fair value at MLSH 1's option upon a voluntary or involuntary separation event that is not deemed to be for cause.

Total compensation cost recognized by the Company during each of the years ended December 31, 2020, 2019 and 2018 for all MLSH 1 Incentive Unit awards, was approximately $22.3 million, $1.3 million, and $1.5 million, respectively.

MLSH 1 Incentive Unit award activity during year ended December 31, 2020 is as follows:

	Number of Unvested MLSH 1 Incentive Units	Weighted Average Grant Date Fair Value Per Unit
Balance as of December 31, 2019	787,100	$ 11.53
Granted	62,000	42.05
Forfeited	(16,500)	5.28
Vested	(483,600)	11.37
Balance as of December 31, 2020	349,000	17.47

As of December 31, 2020, total unrecognized compensation cost related to unvested MLSH 1 Incentive Units subject to service condition is $3.5 million which is expected to be recognized over a weighted average period of 3.7 years.

Equity-Based Compensation

The following table sets forth the total equity-based compensation expense included in the Company's consolidated statements of operations for the years ended December 31, (in thousands):

	2020	2019	2018
Cost of sales	$ 282	$ 22	$ 38
Research and development	131	211	297
Selling, general and administrative	24,216	1,446	1,786
Total equity-based compensation	$ 24,629	$ 1,679	$ 2,121

11. Repurchase of Non-Controlling Interests

In September 2020, Topco LLC and MLSH 1 entered into a Sale and Rollover Agreement with the President of Cygnus Technologies and his affiliated entity (collectively, the "Investors") to purchase 43,264 MLSC Class B preferred units and 18,387,206 MLSC common units held by the Investors for approximately $120.0 million. In October 2020, Topco LLC repurchased $120.0 million of the MLSC Class B preferred and common units for cash. In addition, the Sale and Rollover Agreement provided that the remaining 16,736 MLSC Class B preferred units and 7,112,794 MLSC common units held by the Investors were exchanged upon the IPO into MLSH 1 common units for $46.6 million (the "Exchange"). In November 2020, and before the IPO, MLSH 1 exchanged its MLSH 1 common units for the remaining MLSC Class B preferred and common units and contributed the MLSC Class B preferred and common units to Topco LLC in a common control transaction. The difference between the consideration to be paid to the Investors associated with the non-controlling interests of $166.4 million and the carrying amount of the non-controlling interests in MLSC of $4.8 million was recorded, in the activity prior to the IPO and related Organizational Transactions, as a $161.6 million reduction in members' equity in the consolidated statement of stockholders'/members' equity.

In November 2020, the MLSC LLC Agreement was amended and restated to recapitalize the outstanding equity into 1,000 common units.

12. Income Taxes

We are subject to U.S. federal and state income taxes with respect to our allocable share of any taxable income or loss of Topco LLC generated after the IPO, as well as any stand-alone income or loss we generate. Topco LLC is organized as a limited liability company and treated as a partnership for federal tax purposes, with the exception of Maravai Inc. and its subsidiaries who are taxpaying entities in the U.S., Canada, and the U.K. Topco LLC generally does not pay income taxes on its taxable

income in most jurisdictions. Instead, Topco LLC's taxable income or loss is passed through to its members, including us. Maravai, Inc. files and pays corporate income taxes for U.S. federal and state income tax purposes and internationally, primarily within the U.K. and Canada. We anticipate this structure to remain in existence for the foreseeable future.

Components of income (loss) from continuing operations before income taxes for the years ended December 31 were as follows (in thousands):

	2020	2019	2018
U.S.	$ 82,012	$ (5,581)	$ (16,292)
International	(316)	(272)	(206)
	$ 81,696	$ (5,853)	$ (16,498)

Income tax expense (benefit) consisted of the following for the years ended December 31 (in thousands):

	2020	2019	2018
Current tax expense			
Federal	$ 6,092	$ 505	$ 87
State and local	2,251	2	6
Total current tax expense	$ 8,343	$ 507	$ 93
Deferred tax (benefit) expense			
Federal	$ (3,921)	$ (1,224)	$ 847
State and local	(1,542)	65	(554)
International	—	—	31
Total deferred tax (benefit) expense	$ (5,463)	$ (1,159)	$ 324
Total provision (benefit) for income taxes	$ 2,880	$ (652)	$ 417

A reconciliation between the Company's effective tax rate and the applicable U.S. federal statutory income tax rate as of December 31 is summarized as follows:

	2020	2019	2018
Federal statutory rate	21.0 %	21.0 %	21.0 %
State and local taxes, net of federal benefits	0.3 %	(1.1)%	3.3 %
Deferred tax revaluation	(1.8)%	— %	— %
One-time transition tax	— %	— %	(0.7)%
Income of non-controlling interest	(18.9)%	— %	— %
Rate effect from pass-through entity	— %	(11.1)%	(17.6)%
Taxable gain on subsidiary liquidation	2.7 %	— %	— %
Equity-based compensation	1.3 %	(0.8)%	(0.4)%
Research and development credits	(0.1)%	0.9 %	0.5 %
Uncertain tax positions	— %	2.5 %	(0.1)%
Valuation allowance	(1.5)%	— %	(8.4)%
Other	0.5 %	(0.3)%	(0.1)%
Effective tax rate	3.5 %	11.1 %	(2.5)%

Deferred income taxes reflect the net tax effects of temporary differences between the carrying amounts of assets and liabilities for financial reporting purposes and the amounts used for income tax purposes and operating loss and tax credit carryforwards. Significant items comprising the net deferred tax assets at December 31 were (in thousands):

	2020	2019
Deferred tax assets		
Interest limitation	$ —	$ 2,333
Net operating loss ("NOL") and credit carryforwards	3,392	455
Accruals	668	454
Inventories	228	19
Property, plant and equipment	93	—
Investment in Topco LLC	360,861	—
Deductions to be received for Tax Receivable Agreement payments	81,123	—
Other	1,729	—
Total deferred tax assets	448,094	3,261
Valuation allowance	(13,663)	(1,561)
Total deferred tax assets, net of valuation allowance	434,431	1,700
Deferred tax liabilities		
Property, plant and equipment	—	(3,064)
Intangible assets	(11,341)	(13,007)
Other	—	(326)
Deferred tax liabilities	(11,341)	(16,397)
Total net deferred tax asset (liability)	$ 423,090	$ (14,697)

As a result of the Organizational Transactions and our IPO, we acquired LLC Units and recognized a deferred tax asset for the difference between the financial reporting and tax basis of our investment in Topco LLC which included net deferred tax assets of $445.5 million less a $13.3 million valuation allowance associated with: (i) $364.4 million related to temporary differences in the book basis as compared to the tax basis of our Company's investment in Topco LLC and (ii) $81.1 million related to tax benefits from future deductions attributable to payments under the TRA.

The valuation allowance increased by $12.1 million and decreased by an immaterial amount during the years ended December 31, 2020 and 2019, respectively.

The realizability of the Company's deferred tax asset related to its investment in Topco LLC depends on the Company receiving allocations of tax deductions for its tax basis in the investment and on the Company generating sufficient taxable income to fully offset such deductions. We believe it is more likely than not that the Company will generate sufficient taxable income in the future to fully realize any deductions allocated to it from Topco LLC associated with the reversal of its tax basis as of December 31, 2020. However, a portion of the deferred tax asset may only be realizable through the sale or liquidation of the investment and our ability to generate sufficient capital gains. Therefore, the change in the valuation allowance during December 31, 2020, is primarily due to the establishment of a $13.3 million valuation allowance to reflect the deferred tax asset that is more likely than not to not be realized. Additionally, in response to the COVID-19 pandemic, the Coronavirus Aid, Relief and Economic Security Act ("CARES Act") was signed into law in March 2020. The CARES Act modified the interest expense utilization rules allowing taxpayers to deduct interest up to the sum of 50% of adjusted taxable income plus business interest income (30% limit under the 2017 Tax Act) for tax years beginning January 1, 2019 and 2020. These changes to the interest expense limitation calculation allowed the Company to utilize additional interest expense that was previously disallowed causing a $1.3 million valuation allowance release in 2020.

For the years ended December 31, 2020 and 2019, December 31, 2019 and December 31, 2020, the amount of undistributed foreign earnings was $0.9 million and $1.2 million, respectively. We have provided income taxes on the earnings of foreign subsidiaries, the amount of which is immaterial.

Net operating loss and tax credit carryforwards as of December 31, 2020 were as follows (in millions):

	Amount	Expiration Years
Net operating losses, federal (all post December 31, 2017)	$ 12.5	Do not expire
Net operating losses, state [1]	7.3	Beginning in 2034
Net operating losses, foreign	1.7	Do not expire
Tax credits, federal	0.2	2039 - 2040
Tax credits, state	0.2	CA - Do not expire

(1) The carryforward rules for state net operating losses vary from state to state with some states not having an expiration date.

As of December 31, 2020 and 2019, the Company had $0.2 million and $0.2 million, respectively, of unrecognized tax benefits, all of which would affect the effective tax rate if recognized. The Company does not expect any significant increases or decreases to our unrecognized tax benefits in the next twelve months.

The aggregate changes in the balance of the Company's unrecognized tax benefits were as follows as of December 31 (in thousands):

	2020	2019	2018
Balance, beginning of year	$ 208	$ 136	$ 106
Gross increases based on tax positions related to current year	62	5	34
Gross increases based on tax positions related to prior years	—	105	—
Gross decreases based on tax positions related to prior years	(50)	(38)	(4)
Balance, end of year	$ 220	$ 208	$ 136

The Company files income tax returns in the U.S. federal jurisdiction, various U.S. states, Canada, and the United Kingdom and is not under audit by taxing authorities in any of these jurisdictions. In the normal course of business the Company is subject to examination by taxing authorities throughout the world. With a few exceptions, the Company is no longer subject to U.S. federal, state, and local, or non-U.S. income tax examinations for years before 2016 except for utilization of NOL carryforwards.

Payable to Related Parties Pursuant to the TRA

Pursuant with our IPO, we entered into a tax receivable agreement with MLSH 1 and MLSH 2. The Tax Receivable Agreement provides for the payment by us to MLSH 1 and MLSH 2, collectively, of 85% of the amount of tax benefits, if any, that we actually realize, or in some circumstances are deemed to realize, as a result of the Organizational Transactions and IPO. Based on our current projections of taxable income, and before deduction of any specially allocated depreciation and amortization, we anticipate having enough taxable income to utilize most of these tax benefits. Accordingly, in November 2020 a liability of $389.5 million payable to the MLSH 1 and MLSH 2 under the TRAs, representing approximately 85% of the calculated tax savings we anticipate being able to utilize in future years. The projection of future taxable income involves significant judgment. Actual taxable income may differ from our estimates, which could significantly impact the liability under the TRA. Additionally, if the tax attributes are not utilized in future years, it is reasonably possible no amounts would be paid under the TRA. In this scenario, the reduction of the liability under the TRA would result in a benefit to our consolidated statement of operations.

No payments were made to MLSH1 or MLSH 2 pursuant to the Tax Receivable Agreement during 2020. As of December 31, 2020, our liabilities under the Tax Receivable Agreement are $389.5 million.

Tax Distributions to Topco LLC's Owners

Topco LLC is subject to an operating agreement put in place at the date of the Organizational Transactions. The agreement has numerous provisions related to allocations of income and loss, as well as timing and amounts of distributions to its owners. This agreement also includes a provision requiring cash distributions enabling its owners to pay their taxes on income passing through from Topco LLC. These tax distributions are computed based on an assumed income tax rate equal to the sum of (i) the maximum combined marginal federal and state income tax rate applicable to an individual and (ii) the net investment income tax. The assumed income tax rate currently totals 46.7%, which may increase to 54.1% in certain cases where the qualified business income deduction is unavailable.

In addition, under the tax rules, Topco LLC is required to allocate taxable income disproportionately to its unit holders. Because tax distributions are determined based on the holder of LLC Units who is allocated the largest amount of taxable income on a per unit basis, but are made pro rata based on ownership, Topco LLC is required to make tax distributions that, in the aggregate, will likely exceed the amount of taxes Topco LLC would have otherwise paid if it were taxed on its taxable income at the assumed income tax rate. Topco LLC is subject to entity level taxation in certain states and certain of its subsidiaries are subject to entity level U.S. and foreign income taxes. As a result, the accompanying consolidated statements of operations include income tax expense related to those states and to U.S. and foreign jurisdictions where Topco LLC or any of our subsidiaries are subject to income tax.

During 2020, Topco LLC paid tax distributions of $8.2 million to its owners, excluding us. No tax distributions were made by Topco LLC for the year ended December 31, 2019 and $0.1 million was made for the year ended December 31, 2018. As of December 31, 2020, no amounts for tax distributions have been accrued as such payments were made during 2020.

13. Employee Benefit Plans

The Company sponsors a 401(k) plan (the "Maravai LifeSciences 401(k) Plan") pursuant to which eligible employees can elect to contribute to the 401(k) Plan, subject to certain limitations, on a pretax basis. The Company provides for a cash match of up to 50% of employee contributions up to the first 6% of salary. The Company match vests over a four-year term. In February 2019, a retirement saving plan of one of our subsidiaries was closed and all funds in the plan were rolled over into the Maravai LifeSciences 401(k) Plan.

The Company also maintains a non-qualified Long-Term Incentive Plan ("LTIP") for legacy employees of one of their subsidies which is not subject to the Employee Retirement Income Security Act of 1974. As of December 31, 2019, the Company was no longer required to contribute to the plan under the terms of the historical purchase agreement.

Total contributions by the Company to these plans were approximately $1.0 million, $1.2 million, and $1.0 million for the years ended December 31, 2020, 2019 and 2018, respectively.

14. Related Party Transactions

Prior to the IPO, GTCR, LLC ("GTCR"), MLSH 1's majority owner, provided subsidiaries of the Company with financial and management consulting services through an advisory services agreement. This advisory services agreement also provided that the Company pay placement fees to GTCR of 1.0% of the gross amount of any debt or equity financings. During the years ended December 31, 2020 the Company entered into the New Credit Agreement (see Note 7) and paid GTCR a $3.7 million placement fee. During the years ended December 31, 2019 and 2018, no placement fees were incurred. The advisory services agreement provides that the Company pay a $0.1 million quarterly management fee to GTCR commencing on the date of the first acquisition. For each of the years ended December 31, 2020, 2019, and 2018, the Company incurred approximately $4.2 million, $0.5 million, and $0.5 million in management fees to GTCR which were paid in full as of December 31, 2020, 2019, 2018, respectively. The advisory services agreement was terminated in connection with the IPO.

The Company also reimburses GTCR for out-of-pocket expenses incurred while providing the above professional services. During the years ended December 31, 2020, 2019, and 2018, the Company incurred out-of-pocket expenses to GTCR of $0.2 million, $2.4 million, and $0.1 million, respectively. Of these balances, the amounts included in accrued expense at December 31, 2019 was approximately $2.4 million. The were no amounts included in accounts payable and accrued expenses as of December 31, 2020.

The non-controlling interests in MLSC represent equity interest that was retained by the shareholders of the MLSC entity prior to its acquisition by the Company. The President of Cygnus and his affiliated entity were the owners of the non-controlling interests. In September 2020, Topco LLC and MLSH 1 entered into a Sale and Rollover Agreement with the President of Cygnus and his affiliated entity to purchase certain MLSC Class B preferred units and common units as well as exchange the remaining MLSC Class B preferred units and common units for a variable number of MLSH 1 common units. As a result of this transaction, the President of Cygnus and his affiliated entity no longer held a non-controlling interest in MLSC upon the exchange of MLSH 1 common units for the remaining MLSC Class B preferred and common units which occurred in November 2020 (see Note 11).

In October 2020, the Company made a $88.6 million distribution to MLSH 1.

Following the completion of the Organizational Transactions and IPO, Topco LLC made tax distributions of $8.2 million to MLSH 1.

The Company leases a facility, which through the date of the Organizational Transactions was owned by an entity controlled by a close relative of the President of one of its subsidiaries (see Note 6). The President of this subsidiary also personally financed a loan to this entity which was used to acquire the property leased by the Company. Upon completion of the Sale and Rollover Agreement (Note 11), this individual was no longer deemed to be a related party. For the years ending December 31, 2020, 2019, and 2018, respectively, the Company paid $0.2 million in lease payments for the leased facility.

Concurrent with the completion of the IPO, the Company entered into a TRA with MLSH 1 and MLSH 2 (see Note 12).

15. Segments

Operating segments are defined as components of an enterprise about which separate financial information is available that is evaluated regularly by the chief operating decision maker, or decision-making group, in deciding how to allocate resources and in assessing performance. When determining the reportable segments, the Company aggregated operating segments based on their similar economic and operating characteristics. Segment results are presented in the same manner as we present our operations internally to make operating decisions and assess performance. The accounting policies for the segments are the same as those described in Significant Accounting Policies (see Note 1). The Company's financial performance is reported in three segments. A description of each segment follows:

- *Nucleic Acid Production*: focuses on the manufacturing and sale of highly modified nucleic acids products to support the needs of customers' research, therapeutic and vaccine programs. This segment also provides research products for labeling and detecting proteins in cells and tissue samples.
- *Biologics Safety Testing*: focuses on manufacturing and selling biologics safety and impurity tests and assay development services that are utilized by our customers in their biologic drug manufacturing spectrum.
- *Protein Detection*: focuses on manufacturing and selling labeling and visual detection reagents to scientific research customers for their tissue-based protein detection and characterization needs.

The Company has determined that adjusted earnings before interest, tax, depreciation, and amortization ("Adjusted EBITDA") is the profit or loss measure that the CODM uses to make resource allocation decisions and evaluate segment performance. Adjusted EBITDA assists management in comparing the segment performance on a consistent basis for purposes of business decision-making by removing the impact of certain items that management believes do not directly reflect the core operations and, therefore, are not included in measuring segment performance. The Company defines Adjusted EBITDA as net income before interest, taxes, depreciation and amortization, certain non-cash items, and other adjustments that we do not consider in our evaluation of ongoing operating performance from period to period. Corporate costs are managed on a standalone basis and not allocated to segments.

Following is financial information relating to the operating segments (in thousands):

For the year ended December 31, 2020	Nucleic Acid Production	Biologics Safety Testing	Protein Detection	Corporate	Eliminations	Total
Revenue	$ 207,597	$ 54,897	$ 22,881	$ —	$ (1,277)	$ 284,098
Adjusted EBITDA	$ 133,822	$ 44,516	$ 9,225	$ (18,189)	$ (209)	$ 169,165

For the year ended December 31, 2019	Nucleic Acid Production	Biologics Safety Testing	Protein Detection	Corporate	Eliminations	Total
Revenue	$ 72,602	$ 44,416	$ 26,122	$ —	$ —	$ 143,140
Adjusted EBITDA	$ 22,229	$ 36,371	$ 14,603	$ (11,189)	$ —	$ 62,014

For the year ended December 31, 2018	Nucleic Acid Production	Biologics Safety Testing	Protein Detection	Corporate	Eliminations	Total
Revenue	$ 60,057	$ 38,492	$ 25,284	$ —	$ —	$ 123,833
Adjusted EBITDA	$ 16,751	$ 31,199	$ 13,846	$ (8,796)	$ —	$ 53,000

During the year ended December 31, 2020, intersegment revenue was $1.3 million. The intersegment sales and the related gross margin on inventory recorded at the end of the period are eliminated for consolidation purposes in the Eliminations column. Internal selling prices for intersegment sales are consistent with the segment's normal retail price offered to external parties. There was no commission expense recognized for intersegment sales for the year ended December 31, 2020.

Intersegment revenue represents intersegment revenue between the Nucleic Acid Production and Protein Detection segments. There was no inter-segment activity for the years ended December 31, 2019 and 2018.

The Company does not allocate assets to its reportable segments as they are not included in the review performed by the CODM for purposes of assessing segment performance and allocating resources. Excluding approximately $0.4 million associated with a building in the United Kingdom, all of the Company's long-lived assets are located within the United States.

A reconciliation of Adjusted EBITDA to net loss, the most directly comparable GAAP measure, is set forth below (in thousands):

	Year Ended December 31,		
	2020	2019	2018
Net income (loss)	$ 78,816	$ (5,201)	$ (16,915)
Add:			
Amortization	20,320	20,274	20,122
Depreciation	5,593	3,810	2,225
Interest expense	30,740	29,959	27,399
Income tax expense (benefit)	2,880	(652)	417
EBITDA	138,349	48,190	33,248
Acquisition contingent consideration	—	322	939
Acquisition integration costs	3,857	6,170	7,529
Amortization of purchase accounting inventory step-up	—	1,856	2,967
Acquired in-process research and development costs	2,881	—	—
Equity-based compensation	24,629	1,679	2,121
GTCR management fees	680	523	574
Gain on sale and leaseback transaction	(19,002)	—	—
Merger and acquisition related expenses	395	3,274	—
Financing costs	9,784	—	—
Loss on extinguishment of debt	7,592	—	5,622
Adjusted EBITDA	$ 169,165	$ 62,014	$ 53,000

16. Subsequent Events

In January 2021, the Company entered into a new interest rate cap agreement to manage a portion of its variable interest rate risk on its outstanding long-term debt. The contract, effective March 31, 2021, entitles the Company to receive from the counter party at each calendar quarter end the amount, if any, by which the specified defined floating market rate exceeds the cap strike interest rate, applied to the contract notional amount of $415.0 million. The floating rate of interest is reset at the end of each three month period. The contract expires on March 31, 2023.

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

None.

Item 9A. Controls and Procedures

Evaluation of Disclosure Controls and Procedures

Under the supervision and with the participation of our management, including our Chief Executive Officer and Chief Financial Officer, we evaluated the effectiveness of the design and operation of our disclosure controls and procedures pursuant to Rule 13a-15(e) and 15(d)-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 that are filed or submitted under the Exchange Act is accumulated and communicated to management, including the Chief Executive Officer and Chief Financial Officer, to allow for timely decisions regarding required disclosures. In designing and evaluating the disclosure controls and procedures, management recognized that any controls and procedures, no matter how well designed and operated, can provide only reasonable assurance of achieving the desired control objectives, as ours are designed to do, and management necessarily applies its judgment in evaluating the cost-benefit relationship of

possible controls and procedures. Based on such evaluation, our Chief Executive Officer and Chief Financial Officer have concluded that, as of the end of such period, the Company's disclosure controls and procedures were effective at a reasonable assurance level.

Management's Annual Report on Internal Controls over Financial Reporting

This Annual Report on Form 10-K does not include a report of management's assessment regarding internal control over financial reporting or an attestation report of our independent registered public accounting firm due to a transition period established by the rules of the SEC for newly public companies.

Changes in Internal Control over Financial Reporting

There have been no changes in our internal control over financial reporting, as such term is defined in Rules 13a-15(f) and 15d-15(f) under the Exchange Act, during the three months ended December 31, 2020 that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

Part III.

Item 10. Directors, Executive Officers and Corporate Governance

The information required by this Item is incorporated by reference to the Company's 2021 Proxy Statement (the "2021 Proxy Statement") to be filed with the SEC within 120 days after December 31, 2020 in connection with the solicitation of proxies for the Company's 2021 annual meeting of stockholders.

Item 11. Executive Compensation

The information required by this Item is incorporated by reference to the 2021 Proxy Statement, which is expected to be filed no later than 120 days after the end of our fiscal year ended December 31, 2020.

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

The information required by this Item is incorporated by reference to the 2021 Proxy Statement, which is expected to be filed no later than 120 days after the end of our fiscal year ended December 31, 2020.

Item 13. Certain Relationships and Related Transactions and Director Independence

The information required by this Item is incorporated by reference to the 2021 Proxy Statement, which is expected to be filed no later than 120 days after the end of our fiscal year ended December 31, 2020.

Item 14. Principal Accounting Fees and Services

The information required by this Item is incorporated by reference to the 2021 Proxy Statement, which is expected to be filed no later than 120 days after the end of our fiscal year ended December 31, 2020.

Part IV.

Item 15. Exhibits and Financial Statement Schedules

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

(1) Consolidated Financial Statements (included in Item 8):

Report of Independent Registered Public Accounting Firm

Consolidated Balance Sheets

Consolidated Statements of Operations

Consolidated Statements of Comprehensive Income (Loss)

Consolidated Statements of Changes in Stockholders'/Member's Equity

Consolidated Statements of Cash Flows

Notes to Consolidated Financial Statements

(2) Financial Statement Schedules

All schedules have been omitted because they are not applicable or not required, or because the required information is included either in the consolidated financial statements or in the notes thereto.

(3) Exhibits

Exhibit Number	Description
3.1	Amended and Restated Certificate of Incorporation of Maravai LifeSciences Holdings, Inc. dated November 19, 2020 (incorporated by reference to Exhibit 3.1 to Maravai Life Sciences Holdings, Inc.'s Form 8-K filed on November 25, 2020).
3.2	Amended and Restated Bylaws of Maravai LifeSciences Holdings, Inc. dated November 19, 2020 (incorporated by reference to Exhibit 3.2 to Maravai Life Sciences Holdings, Inc.'s Form 8-K filed on November 25, 2020).
4.1	Registration Rights Agreement, dated November 24, 2020, by and among Maravai LifeSciences Holdings, Inc. and the other signatories party thereto (incorporated by reference to Exhibit 4.1 to Maravai LifeSciences Holdings, Inc.'s Form 8-K filed on November 25, 2020).
4.2	Description of Maravai LifeSciences Holdings, Inc.'s Securities.
10.1+	Maravai LifeSciences Holdings, Inc. 2020 Omnibus Incentive Plan (incorporated by reference to Exhibit 10.1 to Maravai LifeSciences Holdings, Inc.'s Registration Statement on Form S-8 filed with the Securities and Exchange Commission on November 23, 2020).
10.2+§	Senior Management Agreement, dated as of March 18, 2014, among Maravai Life Sciences Holdings, LLC, Maravai Life Sciences, Inc. and Carl Hull (incorporated by reference to Exhibit 10.2 to Maravai LifeSciences Holdings, Inc.'s Form S-1 filed on October 29, 2020).
10.3+§	Amended and Restated Senior Management Agreement, dated as of August 4, 2015, among Maravai Life Sciences Holdings, LLC, Maravai Life Sciences, Inc. and Eric Tardif (incorporated by reference to Exhibit 10.3 to Maravai LifeSciences Holdings, Inc.'s Form S-1 filed on October 29, 2020).
10.4+§	Senior Management Agreement, dated as of May 30, 2017, among Maravai Life Sciences Holdings, LLC, Maravai Life Sciences, Inc. and Kevin M. Herde (incorporated by reference to Exhibit 10.4 to Maravai LifeSciences Holdings, Inc.'s Form S-1 filed on October 29, 2020).
10.5+§	Senior Management Agreement, dated as of December 27, 2017, among Maravai Life Sciences Holdings, LLC, TriLink Biotechnologies, LLC and Brian Neel (incorporated by reference to Exhibit 10.5 to Maravai LifeSciences Holdings, Inc.'s Form S-1 filed on October 29, 2020).
10.6+§	Senior Management Agreement, dated as of December 27, 2017, among MLSC Holdings, LLC, Cygnus Technologies, LLC and Christine Dolan (incorporated by reference to Exhibit 10.6 to Maravai LifeSciences Holdings, Inc.'s Form S-1 filed on October 29, 2020).
10.7+	Form of Stock Option Grant Notice and Stock Option Agreement (incorporated by reference to Exhibit 10.7 to Amendment No. 2 to Maravai LifeSciences Holdings, Inc.'s Registration Statement on Form S-1 filed with the Securities and Exchange Commission on November 13, 2020).

Exhibit Number	Description
10.8	Tax Receivable Agreement, dated as of November 19, 2020, by and among Maravai LifeSciences Holdings, Inc. and the other signatories party thereto (incorporated by reference to Exhibit 10.1 to Maravai LifeSciences Holdings, Inc.'s Form 8-K filed on November 25, 2020).
10.9	Exchange Agreement, dated as of November 19, 2020, by and among Maravai LifeSciences Holdings, Inc. and the other signatories party thereto (incorporated by reference to Exhibit 10.2 to Maravai LifeSciences Holdings, Inc.'s Form 8-K filed on November 25, 2020).
10.10	Second Amended and Restated Limited Liability Agreement of Maravai Topco Holdings, LLC, dated as of November 19, 2020, by and among Maravai LifeSciences Holdings, Inc. and the other signatories party thereto (incorporated by reference to Exhibit 10.3 to Maravai LifeSciences Holdings, Inc.'s Form 8-K filed on November 25, 2020).
10.11+	Maravai LifeSciences Holdings, Inc. 2020 Employee Stock Purchase Plan (incorporated by reference to Exhibit 10.2 to Maravai LifeSciences Holdings, Inc.'s Registration Statement on Form S-8 filed with the Securities and Exchange Commission on November 23, 2020).
10.12	Form of Director and Officer Indemnification Agreement (incorporated by reference to Exhibit 10.12 to Maravai LifeSciences Holdings, Inc.'s Form S-1/A filed on November 9, 2020).
10.13§	First Lien Credit Agreement, dated as of August 2, 2018, among Maravai Intermediate Holdings, LLC, Cygnus Technologies, LLC, Trilink Biotechnologies, LLC, Vector Laboratories, Inc., Maravai Topco Holdings, LLC and JPMorgan Chase Bank, N.A. (incorporated by reference to Exhibit 10.13 to Maravai LifeSciences Holdings, Inc.'s Form S-1 filed on October 29, 2020).
10.14§	Second Lien Credit Agreement, dated as of August 2, 2018, among Maravai Intermediate Holdings, LLC, Cygnus Technologies, LLC, Trilink Biotechnologies, LLC, Vector Laboratories, Inc., Maravai Topco Holdings, LLC and Antares Capital LP (incorporated by reference to Exhibit 10.14 to Maravai LifeSciences Holdings, Inc.'s Form S-1 filed on October 29, 2020).
10.15§	Distribution Agreement, dated January 14, 2019, between Cygnus Technologies, LLC and Beijing XMJ Scientific Co. Ltd. (incorporated by reference to Exhibit 10.15 to Maravai LifeSciences Holdings, Inc.'s Form S-1 filed on October 29, 2020).
10.16§	Lease Agreement, dated as of January 10, 2020, between Shac Ingold Apartments LLC, and Vector Laboratories, Inc., as amended (incorporated by reference to Exhibit 10.16 to Maravai LifeSciences Holdings, Inc.'s Form S-1 filed on October 29, 2020).
10.17§	Lease Agreement, dated as of September 23, 2019, between TransDulles Center, Inc., and Glen Research Corporation, as amended (incorporated by reference to Exhibit 10.17 to Maravai LifeSciences Holdings, Inc.'s Form S-1 filed on October 29, 2020).
10.18§	Lease Agreement, dated as of July 13, 2018, between 10770 Wateridge Investors LLC, and Trilink Biotechnologies, LLC, as amended (incorporated by reference to Exhibit 10.18 to Maravai LifeSciences Holdings, Inc.'s Form S-1 filed on October 29, 2020).
10.19§	Lease Agreement, dated as of October 6, 2016, between Arame, LLC, and Cygnus Technologies, LLC, as amended (incorporated by reference to Exhibit 10.19 to Maravai LifeSciences Holdings, Inc.'s Form S-1 filed on October 29, 2020).
10.20	Second Amended and Restated Advisory Agreement, dated September 15, 2016, between GTCR Management XI LP, Vector Laboratories, Inc. and TriLink Biotechnologies, LLC (incorporated by reference to Exhibit 10.20 to Maravai LifeSciences Holdings, Inc.'s Form S-1 filed on October 29, 2020).
10.21+§	Investment and Director Compensation Agreement, dated as of January 1, 2017, between Maravai Life Sciences Holdings, LLC, and Robert B. Hance (incorporated by reference to Exhibit 10.21 to Maravai LifeSciences Holdings, Inc.'s Form S-1 filed on October 29, 2020).
10.22+§	Investment and Director Compensation Agreement, dated as of January 8, 2020, between Maravai Life Sciences Holdings, LLC, and Gregory T. Lucier (incorporated by reference to Exhibit 10.22 to Maravai LifeSciences Holdings, Inc.'s Form S-1 filed on October 29, 2020).
10.23+§	Investment and Director Compensation Agreement, dated as of August 10, 2016, between Maravai Life Sciences Holdings, LLC, and Murali K. Prahalad (incorporated by reference to Exhibit 10.23 to Maravai LifeSciences Holdings, Inc.'s Form S-1 filed on October 29, 2020).
10.24§	Credit Agreement, dated as of October 19, 2020, among Maravai Intermediate Holdings, LLC, Cygnus Technologies, LLC, Trilink Biotechnologies, LLC, Vector Laboratories, Inc., Maravai Topco Holdings, LLC and Morgan Stanley Senior Funding, Inc. (incorporated by reference to Exhibit 10.24 to Maravai LifeSciences Holdings, Inc.'s Form S-1 filed on October 29, 2020).

Exhibit Number	Description
10.25	Director Nomination Agreement, dated as of November 24, 2020, by and among Maravai LifeSciences Holdings, Inc. and the other signatories party thereto (incorporated by reference to Exhibit 10.5 to Maravai LifeSciences Holdings, Inc.'s Form 8-K filed on November 25, 2020).
10.26§‡	Supply Agreement, dated as of October 9, 2020, by and among Pfizer Inc., BioNTech SE and TriLink BioTechnologies, LLC (incorporated by reference to Exhibit 10.26 to Maravai LifeSciences Holdings, Inc.'s Form S-1/A filed on November 9, 2020).
10.27+	Form of Restricted Stock Unit Grant Notice and Restricted Stock Unit Agreement (incorporated by reference to Exhibit 10.27 to Amendment No. 2 to Maravai LifeSciences Holdings, Inc.'s Registration Statement on Form S-1 filed with the Securities and Exchange Commission on November 13, 2020).
10.28+§	Employment Agreement of Carl W. Hull, dated November 24, 2020, among Maravai LifeSciences Holdings, Inc., Maravai Intermediate Holdings, LLC and Carl W. Hull (incorporated by reference to Exhibit 10.8 to Maravai LifeSciences Holdings, Inc.'s Form 8-K filed on November 25, 2020).
10.29+§	Employment Agreement of Kevin Herde, dated November 24, 2020, among Maravai LifeSciences Holdings, Inc., Maravai Intermediate Holdings, LLC and Kevin Herde (incorporated by reference to Exhibit 10.9 to Maravai LifeSciences Holdings, Inc.'s Form 8-K filed on November 25, 2020).
10.30+§	Employment Agreement of Brian Neel, dated November 24, 2020, among Maravai LifeSciences Holdings, Inc., TriLink Biotechnologies, LLC and Brian Neel (incorporated by reference to Exhibit 10.10 to Maravai LifeSciences Holdings, Inc.'s Form 8-K filed on November 25, 2020).
21.1	List of subsidiaries of Maravai LifeSciences Holdings, Inc.
23.1	Consent of Independent Registered Public Accounting Firm.
31.1	Certification of the Chief Executive Officer pursuant to Exchange Act Rules Rule 13a-14(a), as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002, filed herewith.
31.2	Certification of the Chief Financial Officer pursuant to Exchange Act Rules Rule 13a-14(a), as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002, filed herewith.
32.1*	Certification of the Chief Executive Officer pursuant to 18 U.S. C. Section 1350.
32.2*	Certification of the Chief Financial Officer pursuant to 18 U.S.C. Section 1350.

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* The certifications furnished in Exhibit 32.1 and 32.2 hereto are deemed to accompany this Annual Report on Form 10-K and will not be deemed "filed" for purposes of Section 18 of the Securities Exchange Act of 1934, as amended, except to the extent that the registrant specifically incorporates it by reference.

\+ Indicates a management contract or compensatory plan or agreement.

§ Exhibits and schedules have been omitted pursuant to Item 601(a)(5) of Regulation S-K and will be provided on a supplemental basis to the Securities and Exchange Commission upon request.

‡ Certain portions of this document that constitute confidential information have been redacted in accordance with Regulation S-K, Item 601(b)(10).

(ii) Financial statement schedules

No financial statement schedules are provided because the information called for is not applicable or is shown in the financial statements or notes.

Item 16. Form 10-K Summary

None.

SIGNATURES

Pursuant to the requirements of the Securities Act of 1934, the registrant has duly caused this Annual Report on Form 10-K to be signed on its behalf by the undersigned, thereunto duly authorized.

Maravai LifeSciences Holdings, Inc.

By:	/s/ Carl Hull
Name:	Carl Hull
Title:	Chief Executive Officer

***

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

Signature	Title	Date
/s/ Carl Hull Carl Hull	Chief Executive Officer and Director (Principal Executive Officer)	March 22, 2021
/s/ Kevin Herde Kevin Herde	Chief Financial Officer (Principal Financial and Accounting Officer)	March 22, 2021
/s/ Anat Ashkenazi Anat Ashkenazi	Director	March 22, 2021
/s/ Sean Cunningham Sean Cunningham	Director	March 22, 2021
/s/ Benjamin Daverman Benjamin Daverman	Director	March 22, 2021
/s/ Susannah Gray Susannah Gray	Director	March 22, 2021
/s/ Robert B. Hance Robert B. Hance	Director	March 22, 2021
/s/ Jessica Hopfield Jessica Hopfield	Director	March 22, 2021
/s/ Gregory T. Lucier Gregory T. Lucier	Director	March 22, 2021
/s/ Luke Marker Luke Marker	Director	March 22, 2021
/s/ Constantine Mihas Constantine Mihas	Director	March 22, 2021
/s/ Murali K. Prahalad Murali K. Prahalad	Director	March 22, 2021

BOARD OF DIRECTORS

Carl Hull
Chair and Chief Executive Officer
Maravai LifeSciences Holdings, Inc.

Anat Ashkenazi
Senior Vice President and CFO
Eli Lilly and Company

Sean Cunningham
Managing Director
GTCR

Benjamin Daverman
Managing Director
GTCR

Susannah Gray
Former Executive Vice President of Finance and Strategy
Royalty Pharma Management LLC

Robert B. Hance
Chief Executive Officer
Regatta Medical

Jessica Hopfield, Ph.D.
Strategic Advisor and Healthcare Investor

Gregory T. Lucier
Chief Executive Officer
Corza Health, Inc.

Luke Marker
Principal
GTCR

Constantine Mihas
Managing Director
GTCR

Murali K. Prahalad
President and Chief Executive Officer
Iridia

EXECUTIVE MANAGEMENT

Carl Hull
Chair and Chief Executive Officer

Eric Tardif
President

Kevin Herde
Chief Financial Officer

Brian Neel
Chief Operating Officer, Nucleic Acid Production

Christine Dolan
Chief Operating Officer, Biologic Safety Testing

Lisa Sellers, Ph.D.
Chief Operating Officer, Protein Detection

Kurt Oreshack
General Counsel

TRANSFER AGENT & REGISTRAR

American Stock Transfer & Trust Company, LLC
6201 15th Avenue
Brooklyn, New York, 11219

The Transfer Agent is responsible for handling shareholder questions regarding lost certificates, address changes and change of ownership or name in which shares are held.

CORPORATE COUNSEL

Kirkland & Ellis LLP
Chicago, IL

INDEPENDENT REGISTERED PUBLIC ACCOUNTANTS

Ernst & Young LLP
Redwood City, CA

INVESTOR INFORMATION

Copies of our annual report on Form 10-K, proxy statement, quarterly reports on Form 10-Q and current reports on Form 8-K are available to shareholders at https://investor.maravai.com or you may request paper materials of the Annual Report and Proxy Statement by calling 866-648-8133. Investor questions can be directed to: ir@maravai.com

MARKET FOR MARAVAI STOCK

NASDAQ Global Select Market: MRVI

ANNUAL MEETING

The Annual Meeting of Shareholders will be held live via the internet on Wednesday, May 19, 2021, at 3:00 p.m. PDT. Please visit www.proxydocs.com/MRVI for more details. You can vote your shares if you were a shareholder of record at the close of business on Monday, March 22, 2021 (the “Record Date”).

CONTACT US

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www.maravai.com