UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549
FORM 10-K

(Mark One)

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

For the fiscal year ended: December 31, 2022

or

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

For the transition period from to .
Commission File No.: 001-34705

Codexis, Inc.

(Exact name of registrant as specified in its charter)

Delaware	**71-0872999**
(State or other jurisdiction of incorporation or organization)	**(I.R.S. Employer Identification No.)**
200 Penobscot Drive, Redwood City, California	**94063**
(Address of principal executive offices)	**(Zip Code)**

Registrant's telephone number, including area code: (650) 421-8100

Securities Registered Pursuant to Section 12(b) of the A:

Title of Each Class:	Trading Symbol(s):	Name of Each Exchange on which Registered:
Common Stock, par value $0.0001 per share	CDXS	The Nasdaq Global Select Market

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

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act.	Yes	☐	No	☒
Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or Section 15(d) of the Act.	Yes	☐	No	☒
Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days.	Yes	☒	No	☐
Indicate by check mark whether the registrant has submitted electronically every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T (§ 232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit such files).	Yes	☒	No	☐

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

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

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

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

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

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

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

The aggregate market value of voting and non-voting common stock held by non-affiliates of Codexis as of June 30, 2022 was approximately $383.8 million based upon the closing price reported for such date on the Nasdaq Global Select Market.

As of February 22, 2023, there were 65,946,807 shares of the registrant's Common Stock, par value $0.0001 per share, outstanding.

DOCUMENTS INCORPORATED BY REFERENCE

Portions of the registrant's Definitive Proxy Statement to be filed with the Commission pursuant to Regulation 14A in connection with the registrant's 2023 Annual Meeting of Stockholders (the "Proxy Statement"), to be filed subsequent to the date hereof, are incorporated by reference into Part III of this Report. Such Definitive Proxy Statement will be filed with the Securities and Exchange Commission not later than 120 days after the conclusion of the registrant's fiscal year ended December 31, 2022. Except with respect to information specifically incorporated by reference in this Form 10-K, the Proxy Statement is not deemed to be filed as part of this Form 10-K.

Codexis, Inc.
Annual Report on Form 10-K
For The Year Ended December 31, 2022
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SPECIAL NOTE REGARDING FORWARD-LOOKING STATEMENTS

The following discussion and analysis should be read in conjunction with our audited Consolidated Financial Statements and the related Notes that appear elsewhere in this Annual Report on Form 10-K. This Annual Report on Form 10-K contains "forward-looking statements" within the meaning of Section 21E of the Securities Exchange Act of 1934, as amended ("the Exchange Act"), particularly in Part I, Item 1: "Business," Part I, Item 1A: "Risk Factors" and Part 2, Item 7: "Management's Discussion and Analysis of Financial Condition and Results of Operations." These statements are often identified by the use of words such as "may," "will," "expect," "believe," "anticipate," "intend," "could," "should," "estimate" or "continue," and similar expressions or variations. All statements other than statements of historical fact could be deemed forward-looking, including, but not limited to: any projections of financial information or performance; any statements about historical results that may suggest trends for our business; any statements of the plans, strategies, and objectives of management for future operations; any statements of expectation or belief regarding future events, technology developments, our products and product candidates, product sales, revenues, expenses, liquidity, cash flow, market growth rates or enforceability of our intellectual property rights and related litigation expenses; and any statements of assumptions underlying any of the foregoing. Such forward-looking statements are subject to risks, uncertainties and other factors that could cause actual results and the timing of certain events to differ materially from future results expressed or implied by such forward-looking statements. Accordingly, we caution you not to place undue reliance on these statements. For a discussion of some of the factors that could cause actual results to differ materially from our forward-looking statements, see the discussion on risk factors that appear in Part I, Item 1A: "Risk Factors" of this Annual Report on Form 10-K and other risks and uncertainties detailed in this and our other reports and filings with the Securities and Exchange Commission ("SEC"). The forward-looking statements in this Annual Report on Form 10-K represent our views as of the date of this Annual Report on Form 10-K. We anticipate that subsequent events and developments will cause our views to change. However, while we may elect to update these forward-looking statements at some point in the future, we have no current intention of doing so except to the extent required by applicable law. You should, therefore, not rely on these forward-looking statements as representing our views as of any date subsequent to the date of this Annual Report on Form 10-K.

PART I

ITEM 1. BUSINESS

COMPANY OVERVIEW

We are a leading enzyme engineering company leveraging our proprietary CodeEvolver® technology platform to discover, develop and enhance novel, high performance enzymes and other classes of proteins. Enzymes are naturally occurring biological molecules critical to almost all biochemical reactions that sustain life. They can be precisely engineered and optimized for specific functions, and to have particular characteristics, such as an ability to survive environments in which natural enzymes cannot, or to perform (bio)chemical transformations different than those for which they naturally evolved. The capacity to enhance the properties and performance of enzymes has led to pivotal improvements across three healthcare industry pillars: pharmaceutical manufacturing, life sciences, and biotherapeutics. The enzymes we produce solve for real-world challenges associated with small molecule pharmaceuticals manufacturing, nucleic acid synthesis and genomic sequencing, and – as biotherapeutic candidates – they have the potential to treat challenging diseases. Our unique enzymes drive improvements such as higher yields, reduced energy usage and waste generation, improved efficiency in manufacturing, greater sensitivity in genomic and diagnostic applications, and potentially more efficacious therapeutics.

Our novel biotherapeutics business includes a diverse pipeline of product candidates in clinical and preclinical development. Our initial biotherapeutic product candidates include enzymes that are orally administered for function in the gastrointestinal tract ("GI"), such as our partnered product candidates CDX-7108 for the treatment of exocrine pancreatic insufficiency and CDX-6114 for the treatment of phenylketonuria, which are both in Phase 1 clinical trials. We have also engineered a series of transgenes that code for enzymes that may be used as gene therapies to treat rare lysosomal storage disorders with our partner Takeda, such as Fabry Disease and Pompe Disease, as well as a blood factor disorder.

Our performance enzymes business consists primarily of two focus areas: i) biocatalysts for the sustainable manufacturing of pharmaceuticals and ii) enzymes for life science applications, including genomic sequencing and nucleic acid synthesis. In our pharmaceutical manufacturing business, we utilize our CodeEvolver® platform to develop optimized enzymes that are used by some of the world's largest pharmaceutical companies to reduce their costs and improve the efficiency and productivity of their manufacturing processes for some small molecule therapeutics. In life science markets, we use our platform technology to develop enzymes for customers using next generation sequencing ("NGS"), a parallel sequencing technology used to identify genomic information in the study of biological systems, and PCR/qPCR for in vitro molecular diagnostic and molecular biology research applications, as well as for synthesis of nucleic acids such as DNA/RNA.

History and Core Technology

We are a pioneer in harnessing computational technologies to drive biology advancements. Since 2002, we have made substantial investments in the development of our proprietary CodeEvolver® technology platform, the primary source of our competitive advantage for both our performance enzymes and biotherapeutics businesses. The CodeEvolver® platform has the power to transform the performance of an enzyme, tailoring it for a specific application and/or process. Using powerful machine learning tools and sophisticated molecular, cellular, and bioanalytical workflows, we design and screen libraries of thousands of variants in high throughput every two to four weeks on each project, sequencing every variant and correlating its sequence with its performance in a highly application-relevant screen. Content-rich libraries screened under real-world conditions can yield dense and valuable datasets, when data-mined effectively, and multiple parameters can be optimized in parallel. The resulting evolved variants often have a combination of enhanced properties, such as increased activity, specificity, and stability under desired conditions, or improved expression in the production host. These enhanced properties provide differentiated technical performance in the target application and can provide our customers increased value in the commercial deployment of their products.

Novel Biotherapeutics

We are developing a diverse pipeline of product candidates in our novel biotherapeutics business. These product candidates, which are in clinical and preclinical development, range from orally delivered enzymes to engineered transgenes for delivery as gene therapies that have the potential to address a range of diseases with high unmet patient need. Each of our product candidates is discovered utilizing our proprietary CodeEvolver® protein engineering platform.

Our Partnered Oral Enzyme Programs

CDX-7108 for the treatment of exocrine pancreatic insufficiency

Under a Strategic Collaboration Agreement withNestlé Health Science ("Nestlé SCA"), we have collaboratively developed CDX-7108, a potent lipase intended for use as a pancreatic enzyme replacement therapy ("PERT"). PERT is used to treat pancreatic exocrine insufficiency. There are multiple causes of pancreatic exocrine insufficiency including chronic pancreatitis, cystic fibrosis and pancreatic cancer. We estimate there are approximately 190,000 patients in the United States and the market for current therapies is greater than $2.5 billion globally. Although existing therapies are reasonably effective at delivering amylase and protease activity, achieving adequate levels of lipase activity is challenging due to patient compliance and pill burden often leading patients to experience continued symptoms associated with fat malabsorption. CDX-7108 has been specifically engineered for increased potency as a lipase and also to remain stable in acidic conditions such as those encountered in the stomach. The goal is to study whether this combination of properties will deliver adequate lipase activity with a less burdensome dosing schedule. Under the Nestlé SCA, we and Nestlé Health Science are also working on the development of engineered amylase and protease enzymes for possible use with CDX-7108. Nestlé Health Science is currently dosing patients in a Phase 1b three-party study. The first two parts of the study evaluated the safety, tolerability, and pharmacokinetics ("PK") of escalating single and multiple oral doses of CDX-7108 in 48 healthy adult subjects, with no safety issues noted. The third part of the study is evaluating the pharmacodynamics of a single dose of oral CDX-7108 in six enrolled patients with exocrine pancreatic insufficiency ("EPI"). An interim analysis conducted in January 2023 of five patients who had completed the study at the time showed a clear indication of improved lipid absorption when patients are administered CDX-7108 versus placebo, which we believe supports a path forward together with Nestlé Health Science to further develop CDX-7108, with the potential for the initiation of a Phase 2 study in early 2024.

CDX-6114 for the treatment of phenylketonuria

We internally developed CDX-6114, an enzyme we engineered to be orally administrated for the treatment of phenylketonuria ("PKU") in humansPKU, one of the most common inborn errors of metabolism ("IEMs"), is a metabolic disorder in which the enzyme that converts the essential amino acid phenylalanine into tyrosine is deficient. As a result, phenylalanine accumulates to toxic levels in the brain, causing serious neurological problems including intellectual disability, seizures and cognitive and behavioral problems. To avoid toxic levels of phenylalanine in their blood, individuals with PKU must follow a strict, life-long diet that is low in phenylalanine and supplement their diet with a synthetic phenylalanine-free protein supplements to provide them with sufficient nutrients. Maintaining a strict, life-long diet can be challenging for individuals with PKU. There are an estimated 50,000 patients with PKU in the developed world.

We have partnered with Nestlé Health Science under a Global Development, Option and License Agreement ("Nestlé License Agreement") to further develop CDX-6114. In February 2019, Nestlé Health Science exercised its option under the Nestlé License Agreement to obtain an exclusive license to develop and commercialize CDX-6114. Nestlé Health Science is currently optimizing the formulation of CDX-6114 to improve performance and we expect Nestlé Health Science to announce an IND filing and clinical trial initiation in 2023. If this collaboration can successfully demonstrate benefit in PKU patients with CDX-6114, this will inform our decisions around the oral enzyme approach to several other IEMs.

Our Wholly-owned Oral Enzyme Programs

In the past we have also worked on internal programs to develop orally administrable enzyme substitution therapy candidates for the treatment of homocystinuria ("HCU") and Maple Syrup Urine Disease ("MSUD"), that we are now considering partnering options for pursuing further development. In addition, we have a program to develop orally administrable enzyme substitution therapy candidates for the treatment of Celiac Disease ("CD").

Gene Therapy

We have also used CodeEvolver® to engineer transgenes that encode for enzymes which may improve targeting and expression within the body when administered as gene therapies, offering potentially improved therapeutic benefit as compared to current options.

Our Partnered Gene Therapy Programs

Our first significant program involving engineered transgenes commenced in March 2020 when we entered into a Strategic Collaboration and License Agreement ("Takeda Agreement") with Shire Human Genetic Therapies, Inc., a wholly-owned subsidiary of Takeda Pharmaceutical Co. Ltd. ("Takeda") pursuant to which we are collaborating to research and develop transgenes for use in gene therapy delivery technology for rare lysosomal storage disorders such as Fabry Disease, Pompe Disease, a blood factor disorder, and another lysosomal storage disorder. In March 2020, we received a one-time, non-refundable cash payment of $8.5 million. Of these programs, the Fabry disease program is the most advanced, with a lead candidate identified in investigational new drug ("IND") enabling activities. We have also provided sequences to Takeda for the Pompe program and await updates on preclinical testing and potential IND enabling activities. In May 2021, Takeda elected to exercise their option to initiate an additional program for a certain undisclosed rare genetic disorder and we received the option exercise fee during the third quarter of 2021.

In addition to our partnered gene therapy programs, we continue to explore the possible application of our CodeEvolver® technology to develop therapeutic options for devastating diseases as well as to develop and test our own proprietary gene therapy delivery mechanisms.

Performance Enzymes

Our performance enzymes business consists primarily of two focus areas, pharmaceutical manufacturing and life science products.

Pharmaceutical Manufacturing

We believe the pharmaceutical industry represents a significant market opportunity for our performance enzymes as pharmaceutical companies are in constant search of new drugs to offer to their customers and are under significant competitive pressure both to reduce costs and to increase the speed to market for their products. To address these pressures, pharmaceutical companies are driven to identify reliable, cost effective and sustainable manufacturing processes to produce both their new drug candidates and their existing products, while not impacting drug safety and efficacy. Cost reduction is increasingly important to drug developers (known as innovators) closer to their product launch and during the commercial stage of the product, which can last a decade or more. In addition, cost pressures further intensify as innovators lose their patent exclusivities and begin to experience competition from manufacturers of generic versions of their products.

Our pharmaceutical manufacturing customers, which include many large global pharmaceutical companies, partner with us to develop optimized enzymes for use as biocatalysts, meeting precisely defined criteria, with the goal of lowering costs and improving the efficiency, productivity and sustainability of their manufacturing processes by: improving productivity, yield and purity; using water as a primary solvent; eliminating hazardous inputs; enabling the use of simple equipment and reducing the need for capital expenditure; reducing energy requirements; reducing the generation of chemical byproducts or waste; and reducing the need for late-stage purifications.

As of December 31, 2022, we are selling biocatalysts to pharmaceutical manufacturers for 18 therapeutic drugs that are currently approved for commercial sales.

Of particular note for 2022, in July 2022 we announced that we and Pfizer had entered into an agreement to supply Pfizer with CDX-616, a proprietary high performance enzyme used to manufacture a critical intermediate for nirmatrelvir, an active pharmaceutical ingredient in PAXLOVID™, Pfizer's antiviral therapeutic, which is currently authorized for emergency use by the FDA for the treatment of mild-to-moderate COVID-19 in people at high risk of progression to severe illness and authorized or approved by other regulatory authorities across the globe. While we have generated significant revenue from supplying CDX-616 to Pfizer, there is no future binding commitment for them to purchase any particular quantity or quantities of CDX-616 from us.

We regularly sell biocatalysts, at multi-kilograms to metric tons per annum scale, that have already been engineered, scaled up, and installed in a customer's commercial process. For example, in addition to Pfizer, we sell biocatalysts to Merck for their manufacture of sitagliptin, the active ingredient in JANUVIA®, to Urovant and Kyorin for the manufacture of vibregon, the active ingredient in Urovant's GEMTESA™ and Kyorin's BEOVA®, products for the treatment of overactive bladder, as well as supporting other products and customers for which public disclosures have not been made.

In addition to these larger volumes of biocatalysts that are sold for our customers' ongoing commercial requirements, we also sell lesser quantities of enzymes for use in a customer's developmental, qualification or regulatory approval operations. As of December 31, 2022, 18 drug candidates currently in Phase 2 and Phase 3 clinical trials use enzymes engineered using CodeEvolver® technology (either by Codexis or by our platform licensing partners) in their chemistry, manufacturing and control processes. This pipeline of potential approvals reinforces our confidence in our ability to continue to grow this business over time.

Finally, we also sell even smaller quantities of enzymes (typically grams to multi-kilograms scale) to customers for experimental, testing and qualification purposes, or as part of an enzyme engineering project.

In addition to the sale of biocatalysts, we also offer research and development partnerships to our customers. These research and development activities are typically governed by collaboration agreements, which often contain research fee payments and intellectual property provisions, under which we screen and/or engineer biocatalysts for customers in connection with their process development efforts. In these collaborations, we typically receive consideration in the form of one or more of the following: upfront payments, milestone payments, payments for screening and engineering, with other exclusive supply of enzyme or licensing fees and royalties as the customer's product commercializes.

We also have licensed our CodeEvolver® enzyme engineering technology platform to pharmaceutical companies to help them develop custom-designed enzymes that are highly optimized for efficient manufacturing processes. To date, we have entered into platform technology licensing agreements with each of GlaxoSmithKline Intellectual Property Development Limited, a subsidiary of GlaxoSmithKline plc ("GSK"), Merck, Sharp & Dohme ("Merck") and Novartis Pharma AG ("Novartis").

Life Sciences

We also apply our CodeEvolver® technology to develop enzymes for customers using NGS and PCR/qPCR for *in vitro* molecular diagnostic and molecular biology research applications, as well DNA/RNA synthesis applications. We view these as attractive markets in which Codexis' technology and products can deliver a strong competitive advantage – in part because manipulation of nucleic acids by enzymes (be it "reading" or "writing") is at the core of these markets and our technology has the proven ability to create enzymes which are stable to the workflow and/or supply chain demands or – importantly – which are less biased in the nucleic acids they are able to sequence or synthesis, which can be of significant benefit in various applications.

In December 2019, we entered into a license agreement to provide Roche Sequencing Solutions, Inc. ("Roche") with an improved DNA ligase (EvoT4™ DNA ligase) for NGS library prep, which continues to progress towards commercialization in new NGS kits.

In June 2020, we entered into a co-marketing and enzyme supply collaboration agreement with Alphazyme LLC for the production and co-marketing of enzymes for life science applications. Since then, this collaboration has enabled the commercialization of Codex® HiFi DNA Polymerase, Codex® HiFi Hot Start DNA Polymerase, Codex® HiFi Hot Start 2X NGS Mix, Codex® HiCap RNA Polymerase, Codex® HiFi UL DNA Polymerase, and Codex® HiTemp Reverse Transcriptase. Development of other novel enzymes for life science applications continues.

Also, in June 2020, we entered into a Master Collaboration and Research Agreement with Molecular Assemblies, Inc. ("MAI") (the "MAI Agreement") pursuant to which we are leveraging our CodeEvolver® platform technology to improve the DNA polymerase enzymes that are critical for enzymatic DNA synthesis. At that time, we purchased $1.0 million in MAI's Series A financing and John Nicols, the Codexis' then President and CEO, and current director, joined MAI's board of directors. In April 2021, Codexis invested an additional $0.6 million in MAI's Series A financing and, in September 2021, Codexis invested an additional $7.0 million in MAI's Series B financing. As of December 31, 2022, we currently hold 5,443,734 shares of MAI Series A preferred stock and 12,848,635 shares of MAI Series B preferred stock. In April 2022, we and MAI announced that, using our CodeEvolver® platform technology, we had developed a novel, engineered terminal deoxynucleotidyl transferase ("TdT") enzyme which would enable MAI's Fully Enzymatic Synthesis™ ("FES™") technology that produces highly pure, sequence-specific DNA on demand. In August 2022, we and MAI announced that we had entered into a Commercial License and Enzyme Supply Agreement with MAI (the "MAI Supply Agreement") under which Codexis shall manufacture and sell the TdT enzyme to MAI for use in native DNA synthesis. In connection with the execution of the MAI Supply Agreement, we received a milestone payment of $1.0 million in the form of an additional 1,587,049 shares of Series B preferred stock pursuant to the MAI Agreement.

In March 2022, we announced the initiation of a strategic partnership with seqWell Inc., a developer of transformative library preparation products for demanding genomics plan application, which included an investment to accelerate the commercialization of seqWell's genomics workflow solutions. Codexis and seqWell plan to collaborate on using our CodeEvolver® platform technology for enzyme optimization with seqWell's growing portfolio of genomics workflow and library preparation products. As part of this partnership, we led seqWell's Series C financing with a $5.0 million investment.

OUR STRATEGY

Our strategy is to grow our revenues, profits, and stockholder value by leveraging our CodeEvolver® enzyme engineering technology platform in the following ways:

- *Creating and advancing novel biotherapeutic drug candidates.* We intend to continue to pursue opportunities to apply our protein engineering capabilities to the creation and development of novel biotherapeutic drug candidates. In addition, we intend to extend our biotherapeutics pipeline by developing, with our partner Takeda and developing internally, novel gene therapies and transgene products.
- *Growing our pharmaceutical manufacturing business.* We intend to continue to pursue opportunities in the pharmaceutical market to use our enzymes to reduce the costs for manufacturing small molecule drugs. We intend to increase the number of pharmaceutical customers and processes that utilize and benefit from our novel, cost-saving enzyme biocatalyst solutions.
- *Developing high-performance enzymes for use in life science applications and nucleic acid synthesis* We intend to offer high-performance enzymes to customers using NGS and PCR/qPCR for *in vitro* molecular diagnostic applications and to enable the future of enzymatic nucleic acid synthesis.

Strategic Collaborations

Biotherapeutics

Nestlé Health Science

In October 2017, we entered into the Nestlé License Agreement with Nestlé Health Science pursuant to which we granted to Nestlé Health Science, under certain of our patent rights and know-how: (i) an option to obtain an exclusive, worldwide, royalty-bearing, sublicensable license to develop and commercialize certain products (each, a "Product") based on CDX-6114 and our other therapeutic enzyme product candidates covered by specified patent applications for the treatment of hyperphenylalaninaemia ("HPA") (also referred to as PKU), and (ii) an exclusive right of first negotiation (the "Right of First Negotiation") for a period of five years to obtain an exclusive worldwide license to develop and commercialize up to two enzymes discovered by us for use in the field of the prevention, diagnosis, treatment and management of inborn errors of amino acid metabolism. We are not under any obligation to undertake any research and development activities relating to inborn errors of amino acid metabolism. HPA is a medical condition characterized by elevated concentrations of the amino acid phenylalanine in the blood. PKU can result in severe HPA.

In February 2019, Nestlé Health Science exercised its option to obtain an exclusive, worldwide, royalty-bearing, sub-licensable license for the global development and commercialization of CDX-6114 for the management of PKU. Upon exercising its option, Nestlé Health Science assumed all responsibilities for future clinical development and commercialization of CDX-6114, with the exception of the completion of an extension study, CDX-6114-004, which was substantially completed in the fourth quarter of 2019. The parties established a patent committee to discuss strategies and coordinate activities for the patents related to CDX-6114 and product containing CDX-6114, and we will jointly own all inventions and information that result from each party's activities performed under the Nestlé License Agreement. The Nestlé License Agreement also contains customary representations and warranties by the parties, intellectual property protection provisions, certain indemnification rights in favor of each party and customary confidentiality provisions and limitations of liability.

We are also eligible to receive payments from Nestlé Health Science under the Nestlé License Agreement that include (i) development and approval milestones of up to $85.0 million, (ii) sales-based milestones of up to $250.0 million in the aggregate, which aggregate amount is achievable if net sales exceed $1.0 billion in a single year, and (iii) tiered royalties, at percentages ranging from the mid-single digits to low double-digits, of net sales of products.

In October 2017, we entered into the Nestlé SCA pursuant to which we and Nestlé Health Science are collaborating to leverage the CodeEvolver® enzyme engineering technology platform to develop novel enzymes for Nestlé Health Science's established Consumer Care and Medical Nutrition business areas. The term of the Nestlé SCA has been extended through December 2023 with automatic renewal through December 2024.

In January 2020, we entered into the Nestlé development agreement (the"Nestlé DA") pursuant to which we and Nestlé Health Science are collaborating to advance CDX-7108 into preclinical and early clinical studies. CDX-7108 is the lead candidate discovered under the Nestlé SCA targeting exocrine pancreatic insufficiency. The term of the Nestlé DA has been extended through December 2023 with automatic renewal through December 2024.

Shire Human Genetic Therapies/Takeda Pharmaceutical

In March 2020, we entered into the Takeda Agreement with Takeda pursuant to which we are collaborating to research and develop protein sequences for use in gene therapy products for certain diseases (each, a "Field") in accordance with each applicable program plan (each, a "Program Plan"). On execution of the Takeda Agreement, we received an upfront nonrefundable cash payment of $8.5 million and we initiated activities under three Program Plans for Fabry Disease, Pompe Disease, and an unnamed blood factor disorder, respectively (the "Initial Programs"). We are primarily responsible for the research and development of protein sequences under the Program Plans (the "Protein Sequences") and we are eligible to earn up to $10.5 million of research and development fees and preclinical milestone payments for the Initial Programs. We will own all rights to the protein sequences and corresponding nucleic acid sequences and related intellectual property rights and Takeda will own all rights to products and related intellectual property rights. In May 2021, Takeda elected to exercise their option to initiate an additional (fourth) program for a certain undisclosed rare genetic disorder; as a result, we received the option exercise fee during the third quarter of 2021. We are also eligible to receive up to $3.4 million of research and development fees and preclinical milestone payments for the fourth program under the Takeda Agreement.

We granted to Takeda an exclusive, worldwide, royalty-bearing, sublicensable license to use the protein sequences and their corresponding nucleic acid sequences to develop, manufacture and commercialize the applicable products in the applicable Field. We also granted to Takeda a limited non-exclusive, worldwide, sublicensable license (a) to research the protein sequences within or outside the applicable Fields and (b) to research the products outside of the applicable Fields, which such rights exclude Takeda's right to perform any IND-enabling activities. The licenses to research the Protein Sequences expire after a pre-determined period of time.

The term of the Takeda Agreement begins on the effective date of the Takeda Agreement and continues on a product-by-product and country-by-country basis, until the expiration of Takeda's obligation to pay royalties to the Company with respect to that product in that country. The Takeda Agreement expires in its entirety upon the expiration of Takeda's obligation to pay royalties to the Company with respect to the products in all countries worldwide. Subject to the terms of the Takeda Agreement, and after the first anniversary of the Effective Date with respect to the Initial Programs or after the first anniversary of confirmation of the applicable Program Plan by the parties with respect to the Additional/Option Programs, Takeda may terminate a Program upon specified prior written notice to the Company. Subject to the terms of the Takeda Agreement, Takeda may terminate the Takeda Agreement, at will, on a product-by-product basis upon specified prior written notice to the Company and the Takeda Agreement in its entirety upon specified prior written notice to the Company. Subject to the terms of the Takeda Agreement, Takeda may terminate the Takeda Agreement on a product-by-product basis for safety reasons upon specified prior written notice to the Company. Either party may terminate the Takeda Agreement for an uncured material breach by the other party, or the other party's insolvency or bankruptcy. Pursuant to the Takeda Agreement, we are eligible to receive other payments that include (i) clinical development and commercialization-based milestones, per target gene, of up to $104.0 million and (ii) tiered royalty payments based on net sales of applicable products at percentages ranging from the mid-single digits to low single-digits.

Licensing Our CodeEvolver® Enzyme Engineering Technology Platform

GlaxoSmithKline

We entered into our first CodeEvolver® enzyme engineering Platform Technology Transfer, Collaboration and License Agreement ("GSK CodeEvolver® Agreement") in July 2014 with GlaxoSmithKline Intellectual Property Development Limited, a subsidiary of GSK, pursuant to which we granted GSK a non-exclusive, worldwide license to use our CodeEvolver® enzyme engineering technology platform in the field of human healthcare for its internal development purposes.

Under the GSK CodeEvolver® Agreement, we licensed and transferred our certain patents, patent applications and know-how from our CodeEvolver® enzyme engineering technology platform to GSK, completing the transfer in April 2016. Under this agreement, we have the potential to receive contingent payments that range from $5.75 million to $38.5 million per project based on GSK's successful application of the licensed technology. We are also eligible to receive royalties based on net sales, if any, of a limited set of products developed by GSK using our CodeEvolver® enzyme engineering technology platform.

The term of the GSK CodeEvolver® Agreement continues, unless earlier terminated, until the expiration of all payment obligations under the GSK CodeEvolver® Agreement. GSK can terminate the GSK CodeEvolver® Agreement by providing 90 days written notice to us.

In 2019, we received a $2.0 million milestone payment on the advancement of an enzyme developed by GSK using our CodeEvolver® enzyme engineering platform technology. In 2021, we received two additional milestone payments from GSK under the GSK CodeEvolver® Agreement.

Merck

In August 2015, we entered into a CodeEvolver® Platform Technology Transfer and License Agreement (the "Merck CodeEvolver® Agreement") with Merck. The Merck CodeEvolver® Agreement allows Merck to use our proprietary CodeEvolver® enzyme engineering platform technology in the field of human and animal healthcare.

Under the terms of the Merck CodeEvolver® Agreement, we granted to Merck an exclusive license under certain patents, patent applications and know-how from our CodeEvolver® enzyme engineering technology platform for the research, development and manufacture of novel enzymes for use by Merck in the chemical synthesis of therapeutic products owned or controlled by Merck ("Merck Exclusive Field") and a non-exclusive worldwide license to use the CodeEvolver® enzyme engineering technology platform to research, develop and manufacture novel enzymes for use by Merck in its internal research programs ("Merck Non-Exclusive Field").

Under the terms of the Merck CodeEvolver® Agreement, Merck paid us upfront technology transfer and license fees and milestone payments over the technology transfer period of 15 months from August 2015. We also have the potential to receive product-related payments of up to $15.0 million for each active pharmaceutical ingredient ("API") that is manufactured by Merck using one or more enzymes that have been developed or are in development using the CodeEvolver® enzyme engineering technology platform during the 10-year period that begins on the conclusion of the 15-month technology transfer period. These product-related payments, if any, will be paid by Merck to us for each quarter that Merck manufactures API using a CodeEvolver®-developed enzyme. The payments will be based on the total volume of API produced using the CodeEvolver®-developed enzyme.

In September 2016, we completed the full transfer of the engineering platform technology. In October 2018, we entered into an amendment to the Merck CodeEvolver® Agreement whereby we amended certain licensing provisions and one exhibit. In January 2019, we entered into an amendment to the Merck CodeEvolver® Agreement whereby we installed certain CodeEvolver® enzyme engineering technology upgrades into Merck's platform license installation. We maintained those upgrades for a multi-year term that expired in January 2022.

Novartis

In May 2019, we entered into a Platform Technology Transfer and License Agreement (the "Novartis CodeEvolver® Agreement") with Novartis. The Novartis CodeEvolver® Agreement allows Novartis to use our proprietary CodeEvolver® enzyme engineering platform technology in the field of human healthcare.

Under the terms of the Novartis CodeEvolver® Agreement, Codexis granted to Novartis a worldwide license to use certain patents, patent applications and know-how from our CodeEvolver® enzyme engineering technology platform to research, develop and manufacture novel enzymes for use by or on behalf of Novartis as biocatalysts in the chemical synthesis of small molecule and bioconjugate APIs. The license is exclusive for the research, development and manufacture of novel enzymes for use by Novartis as biocatalysts in the chemical synthesis of API owned or controlled by Novartis ("Novartis Exclusive Field") and non-exclusive license for the research, development and manufacture of novel enzymes for use by Novartis in the chemical synthesis of API not owned or controlled by Novartis or any third party ("Novartis Non-Exclusive Field").

In July 2021, we announced the completion of the technology transfer period during which we transferred our proprietary CodeEvolver® platform technology to Novartis (the "Technology Transfer Period").

Pursuant to the Novartis CodeEvolver® Agreement, we received an upfront payment of $5.0 million shortly after the effective date. We completed the second technology milestone transfer under the agreement and received a milestone payment of $4.0 million in 2020. We have also received an aggregate of $5.0 million for the completion of the third technology transfer milestone in 2021.

In consideration for the continued disclosure and license of improvements to the technology and materials during a multi-year period that began on the conclusion of the Technology Transfer Period ("Improvements Term"), Novartis will pay us annual payments over four years which amount to an additional $8.0 million in aggregate. We also have the potential to receive quantity-dependent, usage payments for each API that is manufactured by Novartis using one or more enzymes that have been developed or are in development using the CodeEvolver® platform technology during the period that began on the conclusion of the Technology Transfer Period and ends on the expiration date of the last to expire licensed patent. These product-related usage payments, if any, will be paid by Novartis to Codexis for each quarter that Novartis manufactures API using a CodeEvolver ®-developed enzyme.

The licenses to Novartis are granted under patents, patent applications and know-how that Codexis owns or controls as of the effective date and that cover the CodeEvolver® platform technology. Any improvements to the CodeEvolver® platform technology during the Technology Transfer Period will also be included in the license grants from Codexis to Novartis.

INTELLECTUAL PROPERTY

Our success depends in large part on our ability to protect our proprietary technology, products and services under patent, copyright, trademark and trade secret laws. We also rely heavily on confidentiality and non-disclosure and other contractual agreements for further protection of our proprietary technology, products and services. Protection of our proprietary rights, titles and interests is important for us to offer our customers and partners proprietary technology, products and services that are not available from our competitors, and to exclude our competitors from practicing technology that we have developed or exclusively licensed from other parties. For example, our ability to successfully supply innovator pharmaceutical manufacturers as customers depends on our ability to supply proprietary enzymes or methods for making pharmaceutical intermediates or APIs that are not available from our competitors. Likewise, in the generic pharmaceutical area, protection of our proprietary technology, products and services directed to our enzymes and methods of producing pharmaceutical products, through patent or trade secret laws or other legal protections is important for us and our customers to maintain a lower cost production advantage over competitors.

As of December 31, 2022, we owned or controlled approximately 2,090 issued patents and pending patent applications in the United States and in various foreign jurisdictions, many of which are directed to our enabling technologies and specific methods and products that support our business in the pharmaceutical markets. In addition, our portfolio includes patents and pending patent applications that support our businesses in the biotherapeutics, molecular diagnostics, food and other markets. Our patents and pending patent applications, if issued, have terms that expire between 2023 and approximately 2043. Our United States ("U.S.") patents and pending patent applications directed to the CodeEvolver® proprietary enabling technology platform developed internally by us have terms that expire between 2029 and approximately 2034. It is possible that some U.S. patents and patent applications (if issued) may be entitled to patent term extensions and/or patent term adjustments, which would extend the protection beyond these expiration dates. It is also possible that some patents and patent applications (if issued) in other jurisdictions will be entitled to additional patent term. Our current intellectual property rights also include patents, trademarks, copyrights, software and certain assumed contracts that we acquired from Maxygen, Inc. ("Maxygen") in October 2010, which are associated with directed evolution technology, known as the MolecularBreeding™ technology platform developed by Maxygen. The intellectual property rights and other related assets that we acquired from Maxygen continue to be subject to existing exclusive and non-exclusive license rights granted by Maxygen to third parties. We continue to file new patent applications, for which terms generally extend 20 years from the non-provisional filing date in the United States.

As of December 31, 2022, we owned approximately 100 trademark registrations in the United States and foreign jurisdictions, as well as many common law trademarks. These include, but are not limited to: Codexis®, Codex®, CodeEvolver®, Mosaic®, Sage®, Microcyp®, MCYP®, ProSAR®, Unlock the Power of Proteins®, the Codexis Protein Engineering Experts® logo, Strategist®, Continuity®, Ameli®, Forager®, Analogene®, Harvester®, Atoms®, Riptide®, APS® and a Codexis design mark (i.e., the stylized Codexis logo).

COMPETITION

We face differing forms of competition in the biotherapeutics, pharmaceutical manufacturing and life sciences markets, as set forth below.

Biotherapeutics

There are other companies that participate in the biotherapeutics market generally and the PKU market specifically. Many of these companies are large, successful and well-capitalized. BioMarin Pharmaceutical Inc. (“BioMarin”) and Daiichi Sankyo Company market Kuvan® in the United States, Europe and Japan for the treatment of a certain type of PKU. In addition, BioMarin had gained FDA approval in May 2018 and began the commercial sales of Palynziq®, an injectable enzyme substitution therapy to address different options for care in the treatment of PKU. Subsequently in May 2019, BioMarin obtained marketing authorization for Palynziq® from the European Commission. Several companies, including Synlogic, Homology Medicines and Rubius have reported clinical efforts to develop biotherapeutic candidates for PKU. Beyond targeting PKU, Takeda, Genzyme / Sanofi S.A., BioMarin, and other companies market or are actively developing enzyme therapeutics. There are numerous companies that are developing other forms of therapeutics, such as small molecules, gene therapy, as well as therapies based on gene editing, which could compete with biotherapeutics.

There are several companies developing or marketing pancreatic enzyme replacement therapies (PERTs) for the treatment of exocrine pancreatic insufficiency (EPI). Approved products derived from porcine pancreas and taken orally with meals include: Creon® (marketed by Abbvie in the US, and by Abbott in the EU, China, Taiwan, Japan, and India), Zenpep® (marketed by Nestlé in the US and EU), Pancreaze® (marketed by Vivus in the US), and Pertzye® (marketed by Chiesi in the US). There are also companies developing recombinant PERTs for treating EPI. First Wave Biopharma is presently testing a recombinant lipase enzyme, adrulipase, in Phase 2 clinical trials. There are also therapies in pre-clinical development for EPI treatment, including SNSP003 (developed by Synspira Therapeutics), a combination of purified lipase, amylase, and protease, in collaboration with the Cystic Fibrosis Foundation. Current marketed PERT therapies as well as potential future PERT therapies in development could compete with CDX-7108.

Performance Enzyme

Pharmaceutical Manufacturing

We market our biocatalyst products and services to manufacturers of small molecule pharmaceutical intermediates and APIs. Our primary competitors in that market are companies marketing either conventional, non-enzymatic catalysts or alternative biocatalyst products and services, or from full service contract development and manufacturing service providers (“CDMOs”) offering conventional chemistry approaches to the production of APIs. We also sometimes face competition from existing in-house technologies (both biocatalysts and conventional chemistries) within our client and potential client companies. The principal methods of competition and competitive differentiation in this market are price, product quality and performance, including manufacturing yield, safety and environmental benefits and speed of delivery of product. Pharmaceutical manufacturers that use biocatalytic processes can face competition from manufacturers that use more conventional processes and/or manufacturers that are based in regions (such as India and China) with lower regulatory, safety and environmental costs.

We also compete with companies developing and marketing conventional catalysts including, for example,Solvias AG, BASF, Johnson-Matthey and Takasago International Corporation.

The market for supplying enzymes for use in pharmaceutical manufacturing is quite fragmented. There is competition from large industrial enzyme companiesas well as subsidiaries of larger contract research/contract manufacturing organizations, such as Royal DSM N.V. (“DSM”), Cambrex Corporation, Lonza, WuXi STA and Almac Group Ltd. Some fermentation pathway design companies, such as Zymergen, which was acquired by Gingko BioWorks, and Amyris, whose traditional focus has been to design microorganisms that express small molecule chemicals, could extend into designing organisms that express enzymes. There is also competition in the enzyme customization and optimization area from several smaller companies, such as BRAIN AG, Arzeda, c-LEcta GmbH and evoxx technologies GmbH.

The market for the manufacture and supply of APIs and intermediates is large, with many established companies. These companies include many of our large innovator and generic pharmaceutical customers, such as Merck, GSK, Novartis, Pfizer Inc. ("Pfizer"), Bristol-Myers Squibb Company ("Bristol-Myers"), KYORIN Pharmaceutical Co., Ltd. ("Kyorin"), Urovant Sciences GmbH ("Urovant"), and Teva Pharmaceutical Industries Limited ("Teva"), which have significant internal research and development efforts directed at developing processes to manufacture APIs and intermediates for use in their drug product manufacturing. There is also a large network of contract (development &) manufacturing organizations (“C(D)MOs”) servicing the innovator companies with supply of APIs and/or intermediates, These C(D)MOs include Cambrex Corporation, Lonza, WuXi STA and Almac Group Ltd, among many others. The processes used by these companies (both C(D)MOs and innovators) include classical organic chemistry reactions, chemo-catalytic reactions, biocatalytic reactions or combinations thereof. Our biocatalyst-based manufacturing processes must compete effectively on cost and efficiency with these internally developed routes.

We believe that our principal advantage is our ability to rapidly deliver customized biocatalysts for existing and new intermediates and APIs in the pharmaceutical manufacturing market. This capability has allowed us to create a breadth of biocatalysts with improved performance characteristics including, for example, better activity, stability, and activity on a range of substrates, compared to traditional chemistry-based manufacturing processes and naturally occurring (and thus not optimized) biocatalysts. We believe that our CodeEvolver® enzyme engineering platform technology provides substantially superior results, in shorter time frames, than companies offering competing biocatalyst development services.

Life Sciences

Our Life Sciences business is focused in two key areas, nucleic acid manufacturing and genomics. We supply engineered enzymes and custom services to manufacturers of messenger RNA ("mRNA"), small interfering RNA ("RNAi"), antisense oligonucleotides ("ASOs"), and other RNA-based molecules as well as manufacturers of next generation sequencing ("NGS") workflows and kits, *in vitro* diagnostics ("IVD"), and molecular diagnostic assays. Several of our competitors, such as ThermoFisher Scientific, Roche Diagnostics (a division of Roche Holding AG), New England Biolabs ("NEB"), and QIAGEN group offer a wide diversity of products across the life sciences market, including products that support multiple applications in RNA manufacturing and genomics. We also compete with companies that are more focused on offering products and services for RNA manufacturing, such as Aldevron (a Danaher company) as well as companies focused on providing enzymes and services to genomic sequencing applications, such as Promega Corporation and Watchmaker Genomics. The life science industry has seen great technological leaps since the introduction of enzymes into laboratory and clinical workflows and we recognize the importance of enzymes in this market and the need for purpose-fit, robust, and highly active enzymes that are made possible with our core technology.

Other

Core Technology

We are a leader in the field of enzyme engineering to create novel enzymes. Each of our segments rely on our core technology. We are aware that other companies, organizations and persons have developed technologies that appear to have some similarities to our patented proprietary technologies. For example, we are aware that other companies, including Zymergen, which was acquired by Gingko Bioworks, Amyris, Absci and Amicus Therapeutics have alternative methods for obtaining and generating genetic diversity or use mutagenesis techniques to produce genetic diversity. In addition, academic institutions such as the California Institute of Technology, the Max Planck Institute and the Austrian Centre of Industrial Biotechnology are also working in this field. This field is highly competitive with companies and academic and research institutions actively seeking to develop technologies that could be competitive with our technologies.

Technological developments by others may result in our products and technologies, as well as products manufactured by our customers using our biocatalysts, becoming obsolete. We monitor publications and patents that relate to directed molecular evolution to be aware of developments in the field and evaluate appropriate courses of action in relation to these developments.

Many of our competitors have substantially greater manufacturing, financial, research and development, personnel and marketing resources than we do. As a result, our competitors may be able to develop competing and/or superior technologies and processes, and compete more aggressively and sustain that competition over a longer period of time than we could. Our technologies and products may be rendered obsolete or uneconomical by technological advances or entirely different approaches developed by one or more of our competitors.

We initially commercialized our CodeEvolver® enzyme engineering technology platform and products in the manufacture of small molecule pharmaceuticals, which remains a primary business focus. Our customers, which include many large, global pharmaceutical companies, use our technology, products and services in their process development and in manufacturing. Additionally, we have licensed our proprietary CodeEvolver® enzyme engineering technology platform to global pharmaceutical companies enabling them to use this technology, in house, to engineer enzymes for their own businesses.

OPERATIONS

Our corporate headquarters are located in Redwood City, California and provide general administrative support to our business and are the center of our research, development and business operations. We have limited internal manufacturing capacity at our headquarters in Redwood City. We expect to rely on third-party manufacturers for commercial production of our biocatalysts for the foreseeable future. Our in-house manufacturing is dedicated to producing both Codex® biocatalyst panels and kits and enzymes for use by our customers in pilot scale and clinical production. We also supply initial commercial quantities of biocatalysts for use by our collaborators to produce pharmaceutical intermediates and manufacture biocatalysts that we sell. In the first quarter of 2021, we entered into an arrangement to lease a facility in San Carlos, California to serve as an additional office and research and development laboratory space which we occupied beginning December 2021. Please see Note 15, “Segment, Geographical and Other Revenue Information”in the Notes to the Consolidated Financial Statements set forth in Item 8 of this Annual Report on Form 10-K for a description of our revenues and long-lived assets both within and outside of the United States, and with respect to the San Carlos facility, please see Note 13, “Commitments and Contingencies” in the Notes to our Consolidated Financial Statements set forth in Item 8 of this Annual Report on Form 10-K.

Our research and development operations include efforts directed towards engineering biocatalysts, bioprocess development, cellular engineering, biocatalyst screening, metabolites, strain improvement, fermentation development and process engineering. We conduct enzyme evolution, enzyme production development, microbial bioprocess development, cellular engineering, microbial evolution and process engineering evaluations and design primarily at our headquarters in Redwood City, California. Manufacturing of our enzymes is conducted primarily in four locations, at our in-house facility in Redwood City, California and at third-party contract manufacturing organizations, Lactosan GmbH & Co. KG (“Lactosan”) in Kapfenberg, Austria, ACS Dobfar S.p.A. ("ACSD") (formerly known as DPhar S.p.A.) in Anagni, Italy, and Alphazyme LLC ("Alphazyme") in Florida, United States. Generally, we perform smaller scale manufacturing in-house and outsource the larger scale manufacturing, representing a large percentage of our production of novel enzymes, to contract manufacturing organizations.

GOVERNMENT REGULATION

In the United States, the FDA extensively regulates, among other things, the research, development, testing, manufacture, quality control, import, export, safety, effectiveness, labeling, packaging, storage, distribution, record keeping, approval, advertising, promotion, marketing, post-approval monitoring, and post-approval reporting of drug and biologic products under the Federal Food, Drug and Cosmetic Act, its implementing regulations and other laws, including, in the case of biologics, the Public Health Service Act. Our biotherapeutic product candidates are subject to regulation by the FDA as biologics. Biologics require the submission of a biologics license application (“BLA”) and licensure, which constitutes approval, by the FDA before being marketed in the United States. We, along with third-party contractors and our collaborators, will be required to navigate the various preclinical, clinical and commercial approval requirements of the governing regulatory agencies of the countries in which we wish to conduct studies or seek approval or licensure of our product candidates. The process of obtaining regulatory approvals and the subsequent compliance with applicable federal, state, local and foreign statutes and regulations require the expenditure of substantial time and financial resources.

The process required by the FDA before a biologic product may be marketed in the United States generally involves the following:

- completion of preclinical laboratory tests and animal studies performed in accordance with the FDA’s good laboratory practice (“GLP”) regulations;
- submission to the FDA of an IND, which must become effective before clinical trials in the United States may begin;
- approval by an institutional review board (“IRB”), or ethics committee at each clinical site before the trial is commenced;
- performance of adequate and well-controlled human clinical trials to establish the safety and potency of the product candidate for each proposed indication, conducted in accordance with the FDA’s good clinical practice (“GCP”) regulations;
- preparation and submission to the FDA of a BLA after completion of all pivotal clinical trials:
- satisfactory completion of an FDA Advisory Committee review, if applicable;
- a determination by the FDA within 60 days of its receipt of a BLA to file the application for review;
- satisfactory completion of an FDA inspection of the manufacturing facility or facilities at which the product is produced to assess compliance with current good manufacturing practice (“cGMP”) regulations and to assure that the facilities, methods and controls are adequate to preserve the biological product’s continued safety, purity and potency, and of selected clinical investigation sites to assess compliance with Good Clinical Practices, or GCPs; and

- FDA review and approval of the BLA prior to any commercial marketing, sale or distribution of the product.

Preclinical and Clinical Trials

Once a product candidate is identified for development, it enters the preclinical testing stage. Preclinical studies include laboratory evaluations of drug chemistry, formulation and stability, as well as studies to evaluate toxicity in animals, which must be conducted in accordance with GLP requirements. The results of preclinical studies, together with manufacturing information and analytical data, are submitted to the FDA as part of an IND. An IND is a request for authorization from the FDA to administer an investigational new drug to humans. The central focus of an IND submission is on the general investigational plan and the protocol(s) for clinical studies. The IND automatically becomes effective 30 days after receipt by the FDA, unless the FDA, within the 30-day time period, raises concerns or questions about the conduct of the clinical trial, including concerns that human research subjects will be exposed to unreasonable health risks, and imposes a clinical hold. In such a case, the IND sponsor and the FDA must resolve any outstanding concerns before the clinical trial can begin.

A separate submission to an existing IND must also be made for each successive clinical trial conducted during product development, and the FDA must grant permission, either explicitly or implicitly by not objecting, before each clinical trial can begin. Progress reports detailing the results of the clinical trials, among other information, must be submitted at least annually to the FDA and written IND safety reports must be submitted to the FDA and the investigators for serious and unexpected suspected adverse events, findings from other studies or animal or *in vitro* testing that suggest a significant risk for human subjects and any clinically important increase in the rate of a serious suspected adverse reaction over that listed in the protocol or investigator brochure.

Clinical trials involve the administration of the product candidate to human subjects under the supervision of qualified investigators in accordance with GCPs, which include the requirement that all research subjects provide their informed consent for their participation in any clinical study. Clinical trials are conducted under protocols detailing, among other things, the objectives of the clinical trial and the parameters and criteria to be used in monitoring safety and evaluating effectiveness. Each protocol must be submitted to the FDA as part of the IND. An independent IRB for each investigator site proposing to participate in a clinical trial must also review and approve the clinical trial and its informed consent form before it can begin at that site, and the IRB must monitor the clinical trial until it is completed. The FDA, the IRB, or the sponsor may suspend or discontinue a clinical trial at any time on various grounds, including a finding that the subjects are being exposed to an unacceptable health risk or that the trial is unlikely to meet its stated objectives. Some studies also include oversight by an independent group of qualified experts organized by the clinical study sponsor, known as a data safety monitoring board, which provides authorization for whether or not a study may move forward at designated check points based on access to certain data from the study and may halt the clinical trial if it determines that there is an unacceptable safety risk for subjects or other grounds, such as no demonstration of efficacy. There are also requirements governing the reporting of ongoing clinical studies and clinical study results to public registries.

For purposes of BLA approval, clinical trials are typically conducted in three sequential phases, which may overlap or be combined.

- *Phase 1* - Phase 1 clinical trials involve initial introduction of the investigational product into healthy human subjects or patients with the target disease or condition. These studies are typically designed to test the safety, dosage tolerance, absorption, metabolism and distribution of the investigational product in humans, the side effects associated with increasing doses, and, if possible, to gain early evidence of effectiveness.
- *Phase 2* - Phase 2 clinical trials typically involve administration of the investigational product to a limited patient population with a specified disease or condition to evaluate the preliminary efficacy, optimal dosage and dosing schedule and to identify possible adverse side effects and safety risks.
- *Phase 3* - Phase 3 clinical trials typically involve administration of the investigational product to an expanded patient population to further evaluate dosage, to provide statistically significant evidence of clinical efficacy and to further test for safety, generally at multiple geographically dispersed clinical trial sites. These clinical trials are intended to establish the overall risk/benefit ratio of the investigational product and to provide an adequate basis for product approval and physician labeling.

In some cases, the FDA may condition approval of a BLA on the sponsor's agreement to conduct additional clinical trials to further assess the biologic's safety and effectiveness after BLA approval. Such post-approval clinical trials are typically referred to as Phase 4 clinical trials. Concurrent with clinical trials, companies usually complete additional animal studies and must also develop additional information about the chemistry and physical characteristics of the biologic and finalize a process for manufacturing the biologic in commercial quantities in accordance with cGMP requirements. The manufacturing process must be capable of consistently producing quality batches of the product candidate and manufacturers must develop, among other things, methods for testing the identity, strength, quality and purity of the final biological product. Additionally, appropriate packaging must be selected and tested and stability studies must be conducted to demonstrate that the product candidate does not undergo unacceptable deterioration over its shelf life.

Although most clinical research performed in the United States in support of a BLA must be authorized in advance by the FDA, under the IND regulations and procedures described above, there are certain circumstances under which clinical trials can be conducted without submission of an IND. For example, a sponsor who wishes to conduct a clinical trial outside the United States may, but need not, obtain FDA authorization to conduct the clinical trial under an IND.

BLA Submission and FDA Review

Assuming successful completion of all required testing in accordance with all applicable regulatory requirements, the results of preclinical studies and clinical trials, together with other detailed information, including extensive manufacturing information and information on the composition of the biologic, are submitted to the FDA in the form of a BLA requesting approval to market the biologic for one or more specified indications. The BLA must include all relevant data available from preclinical and clinical studies, including negative or ambiguous results as well as positive findings, together with detailed information relating to the product's chemistry, manufacturing, controls, and proposed labeling, among other things. Data can come from company-sponsored clinical studies intended to test the safety and effectiveness of a use of the product, or from a number of alternative sources, including studies initiated by investigators. The submission of a BLA requires payment of a substantial user fee unless a waiver is granted. Each BLA submitted to the FDA is reviewed for administrative completeness and reviewability within 60 days of the FDA's receipt of the application. If the BLA is found to be complete, the FDA will file the BLA, triggering a full substantive review of the application. The FDA may refuse to file any BLA that it deems incomplete or not properly reviewable at the time of submission.

Once a BLA has been accepted for filing under the Prescription Drug User Fee Act, the FDA has a goal of reviewing BLAs within ten months of the 60-day filing date for BLAs designated for standard review or six months for priority review, but the overall timeframe is often extended by FDA requests for additional information or clarification. The FDA reviews a BLA to determine, among other things, whether the biological product is safe, pure and potent and whether the facility or facilities in which it is manufactured meet standards designed to assure the product's continued safety, purity and potency. The FDA may refer the application to an advisory committee for review, evaluation and recommendation as to whether the application should be approved. The FDA is not bound by the recommendation of an advisory committee, but it generally follows such recommendations.

Before approving a BLA, the FDA will inspect the facility or the facilities at which the biologic product is manufactured, and will not license the product unless cGMP compliance is satisfactory. The FDA may also inspect the sites at which the clinical trials were conducted to assess their compliance with GCP requirements, and will not license the biologic unless compliance with such requirements is satisfactory. If the FDA determines that the application, manufacturing process or manufacturing facilities are not acceptable, it will outline the deficiencies in the submission and often will request additional testing or information. Notwithstanding the submission of any requested additional information, the FDA ultimately may decide that the application does not satisfy the regulatory criteria for approval.

After the FDA evaluates a BLA and conducts inspections of manufacturing facilities where the investigational product and/or its drug substance will be produced, the FDA may issue an approval letter or a Complete Response Letter ("CRL"). An approval letter authorizes commercial marketing of the product with specific prescribing information for specific indications. A CRL will describe all of the deficiencies that the FDA has identified in the BLA, except that where the FDA determines that the data supporting the application are inadequate to support approval, the FDA may issue the CRL without first conducting required inspections, testing submitted product lots, and/or reviewing proposed labeling. In issuing the CRL, the FDA may recommend actions that the applicant might take to place the BLA in condition for approval, including requests for additional information or clarification. The FDA may delay or refuse approval of a BLA if applicable regulatory criteria are not satisfied, require additional testing or information and/or require post-marketing testing and surveillance to monitor safety or efficacy of a product.

If regulatory approval of a product is granted, such approval will be granted for particular indications and may entail limitations on the indicated uses for which such product may be marketed. For example, the FDA may approve the BLA with a Risk Evaluation and Mitigation Strategy ("REMS"), to ensure the benefits of the product outweigh its risks. A REMS is a safety strategy implemented to manage a known or potential serious risk associated with a product and to enable patients to have continued access to such medicines by managing their safe use, and could include medication guides, physician communication plans, or elements to assure safe use, such as restricted distribution methods, patient registries and other risk minimization tools. The FDA also may condition approval on, among other things, changes to proposed labeling or the development of adequate controls and specifications. Once approved, the FDA may withdraw the product approval if compliance with pre- and post-marketing requirements is not maintained or if problems occur after the product reaches the marketplace. The FDA may require one or more Phase 4 post-market studies and surveillance to further assess and monitor the product's safety and effectiveness after commercialization, and may limit further marketing of the product based on the results of these post-marketing studies.

Expedited Development and Review Programs

The FDA maintains several programs intended to facilitate and expedite development and review of new drugs and biologics designed to address unmet medical needs in the treatment of serious or life-threatening diseases or conditions.

For example, a product candidate is eligible for Fast Track designation if it is intended to treat a serious or life-threatening disease or condition and demonstrates the potential to address unmet medical needs for such disease or condition. Fast Track designation applies to the combination of the product candidate and the specific indication for which it is being studied. Fast Track designation provides increased opportunities for sponsor meetings with the FDA during preclinical and clinical development, in addition to the potential for rolling review once a marketing application is filed, meaning that the FDA may review portions of the marketing application before the sponsor submits the complete application, if the sponsor provides a schedule for the submission of the sections of the BLA, the FDA agrees to accept sections of the BLA and determines that the schedule is acceptable, and the sponsor pays any required user fees upon submission of the first section of the BLA.

In addition, a product candidate may be eligible for Breakthrough Therapy designation if it is intended to treat a serious or life-threatening disease or condition and preliminary clinical evidence indicates that the product candidate may demonstrate substantial improvement over existing therapies on one or more clinically significant endpoints, such as substantial treatment effects observed early in clinical development. Breakthrough Therapy designation provides all the features of Fast Track designation in addition to intensive guidance on an efficient development program beginning as early as Phase 1, and FDA organizational commitment to expedited development, including involvement of senior managers and experienced review staff in a cross-disciplinary review, where appropriate.

Any product candidate submitted to the FDA for approval, including a product candidate with Fast Track or Breakthrough Therapy designation, may also be eligible for additional FDA programs intended to expedite the review process, including Priority Review designation and Accelerated Approval. A BLA is eligible for Priority Review if the product candidate is designed to treat a serious or life-threatening disease or condition, and if approved, would provide a significant improvement in safety or effectiveness in the treatment, diagnosis or prevention of a serious disease or condition.

Additionally, product candidates studied for their safety and effectiveness in treating serious or life-threatening diseases or conditions may receive Accelerated Approval if they can be shown to have an effect on a surrogate endpoint that is reasonably likely to predict clinical benefit, or an effect on a clinical endpoint that can be measured earlier than an effect on irreversible morbidity or mortality which is reasonably likely to predict an effect on irreversible morbidity or mortality or other clinical benefit, taking into account the severity, rarity, or prevalence of the condition and the availability or lack of alternative treatments. As a condition of accelerated approval, the FDA will generally require the sponsor to perform adequate and well-controlled post-marketing clinical studies to verify and describe the anticipated effect on irreversible morbidity or mortality or other clinical benefit. Products receiving accelerated approval may be subject to expedited withdrawal procedures if the sponsor fails to conduct the required post-marketing studies or if such studies fail to verify the predicted clinical benefit. In addition, the FDA currently requires as a condition for accelerated approval pre-approval of promotional materials, which could adversely impact the timing of the commercial launch of the product.

Fast Track designation, Breakthrough Therapy designation, Priority Review designation and Accelerated Approval do not change the standards for approval but may expedite the development or review process. Even if a product qualifies for one or more of these programs, the FDA may later decide that the product no longer meets the conditions for qualification or decide that the time period for FDA review or approval will not be shortened.

Orphan Drug Designation and Exclusivity

Under the Orphan Drug Act, the FDA may grant orphan designation to a drug or biologic intended to treat a rare disease or condition, defined as a disease or condition with a patient population of fewer than 200,000 individuals in the United States, or a patient population greater than 200,000 individuals in the United States and when there is no reasonable expectation that the cost of developing and making available the drug or biologic in the United States will be recovered from sales in the United States for that drug or biologic. Orphan drug designation must be requested before submitting a BLA. After the FDA grants orphan drug designation, the generic identity of the therapeutic agent and its potential orphan use are disclosed publicly by the FDA.

If a product candidate that has orphan drug designation subsequently receives the first FDA approval for a particular active ingredient for the disease for which it has such designation, the product is entitled to orphan product exclusivity, which means that the FDA may not approve any other applications, including a full BLA, to market the same biologic for the same disease or condition for seven years, except in limited circumstances, such as a showing of clinical superiority to the product with orphan drug exclusivity or if the FDA finds that the holder of the orphan drug exclusivity has not shown that it can assure the availability of sufficient quantities of the orphan drug to meet the needs of patients with the disease or condition for which the drug was designated. Orphan drug exclusivity does not prevent the FDA from approving a different drug or biologic for the same disease or condition, or the same drug or biologic for a different disease or condition. Among the other benefits of orphan drug designation are tax credits for certain research and a waiver of the BLA application user fee.

A designated orphan drug many not receive orphan drug exclusivity if it is approved for a use that is broader than the disease or condition for which it received orphan designation. In addition, orphan drug exclusive marketing rights in the United States may be lost if the FDA later determines that the request for designation was materially defective or, as noted above, if a second applicant demonstrates that its product is clinically superior to the approved product with orphan exclusivity or the manufacturer of the approved product is unable to assure sufficient quantities of the product to meet the needs of patients with the rare disease or condition.

Emergency Use Authorization

The Commissioner of the FDA, under delegated authority from the Secretary of HHS may, under certain circumstances in connection with a declared public health emergency, allow for the marketing of a product that does not otherwise comply with FDA regulations by issuing an EUA for such product. Before an EUA may be issued by HHS, the Secretary must declare an emergency based a determination that public health emergency exists that effects or has the significant potential to affect, national security, and that involves a specified biological, chemical, radiological, or nuclear agent or agents ("CBRN"), or a specified disease or condition that may be attributable to such CBRN. On February 4, 2020, the HHS Secretary determined that there is such a public health emergency that involves the virus now known as SARS-CoV-2, the virus that causes the COVID-19 infection. Once the determination of the threat or emergency has been made, the Secretary of HHS must then declare that an emergency exists justifying the issuance of EUAs for certain types of products (referred to as EUA declarations). On March 27, 2020, the Secretary of HHS declared – on the basis of his determination of a public health emergency that has the potential to affect national security or the health and security of U.S. citizens living abroad that involves SARS-CoV-2 – that circumstances exist justifying authorization of drugs and biologics during the COVID-19 pandemic, subject to the terms of any EUA that is issued.

Once an EUA declaration has been issued, the FDA can issue EUAs for products that fall within the scope of that declarationTo issue an EUA, the FDA Commissioner must conclude that (1) the CBRN that is referred to in the EUA declaration can cause serious or life-threatening diseases or conditions; (2) based on the totality of scientific evidence available, it is reasonable to believe that the product may be effective in diagnosing, treating, or preventing the disease or condition attributable to the CBRN and that the product's known and potential benefits outweigh its known and potential risks; and (3) there is no adequate, approved, and available alternative to the product. Products subject to an EUA must still comply with the conditions of the EUA, including labeling and marketing requirements. Moreover, the authorization to market products under an EUA is limited to the period of time the EUA declaration is in effect, and the FDA can revoke an EUA in certain circumstances.

Rare Pediatric Disease Priority Review Voucher Program

In 2012, Congress authorized the FDA to award priority review vouchers to sponsors of certain rare pediatric disease product applications. This program is designed to encourage development of new drug and biological products for prevention and treatment of certain rare pediatric diseases. Specifically, under this program, a sponsor who receives an approval for a drug or biologic for a "rare pediatric disease" may qualify for a voucher that can be redeemed to receive a priority review of a subsequent marketing application for a different product. The sponsor of a rare pediatric disease drug product receiving a priority review voucher may transfer (including by sale) the voucher to another sponsor. The voucher may be further transferred any number of times before the voucher is used, as long as the sponsor making the transfer has not yet submitted the application. The FDA may also revoke any priority review voucher if the rare pediatric disease drug for which the voucher was awarded is not marketed in the U.S. within one year following the date of approval.

For purposes of this program, a "rare pediatric disease" is a (a) serious or life-threatening disease in which the serious or life-threatening manifestations primarily affect individuals aged from birth to 18 years, including age groups often called neonates, infants, children, and adolescents; and (b) rare diseases or conditions within the meaning of the Orphan Drug Act. On December 27, 2020, the Rare Pediatric Disease Priority Review Voucher Program was extended. Under the current statutory sunset provisions, after September 30, 2024, FDA may only award a voucher for an approved rare pediatric disease product application if the sponsor has rare pediatric disease designation for the drug, and that designation was granted by September 30, 2024. After September 30, 2026, FDA may not award any Rare Pediatric Disease Priority Review Voucher.

Post-Approval Requirements

Licensed biologics that are manufactured and distributed in the United States are subject to pervasive and continuing regulation by the FDA, including, among other things, requirements relating to recordkeeping, periodic reporting, product distribution, advertising and promotion and reporting of adverse experiences with the product. There is also a continuing, annual prescription drug program user fee.

Any biologics manufactured or distributed pursuant to FDA approvals remain subject to ongoing regulation by the FDA. Manufacturers and their subcontractors are required to register their establishments with the FDA and certain state agencies, and are subject to periodic unannounced inspections by the FDA and certain state agencies for compliance with ongoing regulatory requirements, including cGMP, which impose extensive procedural and documentation requirements. Failure to comply with statutory and regulatory requirements can subject a manufacturer to possible legal or regulatory action, such as warning letters, suspension of manufacturing, product seizures, injunctions, civil penalties or criminal prosecution.

Later discovery of previously unknown problems with a product, including adverse events of unanticipated severity or frequency, or with manufacturing processes, or failure to comply with regulatory requirements, may result in revisions to the approved labeling to add new safety information, requirements for post-market studies or clinical trials to assess new safety risks, imposition of distribution or other restrictions under a REMS. Other potential consequences include, among other things:

- restrictions on the marketing or manufacturing of the product, complete withdrawal of the product from the market or product recalls;
- fines, warning letters, untitled letters, or holds on post-approval clinical trials;
- refusal of the FDA to approve applications or supplements to approved applications, or suspension or revocation of product approvals;
- product seizure or detention, or refusal to permit the import or export of products;
- mandated modification of promotional materials and labeling and the issuance of corrective information;
- the issuance of safety alerts, Dear Healthcare Provider letters, press releases and other communications containing warnings or other safety information about the product; or
- injunctions or the imposition of civil or criminal penalties.

The FDA closely regulates the post-approval marketing and promotion of biologics, including standards and regulations for direct-to-consumer advertising, off-label promotion, industry-sponsored scientific and educational activities, and promotional activities involving the internet and social media. A company can make only those claims relating to safety and efficacy that are approved by the FDA. Physicians may prescribe legally available biologics for uses that are not described in the product's labeling and that differ from those tested by us and approved by the FDA. Such off-label uses are common across medical specialties. Physicians may believe that such off-label uses are the best treatment for many patients in varied circumstances.

The FDA does not regulate the behavior of physicians in their choice of treatments. The FDA does, however, impose stringent restrictions on manufacturers' communications regarding off-label use. Failure to comply with these requirements can result in adverse publicity, warning letters, corrective advertising and potential civil and criminal penalties.

Biosimilars and Regulatory Exclusivity

As part of the Patient Protection and Affordable Care Act enacted in 2010, as amended by the Health Care and Education Reconciliation Act of 2010, the Biologics Price Competition and Innovation Act ("BPCIA") established an abbreviated pathway for the approval of biosimilar and interchangeable biological products. The abbreviated regulatory pathway provides legal authority for the FDA to review and approve biosimilar biologics based on their similarity to an existing brand product, referred to as a reference product, including the possible designation of a biosimilar as interchangeable with a brand product.

Biosimilarity, which requires that there be no clinically meaningful differences between the biological product and the reference product in terms of safety, purity, and potency, can be shown through analytical studies, animal studies, and a clinical study or studies. Interchangeability requires that a product is biosimilar to the reference product and the product must demonstrate that it can be expected to produce the same clinical results as the reference product in any given patient and, for products that are administered multiple times to an individual, the biologic and the reference biologic may be alternated or switched after one has been previously administered without increasing safety risks or risks of diminished efficacy relative to exclusive use of the reference biologic.

Under the BPCIA, the approval of a biosimilar product may not be made effective by the FDA until 12 years from the date on which the reference product was first licensed by the FDA. In addition, the licensure of a biosimilar product may not be made effective by the FDA until 12 years from the date on which the reference product was first licensed. During this 12-year period of exclusivity, another company may still market a competing version of the reference product if the FDA approves a full BLA for the competing product containing that applicant's own preclinical data and data from adequate and well-controlled clinical trials to demonstrate the safety, purity and potency of its product. The BPCIA also created certain exclusivity periods for biosimilars approved as interchangeable products. At this juncture, it is unclear whether products deemed "interchangeable" by the FDA will, in fact, be readily substituted by pharmacies, which are governed by state pharmacy law. In addition, the period of exclusivity provided by the BPCIA only operates against third parties seeking approval via the abbreviated pathway, but would not prevent third parties from pursuing approval via the traditional BLA approval pathway.

In addition, a biological product can also obtain pediatric market exclusivity in the United States. Pediatric exclusivity, if granted, adds six months to existing exclusivity periods and patent terms. This six-month exclusivity, which runs from the end of other exclusivity protection or patent term, may be granted based on the voluntary completion of a pediatric study in accordance with an FDA-issued "Written Request" for such a study.

Other Healthcare Laws

Pharmaceutical companies are subject to additional healthcare regulation and enforcement by the federal government and by authorities in the states and foreign jurisdictions in which they conduct their business and may constrain the financial arrangements and relationships through which we and our partners research, sell, market and distribute any products for which we obtain marketing approval. Such laws include, without limitation, state and federal anti-kickback, fraud and abuse, false claims and transparency laws regarding drug pricing and payments and other transfer of value to physicians and other healthcare providers. If their operations are found to be in violation of any of such laws or any other governmental regulations that apply, they may be subject to penalties, including, without limitation, administrative, civil and criminal penalties, damages, fines, disgorgement, the curtailment or restructuring of operations, integrity oversight and reporting obligations, exclusion from participation in federal and state healthcare programs and individual imprisonment.

Coverage and Reimbursement

Sales of any product depend, in part, on the extent to which such product will be covered by third-party payors, such as federal, state, and foreign government healthcare programs, commercial insurance and managed healthcare organizations, and the level of reimbursement for such product by third-party payors. Decisions regarding the extent of coverage and amount of reimbursement to be provided are made on a plan-by-plan basis. These third-party payors are increasingly reducing reimbursements for medical products, drugs and services. In addition, the U.S. government, state legislatures and foreign governments have continued implementing cost-containment programs, including price controls, restrictions on coverage and reimbursement and requirements for substitution of generic products. Adoption of price controls and cost-containment measures, and adoption of more restrictive policies in jurisdictions with existing controls and measures, could further limit sales of any product. Decreases in third-party reimbursement for any product or a decision by a third-party payor not to cover a product could reduce physician usage and patient demand for the product and also have a material adverse effect on sales.

Healthcare Reform

In March 2010, the Patient Protection and Affordable Care Act, as amended by the Health Care and Education Reconciliation Act, each as amended (collectively known as the "ACA"), was enacted, which substantially changed the way healthcare is financed by both governmental and private insurers, and significantly affected the pharmaceutical industry. The ACA contained a number of provisions, including those governing enrollment in federal healthcare programs, reimbursement adjustments and changes to fraud and abuse laws. For example, the ACA:

- increased the minimum level of Medicaid rebates payable by manufacturers of brand name drugs from 15.1% to 23.1% of the average manufacturer price;
- required collection of rebates for drugs paid by Medicaid managed care organizations;
- required manufacturers to participate in a coverage gap discount program, under which they must agree to offer 70 percent point-of-sale discounts off negotiated prices of applicable brand drugs to eligible beneficiaries during their coverage gap period, as a condition for the manufacturer's outpatient drugs to be covered under Medicare Part D; and
- imposed a non-deductible annual fee on pharmaceutical manufacturers or importers who sell "branded prescription drugs" to specified federal government programs.

Since its enactment, there have been judicial and Congressional challenges to certain aspects of the ACA.

On June 17, 2021, the U.S Supreme Court dismissed the most recent judicial challenge to the ACA brought by several states without specifically ruling on the constitutionality of the ACA. Thus, the ACA will remain in effect in its current form.

Other legislative changes have been proposed and adopted since the ACA was enacted. In March 2021, the American Rescue Plan Act of 2021 was signed into law, which eliminates the statutory cap on the Medicaid drug rebate, currently set at 100% of a drug's AMP, beginning January 1, 2024. Moreover, there has recently been heightened governmental scrutiny over the manner in which manufacturers set prices for their marketed products, which has resulted in several Congressional inquiries, proposed and enacted legislation and executive orders issued by the President designed to, among other things, bring more transparency to product pricing, review the relationship between pricing and manufacturer patient programs, and reform government program reimbursement methodologies for drug products. Most recently, the Inflation Reduction Act of 2022, or IRA, included a number of significant drug pricing reforms, which include the establishment of a drug price negotiation program within the U.S. Department of Health and Human Services, or HHS (beginning in 2026) that requires manufacturers to charge a negotiated "maximum fair price" for certain selected drugs or pay an excise tax for noncompliance, the establishment of rebate payment requirements on manufacturers under Medicare Parts B and D to penalize price increases that outpace inflation (first due in 2023), and a redesign of the Part D benefit, as part of which manufacturers are required to provide discounts on Part D drugs (beginning in 2025). The IRA permits the HHS Secretary to implement many of these provisions through guidance, as opposed to regulation, for the initial years. Additional drug pricing proposals could appear in future legislation. Individual states in the United States have also become increasingly active in implementing regulations designed to control pharmaceutical product pricing, including price or patient reimbursement constraints, discounts, restrictions on certain product access and marketing cost disclosure and transparency measures, and, in some cases, designed to encourage importation from other countries and bulk purchasing.

Data Privacy and Security Laws

Numerous state, federal and foreign laws, including consumer protection laws and regulations, govern the collection, dissemination, use, access to, confidentiality, and security of personal information, including health-related information. In the United States, numerous federal and state laws and regulations, including data breach notification laws, health information privacy and security laws, and federal and state consumer protection laws and regulations (e.g., Section 5 of the Federal Trade Commission Act) that govern the collection, use, disclosure, and protection of health-related and other personal information could apply to our operations or the operations of our partners. In addition, certain foreign laws govern the privacy and security of personal data, including health-related data. Failure to comply with these laws, were applicable, can result in the imposition of significant civil and /or criminal penalties and private litigation. Privacy and security laws, regulations, and other obligations are constantly evolving, may conflict with each other to make compliance efforts more challenging, and can result in investigations, proceedings, or actions that lead to significant penalties and restrictions on data processing.

Cybersecurity

In the normal course of business, we may collect and store personal information and other sensitive information, including proprietary and confidential business information, trade secrets, intellectual property, information regarding trial participants in connection with clinical trials, sensitive third-party information and employee information. To protect this information, our existing cybersecurity policies require continuous monitoring and detection programs, network security precautions, and in depth security assessment of technology vendors. We maintain various protections designed to safeguard against cyberattacks, including firewalls and virus detection software. We have established and regularly test our disaster recovery plan and we protect against business interruption by backing up our major systems. In addition, we periodically scan our environment for any vulnerabilities, perform penetration testing and engage third parties to assess effectiveness of our data security practices. A third party security consultant conducts regular network security reviews, scans and audits. In addition, we maintain insurance that includes cybersecurity coverage.

The program incorporates industry-standard frameworks, policies and practices designed to protect the privacy and security of our sensitive information.

Despite the implementation of our cybersecurity program, our security measures cannot guarantee that a significant cyberattack will not occur. A successful attack on our information technology systems could have significant consequences to the business. While we devote resources to our security measures to protect our systems and information, these measures cannot provide absolute security. See “Risk Factors – General Risk Factors” for additional information about the risks to our business associated with a breach or compromise to our information technology systems.

HUMAN CAPITAL RESOURCES

As of December 31, 2022, we had 248 full-time employees and part-time employees worldwide. Of these employees, 139 were engaged in research and development, 39 were engaged in operations and quality control and 70 were engaged in selling, general and administrative activities. None of our employees is represented by a labor union. Supported by our annual employee survey, we believe our relationship with our employees to be generally good. Our scientists, bioinformatics experts and other professionals work collaboratively as interdisciplinary teams to unlock and advance technological innovation.

Compensation, benefits and development

Our goal is to attract, motivate and retain talent with a focus on encouraging performance, promoting accountability and adhering to our company values. We offer competitive compensation and benefit programs including a company-matched 401(k) Plan, stock options for eligible employees, health savings and flexible spending accounts, paid time off, education and training programs, and employee assistance programs. We believe it is important to help build community and enabling our employees actively participate in community service projects and in company-sponsored philanthropic activities.

Diversity, inclusion and belonging

We are committed to our continued efforts to increase diversity and foster an inclusive work environment that supports the global workforce and the communities we serve. We recruit the best people for the job regardless of gender, ethnicity or other protected traits and it is our policy to fully comply with all laws applicable to discrimination in the workplace. Our diversity, equity and inclusion principles are also reflected in our employee training and policies. We continue to enhance our diversity, equity and inclusion policies which are guided by our executive leadership team.

Health and safety

We are committed to maintain a safe and healthy workplace for our employees. Our policies and practices are intended to protect our employees and surrounding communities in which we operate.

In 2020, in response to the COVID-19 pandemic, we implemented safety protocols and new procedures to protect our employees. These protocols include complying with social distancing and other health and safety standards as required by state and local government agencies, taking into consideration guidelines of the Centers for Disease Control and Prevention and other public health authorities. In addition, we modified the way we conduct many aspects of our business including the practice of social distancing, wearing face coverings mandated by state and local regulations, and maintaining a quarantine for employees determined to be in close contact with a COVID-19 case. For example, we implemented day-time shift hours in our R&D and manufacturing at our Redwood City pilot plant to minimize the number of employees in close proximity to each other and we have significantly expanded the use of virtual interaction whenever possible in our business. For a detailed discussion of the impact of the COVID-19 pandemic on our human capital resources, see “Risk Factors" Item 1A of this Form 10-K.

We previously launched the Employee-Requested Work from Home Policy in late 2020. This policy establishes the process and criteria to enable Redwood City employees to request permission to work from home on a regular basis.

CORPORATE & AVAILABLE INFORMATION

We were incorporated in Delaware in January 2002 as a wholly-owned subsidiary of Maxygen, Inc. We commenced independent operations in March 2002, after licensing core enabling technology from Maxygen, Inc. Our principal corporate offices are located at 200 Penobscot Drive, Redwood City, California 94063 and our telephone number is (650) 421-8100. Our internet address is www.codexis.com. The information on, or that can be accessed through, our website is not incorporated by reference into this Annual Report on Form 10-K or any other filings we make with the U.S. Securities and Exchange Commission (the "SEC").

We make available on or through our website certain reports and amendments to those reports that we file with, or furnish to, the SEC in accordance with the Exchange Act. These include our Annual Reports on Form 10-K, our Quarterly Reports on Form 10-Q and our Current Reports on Form 8-K, and amendments to those reports filed or furnished pursuant to Section 13(a) or 15(d) of the Exchange Act. We make this information available on or through our website free of charge as soon as reasonably practicable after we electronically file the information with, or furnish it to, the SEC. Copies of this information may be obtained at the SEC website at www.sec.gov. The contents of these websites are not incorporated into this filing. Further, the references to website URLs are intended to be inactive textual references only.

ITEM 1A. RISK FACTORS

You should carefully consider the risks described below together with the other information set forth in this Annual Report on Form 10-K, which could materially affect our business, financial condition or future results. The risks described below are not the only risks facing our company. Risks and uncertainties not currently known to us or that we currently deem to be immaterial also may materially adversely affect our business, financial condition and/or operating results.

RISK FACTORS SUMMARY

The following is a summary of the principal factors that cause an investment in the company to be speculative or risky:

- We have a history of net losses and we may not achieve or maintain profitability.
- We are dependent on our collaborators, and our failure to successfully manage these relationships could prevent us from developing and commercializing many of our products.
- Our biotherapeutic programs are early stage, highly regulated and expensive.
- If either Nestlé Health Science or Takeda terminate their development programs under their respective license agreements with us, any potential revenue from those license agreements will be significantly reduced or non-existent.
- We may need additional capital in the future in order to expand our business.
- We are dependent on a limited number of customers.
- Our product supply agreements with customers have finite duration and may not be extended or renewed.
- With respect to customers purchasing our products for the manufacture of API, the termination or expiration of such patent protection may materially and adversely affect our revenues, financial condition or results of operations.
- We are dependent on a limited number of contract manufacturers for large scale production of substantially all of our enzymes, including CDX-616.
- If we are unable to develop and commercialize new products for the target markets, our business and prospects will be harmed.
- Competitors and potential competitors who have greater resources and experience than we do may develop products and technologies that make ours obsolete.
- The ongoing COVID-19 pandemic has adversely affected and may continue in the future to, directly or indirectly, adversely affect our business, results of operations and financial condition.
- Revenues in in future years from our sales of CDX-616 to Pfizer are subject to a number of factors which are outside of our control and may not materialize.
- We have investments in non-marketable securities, which may subject us to significant impairment charges.
- Ethical, legal and social concerns about genetically engineered products and processes could limit or prevent the use of our products, processes, and technologies and limit our revenues.
- We use hazardous materials in our business and we must comply with environmental laws and regulations.
- Our ability to use our net operating loss carryforwards to offset future taxable income may be subject to certain limitations.
- As a public reporting company, we are subject to rules and regulations established from time to time by the SEC and Nasdaq regarding our internal controls over financial reporting. We may not complete needed improvements to our internal controls over financial reporting in a timely manner, or these internal controls may not be determined to be effective, which may adversely affect investor confidence in our company and, as a result, the value of our common stock and your investment.
- If we engage in any acquisitions, we will incur a variety of costs and may potentially face numerous risks that could adversely affect our business and operations.
- We or our customers may not be able to obtain regulatory approval for the use of our products in food and food ingredients, if required.
- Our ongoing efforts to deploy our technology in the life science tools market may fail.
- The regulatory approval processes of the FDA and comparable foreign authorities are lengthy, time consuming and inherently unpredictable, and we may be unable to obtain regulatory approval for our product candidates.
- Clinical trials are difficult to design and implement, expensive, time-consuming and involve an uncertain outcome.
- Results of preclinical studies and early clinical trials of product candidates may not be predictive of results of later studies or trials.
- We may not be able to maintain orphan drug designations for certain of our product candidates, and may be unable to maintain the benefits associated with orphan drug designation, including the potential for market exclusivity.

- We have obtained rare pediatric disease designation for CDX-6512 and CDX-6210, however, there is no guarantee that such designation will result in approval of CDX-6512 or CDX-6210, and even if we obtain approval of CDX-6512 or CDX-6210 for the indication for which we have been awarded rare pediatric disease designation, there is no guarantee that such approval will result in an aware of a rare pediatric disease priority review voucher.
- Disruptions at the FDA and other government agencies caused by funding shortages or global health concerns could hinder their ability to hire, retain, or deploy key leadership and other personnel, or otherwise prevent new or modified products from being developed, approved, or commercialized in a timely manner, or at all, which could negatively impact our business.
- Even if we obtain regulatory approval for any products that we develop alone or with collaborators, such products will remain subject to ongoing regulatory requirements.
- Our business operations and future relationships with investigators, healthcare professionals, consultants, third-party payors, patient organizations and customers will be subject to applicable healthcare regulatory laws, which could expose us to penalties.
- The successful commercialization of product candidates developed by us or our partners will depend in part on the extent to which governmental authorities and health insurers establish adequate coverage, reimbursement levels and pricing policies.
- Recently enacted legislation, future legislation and healthcare reform measures may increase the difficulty and cost for our partners to obtain marketing approval for and commercialize product candidates developed by us.
- Compliance with European Union chemical regulations could be costly and adversely affect our business and results of operations.
- We rely on third parties to conduct our clinical trials and perform some of our research and preclinical studies, which if not satisfactorily carried out or fail to meet expected deadlines, may have an adverse effect on our business and prospects.
- We contract with third parties for the manufacturing and supply of product candidates, which supply may become limited or interrupted or may not be of satisfactory quality and quantity.
- Our efforts to prosecute, maintain, protect and/or defend our intellectual property rights may not be successful.
- Our ability to compete may decline if we do not adequately prosecute, maintain, protect and/or defend our proprietary technology, products or services or our intellectual property rights.
- Third parties may claim that we are infringing, violating or misappropriating their intellectual property rights, which may subject us to costly and time-consuming litigation and prevent us from developing or commercializing our technology, products or services.
- We may be involved in lawsuits to protect or enforce our intellectual property rights, which could be expensive, time-consuming and unsuccessful.
- We may not be able to enforce our intellectual property rights throughout the world.
- If our biocatalysts are stolen, misappropriated or reverse engineered, others could use these biocatalysts to produce competing products.
- Confidentiality and non-use agreements with employees, consultants, advisors, and other third parties may not adequately prevent disclosures and non-use of trade secrets and other proprietary information.
- We are subject to anti-takeover provisions in our certificate of incorporation and bylaws and under Delaware law that could delay or prevent an acquisition of our company.
- Our quarterly or annual operating results may fluctuate in the future.
- We do not intend to pay cash dividends for the foreseeable future.
- If securities or industry analysts do not publish research or reports about our business, or publish negative reports about our business, our stock price and trading volume could decline.
- We face risks associated with our international business.
- Market and economic conditions may negatively impact our business, financial condition, and share price.
- Business interruptions resulting from disasters or other disturbances could delay us in the process of developing our products and could disrupt our sales.
- We are dependent on information technology systems, infrastructure and data, and any failure of these systems could harm our business.
- Actual or perceived failures to comply with applicable data protection, privacy and security laws, regulations, standards and other requirements could adversely affect our business, results of operations and financial condition.
- Evolving expectations around environmental, social and governance matters may expose us to reputational and other risks.

Risks Relating to Our Business and Strategy

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

We have incurred net losses since our inception, including losses of $33.6 million in 2022, $21.3 million in 2021 and $24.0 million in 2020. As of December 31, 2022 and 2021, we had an accumulated deficit of $421.3 million and $387.7 million, respectively. If we are unable to expand our business, through new or expanded collaborations, development of new products or services, or increased sales of existing products and services, our net losses may increase and we may never achieve profitability. In addition, some of our collaboration agreements, including our collaboration with Nestlé Health Science and Takeda, and our performance enzyme agreements, including the agreements with GSK, Merck and Novartis, provide for milestone payments, usage payments, and/or future royalty payments, which we will only receive if we and our collaborators develop and commercialize products. We also may fund development of additional proprietary performance enzymes and/or biotherapeutic products. There can be no assurance that any of these products will become commercially viable or that we will ever achieve profitability on a quarterly or annual basis. If we fail to achieve profitability, or if the time required to achieve profitability is longer than we anticipate, we may not be able to continue our business. Even if we do achieve profitability, we may not be able to sustain or increase profitability on a quarterly or annual basis.

We are dependent on our collaborators, and our failure to successfully manage these relationships could prevent us from developing and commercializing many of our products and achieving or sustaining profitability, and could lead to disagreements with our current or former collaborators.

Our ability to maintain and manage collaborations in our markets is fundamental to the success of our business. We currently have license agreements, research and development agreements, supply agreements and/or distribution agreements with various collaborators. For example, we have ongoing collaborations and agreements with GSK, Merck, Novartis, Nestlé Health Science and Takeda that are important to our business and financial results. We may have limited or no control over the amount or timing of resources that any collaborator is able or willing to devote to our partnered products or collaborative efforts. Any of our collaborators may fail to perform its obligations. These collaborators may breach or terminate their agreements with us or otherwise fail to conduct their collaborative activities successfully and in a timely manner. Further, our collaborators may not develop products arising out of our collaborative arrangements or devote sufficient resources to the development, manufacture, marketing or sale of these products. Moreover, disagreements with a collaborator could develop, and any conflict with a collaborator could lead to litigation and could reduce our ability to enter into future collaboration agreements and negatively impact our relationships with one or more existing collaborators. If any of these events occur, especially if they occur in our collaborations with GSK, Merck, Novartis, Nestlé Health Science or Takeda, or if we fail to maintain our agreements with our collaborators, we may not be able to commercialize our existing and potential products or grow our business or generate sufficient revenues to support our operations, we may not receive contemplated milestone payments and royalties under the collaboration, and we may be involved in litigation. Our collaboration opportunities could be harmed and our financial condition and results of operations could be negatively affected if:

- we do not achieve our research and development objectives under our collaboration agreements in a timely manner or at all;
- we develop products and processes or enter into additional collaborations that conflict with the business objectives of our other collaborators;
- we, our collaborators and/or our contract manufacturers do not receive the required regulatory and other approvals necessary for the commercialization of the applicable product;
- we disagree with our collaborators as to rights to intellectual property that are developed during the collaboration, or their research programs or commercialization activities;
- we are unable to manage multiple simultaneous collaborations;
- our collaborators or licensees are unable or unwilling to implement or use the technology or products that we provide or license to them;
- our collaborators become competitors of ours or enter into agreements with our competitors;
- our collaborators become unable or less willing to expend their resources on research and development or commercialization efforts due to general market conditions, their financial condition or other circumstances beyond our control; or
- our collaborators experience business difficulties, which could eliminate or impair their ability to effectively perform under our agreements.

Even after collaboration relationships expire or terminate, some elements of the collaboration may survive. For instance, certain rights, licenses and obligations of each party with respect to intellectual property and program materials may survive the expiration or termination of the collaboration. Disagreements or conflicts between and among the parties could develop even though the collaboration has ended. These disagreements or conflicts could result in expensive arbitration or litigation, which may not be resolved in our favor.

Finally, our business could be negatively affected if any of our collaborators or suppliers undergoes a change of control or were to otherwise assign the rights or obligations under any of our agreements.

Our biotherapeutic programs are early stage, highly regulated and expensive. Our ability to obtain additional development partners or additional funding for the programs, to advance our product candidates to clinical trials and to ultimately receive regulatory approvals is highly uncertain.

We are developing and have developed novel biotherapeutic candidates, including CDX-6114, the novel oral enzyme product candidate for the treatment of PKU that we licensed to Nestlé Health Science. We are also developing protein sequences for use in gene therapy products for Fabry Disease, Pompe Disease, an undisclosed blood factor deficiency and a certain undisclosed rare genetic disorder for Takeda. The successful development of biotherapeutic candidates involves many risks and uncertainties, requires long timelines and may lead to uncertain results. In addition, drug development is highly regulated and requires areas of expertise and capital resources we do not currently possess. In order to market a biologic product in the United States, we or our collaborators must undergo the following process required by the FDA:

- completion of extensive preclinical laboratory tests and preclinical animal studies, all performed in accordance with GLP requirements;
- submission to the FDA of an IND, which must become effective before human clinical studies may begin in the United States;
- approval by an independent IRB representing each clinical site before the clinical study may be initiated at the site;
- performance of adequate and well-controlled human clinical studies (generally divided into three phases) in accordance with GCP requirements to establish the safety, purity and potency (or efficacy) of the product candidate for each proposed indication;
- preparation of and submission to the FDA of a BLA after completion of all clinical studies;
- potential review of the product candidate by an FDA advisory committee;
- satisfactory completion of an FDA pre-approval inspection of the manufacturing facilities where the product candidate is produced to assess compliance with cGMP requirements; and
- FDA review and approval of a BLA prior to any commercial marketing or sale of the product in the United States.

If we fail to comply with applicable FDA or other regulatory requirements at any time during the drug development process, clinical testing, the approval process or after approval, we may become subject to administrative or judicial penalties, including the FDA's refusal to approve a pending application, withdrawal of an approval, warning letters, product recalls and additional enforcement actions.

Our efforts to advance our biotherapeutic candidates that we develop are subject to numerous risks, including the following:

- The regulatory approval processes of the FDA and comparable foreign authorities are lengthy, time consuming and the results are inherently unpredictable. If we are ultimately unable to obtain regulatory approval for biotherapeutic product candidates, our business will be harmed. To obtain regulatory approval to market any product candidate, preclinical studies and costly and lengthy clinical trials are required, and the results of the studies and trials are highly uncertain. A failure of one or more preclinical or clinical trials can occur at any stage, and many companies that have believed their drug candidates performed satisfactorily in preclinical and clinical testing have nonetheless failed to obtain marketing approval of their product candidates.
- We may find it difficult to enroll patients in our clinical trials for product candidates. Any enrollment difficulties could delay clinical trials and any potential product approval.

- We may experience difficulty or delay in obtaining the FDA's acceptance of an IND for product candidates we may seek to enter into clinical development, which would delay initiation of Phase 1 clinical testing. Delays in the commencement or completion of clinical testing could significantly affect our product development costs or the product development costs of our present and any future collaborators. We do not know whether planned clinical trials will begin on time or be completed on schedule, if at all. The commencement and completion of clinical trials can be delayed for a number of reasons. For example, a clinical trial may be suspended or terminated by us, by the IRB of the institution in which such trial is being conducted, or by the FDA due to a number of factors, including unforeseen safety issues, changes in governmental regulations or lack of adequate funding to continue the clinical trial.
- We have limited experience in drug development or regulatory matters related to drug development. As a result, we rely or will rely on third parties to conduct our preclinical and clinical studies, assist us with drug manufacturing and formulation and perform other tasks for us. If these third parties do not successfully carry out their responsibilities or comply with regulatory requirements, we may receive lower quality products or services, suffer reputational harm and not be able to obtain regulatory approval for product candidates.
- Our efforts to use CodeEvolver® protein engineering technology platform to generate new lead biotherapeutic candidates, whether under our collaborations with Nestlé Health Science, Takeda or otherwise, may not be successful in creating candidates of value.
- We will be exposed to potential product liability risks through the testing of experimental therapeutics in humans, which may expose us to substantial uninsured liabilities.
- Third parties may develop intellectual property that could limit our ability to develop, market and commercialize product candidates.
- Changes in methods of treatment of disease, such as gene therapy, could cause us to stop development of our product candidates or reduce or eliminate potential demand for CDX-6114, if approved, or any other product candidates that we may develop in the future.

If either Nestlé Health Science or Takeda terminate their development programs under their respective license agreements with us, any potential revenue from those license agreements will be significantly reduced or non-existent, and our results of operations and financial condition will be materially and adversely affected.

We have invested significant time and financial resources in the development of CDX-6114 and other product candidates for the treatment of hyperphenylalaninemia now included in the Nestlé License Agreement as well as in the development of candidates for the treatment of Fabry disease and Pompe disease which are now included in the Takeda Agreement.

Under the Nestlé License Agreement, we are eligible to receive payments from Nestlé Health Science that include (i) development and approval milestones of up to $85.0 million, (ii) sales-based milestones of up to $250.0 million in the aggregate, which aggregate amount is achievable if net sales exceed $1.0 billion in a single year, and (iii) tiered royalties, at percentages ranging from the mid-single digits to low double-digits, of net sales of product. Under the Takeda Agreement, we are eligible to earn potential payments that include (i) reimbursement of research and development fees and preclinical development milestone payments for the three initial programs of $10.5 million, in aggregate, and $3.4 million for the fourth program, (ii) clinical development and commercialization-based milestone, per target gene, of up to $104.0 million, and (iii) tiered royalty payments based on net sales of applicable products at percentages ranging from the mid-single digits to low single-digits. While we have received milestone payments under the Nestlé License Agreement to date there is no guarantee that we will receive further milestone payments under the Nestlé Agreement or Takeda Agreement in the future.

Under the Nestle Agreement and the Takeda Agreement, either Nestlé Health Science and Takeda, as applicable, may each terminate the entire agreement or specified programs thereunder at will under certain circumstances as described in more detail under "Item 1. Business--Our Market Opportunities--Pharmaceutical Market--Our Solutions for the Pharmaceutical Market--Biotherapeutic Product Discovery and Development" in this Annual Report on Form 10-K.

If Nestlé Health Science terminates its rights and obligations with respect to the Nestlé License Agreement and/or Takeda terminates its rights and obligations with respect to the Takeda Agreement, then depending on the timing of such event:

- the development of our product candidates subject to the respective agreements may be terminated or significantly delayed;
- our cash expenditures could increase significantly if it is necessary for us to hire additional employees and allocate scarce resources to the development and commercialization of product candidates;

- we would bear all of the risks and costs related to the further development and commercialization of product candidates that were previously the subject of the respective agreements, including the reimbursement of third parties; and
- in order to fund further development and commercialization of new product candidates or programs, we may need to seek out and establish alternative collaboration arrangements with third-party partners; this may not be possible, or we may not be able to do so on terms which are acceptable to us, in which case it may be necessary for us to limit the size or scope of one or more of our programs or increase our expenditures and seek additional funding by other means.

We may need additional capital in the future in order to expand our business.

Our future capital requirements may be substantial, particularly as we continue to develop our business. Although we believe that, based on our current level of operations, our existing cash, cash equivalents and equity securities will provide adequate funds for ongoing operations, planned capital expenditures and working capital requirements for at least the next 12 months, we may need additional capital if our current plans and assumptions change. Our need for additional capital will depend on many factors, including the financial success of our performance enzyme business, our spending to develop and commercialize new and existing products and the amount of collaboration funding we may receive to help cover the cost of such expenditures, the effect of any acquisitions of other businesses, technologies or facilities that we may make or develop in the future, our spending on new market opportunities, including opportunities in the biotherapeutics markets, and the filing, prosecution, enforcement and defense of patent claims. If our capital resources are insufficient to meet our capital requirements, and we are unable to enter into or maintain collaborations with partners that are able or willing to fund our development efforts or commercialize any products that we develop or enable, we will have to raise additional funds to continue the development of our technology and products and complete the commercialization of products, if any, resulting from our technologies.

In addition, we may choose to raise additional capital due to market conditions or strategic considerations, such as funding investments in our biotherapeutics business, even if we believe we have sufficient funds for our current or future operating plans. We may seek to obtain such additional capital through equity offerings, debt financings, credit facilities and/or strategic collaborations. If future financings involve the issuance of equity securities, our existing stockholders would suffer dilution. If we raise debt financing or enter into credit facilities, we may be subject to restrictive covenants that limit our ability to conduct our business. Strategic collaborations may also place restrictions on our business. We may not be able to raise sufficient additional funds on terms that are favorable to us, if at all. If we fail to raise sufficient funds and fail to generate sufficient revenues to achieve planned gross margins and to control operating costs, our ability to fund our operations, take advantage of strategic opportunities, develop products or technologies, or otherwise respond to competitive pressures could be significantly limited. If this happens, we may be forced to delay or terminate research or development programs or the commercialization of products resulting from our technologies, curtail or cease operations or obtain funds through collaborative and licensing arrangements that may require us to relinquish commercial rights, or grant licenses on terms that are not favorable to us. If adequate funds are not available, we will not be able to successfully execute our business plan or continue our business.

We are dependent on a limited number of customers.

Our current revenues are derived from a limited number of key customers. For the years ended December 31, 2022 and 2021, customers that each individually contributed 10% or more of our total revenue accounted for 56% and 44% of our total revenues in 2022 and 2021, respectively. We expect a limited number of customers to continue to account for a significant portion of our revenues for the foreseeable future. This customer concentration increases the risk of quarterly fluctuations in our revenues and operating results. The loss or reduction of business from one or a combination of our significant customers could, materially adversely affect our revenues, financial condition and results of operations.

Our product supply agreements with customers have finite duration, may not be extended or renewed and generally do not require the customer to purchase any particular quantity or quantities of our products.

Our product supply agreements with customers generally have a finite duration, may not be extended or renewed and generally do not require the customer to purchase any particular quantity or quantities of our products. While our products are not considered commodities and may not be easily substituted for by our customers, particularly when our products are used in the manufacture of active pharmaceutical ingredients, our customers may nevertheless terminate or fail to renew their product supply agreements with us or significantly curtail their purchases thereunder under certain circumstances. Any such termination or reduction could materially adversely affect our revenues, financial condition and results of operations. For the year ended December 31, 2022, we derived a majority of our product revenue from these product supply agreements.

With respect to customers purchasing our products for the manufacture of active pharmaceutical ingredients ("API") for which they have exclusivity due to patent protection, the termination or expiration of such patent protection and any resulting generic competition may materially and adversely affect our revenues, financial condition or results of operations.

With respect to customers purchasing our products for the manufacture of API, or lead to the manufacture of API, for which exclusivity due to patent protection has or is about to expire, we can expect that the quantity of our products sold to such customers for such products may decline as generic competition for the API increases. While we anticipate that we may, in some cases, also be able to sell products to these generic competitors for the manufacture of these APIs, or lead to the manufacture of these APIs, the overall effect on our revenues, financial condition and results of operations could be materially adverse.

We are dependent on a limited number of contract manufacturers for large scale production of substantially all of our enzymes, including CDX-616. We are working to qualify new contract manufacturers to produce certain of our enzymes, including CDX-616, however those efforts may not be successful and therefore we may experience limitations on our ability to supply our enzymes to customers.

Manufacturing of our enzymes is conducted primarily in four locations: our in-house facility in Redwood City, California, and at three third-party contract manufacturing organizations, Lactosan GmbH & Co. KG ("Lactosan"), in Kapfenberg, Austria, ACS Dobfar S.p.A. ("ACSD") (formerly known as DPhar S.p.A.), in Anagni, Italy, and Alphazyme LLC in Florida, United States. Generally, we perform smaller scale manufacturing in-house and outsource the larger scale manufacturing to these contract manufacturers. We have limited internal capacity to manufacture enzymes. As a result, we are dependent upon the performance and capacity of third-party manufacturers for the larger scale manufacturing of the enzymes used in our pharmaceutical and life sciences businesses.

Accordingly, we face risks of difficulties with, and interruptions in, performance by third party manufacturers, the occurrence of which could adversely impact the availability, launch and/or sales of our enzymes in the future. Enzyme manufacturing capacity limitations at our third-party manufacturers and manufacturing delays could negatively affect our business, reputation, results of operations and financial condition. The failure of any contract manufacturer to supply us our required volumes of enzyme on a timely basis, or to manufacture our enzymes in compliance with our specifications or applicable quality requirements or in volumes sufficient to meet demand, would adversely affect our ability to sell pharmaceutical and fine and complex chemicals products, could harm our relationships with our collaborators or customers and could negatively affect our revenues and operating results. We may be forced to secure alternative sources of supply, which may be unavailable on commercially acceptable terms, and could cause delays in our ability to deliver products to our customers, increase our costs and decrease our profit margins.

We currently have supply agreements in place with Lactosan, ACSD and Alphazyme. In the absence of a supply agreement, a contract manufacturer will be under no obligation to manufacture our enzymes and could elect to discontinue their manufacture at any time. If we require additional manufacturing capacity and are unable to obtain it in sufficient quantity, we may not be able to increase our product sales, or we may be required to make substantial capital investments to build that capacity or to contract with other manufacturers on terms that may be less favorable than the terms we currently have with our suppliers. If we choose to build our own additional manufacturing facility, it could take two years or longer before our facility is able to produce commercial volumes of our enzymes. Any resources we expend on acquiring or building internal manufacturing capabilities could be at the expense of other potentially more profitable opportunities. In addition, if we contract with other manufacturers, we may experience delays of several months in qualifying them, which could harm our relationships with our collaborators or customers and could negatively affect our revenues or operating results.

If we are unable to develop and commercialize new products for the pharmaceutical, biotherapeutics, diagnostics and life science tools markets, our business and prospects will be harmed.

We plan to launch new products for the pharmaceutical, biotherapeutics, diagnostics and other life science tools markets. These efforts are subject to numerous risks, including the following:

- customers in these markets may be reluctant to adopt new manufacturing processes that use our enzymes;
- we may be unable to successfully develop the enzymes or manufacturing processes for our products in a timely and cost-effective manner, if at all;
- we may face difficulties in transferring the developed technologies to our customers and the contract manufacturers that we may use for commercial scale production of intermediates and enzymes in these markets;

- the contract manufacturers that we may use may be unable to scale their manufacturing operations to meet the demand for these products and we may be unable to secure additional manufacturing capacity;
- customers may not be willing to purchase these products for these markets from us on favorable terms, if at all;
- we may face product liability litigation, unexpected safety or efficacy concerns and product recalls or withdrawals;
- our customers' products may experience adverse events or face competition from new products, which would reduce demand for our products;
- we may face pressure from existing or new competitive products; and
- we may face pricing pressures from existing or new competitors, some of which may benefit from government subsidies or other incentives.

Competitors and potential competitors who have greater resources and experience than we do may develop products and technologies that make ours obsolete or may use their greater resources to gain market share at our expense.

The biocatalysis industry and each of our target markets are characterized by rapid technological change. Our future success will depend on our ability to maintain a competitive position with respect to technological advances. In addition, as we enter new markets, we will face new competition and will need to adapt to competitive factors that may be different from those we face today.

We are aware that other companies, including Royal DSM, N.V. ("DSM"), BASF, Bayer and Novozymes have alternative methods for obtaining and generating genetic diversity or use mutagenesis techniques to produce genetic diversity. Academic institutions such as the California Institute of Technology, the Max Planck Institute and the Austrian Centre of Industrial Biotechnology are also working in this field. Technological development by others may result in our technology, products and services, as well as products developed by our customers using our biocatalysts, becoming obsolete.

Our primary competitors in the performance enzymes for pharmaceutical productsare companies marketing either conventional, non-enzymatic processes or biocatalytic enzymes to manufacturers of pharmaceutical intermediates and APIs, and also existing in-house technologies (both biocatalysts and conventional catalysts) within our client and potential client companies. The principal methods of competition and competitive differentiation in this market are price, product quality and performance, including manufacturing yield, safety and environmental benefits, and speed of delivery of product. Pharmaceutical manufacturers that use biocatalytic processes can face increased competition from manufacturers that use more conventional processes and/or manufacturers that are based in regions (such as India and China) with lower regulatory, safety and environmental costs.

The market for the manufacture and supply of APIs and intermediates is large with many established companies. These companies include many of our large innovator and generic pharmaceutical customers, such as Merck, GSK, Novartis, Pfizer, Bristol-Myers, Kyorin, Urovant and Teva which have significant internal research and development efforts directed at developing processes to manufacture APIs and intermediates. The processes used by these companies include classical conventional organic chemistry reactions, chemo catalytic reactions, biocatalytic reactions or combinations thereof. Our biocatalytic based manufacturing processes must compete with these internally developed routes. Additionally, we also face competition from companies developing and marketing conventional catalysts such as Solvias Inc., BASF and Takasago International Corporation.

The market for supplying enzymes for use in pharmaceutical manufacturing is quite fragmented. There is competition from large industrial enzyme companies, such as Novozymes and DuPont, as well as subsidiaries of larger contract research/contract manufacturing organizations, such as DSM, Cambrex Corporation, Lonza, WuXi STA and Almac Group Ltd. Some fermentation pathway design companies, like Ginkgo Bioworks (who recently acquired Zymergen), whose traditional focus has been to design microorganisms that express small molecule chemicals, could extend into designing organisms that express enzymes. There is also competition in the enzyme customization and optimization area from several smaller companies, such as BRAIN AG, Arzeda, c-LEcta GmbH and Evocatal GmbH.

We entered the fine chemicals market in 2013, by applying our protein engineering technology in the food market. We face similar forms of competition in this market as in the pharmaceutical markets with the exception that the risk of losing opportunities to larger competitors in fine chemicals is greater given the larger scale of opportunities available in the fine chemicals market compared to the pharmaceutical market. Our significant competitors in the fine chemicals markets include companies that have been in these marketplaces for many years, such as DuPont Industrial Biosciences ("DuPont Genencor"), DSM, Novozymes and A.B. Enzymes. These companies have greater resources in these markets than we do and have long-term supply arrangements already in place with customers. Our ability to compete in these markets may be limited by our relatively late entrance. We also face competition in both the fine chemicals and pharmaceutical markets from emerging companies offering whole cell metabolic pathway approaches to these markets.

There are numerous companies that participate in the biotherapeutics market generally and the PKU market specifically. Many of these companies are large, successful and well-capitalized. BioMarin Pharmaceutical Inc. ("BioMarin") and Daiichi Sankyo Company market Kuvan® in the United States, Europe and Japan for the treatment of a certain type of PKU. In addition, BioMarin gained US FDA approval in 2018 and began commercial sales of Palynziq™ as an injectable enzyme substitution therapy for the potential treatment of PKU. Several companies, i.e., Synlogic, Homology Medicines and Rubius have reported clinical efforts to develop biotherapeutic candidates for PKU. Beyond targeting PKU, Takeda (who acquired Shire Plc in 2019), Genzyme / Sanofi S.A., BioMarin and other companies market or are actively developing new enzyme therapeutics. There are numerous companies that are developing other forms of therapeutics, such as small molecules, gene therapies, as well as therapies based on gene editing, which could compete with biotherapeutics.

Our ability to compete successfully in any of these markets will depend on our ability to develop proprietary products that reach the market in a timely manner and are technologically superior to and/or are less expensive than other products on the market. Many of our competitors have substantially greater production, financial, research and development, personnel and marketing resources than we do. They also started developing products earlier than we did, which may allow them to establish blocking intellectual property positions or bring products to market before we can. In addition, certain of our competitors may also benefit from local government subsidies and other incentives that are not available to us. As a result, our competitors may be able to develop competing and/or superior technologies and processes, and compete more aggressively and sustain that competition over a longer period of time than we could. Our technologies and products may be rendered obsolete or uneconomical by technological advances or entirely different approaches developed by one or more of our competitors. We cannot be certain that any products we develop in the future will compare favorably to products offered by our competitors or that our existing or future products will compare favorably to any new products that are developed by our competitors. As more companies develop new intellectual property in our markets, the possibility of a competitor acquiring patent or other rights that may limit our products or potential products increases, which could lead to litigation.

Our limited resources relative to many of our competitors may cause us to fail to anticipate or respond adequately to new developments and other competitive pressures. This failure could reduce our competitiveness and market share, adversely affect our results of operations and financial position, and prevent us from obtaining or maintaining profitability.

The ongoing COVID-19 pandemic has adversely affected and may continue in the future to, directly or indirectly, adversely affect our business, results of operations and financial condition.

The COVID-19 pandemic has had, and continues to have, a significant impact globally, prompting governments and businesses to take unprecedented measures in response. In the United States, the COVID-19 pandemic has and may continue in the future to, directly or indirectly, adversely affect our business, results of operations and financial condition, including as a result of compliance with governmental orders governing the operation of businesses during the pandemic, the temporary closure of our Redwood City, California facilities from mid-March 2020 through the end of April 2020 and disruption of our research and development operations.

In the future, our business could be materially adversely affected, directly or indirectly, by the widespread outbreak of contagious disease, including the ongoing COVID-19 pandemic. National, state and local governments in affected regions have implemented and may continue to implement safety precautions, including quarantines, border closures, increased border controls, travel restrictions, governmental orders and shutdowns, business closures, cancellations of public gatherings and other measures. Organizations and individuals are taking additional steps to avoid or reduce infection, including limiting travel and staying home from work. These measures are disrupting normal business operations both in and outside of affected areas and have had significant negative impacts on businesses and financial markets worldwide.

The potential impact and duration of COVID-19 or another pandemic or public health crisis has had and could continue to have, significant repercussions across regional, national and global economies and financial markets, and could trigger a period of regional, national and global economic slowdown or regional, national or global recessions. The outbreak of COVID-19 in many countries continues to adversely impact regional, national and global economic activity and has contributed to significant volatility and negative pressure in financial markets. As a result, we may experience difficulty accessing debt and equity capital on attractive terms, or at all, due to the severe disruption and instability in the global financial markets. In addition, our customers may terminate or amend their agreements for the purchase of our technology, products and services due to bankruptcy, lack of liquidity, lack of funding, operational failures or other reasons.

Revenues in in future years from our sales of CDX-616 to Pfizer are subject to a number of factors which are outside of our control and may not materialize.

Starting the first and second quarters of 2021, we began to receive purchase orders from Pfizer, Inc. ("Pfizer") for large quantities of our proprietary enzyme product, CDX-616, for use by Pfizer in the manufacture of a critical intermediate for its proprietary active pharmaceutical ingredient, nirmatrelvir. Pfizer markets, sells and distributes nirmatrelvir, in combination with the active pharmaceutical ingredient ritonavir, as its PAXLOVID™ (nirmatrelvir tablets; ritonavir tablets) product, which received emergency use authorization ("EUA") by the U.S. Food and Drug Administration ("FDA") in late 2021 for the treatment of mild-to-moderate COVID-19 in adults and pediatric patients (12 years of age and older weighing at least 40 kg) with positive results of direct severe acute respiratory syndrome coronavirus 2 ("SARS-CoV-2") viral testing, and who are at high risk for progression to severe COVID-19, including hospitalization or death.

The FDA has the authority to issue an EUA under certain circumstances, such as during a public health emergency, pursuant to a declaration by the Secretary of the Department of Health and Human Services ("HHS"), that an emergency exists justifying the issuance of EUAs for certain types of products (referred to as EUA declarations). On March 27, 2020, the Secretary of HHS declared that circumstances exist justifying authorization of drugs and biologics during the COVID-19 pandemic, subject to the terms of any EUA that is issued for a specific product. Once an EUA declaration has been issued, the FDA can issue EUAs for products that fall within the scope of that declaration. To issue an EUA, the FDA Commissioner must conclude that (1) the chemical, biological, radioactive or nuclear agent ("CBRN") that is referred to in the EUA declaration can cause serious or life-threatening diseases or conditions; (2) based on the totality of scientific evidence available, it is reasonable to believe that the product may be effective in diagnosing, treating, or preventing the disease or condition attributable to the CBRN and that the product's known and potential benefits outweigh its known and potential risks; and (3) there is no adequate, approved, and available alternative to the product. the authorization to market products under an EUA is limited to the period of time the EUA declaration is in effect, and the FDA can revoke an EUA in certain circumstances. The FDA's policies regarding an EUA can change unexpectedly. We cannot predict how long Pfizer's EUA will remain in place. The FDA's policies regarding products used to diagnose, treat or mitigate COVID-19 remain in flux as the FDA responds to new and evolving public health information and clinical evidence. Therefore, it is possible that Pfizer's EUA may be revoked, which could adversely affect our financial condition and results of operations.

Revenues in 2023 and in future years from our sales of CDX-616 to Pfizer and other potential customers (including sublicensees of Pfizer technology from The Medicines Patent Pool (the "MPP")) are subject to a number of factors which are outside of our control, including, without limitation, the following, all of which could reduce or eliminate our sales of CDX-616, and therefore materially and adversely affect our business, results of operations and financial condition:

- Pfizer has no future binding commitment to purchase any particular quantity or quantities of CDX-616 from us, and we are dependent upon Pfizer continuing to place orders with us (whether on a spot basis or under a long term agreement, when and if executed) for their requirements, if any, for CDX-616;
- to our knowledge, sublicensees of Pfizer technology from the MPP have no obligation to purchase CDX-616 from us under their sublicenses with the MPP;
- the EUA granted by the FDA for the use of PAXLOVID™ for the treatment of COVID-19 infections in humans could be withdrawn at any time;
- future vaccine development and usage and the development and usage of other new therapies for the treatment or elimination of COVID-19 may eliminate or reduce demand for PAXLOVID™;
- new variants of COVID-19 may emerge which PAXLOVID™ is not effective in treating;
- Pfizer may not ultimately receive full marketing authorization for PAXLOVID™ from the FDA and other international regulatory authorities;
- Pfizer could reformulate or make changes in the manufacturing process for nirmatrelvir which would eliminate or reduce demand for the use of CDX-616 in its manufacture;

- sublicensees of Pfizer technology for the manufacture, sale and distribution of PAXLOVID™ from the MPP may not utilize CDX-616 in the manufacture of nirmatrelvir;
- national and regional governmental authorities (including those of the United States government) may mandate that raw materials and intermediates used in the manufacture of PAXLOVID™ to be marketed, sold and distributed within the borders of that country be domestically produced, which could eliminate or reduce demand for the use of CDX-616 in such country; and
- we may be unable (because of lack of available manufacturing capacity at our contract manufacturers, supply chain disruptions or an inability to obtain applicable regulatory approvals) to manufacture the quantities of CDX-616 that Pfizer may desire to purchase from us.

We have investments in non-marketable securities, which may subject us to significant impairment charges.

We have investments in illiquid non-marketable equity securities acquired in private transactions. At December 31, 2022, 8.2% of our consolidated assets consisted of investment securities, which are illiquid investments. Investments in illiquid, or non-marketable, securities are inherently risky and difficult to value. We account for our non-marketable equity securities under the measurement alternative. Under the measurement alternative, the carrying value of our non-marketable equity investments is adjusted to fair value for observable transactions for identical or similar investments of the same issuer or impairment. We evaluate our investment in non-marketable securities when circumstances indicate that we may not be able to recover the carrying value. We may impair these securities and establish an allowance for a credit loss when we determine that there has been an "other-than-temporary" decline in estimated fair value of the equity security compared to its carrying value. The impairment analysis requires significant judgment to identify events or circumstances that would likely have a material adverse effect on the fair value of the investment. Because over 5% of our total assets consisted of non-marketable investment securities, any future impairment charges from the write down in value of these securities could have a material adverse effect on our financial condition or results of operations.

Ethical, legal and social concerns about genetically engineered products and processes could limit or prevent the use of our technology, products and processes and limit our revenues.

Some of our technology, products and services are genetically engineered or involve the use of genetically engineered products or genetic engineering technologies. If we and/or our collaborators are not able to overcome the ethical, legal, and social concerns relating to genetic engineering, our technology, products and services may not be accepted. Any of the risks discussed below could result in increased expenses, delays, or other impediments to our programs or the public acceptance and commercialization of products and processes dependent on our technologies or inventions. Our ability to develop and commercialize one or more of our technologies, products, or processes could be limited by the following factors:

- public attitudes about the safety and environmental hazards of, and ethical concerns over, genetic research and genetically engineered products and processes, which could influence public acceptance of our technologies, products and processes;
- public attitudes regarding, and potential changes to laws governing ownership of genetic material, which could harm our intellectual property rights with respect to our genetic material and discourage collaborators from supporting, developing, or commercializing our technology, products and services; and
- governmental reaction to negative publicity concerning genetically modified organisms, which could result in greater government regulation of genetic research and derivative products.

The subject of genetically modified organisms has received negative publicity, which has aroused public debate. This adverse publicity could lead to greater regulation and trade restrictions on imports of genetically altered products. The biocatalysts that we develop have significantly enhanced characteristics compared to those found in naturally occurring enzymes or microbes. While we produce our biocatalysts only for use in a controlled industrial environment, the release of such biocatalysts into uncontrolled environments could have unintended consequences. Any adverse effect resulting from such a release could have a material adverse effect on our business and financial condition, and we may have exposure to liability for any resulting harm.

We use hazardous materials in our business and we must comply with environmental laws and regulations. Any claims relating to improper handling, storage or disposal of these materials or noncompliance of applicable laws and regulations could be time consuming and costly and could adversely affect our business and results of operations.

Our research and development and commercial processes involve the use of hazardous materials, including chemical, radioactive and biological materials. Our operations also produce hazardous waste. We cannot eliminate entirely the risk of accidental contamination or discharge and any resultant injury from these materials. Federal, state, local and foreign laws and regulations govern the use, manufacture, storage, handling and disposal of, and human exposure to, these materials. We may be sued for any injury or contamination that results from our use or the use by third parties of these materials, and our liability may exceed our total assets. Although we believe that our activities comply in all material respects with environmental laws, there can be no assurance that violations of environmental, health and safety laws will not occur in the future as a result of human error, accident, equipment failure or other causes. Compliance with applicable environmental laws and regulations may be expensive, and the failure to comply with past, present or future laws could result in the imposition of fines, third party property damage, product liability and personal injury claims, investigation and remediation costs, the suspension of production or a cessation of operations, and our liability may exceed our total assets. Liability under environmental laws can be joint and several and without regard to comparative fault. Environmental laws could become more stringent over time imposing greater compliance costs and increasing risks and penalties associated with violations, which could impair our research, development or production efforts and harm our business. In addition, we may have to indemnify some of our customers or suppliers for losses related to our failure to comply with environmental laws, which could expose us to significant liabilities.

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

In general, under Section 382 of the Internal Revenue Code of 1986, as amended (the "Code"), a corporation that undergoes an "ownership change" is subject to limitations on its ability to utilize its pre-change net operating loss carryforwards ("NOLs"), to offset future taxable income. If the Internal Revenue Service challenges our analysis that our existing NOLs are not subject to limitations arising from previous ownership changes, our ability to utilize NOLs could be limited by Section 382 of the Code. Future changes in our stock ownership, some of which are outside of our control, could result in an ownership change under Section 382 of the Code. Furthermore, our ability to utilize NOLs of companies that we may acquire in the future may be subject to limitations. For these reasons, we may not be able to utilize a material portion of the NOLs reflected in our financial statements, even if we attain profitability.

As a public reporting company, we are subject to rules and regulations established from time to time by the SEC and Nasdaq regarding our internal controls over financial reporting. We may not complete needed improvements to our internal controls over financial reporting in a timely manner, or these internal controls may not be determined to be effective, which may adversely affect investor confidence in our company and, as a result, the value of our common stock and your investment.

We are subject to the rules and regulations established from time to time by the Securities and Exchange Commission, and Nasdaq. These rules regulations require, among other things, that we establish and periodically evaluate procedures with respect to our internal controls over financial reporting. As part of these evaluations, material weaknesses in our internal controls over financial reporting may be identified. A material weakness is a deficiency, or a combination of deficiencies, in internal controls over financial reporting such that there is a reasonable possibility that a material misstatement of a company's annual or interim consolidated financial statements will not be prevented or detected on a timely basis. While we were able to remediate previously identified material weaknesses in our internal controls over financial reporting, there can be no guarantee we will not identify similar or other material weaknesses in the future and if such material weaknesses are identified, there can be no guarantee we would be able to remediate such material weaknesses. Any material weaknesses in our internal controls may adversely affect our ability to record, process, summarize and accurately report timely financial information and, as a result, our consolidated financial statements may contain material misstatements or omissions.

Reporting obligations as a public company place a considerable strain on our financial and management systems, processes and controls, as well as on our personnel. In addition, as a public company we are required to document and test our internal controls over financial reporting pursuant to Section 404 of the Sarbanes-Oxley Act so that our management can certify as to the effectiveness of our internal controls over financial reporting. Likewise, our independent registered public accounting firm is required to provide an attestation report on the effectiveness of our internal controls over financial reporting in our Annual Reports on Form 10-K. If our management is unable to certify the effectiveness of our internal controls or if our independent registered public accounting firm cannot deliver a report attesting to the effectiveness of our internal controls over financial reporting, or if we identify or fail to remediate material weaknesses in our internal controls, we could be subject to regulatory scrutiny and a loss of public confidence, which could seriously harm our reputation and the market price of our common stock. In addition, if we do not maintain adequate financial and management personnel, processes and controls, we may not be able to manage our business effectively or accurately report our financial performance on a timely basis, which could cause a decline in our common stock price and may seriously harm our business.

If we engage in any acquisitions, we will incur a variety of costs and may potentially face numerous risks that could adversely affect our business and operations.

We have made acquisitions in the past, and if appropriate opportunities become available, we expect to acquire additional businesses, assets, technologies, or products to enhance our business in the future. For example, in October 2010, we acquired substantially all of the patents and other intellectual property rights associated with Maxygen's directed evolution technology.

In connection with any future acquisitions, we could:

- issue additional equity securities, which would dilute our current stockholders;
- incur substantial debt to fund the acquisitions;
- use our cash to fund the acquisitions; or
- assume significant liabilities including litigation risk.

Acquisitions involve numerous risks, including problems integrating the purchased operations, technologies or products, unanticipated costs and other liabilities, diversion of management's attention from our core businesses, adverse effects on existing business relationships with current and/or prospective collaborators, customers and/or suppliers, risks associated with entering markets in which we have no or limited prior experience and potential loss of key employees. We do not have extensive experience in managing the integration process and we may not be able to successfully integrate any businesses, assets, products, technologies or personnel that we might acquire in the future without a significant expenditure of operating, financial and management resources, if at all. The integration process could divert management's time from focusing on operating our business, result in a decline in employee morale and cause retention issues to arise from changes in compensation, reporting relationships, future prospects or the direction of the business. Acquisitions may also require us to record goodwill and non-amortizable intangible assets that will be subject to impairment testing on a regular basis and potential periodic impairment charges, incur amortization expenses related to certain intangible assets, and incur large and immediate write offs and restructuring and other related expenses, all of which could harm our operating results and financial condition. In addition, we may acquire companies that have insufficient internal financial controls, which could impair our ability to integrate the acquired company and adversely impact our financial reporting. If we fail in our integration efforts with respect to any of our acquisitions and are unable to efficiently operate as a combined organization, our business and financial condition may be adversely affected.

Risks Related to Government Regulation and Clinical Product Development

We or our customers may not be able to obtain regulatory approval for the use of our products in food and food ingredients, if required, and, even if approvals are obtained, complying on an ongoing basis with the numerous regulatory requirements applicable to these products will be time-consuming and costly.

The products that we develop for our food and food ingredient customers are, and any other products that we may develop for the food and food ingredients market will likely be, subject to regulation by various government agencies, including the FDA, state and local agencies and similar agencies outside the United States, as well as religious compliance certifying organizations. Food ingredients are regulated by the FDA either as food additives or as substances generally recognized as safe ("GRAS"). A substance can be listed or affirmed as GRAS by the FDA or self-affirmed by its manufacturer upon determination that independent qualified experts would generally agree that the substance is GRAS for a particular use. While we generally self-affirm GRAS status for the ingredients used in the products that we develop for the food market, our customer(s) may be required to submit a GRAS notification to FDA to establish that ingredients in a final commercial product may be considered GRAS. There can be no assurance that our customer(s) will not receive any objections from the FDA with respect to any GRAS notification our customer(s) may submit. If the FDA were to disagree with our customer's determination that their commercial product and/or its ingredients are GRAS or otherwise compliant, the FDA could ask such customer to voluntarily withdraw the final commercial product from the market or could initiate legal action to halt its sale. Such actions by the FDA could have an adverse effect on our business, financial condition, and results of our operations. Food ingredients that are not GRAS are regulated as food additives and require FDA approval prior to commercialization or must be the subject of an existing food additive regulation. The food additive petition process for ingredients that are not already authorized by regulation is generally expensive and time consuming, with approval, if secured, potentially taking years.

Our ongoing efforts to deploy our technology in the life science tools markets may fail.

We have recently begun to use our CodeEvolver® protein engineering technology platform to develop new products for customers using NGS and PCR/qPCR for*in vitro* molecular diagnostic applications. while we have entered into some license agreements for products in this market, we do not know if we can successfully compete in this new market. This new market is well established and consists of numerous large, well-funded entrenched market participants who have long and established track records and customer relationships. In December 2019, we licensed our first proprietary enzyme for this market, EvoT4™ DNA ligase, which is designed to improve library preparation for NGS users, to Roche. This enzyme, and any products that we may develop in the future for this market, may not succeed in displacing current products. If we succeed in commercializing new products for this market, we may not generate significant revenues and cash flows from these activities. The failure to successfully deploy products on timely basis in this space may limit our growth and have a material adverse effect on our financial condition, operating results and business prospects.

The regulatory approval processes of the FDA and comparable foreign authorities are lengthy, time consuming and inherently unpredictable, and if we are ultimately unable to obtain regulatory approval for our product candidates, our business will be substantially harmed.

We and any collaborators are not permitted to commercialize, market, promote or sell any product candidate in the United States without obtaining marketing approval from the FDA. Foreign regulatory authorities impose similar requirements. The time required to obtain approval by the FDA and comparable foreign authorities is unpredictable, but typically takes many years following the commencement of clinical trials and depends upon numerous factors, including substantial discretion of the regulatory authorities. In addition, approval policies, regulations or the type and amount of clinical data necessary to gain approval may change during the course of a product candidate's clinical development and may vary among jurisdictions. We and any collaborators must complete additional preclinical or nonclinical studies and clinical trials to demonstrate the safety, purity and potency (or efficacy) of our product candidates in humans to the satisfaction of the regulatory authorities before we will be able to obtain these approvals. Our product candidates could fail to receive regulatory approval for many reasons, including the following:

- the FDA or comparable foreign regulatory authorities may disagree with the design or implementation of our or our collaborators' clinical trials;
- we or our collaborators may be unable to demonstrate to the satisfaction of the FDA or comparable foreign regulatory authorities that a product candidate is safe and effective for its proposed indication;
- the results of clinical trials may not meet the level of statistical significance required by the FDA or comparable foreign regulatory authorities for approval;
- we or our collaborators may be unable to demonstrate that a product candidate's clinical and other benefits outweigh its safety risks;

- the FDA or comparable foreign regulatory authorities may disagree with our or our collaborators' interpretation of data from preclinical studies or clinical trials;
- the data collected from clinical trials of product candidates may not be sufficient to support the submission of a BLA to obtain regulatory approval in the United States or elsewhere;
- the FDA or comparable foreign regulatory authorities may fail to approve the manufacturing processes or facilities of third-party manufacturers with which we or our collaborators contract for clinical and commercial supplies;
- the FDA or comparable foreign regulatory authorities may fail to approve the companion diagnostics we contemplate developing with collaborators; and
- the approval policies or regulations of the FDA or comparable foreign regulatory authorities may significantly change in a manner rendering our or our collaborators' clinical data insufficient for approval.

This lengthy approval process as well as the unpredictability of future clinical trial results may result in our failing to obtain regulatory approval to market our product candidates, which would significantly harm our business, results of operations and prospects. In addition, even if we were to obtain approval, regulatory authorities may approve any of our product candidates for fewer or more limited indications than we request, may impose significant limitations in the form of narrow indications, warnings, or a REMS. Regulatory authorities may not approve the price we or our collaborators intend to charge for products we may develop, may grant approval contingent on the performance of costly post-marketing clinical trials, or may approve a product candidate with a label that does not include the labeling claims necessary or desirable for the successful commercialization of that product candidate. Any of the foregoing scenarios could materially harm the commercial prospects for our product candidates.

Clinical trials are difficult to design and implement, expensive, time-consuming and involve an uncertain outcome, and the inability to successfully conduct clinical trials and obtain regulatory approval for our product candidates would substantially harm our business.

Clinical testing is expensive and usually takes many years to complete, and its outcome is inherently uncertain. Failure can occur at any time during the clinical trial process, and product candidates in later stages of clinical trials may fail to show the desired safety and efficacy traits despite having progressed through preclinical studies and initial clinical trials. We do not know whether planned clinical trials will begin on time, need to be redesigned, recruit and enroll patients on time or be completed on schedule, or at all. Clinical trials can be delayed, suspended or terminated for a variety of reasons, including in connection with:

- the inability to generate sufficient preclinical, toxicology or other *in vivo* or *in vitro* data to support the initiation of clinical trials;
- applicable regulatory authorities disagreeing as to the design or implementation of the clinical trials;
- obtaining regulatory authorization to commence a trial;
- reaching an agreement on acceptable terms with prospective contract research organizations ("CROs"), and clinical trial sites, the terms of which can be subject to extensive negotiation and may vary significantly among different CROs and trial sites;
- obtaining IRB approval at each site;
- developing and validating the companion diagnostic to be used in a clinical trial, if applicable;
- insufficient or inadequate supply or quality of product candidates or other materials necessary for use in clinical trials, or delays in sufficiently developing, characterizing or controlling a manufacturing process suitable for clinical trials;
- recruiting and retaining enough suitable patients to participate in a trial;
- having enough patients complete a trial or return for post-treatment follow-up;
- adding a sufficient number of clinical trial sites;
- inspections of clinical trial sites or operations by applicable regulatory authorities, or the imposition of a clinical hold;
- clinical sites deviating from trial protocol or dropping out of a trial;
- the inability to demonstrate the efficacy and benefits of a product candidate;
- discovering that product candidates have unforeseen safety issues, undesirable side effects or other unexpected characteristics;

- addressing patient safety concerns that arise during the course of a trial; receiving untimely or unfavorable feedback from applicable regulatory authorities regarding the trial or requests from regulatory authorities to modify the design of a trial;
- non-compliance with applicable regulatory requirements by us or third parties or changes in such regulations or administrative actions;
- suspensions or terminations by IRBs of the institutions at which such trials are being conducted, by the Data Safety Monitoring Board for such trial or by the FDA or other regulatory authorities due to a number of factors, including those described above;
- third parties being unable or unwilling to satisfy their contractual obligations to us; or
- changes in our financial priorities, greater than anticipated costs of completing a trial or our inability to continue funding the trial.

Many of the factors that cause, or lead to, a delay in the commencement or completion of clinical trials may also ultimately lead to the denial of regulatory approval of our product candidates. Additionally, we or our collaborators may experience unforeseen events during or resulting from clinical trials that could delay or prevent receipt of marketing approval for or commercialization of product candidates. For example, clinical trials of product candidates may produce negative, inconsistent or inconclusive results, and we may decide, or regulators may require us, to conduct additional clinical trials or abandon development programs. Regulators may also revise the requirements for approving the product candidates, or such requirements may not be as we anticipate. If we or our collaborators are required to conduct additional clinical trials or other testing of product candidates beyond those that we or our collaborators currently contemplate, if we or our collaborators are unable to successfully complete clinical trials or other testing of such product candidates, if the results of these trials or tests are not positive or are only modestly positive or if there are safety concerns, we may:

- incur unplanned costs;
- be delayed in obtaining or fail to obtain marketing approval for product candidates;
- obtain marketing approval in some countries and not in others;
- obtain marketing approval for indications or patient populations that are not as broad as intended or desired;
- obtain marketing approval with labeling that includes significant use or distribution restrictions or safety warnings, including boxed warnings;
- be subject to additional post-marketing testing requirements;
- be subject to changes in the way the product is administered;
- have regulatory authorities withdraw or suspend their approval of the product or impose restrictions on its distribution;
- be sued; or
- experience damage to our reputation.

If we or our collaborators experience delays in the commencement or completion of our clinical trials, or if we or our collaborators terminate a clinical trial prior to completion, we may experience increased costs, have difficulty raising capital and/or be required to slow down the development and approval process timelines. Furthermore, the product candidates that are the subject of such trials may never receive regulatory approval, and their commercial prospects and our ability to generate product revenues from them could be impaired or not realized at all.

Results of preclinical studies and early clinical trials of product candidates may not be predictive of results of later studies or trials. Our product candidates may not have favorable results in later clinical trials, if any, or receive regulatory approval.

Preclinical and clinical drug development is expensive and can take many years to complete, and its outcome is inherently uncertain. Failure can occur at any time during the drug development process. Despite promising preclinical or clinical results, any product candidate can unexpectedly fail at any stage of preclinical or clinical development. The historical failure rate for product candidates in our industry is high. The results from preclinical studies or early clinical trials of a product candidate may not be predictive of the results from later preclinical studies or clinical trials, and interim results of a clinical trial are not necessarily indicative of final results. Product candidates in later stages of clinical trials may fail to show the desired safety and efficacy characteristics despite having progressed through preclinical studies and initial clinical trials.

Many companies in the biopharmaceutical and biotechnology industries have suffered significant setbacks at later stages of development after achieving positive results in early stages of development, and we may face similar setbacks. These setbacks have been caused by, among other things, preclinical findings made while clinical trials were underway or safety or efficacy observations made in clinical trials, including previously unreported adverse events. Moreover, non-clinical and clinical data are often susceptible to varying interpretations and analyses, and many companies that believed their product candidates performed satisfactorily in preclinical studies and clinical trials nonetheless failed to obtain regulatory approval. Even if any product candidates progress to clinical trials, these product candidates may fail to show the safety and efficacy in clinical development required to obtain regulatory approval, despite the observation of positive results in animal studies. Our or our collaborators' failure to replicate positive results from early research programs and preclinical or greenhouse studies may prevent us from further developing and commercializing those or other product candidates, which would limit our potential to generate revenues from them and harm our business and prospects.

For the foregoing reasons, we cannot be certain that any ongoing or future preclinical studies or clinical trials will be successful. Any safety or efficacy concerns observed in any one of our preclinical studies or clinical trials in a targeted area could limit the prospects for regulatory approval of product candidates in that and other areas, which could have a material adverse effect on our business and prospects.

We may not be able to maintain orphan drug designations for certain of our product candidates, and may be unable to maintain the benefits associated with orphan drug designation, including the potential for market exclusivity.

Regulatory authorities in some jurisdictions, including the U.S. and Europe, may designate drugs for relatively small patient populations as orphan drugs. Under the Orphan Drug Act of 1983, the FDA may designate a product candidate as an orphan product if it is intended to treat a rare disease or condition, which is generally defined as a patient population of fewer than 200,000 individuals in the U.S., or a patient population of greater than 200,000 individuals in the U.S., but for which there is no reasonable expectation that the cost of developing the drug will be recovered from sales in the U.S. The FDA has granted orphan drug designation to CDX-6512 for the treatment of HCU and to CDX-6210 for the treatment of Maple Syrup Urine Disease (MSUD).

In the U.S., orphan designation entitles a party to financial incentives such as opportunities for grant funding for clinical trial costs, tax advantages and user-fee waivers. In addition, if a product candidate that has orphan designation subsequently receives the first FDA approval for the disease for which it has such designation, the product is entitled to orphan drug exclusivity, which means that the FDA may not approve any other applications, including a BLA, to market the same drug for the same disease or condition for seven years, except in limited circumstances, such as a showing of clinical superiority to the product with orphan exclusivity or where the manufacturer is unable to assure sufficient product quantity.

Even if we obtain orphan drug exclusivity for a product, that exclusivity may not effectively protect the product from competition because different drugs can be approved for the same disease condition. Even after an orphan drug is approved, the FDA can subsequently approve the same drug for the same disease condition if such regulatory authority concludes that the later drug is clinically superior if it is shown to be safer, more effective or makes a major contribution to patient care. Orphan drug designation neither shortens the development time or regulatory review time of a drug nor gives the drug any advantage in the regulatory review or approval process.

We have obtained rare pediatric disease designation for CDX-6512 and CDX-6120, however, there is no guarantee that such designation will result in approval of CDX-6512 or CDX-6210, and even if we obtain approval of CDX-6512 or CDX-6210 for the indications for which we have been awarded rare pediatric disease designation, there is no guarantee that such approval will result in an aware of a rare pediatric disease priority review voucher.

In 2012, Congress authorized the FDA to award priority review vouchers to sponsors of certain rare pediatric disease product applications. This program is designed to encourage development of new drug and biological products for the prevention and treatment of certain rare pediatric diseases. Specifically, under this program, a sponsor who receives an approval for a drug or biologic for a "rare pediatric disease" that meets certain criteria may qualify for a voucher that can be redeemed to receive a priority review of a subsequent marketing application for a different product, even if that subsequent marketing application would not otherwise qualify for priority review on its own. The sponsor of a rare pediatric disease product receiving a priority review voucher may transfer (including by sale) the voucher to another sponsor. The voucher may be further transferred any number of times before the voucher is used, as long as the sponsor making the transfer has not yet submitted the application. The FDA may also revoke any priority review voucher if the rare pediatric disease drug for which the voucher was awarded is not marketed in the U.S. within one year following the date of approval.

We have obtained rare pediatric disease designation for CDX-6512 for the treatment of HCU and for CDX-6210 for the treatment of MSUD. Even though we have obtained rare pediatric disease designations, there is no guarantee that we will be able to obtain a priority review voucher, even if CDX-6512 and/or CDX-6210 are approved by the FDA. Moreover, Congress included a sunset provision in the statute authorizing the rare pediatric disease priority review voucher program. On December 27, 2020, the Rare Pediatric Disease Priority Review Voucher Program was extended, and under the current statutory sunset provisions, after September 30, 2024, FDA may only award a voucher for an approved rare pediatric disease product application if the sponsor has rare pediatric disease designation for the drug, and that designation was granted by September 30, 2024. After September 30, 2026, FDA may not award any rare pediatric disease priority review vouchers (unless Congress amends the law to extend the program further).

Disruptions at the FDA and other government agencies caused by funding shortages or global health concerns could hinder their ability to hire, retain, or deploy key leadership and other personnel, or otherwise prevent new or modified products from being developed, approved, or commercialized in a timely manner, or at all, which could negatively impact our business.

The ability of the FDA and other government agencies to review and approve new products can be affected by a variety of factors, including government budget and funding levels, statutory, regulatory and policy changes, a government agency's ability to hire and retain key personnel and accept the payment of user fees, and other events that may otherwise affect the government agency's ability to perform routine functions. Average review times at the FDA and other government agencies have fluctuated in recent years as a result. In addition, government funding of other government agencies that fund research and development activities is subject to the political process, which is inherently fluid and unpredictable. Disruptions at the FDA and other agencies may also slow the time necessary for new drugs and biologics or modifications to approved drugs or biologics to be reviewed and/or approved by necessary government agencies, which would adversely affect our business. For example, over the last several years, the United States government has shut down several times and certain regulatory agencies, such as the FDA, have had to furlough critical FDA employees and stop critical activities.

Separately, in response to the COVID-19 pandemic, the FDA postponed most inspections of domestic and foreign manufacturing facilities at various points. Even though the FDA has since resumed standard inspection operations of domestic facilities where feasible, the FDA has continued to monitor and implement changes to its inspectional activities to ensure the safety of its employees and those of the firms it regulates as it adapts to the evolving COVID-19 pandemic, and any resurgence of the virus or emergence of new variants may lead to further inspectional delays. Regulatory authorities outside the United States may adopt similar restrictions or other policy measures in response to the COVID-19 pandemic. If a prolonged government shutdown occurs, or if global health concerns continue to hinder or prevent the FDA or other regulatory authorities from conducting their regular inspections, reviews, or other regulatory activities, it could significantly impact the ability of the FDA or other regulatory authorities to timely review and process our regulatory submissions, which could have a material adverse effect on our business.

Even if we obtain regulatory approval for any products that we develop alone or with collaborators, such products will remain subject to ongoing regulatory requirements, which may result in significant additional expense.

Even if products we develop alone or with collaborators receive regulatory approval, they will be subject to ongoing regulatory requirements for manufacturing, labeling, packaging, distribution, storage, advertising, promotion, sampling, record-keeping and submission of safety and other post-market information, among other things. Any regulatory approvals received for such products may also be subject to limitations on the approved indicated uses for which they may be marketed or to the conditions of approval, or contain requirements for potentially costly post-marketing testing and surveillance studies. For example, the holder of an approved BLA in the United States is obligated to monitor and report adverse events and any failure of a product to meet the specifications in the BLA. In the United States, the holder of an approved BLA must also submit new or supplemental applications and obtain FDA approval for certain changes to the approved product, product labeling or manufacturing process. Similar provisions apply in the European Union (the "EU"). Advertising and promotional materials must comply with FDA rules and are subject to FDA review, in addition to other potentially applicable federal and state laws. Similarly, in the EU any promotion of medicinal products is highly regulated and, depending on the specific jurisdiction involved, may require prior vetting by the competent national regulatory authority. In addition, product manufacturers and their facilities are subject to payment of user fees and continual review and periodic inspections by the FDA and other regulatory authorities for compliance with cGMP requirements and adherence to commitments made in the BLA or foreign marketing application.

If we, our collaborators or a regulatory agency discovers previously unknown problems with a product such as adverse events of unanticipated severity or frequency or problems with the facility where the product is manufactured or disagrees with the promotion, marketing or labeling of that product, a regulatory agency may impose restrictions relative to that product, the manufacturing facility or us or our collaborators, including requiring recall or withdrawal of the product from the market or suspension of manufacturing.

Moreover, if any of our product candidates are approved, our product labeling, advertising, promotion and distribution will be subject to regulatory requirements and continuing regulatory review. The FDA strictly regulates the promotional claims that may be made about drug products. In particular, a product may not be promoted for uses that are not approved by the FDA as reflected in the product's approved labeling. If we or our collaborators fail to comply with applicable regulatory requirements following approval of any potential products we may develop, authorities may:

- issue an untitled enforcement letter or a warning letter asserting a violation of the law;
- seek an injunction, impose civil and criminal penalties, and impose monetary fines, restitution or disgorgement of profits or revenues;
- suspend or withdraw regulatory approval;
- suspend or terminate any ongoing clinical trials or implement requirements to conduct post-marketing studies or clinical trials;
- refuse to approve a pending BLA or comparable foreign marketing application (or any supplements thereto) submitted by us or our collaborators;
- restrict the labeling, marketing, distribution, use or manufacturing of products;
- seize or detain products or otherwise require the withdrawal or recall of products from the market;
- refuse to approve pending applications or supplements to approved applications that we or our collaborators submit;
- refuse to permit the import or export of products; or
- refuse to allow us or our collaborators to enter into government contracts.

Any government investigation of alleged violations of law could require us to expend significant time and resources in response and could generate negative publicity. The occurrence of any event or penalty described above may inhibit our or our collaborators' ability to commercialize products and our ability to generate revenues.

In addition, the FDA's policies, and policies of foreign regulatory agencies, may change, and additional regulations may be enacted that could prevent, limit or delay regulatory approval of product candidates. We cannot predict the likelihood, nature or extent of government regulation that may arise from future legislation or administrative or executive action, either in the United States or abroad. If we are slow or unable to adapt to changes in existing requirements or the adoption of new requirements or policies, or if we are not able to maintain regulatory compliance, we may be subject to enforcement action and we may not achieve or sustain profitability.

Our business operations and future relationships with investigators, healthcare professionals, consultants, third-party payors, patient organizations and customers will be subject to applicable healthcare regulatory laws, which could expose us to penalties.

Our business operations and future arrangements with investigators, healthcare professionals, consultants, third-party payors, patient organizations and customers, may expose us to broadly applicable fraud and abuse and other healthcare laws and regulations. These laws may constrain the business or financial arrangements and relationships through which we will conduct our operations, including how we research, market, sell and distribute our product candidates, if approved. Such laws include:

- the U.S. federal Anti-Kickback Statute, which prohibits, among other things, persons or entities from knowingly and willfully soliciting, offering, receiving or providing any remuneration (including any kickback, bribe, or certain rebate), directly or indirectly, overtly or covertly, in cash or in kind, to induce or reward, or in return for, either the referral of an individual for, or the purchase, lease, order or recommendation of, any good, facility, item or service, for which payment may be made, in whole or in part, under U.S. federal and state healthcare programs such as Medicare and Medicaid. A person or entity does not need to have actual knowledge of the statute or specific intent to violate it in order to have committed a violation;

- the U.S. federal false claims laws, including the civil False Claims Act, which, among other things, impose criminal and civil penalties, including through civil whistleblower or qui tam actions, against individuals or entities for knowingly presenting, or causing to be presented, to the U.S. federal government, claims for payment or approval that are false or fraudulent, knowingly making, using or causing to be made or used, a false record or statement material to a false or fraudulent claim, or from knowingly making a false statement to avoid, decrease or conceal an obligation to pay money to the U.S. federal government. In addition, the government may assert that a claim including items and services resulting from a violation of the U.S. federal Anti-Kickback Statute constitutes a false or fraudulent claim for purposes of the False Claims Act;
- the U.S. federal Health Insurance Portability and Accountability Act of 1996 ("HIPAA"), which imposes criminal and civil liability for, among other things, knowingly and willfully executing, or attempting to execute, a scheme to defraud any healthcare benefit program, or knowingly and willfully falsifying, concealing or covering up a material fact or making any materially false statement, in connection with the delivery of, or payment for, healthcare benefits, items or services; similar to the U.S. federal Anti-Kickback Statute, a person or entity does not need to have actual knowledge of the statute or specific intent to violate it in order to have committed a violation;
- the U.S. federal Physician Payments Sunshine Act, which requires certain manufacturers of drugs, devices, biologics and medical supplies that are reimbursable under Medicare, Medicaid, or the Children's Health Insurance Program to report annually to the government information related to certain payments and other transfers of value to physicians (defined to include doctors, dentists, optometrists, podiatrists and chiropractors), certain non-physician practitioners such as physician assistants and nurse practitioners, and teaching hospitals, as well as ownership and investment interests held by the physicians described above and their immediate family members; and
- analogous U.S. state laws and regulations, including: state anti-kickback and false claims laws, which may apply to our future business practices, including but not limited to, research, distribution, sales and marketing arrangements and claims involving healthcare items or services reimbursed by any third-party payor, including private insurers; state laws that require pharmaceutical companies to comply with the pharmaceutical industry's voluntary compliance guidelines and the relevant compliance guidance promulgated by the U.S. federal government, or otherwise restrict payments that may be made to healthcare providers and other potential referral sources; and state laws and regulations that require drug manufacturers to file reports relating to pricing and marketing information, which requires tracking gifts and other remuneration and items of value provided to healthcare professionals and entities.

Ensuring that our internal operations and future business arrangements with third parties comply with applicable healthcare laws and regulations will involve substantial costs. It is possible that governmental authorities will conclude that our business practices do not comply with current or future statutes, regulations, agency guidance or case law involving applicable fraud and abuse or other healthcare laws and regulations. If our operations are found to be in violation of any of the laws described above or any other governmental laws and regulations that may apply to us, we may be subject to significant penalties, including civil, criminal and administrative penalties, damages, fines, exclusion from government-funded healthcare programs, such as Medicare and Medicaid or similar programs in other countries or jurisdictions, disgorgement, individual imprisonment, contractual damages, reputational harm, diminished profits and the curtailment or restructuring of our operations.

The successful commercialization of product candidates developed by us or our partners will depend in part on the extent to which governmental authorities and health insurers establish adequate coverage, reimbursement levels and pricing policies. Failure to obtain or maintain coverage and adequate reimbursement for such product candidates, if approved, could limit our or our partners' ability to market those products and decrease our ability to generate revenue.

The availability and adequacy of coverage and reimbursement by governmental healthcare programs such as Medicare and Medicaid, private health insurers and other third-party payors are essential for most patients to be able to afford prescription medications such as our product candidates, assuming FDA approval. Our ability to achieve acceptable levels of coverage and reimbursement for products by governmental authorities, private health insurers and other organizations will have an effect on our ability to successfully commercialize our product candidates. Assuming we obtain coverage for our product candidates by a third-party payor, the resulting reimbursement payment rates may not be adequate or may require co-payments that patients find unacceptably high. We cannot be sure that coverage and reimbursement in the United States, the EU or elsewhere will be available for our product candidates or any product that we may develop, and any reimbursement that may become available may be decreased or eliminated in the future.

Third-party payors increasingly are challenging prices charged for pharmaceutical products and services, and many third-party payors may refuse to provide coverage and reimbursement for particular drugs or biologics when an equivalent generic drug, biosimilar or a less expensive therapy is available. It is possible that a third-party payor may consider our product candidates as substitutable and only offer to reimburse patients for the less expensive product. Even if we show improved efficacy or improved convenience of administration with our product candidates, pricing of existing third-party therapeutics may limit the amount we will be able to charge for our product candidates. These payors may deny or revoke the reimbursement status of a given product or establish prices for new or existing marketed products at levels that are too low to enable us to realize an appropriate return on our investment in our product candidates. For products administered under the supervision of a physician, obtaining coverage and adequate reimbursement may be particularly difficult because of the higher prices often associated with such drugs. Additionally, separate reimbursement for the product itself or the treatment or procedure in which the product is used may not be available, which may impact physician utilization. If reimbursement is not available or is available only at limited levels, we may not be able to successfully commercialize our product candidates, and may not be able to obtain a satisfactory financial return on our product candidates.

No uniform policy for coverage and reimbursement for products exists among third-party payors in the United States. Therefore, coverage and reimbursement for products can differ significantly from payor to payor. As a result, the coverage determination process is often a time-consuming and costly process that will require us to provide scientific and clinical support for the use of our product candidates to each payor separately, with no assurance that coverage and adequate reimbursement will be applied consistently or obtained in the first instance. Furthermore, rules and regulations regarding reimbursement change frequently, in some cases on short notice, and we believe that changes in these rules and regulations are likely.

Outside the United States, international operations are generally subject to extensive governmental price controls and other market regulations, and we believe the increasing emphasis on cost-containment initiatives in Europe and other countries have and will continue to put pressure on the pricing and usage of our product candidates. In many countries, the prices of medical products are subject to varying price control mechanisms as part of national health systems. Other countries allow companies to fix their own prices for medical products, but monitor and control company profits. Additional foreign price controls or other changes in pricing regulation could restrict the amount that we are able to charge for our product candidates. Accordingly, in markets outside the United States, the reimbursement for our product candidates may be reduced compared with the United States and may be insufficient to generate commercially-reasonable revenue and profits.

Moreover, increasing efforts by governmental and third-party payors in the United States and abroad to cap or reduce healthcare costs may cause such organizations to limit both coverage and the level of reimbursement for newly approved products and, as a result, they may not cover or provide adequate payment for our product candidates. We expect to experience pricing pressures in connection with the sale of our product candidates due to the trend toward managed health care, the increasing influence of health maintenance organizations and additional legislative changes. The downward pressure on healthcare costs in general, particularly prescription drugs and biologics and surgical procedures and other treatments, has become intense. As a result, increasingly high barriers are being erected to the entry of new products.

Recently enacted legislation, future legislation and healthcare reform measures may increase the difficulty and cost for our partners to obtain marketing approval for and commercialize product candidates developed by us.

In the United States and some foreign jurisdictions, there have been, and we expect there will continue to be, a number of legislative and regulatory changes to the healthcare system, including cost-containment measures that may reduce or limit coverage and reimbursement for newly approved drugs and affect our ability to profitably sell any product candidates for which we develop and our partners obtain marketing approval. In particular, there have been and continue to be a number of initiatives at the U.S. federal and state levels that seek to reduce healthcare costs and improve the quality of healthcare.

For example, in March 2010, the Affordable Care Act (the "ACA") was enacted in the United States. The ACA established an annual, nondeductible fee on any entity that manufactures or imports specified branded prescription drugs and biologic agents; extended manufacturers' Medicaid rebate liability to covered drugs dispensed to individuals who are enrolled in Medicaid managed care organizations; expanded eligibility criteria for Medicaid programs; expanded the entities eligible for discounts under the 340B drug pricing program; increased the statutory minimum rebates a manufacturer must pay under the Medicaid Drug Rebate Program; established a new Patient-Centered Outcomes Research Institute to oversee, identify priorities in and conduct comparative clinical effectiveness research, along with funding for such research; and establishes a Center for Medicare & Medicaid Innovation at the Centers for Medicare & Medicaid Services to test innovative payment and service delivery models to lower Medicare and Medicaid spending.

Since its enactment, there have been executive, judicial and Congressional challenges to certain aspects of the ACA, and on June 17, 2021, the U.S. Supreme Court dismissed the most recent judicial challenge to the ACA brought by several states without specifically ruling on the constitutionality of the ACA. Prior to the Supreme Court's decision, President Biden had issued an executive order to initiate a special enrollment period from February 15, 2021 through August 15, 2021 for purposes of obtaining health insurance coverage through the ACA marketplace. The executive order also instructed certain governmental agencies to review and reconsider their existing policies and rules that limit access to healthcare, including among others, reexamining Medicaid demonstration projects and waiver programs that include work requirements, and policies that create unnecessary barriers to obtaining access to health insurance coverage through Medicaid or the ACA. It is unclear how the healthcare reform measures will impact our business.

In addition, other legislative changes have been proposed and adopted since the ACA was enacted. In March 2021, the American Rescue Plan Act of 2021 was signed into law, which eliminates the statutory cap on the Medicaid drug rebate, currently set at 100% of a drug's average manufacturer price, beginning January 1, 2024. Further, there has been heightened governmental scrutiny in the United States of pharmaceutical pricing practices in light of the rising cost of prescription drugs. Such scrutiny has resulted in several recent congressional inquiries and proposed and enacted federal and state legislation designed to, among other things, bring more transparency to product pricing, review the relationship between pricing and manufacturer patient assistance programs, and reform government program reimbursement methodologies for products. Most recently, the Inflation Reduction Act of 2022 (the "IRA"), included a number of significant drug pricing reforms, which include the establishment of a drug price negotiation program within the U.S. Department of Health and Human Services ("HHS") (beginning in 2026) that requires manufacturers to charge a negotiated "maximum fair price" for certain selected drugs or pay an excise tax for noncompliance, the establishment of rebate payment requirements on manufacturers under Medicare Parts B and D to penalize price increases that outpace inflation (first due in 2023), and a redesign of the Part D benefit, as part of which manufacturers are required to provide discounts on Part D drugs (beginning in 2025). The IRA permits the HHS Secretary to implement many of these provisions through guidance, as opposed to regulation, for the initial years. Additional drug pricing proposals could appear in future legislation. Further, it is possible that additional governmental action is taken in response to the COVID-19 pandemic.

At the state level, legislatures have increasingly passed legislation and implemented regulations designed to control pharmaceutical and biological product pricing, including price or reimbursement constraints, discounts, restrictions on certain product access and marketing cost disclosure and transparency measures, and, in some cases, designed to encourage importation from other countries and bulk purchasing. Legally mandated price controls on payment amounts by third-party payors or other restrictions could harm our business, results of operations, financial condition and prospects. In addition, regional healthcare authorities and individual hospitals are increasingly using bidding procedures to determine what pharmaceutical products and which suppliers will be included in their prescription drug and other healthcare programs. This could reduce the ultimate demand for any product candidate we develop, if approved, or put pressure on our product pricing, which could negatively affect our business, results of operations, financial condition and prospects.

We expect that these new laws and other healthcare reform measures that may be adopted in the future may result in additional reductions in Medicare and other healthcare funding, more rigorous coverage criteria, new payment methodologies and additional downward pressure on the price that we receive for any approved product. Any reduction in reimbursement from Medicare or other government programs may result in a similar reduction in payments from private payors. The implementation of cost containment measures or other healthcare reforms may prevent us from being able to generate revenue, attain profitability or commercialize any product candidates we develop, if approved.

Compliance with European Union chemical regulations could be costly and adversely affect our business and results of operations.

Some of our products are subject to the EU regulatory regime known as The Registration, Evaluation and Authorization of Chemicals ("REACH"). REACH mandates that certain chemicals manufactured in, or imported into, the EU be registered and evaluated for their potential effects on human health and the environment. Under REACH, we and our contract manufacturers located in the EU are required to register certain of our products based on the quantity of such product imported into or manufactured in the EU and on the product's intended end-use. The registration, evaluation and authorization process under REACH can be costly and time consuming. Problems or delays in the registration, evaluation or authorization process under REACH could delay or prevent the manufacture of some of our products in, or the importation of some of our products into, the EU, which could adversely affect our business and results of operations. In addition, if we or our contract manufacturers fail to comply with REACH, we may be subject to penalties or other enforcement actions, which could have a material adverse effect on our business and results of operations.

Risks Related to our Dependence on Third Parties

We rely on third parties to conduct our clinical trials and perform some of our research and preclinical studies. If these third parties do not satisfactorily carry out their contractual duties or fail to meet expected deadlines, our development programs may be delayed or subject to increased costs, each of which may have an adverse effect on our business and prospects.

We do not have the ability to conduct all aspects of our preclinical testing or clinical trials ourselves. As a result, we are and expect to remain dependent on third parties to conduct clinical trials of our product candidates. Specifically, we expect CROs, clinical investigators, and consultants to play a significant role in the conduct of these trials and the subsequent collection and analysis of data. However, we will not be able to control all aspects of their activities. Nevertheless, we are responsible for ensuring that each of our trials is conducted in accordance with the applicable protocol and legal, regulatory and scientific standards, and our reliance on the CROs and other third parties does not relieve us of our regulatory responsibilities. We and our CROs are required to comply with GCP requirements, which are regulations and guidelines enforced by the FDA and comparable foreign regulatory authorities for all of our product candidates in clinical development. Regulatory authorities enforce these GCP requirements through periodic inspections of trial sponsors, clinical trial investigators and clinical trial sites. If we or any of our CROs or clinical trial sites fail to comply with applicable GCP requirements, the data generated in our clinical trials may be deemed unreliable, and the FDA or comparable foreign regulatory authorities may require us to perform additional clinical trials before approving our marketing applications. In addition, our clinical trials must be conducted with product produced under cGMP regulations. Our failure to comply with these regulations may require us to stop and/or repeat clinical trials, which would delay the marketing approval process.

There is no guarantee that any such CROs, clinical trial investigators or other third parties on which we rely will devote adequate time and resources to our development activities or perform as contractually required. If any of these third parties fail to meet expected deadlines, adhere to our clinical protocols or meet regulatory requirements, otherwise performs in a substandard manner, or terminates its engagement with us, the timelines for our development programs may be extended or delayed or our development activities may be suspended or terminated. If any of our clinical trial sites terminates for any reason, we may experience the loss of follow-up information on subjects enrolled in such clinical trials unless we are able to transfer those subjects to another qualified clinical trial site, which may be difficult or impossible. In addition, clinical trial investigators for our clinical trials may serve as scientific advisors or consultants to us from time to time and may receive cash or equity compensation in connection with such services. If these relationships and any related compensation result in perceived or actual conflicts of interest, or the FDA or comparable foreign regulatory authorities concludes that the financial relationship may have affected the interpretation of the trial, the integrity of the data generated at the applicable clinical trial site may be questioned and the utility of the clinical trial itself may be jeopardized, which could result in the delay or rejection of any marketing application we submit by the FDA or any comparable foreign regulatory authority. Any such delay or rejection could prevent us from commercializing our product candidates.

We contract with third parties for the manufacturing and supply of product candidates for use in preclinical testing and clinical trials and related services, which supply may become limited or interrupted or may not be of satisfactory quality and quantity.

We do not have any manufacturing facilities. We produce in our laboratory relatively small quantities of products for evaluation in our research programs. We rely, and expect to continue to rely, on third parties for the manufacture of our product candidates for preclinical and clinical testing, as well as for commercial manufacture if any of our product candidates are approved. We currently have limited manufacturing arrangements and expect that each of our product candidates will only be covered by single source suppliers for the foreseeable future. This reliance increases the risk that we will not have sufficient quantities of our product candidates or products, if approved, or such quantities at an acceptable cost or quality, which could delay, prevent or impair our development or commercialization efforts.

Furthermore, all entities involved in the preparation of therapeutics for clinical trials or commercial sale, including our existing contract manufacturers for our product candidates, are subject to extensive regulation. Components of a finished therapeutic product approved for commercial sale or used in clinical trials must be manufactured in accordance with cGMP requirements. These regulations govern manufacturing processes and procedures, including record keeping, and the implementation and operation of quality systems to control and assure the quality of investigational products and products approved for sale. Poor control of production processes can lead to the introduction of contaminants, or to inadvertent changes in the properties or stability of our product candidates that may not be detectable in final product testing. We or our contract manufacturers must supply all necessary documentation in support of a BLA on a timely basis and must adhere to the FDA's cGMP regulations enforced by the FDA through its facilities inspection program. Comparable foreign regulatory authorities may require compliance with similar requirements. The facilities and quality systems of our third-party contractor manufacturers must pass a pre-approval inspection for compliance with the applicable regulations as a condition of marketing approval of our product candidates. We do not control the manufacturing activities of, and are completely dependent on, our contract manufacturers for compliance with cGMP regulations.

In the event that any of our manufacturers fails to comply with such requirements or to perform its obligations to us in relation to quality, timing or otherwise, or if our supply of components or other materials becomes limited or interrupted for other reasons, we may be forced to manufacture the materials ourselves, for which we currently do not have the capabilities or resources, or enter into an agreement with another third party, which we may not be able to do on commercially reasonable terms, if at all. In particular, any replacement of our manufacturers could require significant effort and expertise because there may be a limited number of qualified replacements. In some cases, the technical skills or technology required to manufacture our product candidates may be unique or proprietary to the original manufacturer and we may have difficulty transferring such skills or technology to another third party and a feasible alternative may not exist. In addition, certain of our product candidates and our own proprietary methods have never been produced or implemented outside of our company, and we may therefore experience delays to our development programs if and when we attempt to establish new third party manufacturing arrangements for these product candidates or methods. These factors would increase our reliance on such manufacturer or require us to obtain a license from such manufacturer in order to have another third party manufacture our product candidates. If we are required to change manufacturers for any reason, we will be required to verify that the new manufacturer maintains facilities and procedures that comply with quality standards and with all applicable regulations and guidelines. The delays associated with the verification of a new manufacturer could negatively affect our ability to develop product candidates in a timely manner or within budget.

Our or a third party's failure to execute on our manufacturing requirements, do so on commercially reasonable terms and comply with cGMP could adversely affect our business in a number of ways, including:

- an inability to initiate or continue clinical trials of our product candidates under development;
- delay in submitting regulatory applications, or receiving marketing approvals, for our product candidates;
- loss of the cooperation of future collaborators;
- subjecting third-party manufacturing facilities or our manufacturing facilities to additional inspections by regulatory authorities;
- requirements to cease development or to recall batches of our product candidates; and
- in the event of approval to market and commercialize our product candidates, an inability to meet commercial demands for our product or any other future product candidates.

Risks Related to Intellectual Property and Information Technology

Our efforts to prosecute, maintain, protect and/or defend our intellectual property rights may not be successful.

We will continue to file and prosecute patent applications and maintain trade secrets in an ongoing effort to protect our intellectual property rights. It is possible that our current patents, or patents which we may later acquire, may be successfully challenged or invalidated, in whole or in part. It is also possible that we may not obtain issued patents from our pending patent applications. We sometimes permit certain patents or patent applications to lapse or go abandoned under appropriate circumstances. Due to uncertainties inherent in prosecuting patent applications, sometimes patent applications are rejected, and we subsequently abandon them. It is also possible that we may develop proprietary technology, products or services in the future that are not patentable or that the patents of others will limit or altogether preclude our ability to conduct business. In addition, any patent issued to us or to our licensor may provide us with little or no competitive advantage, in which case we may abandon such patent or license it to another entity, or terminate the license agreement.

Our means of protecting our proprietary rights may not be adequate and our competitors may independently develop technologies, products or services that are identical or similar to ours or that compete with ours. Patent, trademark, copyright and trade secret laws afford only limited protection for our technology, products and services . The laws of many countries do not protect our proprietary rights to as great an extent as do the laws of the United States. Despite our efforts to protect our proprietary rights, unauthorized parties have in the past attempted, and may in the future attempt, to operate under the aspects of our intellectual property rights, or proprietary technology, products or services or products, or to obtain and use information that we regard as proprietary. Third parties may also design around our proprietary rights, which may render our protected technology, services and products less valuable, if the design around is favorably received in the marketplace. In addition, if any of our technology, products and services is covered by third-party patents or other intellectual property rights, we could be subject to various legal actions. We cannot assure that our technology products and/or services do not infringe, violate or misappropriate any patents or other intellectual property rights owned or controlled by others or that they will not in the future.

Litigation may be necessary to enforce our intellectual property rights, to protect our trade secrets, to determine the validity and scope of the proprietary rights of others, or to defend against claims of infringement, invalidity, misappropriation, or other claims.

Any such litigation could result in substantial costs and diversion of our resources. Moreover, any settlement of or adverse judgment resulting from litigation relating to intellectual property rights could require us to obtain a license to continue to make, use, import, sell or offer for sale the technology, products or services that is the subject of the claim, or otherwise restrict or prohibit our use of the technology, products or services.

Our ability to compete may decline if we do not adequately prosecute, maintain, protect and/or defend our proprietary technology, products or services or our intellectual property rights.

Our success depends in part on our ability to obtain patents and maintain adequate protection of our intellectual property rights directed to our technology, products and services in the United States and other countries. We have adopted a strategy of seeking patent protection in the United States and in foreign countries with respect to certain of the technology used in or relating to our products, services, and processes. As such, as of December 31, 2022, we owned or controlled approximately 2,090 issued patents and pending patent applications in the United States and in various foreign jurisdictions. Our patents and patent applications, if issued, as of December 31, 2022, have terms that expire between 2023 and approximately 2043. We also have license rights to a number of issued patents and pending patent applications in the United States and in various foreign jurisdictions. Our owned and licensed patents and patent applications include those directed to our enabling technology and to the methods and products that support our business in the biotherapeutics, pharma manufacturing, life sciences, food and other markets. We intend to continue to apply for patents relating to our technology, methods, services and products as we deem appropriate.

Issuance of claims in patent applications and enforceability of such claims once issued involve complex legal and factual questions and, therefore, we cannot predict with any certainty whether any of our issued patents will survive invalidity claims asserted by third parties. Issued patents and patents issuing from pending applications may be challenged, invalidated, circumvented, rendered unenforceable or substantially narrowed in scope. In addition, the inventorship and ownership of the patents and patent applications may be challenged by others. Moreover, the United States Leahy-Smith America Invents Act (“AIA”), enacted in September 2011, brought significant changes to the United States patent system, which include a change to a “first to file” system from a “first to invent” system and changes to the procedures for challenging issued patents and disputing patent applications during the examination process, among other things. While interference proceedings are possible for patent claims filed prior to March 16, 2013, many of our filings will be subject to the post- and pre-grant proceedings set forth in the AIA, including citation of prior art and written statements by third parties, third party pre-issuance submissions, ex parte reexamination, inter partes review, post-grant review, and derivation proceedings. We may need to utilize the processes provided by the AIA for supplemental examination or patent reissuance. These proceedings could result in substantial cost to us even if the outcome is favorable. Even if successful, any proceeding may result in loss of certain claims. Any litigation or proceedings could divert our management's time and efforts. Even unsuccessful claims brought by third parties could result in significant legal fees and other expenses, diversion of management time, and disruption in our business. Uncertainties resulting from initiation and continuation of any patent or related litigation could harm our ability to compete.

Additional uncertainty may result from legal precedent handed down by the United States Federal Circuit Court and Supreme Court as they determine legal issues concerning the scope and construction of patent claims and inconsistent interpretation of patent laws by the lower courts. Accordingly, we cannot ensure that any of our pending patent applications will result in issued patents, or even if issued, predict the breadth of the claims upheld in our and other companies' patents. Given that the degree of future protection for our proprietary rights is uncertain, we cannot ensure that: (i) we were the first to invent the inventions covered by each of our pending applications, (ii) we were the first to file patent applications for these inventions, or (iii) the proprietary technology, products or services we develop will be patentable. In addition, unauthorized parties may attempt to copy or otherwise obtain and use our technology, products and services. Monitoring unauthorized use of our intellectual property rights is difficult, and we cannot be certain that the steps we have taken will prevent unauthorized use of our technology, products or services, particularly in certain foreign countries where the local laws may not protect our proprietary rights as fully as in the United States. Moreover, third parties could practice our inventions in territories where we do not have patent protection. Such third parties may then try to import products made using our inventions into the United States or other countries. If competitors are able to use our proprietary technology, products or services, our ability to compete effectively could be harmed. In addition, others may independently develop and obtain patents for technologies, products or services that are similar to or superior to our technologies, products or services. If that happens, we may need to license these technologies, products or services, and we may not be able to obtain licenses on reasonable terms, if at all, which could cause harm to our business.

Similarly, foreign courts have made, and will likely continue to make, changes in how the patent laws in their respective jurisdictions are interpreted. Changes in patent laws and regulations in other countries or jurisdictions, changes in the governmental bodies that enforce them, or changes in how the relevant governmental authority enforces patent laws or regulations may weaken our ability to obtain new patents or to enforce patents that we own or may obtain in the future. Further, the laws of some foreign countries do not protect proprietary rights to the same extent or in the same manner as the laws of the United States. For example, in some foreign jurisdictions, governments have the right to compel patent owners to grant others licenses to their intellectual property under certain circumstances. In addition, any protection afforded by foreign patents may be more limited than that provided under U.S. patent and intellectual property laws. We may encounter significant problems in enforcing and defending our intellectual property both in the United States and abroad. For example, if the issuance in a given country of a patent covering an invention is not followed by the issuance in other countries of patents covering the same invention, or if any judicial interpretation of the validity, enforceability or scope of the claims or the written description or enablement in a patent issued in one country is not similar to the interpretation given to the corresponding patent issued in other countries, our ability to protect our intellectual property rights in those countries may be limited. Changes in either patent laws or in interpretations of patent laws in the United States and other countries may materially diminish the value of our intellectual property rights or narrow the scope of our patent protection. We cannot predict future changes in the interpretation of patent laws or changes to patent laws that might be enacted into law by U.S. and foreign legislative bodies. Those changes may materially affect our patents or patent applications and our ability to obtain additional patent protection in the future. Any of the foregoing could have a material adverse effect on our competitive position, business, financial condition, results of operations and prospects.

Third parties may claim that we are infringing, violating or misappropriating their intellectual property rights, which may subject us to costly and time consuming litigation and prevent us from developing or commercializing our technology, products or services.

Our commercial success also depends in part on our ability to operate without infringing, violating or misappropriating patents and other intellectual property rights of third parties, and without breaching any licenses or other agreements that we have entered into with regard to our technologies, products or services. We cannot ensure that patents have not been issued, or will not be issued, to third parties that could block our ability to obtain patents or to operate as we would like. There may be patents in some countries that, if valid, may block our ability to make, use, sell, or offer for sale our technology, products or services in those countries, or import our products into those countries, if we are unsuccessful in circumventing or acquiring rights to these patents. There also may be claims in patent applications filed in some countries that, if granted and valid, may also block our ability to commercialize technology, products, services or processes in these countries if we are unable to circumvent or obtain rights to them.

The industries in which we operate and the biotechnology industry, in particular, are characterized by frequent and extensive litigation regarding patents and other intellectual property rights. Many biotechnology companies have employed intellectual property litigation as a way to gain a competitive advantage. Any involvement in litigation or other intellectual property proceedings inside and outside of the United States to defend against claims that we infringe, misappropriate or violate the intellectual property of the rights of others may divert our management’s time from focusing on business operations and could cause us to spend significant amounts of money. Any potential intellectual property litigation also could force us to do one or more of the following:

- stop making, using, selling or importing our technologies, products and services that use the subject intellectual property;
- pay monetary damages to the third party asserting claims against us;
- grant or transfer rights to third parties relating to our patents or other intellectual property rights;
- obtain from the third party asserting its intellectual property rights a license to make, sell, offer for sale, import or use the relevant technology, product or service, which license may not be available on reasonable terms, or at all; or
- redesign those technologies, products, services or processes that use any allegedly infringing, misappropriating or violating intellectual property rights, or relocate the operations relating to the allegedly infringing misappropriating or violating intellectual property rights to another jurisdiction, which may result in significant cost or delay to us, could be technically infeasible or could prevent us from making, selling, offering for sale, using or importing some of our technologies, products or services in the United States or other jurisdictions.

We are aware of some patents and patent applications relating to aspects of our technologies, products or services filed by, and issued to, third parties. We cannot assure that if such third party patents rights are asserted against us that we would ultimately prevail.

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

Competitors may infringe, violate or misappropriate our intellectual property rights or those of our licensors. To prevent infringement, violation, misappropriation or other unauthorized use, we have in the past filed, and may in the future be required to file, enforcement claims, which can be expensive and time-consuming. In addition, in an enforcement proceeding, a court may decide that the intellectual property right that we own or control is not valid, is unenforceable and/or is not infringed, violated or misappropriated. In addition, in legal proceedings against a third party to enforce a patent directed at one of our technologies, products or services, the defendant could counterclaim that our patent is invalid and/or unenforceable in whole or in part. In patent enforcement litigation in the United States, defendant counterclaims alleging invalidity and/or unenforceability are commonplace. Grounds for a patent validity challenge include an alleged failure to meet any of several statutory requirements, including lack of novelty, obviousness or non-enablement. Grounds for an unenforceability assertion could include an allegation that someone connected with prosecution of the patent withheld relevant information from the United States Patent and Trademark Office ("USPTO") or made a misleading statement during prosecution. Third parties may also raise similar claims before the USPTO, even outside the context of enforcement litigation. The outcome following legal assertions of invalidity and unenforceability is unpredictable, and prior art could render our patents or those of our licensors invalid. If a defendant were to prevail on a legal assertion of invalidity and/or unenforceability, we would lose at least part, and perhaps all, of the patent protection on the respective technology, products or services. Such a loss of patent protection could have a material adverse impact on our business.

Even if resolved in our favor, litigation or other legal proceedings relating to our intellectual property rights may cause us to incur significant expenses, and could distract our technical and management personnel from their normal responsibilities. In addition, there could be public announcements of the results of hearings, motions or other interim proceedings or developments and if securities analysts or investors perceive these results to be negative, it could have a substantial adverse effect on the price of our common stock. Such litigation or proceedings could substantially increase our expenses and reduce the resources available for operations and research and development activities. We may not have sufficient financial or other resources to conduct such litigation or proceedings adequately. Some of our competitors may be able to sustain the costs of such litigation or proceedings more effectively than we can because of their greater financial resources. Uncertainties resulting from the initiation and continuation of patent litigation or other proceedings could compromise our ability to compete in the marketplace. Furthermore, because of the substantial amount of discovery required in connection with U.S. intellectual property litigation, there is a risk that some of our confidential information could be compromised by disclosure during this type of litigation.

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

The laws of some foreign countries where we do business do not protect intellectual property rights to the same extent as the laws of the United States. Many companies have encountered significant problems in protecting and enforcing intellectual property rights in certain 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 technologies. Accordingly, our efforts to protect and enforce our intellectual property rights in such countries may be inadequate. This could make it difficult for us to stop the infringement, violation or misappropriation of our patents or other intellectual property rights. Additionally, proceedings to enforce our patent rights in foreign jurisdictions could result in substantial costs and divert our efforts and attention from other aspects of our business.

If our biocatalysts, or the genes that code for our biocatalysts, are stolen, misappropriated or reverse engineered, others could use these biocatalysts or genes to produce competing products.

Third parties, including our contract manufacturers, customers and those involved in shipping our biocatalysts, often have custody or control of our biocatalysts. If our biocatalysts, or the genes that code for our biocatalysts, were stolen, misappropriated or reverse engineered, they could be used by other parties who may be able to reproduce these biocatalysts for their own commercial gain. If this were to occur, it may be difficult for us to challenge this type of use, especially in countries with limited intellectual property rights protection or in countries in which we do not have patents covering the misappropriated biocatalysts.

Confidentiality and non-use agreements with employees, consultants, advisors and other third parties may not adequately prevent disclosures and non-use of trade secrets and other proprietary information.

In addition to patent protection, we also rely on other intellectual property rights, including protection of copyright, trade secrets, know-how and/or other proprietary information that is not patentable or that we elect not to patent. However, trade secrets can be difficult to protect, and some courts are less willing or unwilling to protect trade secrets. To maintain the confidentiality of our trade secrets and proprietary information, we rely in part on trade secret law and contractual agreements to protect our confidential and proprietary information and processes. We generally enter into confidentiality and invention assignment agreements with our employees, consultants and third parties working on our behalf upon their commencement of a relationship with us. However, trade secrets and confidential information are difficult to protect and we cannot guarantee that we have entered into such agreements with each party that may have or have had access to our trade secrets or proprietary technology and processes and we may not enter into such agreements with all employees, consultants and third parties who have been involved in the development of our intellectual property rights. Nevertheless, without our permission or awareness, our confidential and proprietary information may be disclosed to third parties, used by the respective individuals for purposes other than for the Company's business, or obtained through illegal means, such that third parties could reverse engineer our biocatalysts, product candidates, and processes, to attempt to develop the same technology or develop substantially equivalent technology.

Costly and time-consuming litigation could be necessary to enforce and determine the scope of our confidential and proprietary rights, and failure to protect our trade secrets could adversely affect our competitive business position. If any of our trade secrets were lawfully obtained, we may be unable to prevent them, or those to whom they communicate it, from using that technology or information to compete with us or disclosing it publicly. Therefore, these events could have a material adverse effect ob our business, financial condition and results of operations. In particular, a failure to protect our proprietary rights may allow competitors to copy our technology, which could adversely affect our pricing and market share.

In addition to contractual measures, we try to protect the confidential nature of our proprietary information by maintaining physical security of our premises and electronic security of our information technology systems. Such security measures may not, for example, in the case of misappropriation of a trade secret by an employee, consultant or other third party with authorized access or with unauthorized access but an intent to steal, provide adequate protection for our proprietary information. Our security measures may not prevent such employee, consultant or other third party from misappropriating our trade secrets and using them or providing them to a competitor, and recourse we take against such misconduct may not provide an adequate remedy to protect our interests fully. While we use commonly accepted security measures, trade secret violations are often a matter of state law in the United States, and the criteria for protection of trade secrets can vary among different jurisdictions. If the steps we have taken to maintain our trade secrets are deemed inadequate, we may have insufficient recourse against third parties for misappropriating the trade secret.

Risks Related to Owning our Common Stock

We are subject to anti-takeover provisions in our certificate of incorporation and bylaws and under Delaware law that could delay or prevent an acquisition of our company, even if the acquisition would be beneficial to our stockholders.

Provisions in our amended and restated certificate of incorporation and our bylaws may delay or prevent an acquisition of us. Among other things, our amended and restated certificate of incorporation and bylaws provide for a board of directors which is divided into three classes, with staggered three-year terms and provide that all stockholder action must be effected at a duly called meeting of the stockholders and not by a consent in writing, and further provide that only our board of directors, the chairman of the board of directors, our chief executive officer or president may call a special meeting of the stockholders. In addition, our amended and restated certificate of incorporation allows our board of directors, without further action by our stockholders, to issue up to 5,000,000 shares of preferred stock in one or more series and to fix the rights, preferences, privileges and restrictions thereof. These provisions may also frustrate or prevent any attempts by our stockholders to replace or remove our current management by making it more difficult for stockholders to replace members of our board of directors, who are responsible for appointing the members of our management team. Furthermore, because we are incorporated in Delaware, we are governed by the provisions of Section 203 of the Delaware General Corporation Law which prohibits, with some exceptions, stockholders owning in excess of 15% of our outstanding voting stock from merging or combining with us. Finally, our charter documents establish advanced notice requirements for nominations for election to our board of directors and for proposing matters that can be acted upon at stockholder meetings. Although we believe these provisions together provide for an opportunity to receive higher bids by requiring potential acquirers to negotiate with our board of directors, they would apply even if an offer to acquire our company may be considered beneficial by some stockholders.

Our quarterly or annual operating results may fluctuate in the future. As a result, we may fail to meet or exceed the expectations of research analysts or investors, which could cause our stock price to decline.

Our financial condition and operating results have varied significantly in the past and may continue to fluctuate from quarter to quarter and year to year in the future due to a variety of factors, many of which are beyond our control. Factors relating to our business that may contribute to these fluctuations include the following factors, as well as other factors described elsewhere in this report:

- our ability to achieve or maintain profitability;
- our relationships with, and dependence on, collaborators in our principal markets;
- our dependence on a limited number of customers,;
- our product supply agreements with customers have finite duration, may not be extended or renewed and generally do not require the customer to purchase any particular quantity or quantities of our products;
- with respect to customers purchasing our products for the manufacture of active pharmaceutical ingredients for which they have exclusivity due to patent protection, the termination or expiration of such patent protection and any resulting generic competition may materially and adversely affect our revenues, financial condition or results of operations;
- our dependence on a limited number of products in our performance enzymes business;
- our reliance on a limited number of contract manufacturers for large scale production of substantially all of our enzyme products;
- our ability to develop and successfully commercialize new products for the markets we serve;
- our ability to obtain additional development partners for our novel biotherapeutic programs;
- potential of Nestlé Health Science or Takeda terminating any development program under their license agreements with us;
- potential of GSK, Merck, Novartis or any other performance enzyme customer terminating their agreements with us;
- the success of our customers' products in the market and the ability of such customers to obtain regulatory approvals for products and processes;
- our or our customers' ability to obtain regulatory approval for the sale and manufacturing of food products using our enzymes;
- our ability to deploy our technology platform in life science tools markets;
- our ability to successfully achieve domestic and foreign regulatory approval for product candidates;

- our ability to successfully design and execute clinical testing at a reasonable cost and on an acceptable time-frame;
- our dependence on product candidates which could unexpectedly fail at any stage of preclinical or clinical development;
- our dependence on product candidates which may lack the ability to work as intended or cause undesirable side effects;
- our dependency on third parties to conduct clinical trials, research, and preclinical studies;
- our ability to successfully prosecute and protect our intellectual property;
- our ability to compete if we do not adequately protect our proprietary technologies or if we lose some of our intellectual property rights;
- our ability to avoid infringing the intellectual property rights of third parties;
- our involvement in lawsuits to protect or enforce our patents or other intellectual property rights;
- our ability to enforce our intellectual property rights throughout the world;
- our dependence on, and the need to attract and retain, key management and other personnel;
- our ability to prevent the theft or misappropriation of our biocatalysts, the genes that code for our biocatalysts, know-how or technologies;
- our ability to protect our trade secrets and other proprietary information from disclosure by employees and others;
- our ability to obtain substantial additional capital that may be necessary to expand our business;
- our ability to comply with the terms of our credit facility;
- our ability to timely pay debt service obligations;
- our customers' ability to pay amounts owed to us in a timely manner;
- our ability to avoid charges to earnings as a result of any impairment of goodwill, intangible assets or other long-lived assets;
- changes in financial accounting standards or practices may cause adverse, unexpected financial reporting fluctuations and affect our reported results of operations;
- our ability to maintain effective internal control over financial reporting;
- our dependency on information technology systems, infrastructure and data;
- our ability to control and to improve product gross margins;
- our ability to protect against risks associated with the international aspects of our business;
- the cost of compliance with EU chemical regulations;
- potential advantages that our competitors and potential competitors may have in securing funding or developing products;
- our ability to accurately report our financial results in a timely manner;
- results of regulatory tax examinations;
- market and economic conditions may negatively impact our business, financial condition, and share price;
- business interruptions due to natural disasters, disease outbreaks or other events beyond our control;
- public concerns about the ethical, legal and social ramifications of genetically engineered products and processes;
- our ability to integrate our current business with any businesses that we may acquire in the future;
- our ability to properly handle and dispose of hazardous materials in our business;
- potential product liability claims;
- changes to tax law and related regulations could materially affect our tax obligations and effective tax rate; and
- our ability to use our NOLs to offset future taxable income.

Due to the various factors mentioned above, and others, the results of any prior quarterly or annual periods should not be relied upon as indications of our future operating performance.

We do not intend to pay cash dividends for the foreseeable future.

We currently intend to retain our future earnings, if any, to finance the further development and expansion of our business and do not intend to pay cash dividends in the foreseeable future. Any future determination to pay dividends will be at the discretion of our board of directors and will depend on our financial condition, results of operations, capital requirements, restrictions contained in future agreements and financing instruments, business prospects and such other factors as our board of directors deems relevant.

General Risk Factors

If securities or industry analysts do not publish research or reports about our business, or publish negative reports about our business, our stock price and trading volume could decline.

The trading market for our common stock will be influenced by the research and reports that securities or industry analysts publish about us or our business. We do not have any control over these analysts. If one or more of the analysts who cover us downgrade our stock or change their opinion of our stock in a negative manner, our stock price would likely decline. If one or more of these analysts cease coverage of our company or fail to regularly publish reports on us, we could lose visibility in the financial markets, which could cause our stock price or trading volume to decline.

We face risks associated with our international business.

While we have a limited number of employees located outside of the United States, we are and will continue to be dependent upon contract manufacturers located outside of the United States. In addition, we have customers and partners located outside of the United States. Conducting business internationally exposes us to a variety of risks, including:

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

Market and economic conditions may negatively impact our business, financial condition, and share price.

Concerns about inflation, energy costs, geopolitical issues, the United States mortgage market and a declining real estate market, unstable global credit markets and financial conditions, and volatile oil prices have led to periods of significant economic instability, diminished liquidity and credit availability, declines in consumer confidence and discretionary spending, diminished expectations for the global economy and expectations of slower global economic growth going forward, increased unemployment rates, and increased credit defaults in recent years. Our general business strategy may be adversely affected by any such economic downturns, volatile business environments and continued unstable or unpredictable economic and market conditions. In addition, if the market and economic conditions described above continue to deteriorate or do not improve, it may make any necessary debt or equity financing more difficult to complete, more costly, and more dilutive. Failure to secure any necessary financing in a timely manner and on favorable terms could have a material adverse effect on our growth strategy, financial performance, and stock price. Additionally, rising rates of inflation have increased the costs associated with conducting our business, including by causing substantial increases in the costs of materials, including raw materials and consumables, equipment, services, and labor. Moreover, given the unpredictable nature of the current economic climate, including future changes in rates of inflation, it may be increasingly difficult for us to predict and control our future expenses, which may harm our ability to conduct our business.

Business interruptions resulting from disasters or other disturbances could delay us in the process of developing our products and could disrupt our sales. Our business continuity and disaster recovery plans may not adequately protect us from a serious disaster or other disturbance.

Our headquarters and other facilities are located in the San Francisco Bay Area, which in the past has experienced both severe earthquakes and wildfires. Earthquakes, wildfires or other natural disasters could severely disrupt our operations, and have a material adverse effect on our business, results of operations, financial condition and prospects. We are also vulnerable to other types of disasters and other events that could disrupt our operations, such as riot, civil disturbances, war, terrorist acts, infections in our laboratory or production facilities or those of our customers or contract manufacturers and other events beyond our control. If a natural disaster or other event occurred that prevented us from using all or a significant portion of our headquarters, that damaged critical infrastructure, such as our enterprise financial systems or manufacturing resource planning and enterprise quality systems, or that otherwise disrupted operations, it may be difficult or, in certain cases, impossible, for us to continue our business for a substantial period of time. The disaster recovery and business continuity plans we have in place currently are limited and are unlikely to prove adequate in the event of a serious disaster or similar event. We may incur substantial expenses as a result of the limited nature of our disaster recovery and business continuity plans. We do not carry insurance for earthquakes and we may not carry sufficient business interruption insurance to compensate us for losses that may occur. Any losses or damages we incur could have a material adverse effect on our cash flows and success as an overall business.

We are dependent on information technology systems, infrastructure and data, and any failure of these systems could harm our business. Security breaches, loss of data and other disruptions could compromise sensitive information related to our business or prevent us from accessing critical information and expose us to liability, which could adversely affect our business, results of operations and financial condition.

Information technology helps us operate efficiently, interface with customers, maintain financial accuracy and efficiency and accurately produce our financial statements. If we do not allocate and effectively manage the resources necessary to build and sustain the proper technology infrastructure, we could be subject to transaction errors, processing inefficiencies, the loss of customers, business disruptions or the loss of or damage to intellectual property through security breach. If our information technology systems do not effectively collect, store, process and report relevant data for the operation of our business, whether due to equipment malfunction or constraints, software deficiencies, or human error, our ability to effectively plan, forecast and execute our business plan and comply with applicable laws and regulations will be impaired, perhaps materially. Our information technology systems and those of our external vendors, strategic partners and other contractors or consultants are vulnerable to attack and damage or interruption from computer viruses and malware (e.g. ransomware), malicious code, natural disasters, terrorism, war, telecommunication and electrical failures, hacking, cyberattacks, phishing attacks and other social engineering schemes, employee theft or misuse, human error, fraud, denial or degradation of service attacks, sophisticated nation-state and nation-state-supported actors or unauthorized access or use by persons inside our organization, or persons with access to systems inside our organization. Any such impairment could materially and adversely affect our financial condition, results of operations, cash flows and the timeliness with which we report our internal and external operating results.

Our business may require us to use and store personal information of our customers, employees, and business partners. This may include names, addresses, phone numbers, email addresses, contact preferences, tax identification numbers and payment account information. We require usernames and passwords in order to access our information technology systems. We also use encryption and authentication technologies to secure the transmission and storage of data. However, these security measures may be compromised as a result of security breaches by unauthorized persons, employee error, malfeasance, faulty password management or other irregularity, and result in persons obtaining unauthorized access to our data or accounts. Third parties may attempt to fraudulently induce employees or customers into disclosing usernames, passwords or other sensitive information, which may in turn be used to access our information technology systems. For example, our employees have received "phishing" emails and phone calls attempting to induce them to divulge passwords and other sensitive information.

In addition, unauthorized persons may attempt to hack into our products or systems to obtain personal data relating to employees and other individuals, our confidential or proprietary information or confidential information we hold on behalf of third parties. We also rely on external vendors to supply and/or support certain aspects of our information technology systems. The systems of these external vendors may contain defects in design or manufacture or other problems that could unexpectedly compromise information security of our own systems, and we are dependent on these third parties to deploy appropriate security programs to protect their systems. If we or our third-party vendors were to experience a significant cybersecurity breach of our or their information systems or data, the costs associated with the investigation, remediation and potential notification of the breach to counter-parties and data subjects could be material. Our remediation efforts may not be successful. Further, if such an event were to occur and cause interruptions in our operations, it could result in a material disruption of our development programs and our business operations, whether due to a loss, corruption or unauthorized disclosure of our trade secrets, personal information or other proprietary or sensitive information or other similar disruptions. Attacks upon information technology systems are also increasing in their frequency, levels of persistence, sophistication and intensity, and are being conducted by sophisticated and organized groups and individuals with a wide range of motives and expertise. As a result of the COVID-19 pandemic, we may also face increased cybersecurity risks due to our reliance on internet technology and the number of our employees who are working remotely, which may create additional opportunities for cybercriminals to exploit vulnerabilities. We have programs in place to detect, contain and respond to data security incidents, and we make ongoing improvements to our information-sharing products in order to minimize vulnerabilities, in accordance with industry and regulatory standards. However, because the techniques used to obtain unauthorized access to or sabotage systems change frequently and may be difficult to detect, we may not be able to anticipate and prevent these intrusions or mitigate them when and if they occur. Even if identified, we may be unable to adequately investigate or remediate incidents or breaches due to attackers increasingly using tools and techniques that are designed to circumvent controls, to avoid detection and to remove or obfuscate forensic evidence.

We and certain of our external vendors are from time to time subject to cyberattacks and security incidents. While we do not believe that we have experienced any significant system failure, accident, or security breach to date, if such an event were to occur, it could result in the unauthorized access to or unauthorized use, disclosure, release or other processing of personal information, it may be necessary to notify individuals, governmental authorities, supervisory bodies, the media and other parties pursuant to privacy and security laws. Any security compromise affecting us, our service providers, vendors, strategic partners, other contractors, consultants or our industry, whether real or perceived, could harm our reputation, erode confidence in the effectiveness of our security measures and lead to regulatory scrutiny. To the extent that any disruption or security breach were to result in a loss of, or damage to, our data or systems, or inappropriate disclosure of confidential or proprietary or personal information, we could incur liability, including litigation exposure, penalties and fines, we could become the subject of regulatory action or investigation, our competitive position could be harmed and the further development of our products could be delayed. If such an event were to occur and cause interruptions in our operations, it could result in a material disruption of our business. Furthermore, federal, state and international laws and regulations can expose us to enforcement actions and investigations by regulatory authorities, and potentially result in regulatory penalties, fines and significant legal liability, if our information technology security efforts fail. We may also be exposed to a risk of loss or litigation and potential liability, which could materially and adversely affect our business, results of operations and financial condition.

Actual or perceived failures to comply with applicable data protection, privacy and security laws, regulations, standards and other requirements could adversely affect our business, results of operations and financial condition.

The global data protection landscape is rapidly evolving, and we are or may become subject to state, federal and foreign laws, regulations, decisions and directives governing the privacy, security, collection, storage, transmission, use, processing, retention and disclosure of personal information. Any failure or perceived failure by us to comply with applicable laws or regulations, our internal policies and procedures or our contracts governing our processing of personal information could result in negative publicity, government investigations and enforcement actions, claims by third parties and damage to our reputation, any of which could have a material adverse effect on our operations, financial performance and business.

In the United States, HIPAA imposes, among other things, certain standards relating to the privacy, security, transmission and breach reporting of individually identifiable health information. Certain states have also adopted comparable privacy and security laws and regulations, which govern the privacy, processing and protection of health-related and other personal information. Such laws and regulations will be subject to interpretation by various courts and other governmental authorities, thus creating potentially complex compliance issues for us and our future customers and strategic partners. For example, the California Consumer Privacy Act ("CCPA") went into effect on January 1, 2020 , and introduces new compliance burdens on organizations doing business in California that collect personal information about California residents. It creates individual privacy rights for California consumers and increases the privacy and security obligations of entities handling certain personal information. The CCPA also provides for civil penalties for violations, as well as a private right of action for data breaches that is expected to increase data breach litigation. Further, the California Consumer Privacy Act ("CCPA") recently passed in California. The CPRA will impose additional data protection obligations on covered businesses, including additional consumer rights processes, limitations on data uses, new audit requirements for higher risk data and opt outs for certain uses of sensitive data. It will also create a new California data protection agency authorized to issue substantive regulations and could result in increased privacy and information security enforcement. The majority of the provisions went into effect on January 1, 2023, and additional compliance investment and potential business process changes may be required. Similar laws have passed in Virginia, Colorado, Connecticut and Utah and have been proposed in other states and at the federal level, reflecting a trend toward more stringent privacy legislation in the United States. These developments increase our compliance burden and our risk, including risks of regulatory fines, litigation and associated reputational harm. Any liability from failure to comply with the requirements of these laws could adversely affect our financial condition.

Furthermore, the Federal Trade Commission ("FTC") and many state Attorneys General continue to enforce federal and state consumer protection laws against companies for online collection, use, dissemination and security practices that appear to be unfair or deceptive. For example, according to the FTC, failing to take appropriate steps to keep consumers' personal information secure can constitute unfair acts or practices in or affecting commerce in violation of Section 5(a) of the Federal Trade Commission Act. The FTC expects a company's data security measures to be reasonable and appropriate in light of the sensitivity and volume of consumer information it holds, the size and complexity of its business, and the cost of available tools to improve security and reduce vulnerabilities.

In Europe, the General Data Protection Regulation ("GDPR") went into effect in May 2018 and imposes strict requirements for processing the personal data of individuals within the European Economic Area ("EEA"). The GDPR imposes stringent requirements for controllers and processors of personal data and increases our obligations, for example, by imposing higher standards when obtaining consent from individuals to process their personal data, requiring more robust disclosures to individuals, strengthening individual data rights, shortening timelines for data breach notifications, limiting retention periods and secondary use of information, increasing requirements pertaining to health data as well as pseudonymized (i.e., key-coded) data and imposing additional obligations when we contract with third-party processors in connection with the processing of personal data. The GDPR provides that EEA member states may make their own additional laws and regulations limiting the processing of genetic, biometric or health data, which could limit our ability to use and share personal data or could cause our costs to increase and harm our business and financial condition. Failure to comply with the requirements of the GDPR can result in fines of up to the greater of €20 million and 4% of the total worldwide annual turnover of the preceding financial year and other administrative penalties. If we are required to comply with the new data protection rules imposed by GDPR, such compliance may be onerous and adversely affect our business, financial condition, and results of operations. Among other requirements, the GDPR regulates transfers of personal data subject to the GDPR to third countries that have not been found to provide adequate protection to such personal data, including the United States, and the efficacy and longevity of current transfer mechanisms between the EU and the United States remains uncertain. For example, in July 2020, the Court of Justice of the EU ("CJEU") limited how organizations could lawfully transfer personal data from the EU/EEA to the United States by invalidating the Privacy Shield for purposes of international transfers and imposing further restrictions on the use of standard contractual clauses ("SCCs"). In March 2022, the United States and EU announced a new regulatory regime intended to replace the invalidated regulations; however, this new EU-US Data Privacy Framework has not been implemented beyond an executive order signed by President Biden on October 7, 2022 on Enhancing Safeguards for United States Signals Intelligence Activities. The European Commission issued revised SCCs on June 4, 2021 to account for the decision of the CJEU and recommendations made by the European Data Protection Board. The revised SCCs must be used for relevant new data transfers from September 27, 2021; existing standard contractual clauses arrangements must be migrated to the revised clauses by December 27, 2022. The new SCCs apply only to the transfer of personal data outside of the EEA and not the United Kingdom; the United Kingdom's Information Commissioner's Office launched a public consultation on its draft revised data transfers mechanisms in August 2021. There is some uncertainty around whether the revised clauses can be used for all types of data transfers, particularly whether they can be relied on for data transfers to non-EEA entities subject to the GDPR. As supervisory authorities issue further guidance on personal data export mechanisms, including circumstances where the SCCs cannot be used, and/or start taking enforcement action, we could suffer additional costs, complaints and/or regulatory investigations or fines, and/or if we are otherwise unable to transfer personal data between and among countries and regions in which we operate, it could affect the manner in which we provide our services, the geographical location or segregation of our relevant systems and operations, and could adversely affect our financial results.

Further, from January 1, 2021, companies have had to comply with the GDPR and also the United Kingdom GDPR ("UK GDPR"), which, together with the amended UK Data Protection Act 2018, retains the GDPR in UK national law. The UK GDPR mirrors the fines under the GDPR, i.e., fines up to the greater of €20 million (or up to £17.5 million for UK) or 4% of global turnover. The relationship between the United Kingdom and the EU in relation to certain aspects of data protection law remains unclear, and it is unclear how United Kingdom data protection laws and regulations will develop in the medium to longer term. The European Commission has adopted an adequacy decision in favor of the United Kingdom, enabling data transfers from EU member states to the United Kingdom without additional safeguards. However, the UK adequacy decision will automatically expire in June 2025 unless the European Commission re-assesses and renews or extends that decision. In September 2021, the United Kingdom government launched a consultation on its proposals for wide-ranging reform of United Kingdom data protection laws following Brexit and the response to this consultation was published in June 2022. There is a risk that any material changes which are made to the United Kingdom data protection regime could result in the European Commission reviewing the United Kingdom adequacy decision, and the UK United Kingdom losing its adequacy decision if the European Commission deems the United Kingdom to no longer provide adequate protection for personal data.

Although we work to comply with applicable laws, regulations and standards, our contractual obligations and other legal obligations, these requirements are evolving and may be modified, interpreted and applied in an inconsistent manner from one jurisdiction to another, and may conflict with one another or other legal obligations with which we must comply. Various federal, state and foreign legislative or regulatory bodies may enact new or additional laws and regulations concerning privacy, data-retention and data-protection issues, including laws or regulations mandating disclosure to domestic or international law enforcement bodies, which could adversely impact our business or our reputation with customers. For example, some countries have adopted laws mandating that certain personal information regarding customers in their country be maintained solely in their country. Having to maintain local data centers and redesign product, service and business operations to limit processing of personal information to within individual countries could increase our operating costs significantly. Any failure, or perceived failure, by us to comply with federal, state or international privacy, data-retention or data-protection-related laws, regulations, orders or industry self-regulatory principles could result in proceedings or actions against us by governmental entities or others, a loss of customer confidence, damage to our brand and reputation and a loss of customers, any of which could have an adverse effect on our business.

Evolving expectations around corporate responsibility practices, specifically related to environmental, social and governance ("ESG") matters, may expose us to reputational and other risks.

Investors, stockholders, customers, suppliers and other third parties are increasingly focusing on ESG and corporate social responsibility endeavors and reporting. Companies that do not adapt to or comply with the evolving investor or stakeholder expectations and standards, or which are perceived to have not responded appropriately, may suffer from reputational damage and result in the business, financial condition and/or stock price of a company being materially and adversely affected. Further, this increased focus on ESG issues may result in new regulations and/or third-party requirements that could adversely impact our business, or certain shareholders reducing or eliminating their holdings of our stock. Additionally, an allegation or perception that we have not taken sufficient action in these areas could negatively harm our reputation.

ITEM 1B. UNRESOLVED STAFF COMMENTS

Not applicable.

ITEM 2. PROPERTIES

FACILITIES

Our headquarters are located in Redwood City, California, where we lease approximately 77,300 square feet of office and laboratory space.

Our lease ("RWC Lease") with Metropolitan Life Insurance Company ("MetLife") includes approximately 28,200 square feet of space located at 200 and 220 Penobscot Drive, Redwood City, California (the "200/220 Penobscot Space"), approximately 37,900 square feet of space located at 400 Penobscot Drive, Redwood City, California (the "400 Penobscot Space") (the 200/220 Penobscot Space and the 400 Penobscot Space are collectively referred to as the "Penobscot Space"), and approximately 11,200 square feet of space located at 501 Chesapeake Drive, Redwood City, California (the "Chesapeake Space").

We entered into the initial lease with MetLife for our facilities in Redwood City in 2004 and the RWC lease has been amended multiple times since then to adjust the leased space and terms of the RWC Lease. In February 2019, we entered into an Eighth Amendment to the RWC Lease (the "Eighth Amendment") with MetLife with respect to the Penobscot Space and the 501 Chesapeake Space to extend the term of the RWC Lease for additional periods. Pursuant to the Eighth Amendment, the term of the lease of the Penobscot Space has been extended through May 2027. The lease term for the 501 Chesapeake Space has been extended to May 2029. We have one (1) option to extend the term of the lease for the Penobscot Space for five (5) years, and one (1) separate option to extend the term of the lease for the 501 Chesapeake Space for five (5) years.

In January 2021, we entered into a lease agreement with ARE-San Francisco No. 63, LLC ("ARE") to lease a portion of a facility comprising approximately 36,593 rentable square feet at 825 Industrial Road, San Carlos, California to serve as additional office and research and development laboratory space (the "San Carlos Space"). In December 2021, we commenced occupancy of the San Carlos Space. The lease term for the San Carlos Space is through the end of November 2031. We have one (1) option to extend the term of the lease for the San Carlos Space for five (5) years.

In May 2021, we entered into a short-term office lease with The Inside Source, Inc., to sublease approximately 3,313 square feet of office space in a building located at 985 Industrial Blvd. San Carlos, California. This lease expired in April 2022.

We believe that the facilities that we currently lease in Redwood City and San Carlos, California are adequate for our needs for the immediate future and that, should it be needed, additional space can be leased to accommodate any future growth.

ITEM 3. LEGAL PROCEEDINGS

We are currently not a party to any material pending litigation or other material legal proceedings.

ITEM 4. MINE SAFETY DISCLOSURES

Not applicable.

PART II

ITEM 5. MARKET FOR REGISTRANT'S COMMON EQUITY, RELATED STOCKHOLDER MATTERS AND ISSUER PURCHASES OF EQUITY SECURITIES

MARKET INFORMATION

Our common stock is quoted on the Nasdaq Global Select Market ("Nasdaq"), under the symbol "CDXS."

As of February 22, 2023, there were approximately 125 stockholders of record. A substantially greater number of stockholders may be "street name" or beneficial holders, whose shares are held of record by banks, brokers and other financial institutions.

Dividend Policy

We have never declared or paid cash dividends on our common stock, and we currently do not plan to declare dividends on shares of our common stock in the foreseeable future. We expect to retain our future earnings, if any, for use in the operation and expansion of our business. In addition, unless waived, the terms of our Credit Facility prohibit us from paying any cash dividends or making other distributions. The payment of cash dividends in the future, if any, will be at the discretion of our board of directors and will depend upon such factors as earnings levels, capital requirements, our overall financial condition and any other factors deemed relevant by our board of directors.

Securities Authorized for Issuance under Equity Compensation Plans

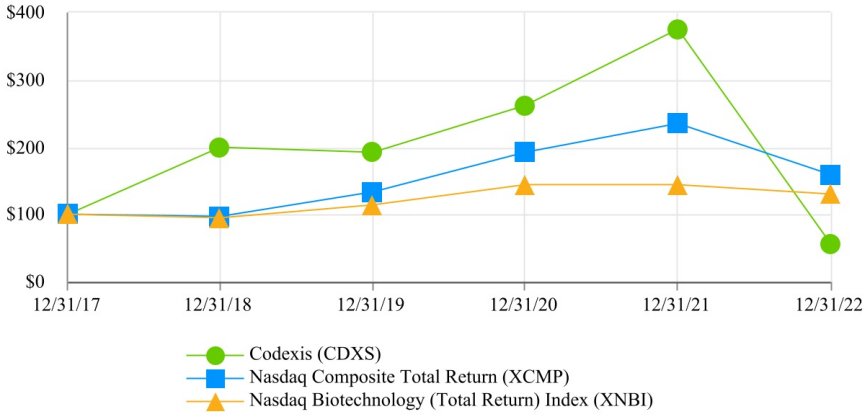
The information required by this item concerning securities authorized for issuance under equity compensation plans is incorporated by reference from the information that will be set forth in the Definitive Proxy Statement to be filed with the Securities and Exchange Commission in connection with the Annual Meeting of Stockholders to be held in 2023 (the "2023 Proxy Statement") under the heading "Executive Compensation—Equity Compensation Plan Information."

Stock Price Performance Graph

The following tabular information and graph compare our total common stock return with the total return for (i) the Nasdaq Composite Index and (ii) the Nasdaq Biotechnology Index for the period December 31, 2017 through December 31, 2022. The figures represented below assume an investment of $100 in our common stock at the closing price on December 31, 2017 and in the Nasdaq Composite Index and the Nasdaq Biotechnology Index on December 31, 2017 and the reinvestment of dividends into shares of common stock. The comparisons in the table and graph are required by the SEC and are not intended to forecast or be indicative of possible future performance of our common stock. The tabular information and graph shall not be deemed "soliciting material" or to be "filed" for purposes of Section 18 of the 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 or the Exchange Act.

		December 31,					
$100 investment in stock or index	**Ticker**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**
Codexis, Inc.	CDXS	$ 100.00	$ 200.00	$ 191.50	$ 261.44	$ 374.49	$ 55.81
Nasdaq Composite Total Return	XCMP	$ 100.00	$ 97.16	$ 132.81	$ 192.48	$ 235.16	$ 158.65
Nasdaq Biotechnology (Total Return) Index	XNBI	$ 100.00	$ 91.14	$ 114.02	$ 144.14	$ 144.17	$ 129.58

Comparison of Cumulative Total Return
Among Codexis, Nasdaq Composite Index and Nasdaq
Biotechnology Index



Unregistered Sales of Equity Securities and Use of Proceeds

Unregistered Sales of Equity Securities

During the year ended December 31, 2022, we did not issue or sell any unregistered securities not previously disclosed in a Quarterly Report on Form 10-Q or in a Current Report on Form 8-K.

Issuer Purchases of Equity Securities

None.

ITEM 6. [RESERVED]

ITEM 7. MANAGEMENT'S DISCUSSION AND ANALYSIS OF

FINANCIAL CONDITION AND RESULTS OF OPERATIONS

The following management's discussion and analysis of our financial condition and results of operations should be read in conjunction with our audited Consolidated Financial Statements and the related notes thereto included elsewhere in this Annual Report on Form 10-K. This Annual Report on Form 10-K contains forward-looking statements within the meaning of Section 21E of the Securities Exchange Act of 1934, as amended (the "Exchange Act"). These statements include, but are not limited to, expectations regarding our strategy, business plans, financial performance and developments relating to our industry. These statements are often identified by the use of words such as "may," "will," "expect," "believe," "anticipate," "intend," "could," "should," "estimate," or "continue," and similar expressions or variations. Such forward-looking statements are subject to risks, uncertainties and other factors that could cause actual results and the timing of certain events to differ materially from future results expressed or implied by such forward-looking statements. Factors that could cause or contribute to such differences include, but are not limited to, those discussed in Part I, Item IA:"Risk Factors," of this Annual Report on Form 10-K and elsewhere in this report. The forward-looking statements in this Annual Report on Form 10-K represent our views as of the date of this Annual Report on Form 10-K. We anticipate that subsequent events and developments will cause our views to change. However, while we may elect to update these forward-looking statements at some point in the future, we have no current intention of doing so except to the extent required by applicable law. You should, therefore, not rely on these forward-looking statements as representing our views as of any date subsequent to the date of this Annual Report on Form 10-K.

Business Overview

We are a leading enzyme engineering company leveraging our proprietary CodeEvolver® technology platform to discover, develop and enhance novel, high performance enzymes and other classes of proteins. Enzymes are naturally occurring biological molecules critical to almost all biochemical reactions that sustain life. They can be precisely engineered and optimized for specific functions, and to have particular characteristics, such as an ability to survive environments in which natural enzymes cannot, or to perform (bio)chemical transformations different than those for which they naturally evolved. The capacity to enhance the properties and performance of enzymes has led to pivotal improvements across three healthcare industry pillars: pharmaceutical manufacturing, life sciences, and biotherapeutics. The enzymes we produce solve for real-world challenges associated with small molecule pharmaceuticals manufacturing, nucleic acid synthesis and genomic sequencing, and – as biotherapeutic candidates – they have the potential to treat challenging diseases. Our unique enzymes drive improvements such as higher yields, reduced energy usage and waste generation, improved efficiency in manufacturing, greater sensitivity in genomic and diagnostic applications, and potentially more efficacious therapeutics.

Recent Developments

Announcement of interim results from Phase 1 trial of CDX-7108 for Exocrine Pancreatic Insufficiency ("EPI")

On February 23, 2023, we and our partner, Nestlé Health Science announced interim results from a Phase 1 clinical trial of CDX-7108 for the treatment of EPI. Data from the proof-of-concept arm indicated improved lipid absorption when patients are administered CDX-7108 versus placebo. Importantly, no safety issues were noted in the 48 subjects that participated in the single ascending dose and multiple ascending dose portion of the study. We believe the interim data support further development of CDX-7018 in partnership with Nestlé Health Science, with potential for the initiation of a Phase 2 study in early 2024.

Presentation of pre-clinical data from the Fabry disease transgene program

On February 22, 2023, we announced that Takeda Pharmaceutical Company Limited (Takeda) presented pre-clinical data from the Fabry disease transgene program, part of its Strategic Collaboration and License Agreement with Codexis, at the 19th Annual WORLD*Symposium*™. The gene therapy candidate is being developed to encode the codon optimized, CodeEvolver® engineered -GAL enzyme, which is designed to have improved serum and lysosomal stability and a predicted reduced immunogenicity.

Strengthened management team and Board of Directors with new appointments

On January 23,2023, we announced the appointment of Sri Ryali as Chief Financial Officer and on December 20, 2022, we announced the appointment of H. Stewart Parker to our Board of Directors.

Recent Investing and Financing Activities

In March 2022, we entered into a Stock Purchase Agreement with seqWell Inc. ("seqWell"), a privately held biotechnology company, pursuant to which we purchased 1,000,000 shares of seqWell's Series C preferred stock for $5.0 million.

In May 2021, we filed a Registration Statement on Form S-3 with the SEC, that automatically became effective upon its filing, under which we may sell common stock, preferred stock, debt securities, warrants, purchase contracts, and units from time to time in one or more offerings. On the date of this filing, we also filed a post-effective amendment to that Registration Statement on Form S-3. Pursuant to that post-effective amendment, we registered an aggregate $200.0 million of securities. In May 2021, we entered into an Equity Distribution Agreement ("EDA") with Piper Sandler & Co ("PSC"), under which PSC, as our exclusive agent, at our discretion and at such times that we may determine from time to time, may sell over a three-year period from the execution of the EDA up to a maximum of $50.0 million of shares of our common stock. Under the terms of the EDA, PSC may sell the shares at market prices by any method that is deemed to be an "at the market offering" as defined in Rule 415 under the Securities Act of 1933, as amended. During the year ended December 31, 2022, no shares of our common stock were issued pursuant to the EDA.

In December 2020, we completed an underwritten public offering of 4,928,572 shares of our common stock at a public offering price of $17.50 per share. The net proceeds to us were approximately $80.8 million after deducting offering costs, underwriting discounts and commissions and other offering expenses of $5.5 million.

In June 2020, we entered into a Stock Purchase Agreement with MAI pursuant to which we purchased 1,587,050 shares of MAI's Series A preferred stock for $1.0 million. In connection with the transaction, John Nicols, our former President and Chief Executive Officer, also joined MAI’s board of directors. Concurrently with our initial equity investment, we entered into the MAI Agreement pursuant to which performed services utilizing our CodeEvolver® protein engineering platform technology to improve DNA polymerase enzymes in exchange for compensation in the form of additional shares of MAI's Series A preferred stock. In April 2021, we purchased an additional 1,000,000 shares of MAI's Series A preferred stock for $0.6 million. In September 2021, we purchased 9,198,423 shares of MAI's Series B preferred stock for $7.0 million. As of December 31, 2022, we have 18,292,369 shares of MAI's Series A and B preferred stock that we have earned or purchased since executing the Stock Purchase Agreement with MAI.

In November 2020, we invested $1.0 million in Arzeda Corp., a privately-held computational protein design company that focuses on computational approaches to designing novel enzyme functionality, and received a convertible subordinated note issued by Arzeda Corp. In July 2021, we converted the non-marketable debt security with a carrying value of $1.3 million into 207,070 shares of Series B-2 preferred stock of Arzeda Corp.

Recent Accounting Pronouncements

For information on recent accounting pronouncements, see Note 2, "Summary of Significant Accounting Policies" in the Notes to the Consolidated Financial Statements set forth in Item 8 of this Annual Report on Form 10-K.

Business Update Regarding COVID-19

In March 2020, the World Health Organization declared COVID-19 a global pandemic and recommended containment and mitigation measures worldwide. The spread of COVID-19 has affected segments of the global economy and may affect our operations, including the potential interruption of our supply chain. We are monitoring this situation closely, and although operations have not been materially affected by the COVID-19 outbreak to date, the ultimate duration and severity of the outbreak and its impact on the economic environment and our business is uncertain.

As a result of the COVID-19 pandemic, we have received purchase orders from Pfizer Inc. ("Pfizer") for large quantities of our proprietary enzyme product, CDX-616, for use by Pfizer in the manufacture of a critical intermediate for its proprietary API, nirmatrelvir, used by Pfizer in combination with the API ritonavir, as its PAXLOVID™ (nirmatrelvir tablets; ritonavir tablets) product for the treatment of COVID-19 infections in humans. We are a party to an Enzyme Supply Agreement with Pfizer Ireland Pharmaceuticals, a subsidiary of Pfizer, Inc. (the "Pfizer Supply Agreement"), covering the manufacture, sale and purchase of CDX-616 for use by Pfizer in the manufacture of nirmatrelvir. Under the terms of the Pfizer Supply Agreement, Pfizer paid us a fee of $25.9 million in August 2022 which is creditable against future orders of CDX-616 used to manufacture its PAXLOVID™. The sale of CDX-616 to Pfizer had a substantial impact on our revenue for the year ended December 31, 2022. Revenues in 2023 and in future years from our sales of CDX-616 to Pfizer and other potential customers (including sublicensees of Pfizer technology from The Medicine Patent Pool) are subject to a number of factors which are outside of our control and could reduce or eliminate our sales of CDX-616, and therefore materially and adversely affect our business, results of operations and financial conditions.

For additional information on the various risks posed by the COVID-19 pandemic, please read Item 1A. Risk Factors included in this Annual Report on Form 10-K.

RESULTS OF OPERATIONS

The following table shows the amounts from our consolidated statements of operations for the periods presented (in thousands, except percentages):

	Year Ended December 31,			% of Total Revenues		
	2022	2021	2020	2022	2021	2020
Revenues:						
Product revenue	$ 116,676	$ 70,657	$ 30,220	84 %	67 %	44 %
Research and development revenue	21,914	34,097	38,836	16 %	33 %	56 %
Total revenues	138,590	104,754	69,056	100 %	100 %	100 %
Costs and operating expenses:						
Cost of product revenue	38,033	22,209	13,742	27 %	21 %	20 %
Research and development	80,099	55,919	44,185	58 %	53 %	64 %
Selling, general and administrative	52,172	49,323	35,049	38 %	47 %	51 %
Restructuring charges	3,167	—	—	2 %	— %	— %
Total costs and operating expenses	173,471	127,451	92,976	125 %	121 %	135 %
Loss from operations	(34,881)	(22,697)	(23,920)	(25) %	(21) %	(35) %
Interest income	1,441	459	405	1 %	— %	1 %
Other income (expense), net	124	1,148	(156)	— %	1 %	— %
Loss before income taxes	(33,316)	(21,090)	(23,671)	(24) %	(20) %	(34) %
Provision for income taxes	276	189	339	— %	— %	— %
Net loss	$ (33,592)	$ (21,279)	$ (24,010)	(24) %	(20) %	(34) %

Revenues

Our revenues consist of product revenue and research and development revenue as follows:

- Product revenue consist of sales of biocatalysts, pharmaceutical intermediates, and Codex® biocatalyst panels and kits.
- Research and development revenue include license, technology access and exclusivity fees, research services fees, milestone payments, royalties, optimization and screening fees.

Revenues are as follows (in thousands, except percentages):

	Year Ended December 31,			Change				
				2022		2021		
	2022	2021	2020	$	%	$	%	
Product revenue	$ 116,676	$ 70,657	$ 30,220	$ 46,019	65 %	$ 40,437	134 %	
Research and development revenue	21,914	34,097	38,836	(12,183)	(36) %	(4,739)	(12) %	
Total revenues	$ 138,590	$ 104,754	$ 69,056	$ 33,836	32 %	$ 35,698	52 %	

Revenues typically fluctuate on a quarterly basis due to the variability in our customers' manufacturing schedules and the timing of our customers' clinical trials. In addition, we have limited internal capacity to manufacture enzymes. As a result, we are dependent upon the performance and capacity of third party manufacturers for the commercial scale manufacturing of the enzymes used in our pharmaceutical and fine chemicals business.

We accept purchase orders for deliveries covering periods from one day up to 14 months from the date on which the order is placed. However, some of our purchase orders can be revised or cancelled by the customer without penalty. Considering these industry practices and our experience, we do not believe the total of customer purchase orders outstanding (backlog) provides meaningful information that can be relied on to predict actual sales for future periods.

2022 compared to 2021

Total revenues increased by $33.8 million in 2022 to $138.6 million, as compared to 2021. The increase was driven by growth in product revenue of $46.0 million, or 65%, but partially offset by a decrease in research and development revenue of $12.2 million, or 36%.

Product revenue, which consist primarily of sales of biocatalysts, pharmaceutical intermediates, and Codex® biocatalyst panels and kits, was $116.7 million in 2022, an increase of 65% compared with $70.7 million in 2021. The increase in product revenue was primarily due to $40.9 million higher revenue from Pfizer sales related to the purchase of CDX-616.

Research and development revenue decreased by $12.2 million in 2022 to $21.9 millior, or 36% compared with $34.1 million in 2021,primarily due to lower license fees from Takeda, decreased revenue from milestone payments received from GSK in 2021 and lower research and development fees from other existing collaboration agreements being recognized in 2022 as compared to the prior year. A portion of our research and development revenue in 2022 and 2021 was paid to us by MAI in the form of additional shares of MAI Series A and Series B preferred stock. We received an aggregate of 1,587,049 and 3,491,505 shares of MAI's Series A and B preferred stock for the years ended December 31, 2022 and 2021, respectively.

2021 compared to 2020

Total revenues increased by $35.7 million in 2021 to $104.8 million, as compared to 2020. The increase was driven by growth in product revenue of $40.4 million, or 134%, but partially offset by a decrease in research and development revenue of $4.7 million, or 12%.

Product revenues were $70.7 million in 2021, an increase of 134% compared with $30.2 million in 2020The increase in product revenue was primarily due to $34.5 million in revenue from Pfizer and an increase in demand for enzymes used in the manufacture of branded pharmaceutical products.

Research and development revenue decreased by $4.7 million in 2021 to $34.1 million, or 12% compared with $38.8 million in 2020, primarily due to lower license and research and development fees from Takeda and lower revenues from Novartis recognized in 2021 compared to the prior year, which was partially offset by higher license fees from other existing collaboration agreements. A portion of our research and development revenue in 2020 was paid to us by MAI in the form of additional shares of MAI Series A preferred stock. We received an aggregate of 714,171 shares of MAI's Series A preferred stock for the year ended December 31, 2020.

Costs and Operating Expenses (in thousands, except percentages):

	Year Ended December 31,			Change			
				2022		2021	
	2022	2021	2020	$	%	$	%
Cost of product revenue	$ 38,033	$ 22,209	$ 13,742	$ 15,824	71 %	$ 8,467	62 %
Research and development	80,099	55,919	44,185	24,180	43 %	11,734	26 %
Selling, general and administrative	52,172	49,323	35,049	2,849	6 %	14,274	41 %
Restructuring charges	3,167	—	—	$ 3,167	100 %	$ —	— %
Total costs and operating expenses	$ 173,471	$ 127,451	$ 92,976	$ 46,020	36 %	$ 34,475	37 %

Costs of Product Revenue and Product Gross Margin

Our product revenues are derived entirely from our Performance Enzymes segment. Revenues from the Novel Biotherapeutics segment are only from collaborative research and development activities.

The following table shows the amounts of our product revenue, cost of product revenue, product gross profit and product gross margin from our consolidated statements of operations (in thousands, except percentages):

	Year Ended December 31,		Change		Year Ended December 31,		Change	
	2022	2021	$	%	2021	2020	$	%
Product revenue	$ 116,676	$ 70,657	$ 46,019	65 %	$ 70,657	$ 30,220	$ 40,437	134 %
Cost of product revenue [1]	38,033	22,209	15,824	71 %	22,209	13,742	8,467	62 %
Product gross profit	$ 78,643	$ 48,448	$ 30,195	62 %	$ 48,448	$ 16,478	$ 31,970	194 %
Product gross margin (%) [2]	67 %	69 %			69 %	55 %		

[1] Cost of product revenue comprises both internal and third-party fixed and variable costs, including materials and supplies, labor, facilities and other overhead costs associated with our product revenue.
[2] Product gross margin is used as a performance measure to provide additional information regarding our results of operations on a consolidated basis.

2022 compared to 2021

Cost of product revenue increased by $15.8 million in 2022 to $38.0 million, as compared to 2021. The increase was primarily due to a higher volume of product sales and variations in product mix. Product gross margins decreased to 67% in 2022 as compared to 69% in 2021, primarily due to variations in product mix, variation in prices per volume sold and higher shipping costs. Some of these cost increases are a result of the impact of inflation and supply chain pressures seen in 2022.

2021 compared to 2020

Cost of product revenue increased by $8.5 million in 2021 to $22.2 million, as compared to 2020. The increase was primarily due to a higher volume of product sales and variations in product mix. The product gross margin increased to 69% in 2021 as compared to 55% in 2020, primarily due to the sale of higher margin branded products.

Research and Development Expenses

Research and development expenses consist of costs incurred for internal projects as well as collaborative research and development activities. These costs primarily consist of (i) employee-related costs, which include salaries and other personnel-related expenses (including stock-based compensation), (ii) various allocable expenses, which include occupancy-related costs, supplies, depreciation of facilities and laboratory equipment, and (iii) external costs. Research and development expenses are expensed when incurred.

2022 compared to 2021

Research and development expenses were $80.1 million in 2022 compared to $55.9 million in 2021, an increase of $24.2 million, or 43%. The increase was primarily due to an increase of $7.4 million in costs associated with higher headcount, $4.8 million in higher facilities and repair and maintenance expenses, $5.3 million increase in outside services and Chemistry, Manufacturing and Controls (“CMC”) and regulatory expenses, $2.6 million in higher lab supplies, $2.1 million in higher depreciation expenses, $1.1 million in higher stock-based compensation expenses and $0.7 million in higher allocable expenses. Some of these cost increases are a result of the impact of inflation seen in 2022.

2021 compared to 2020

Research and development expenses were $55.9 million in 2021 compared to $44.2 million in 2020, an increase of $11.7 million, or 26%. The increase was primarily due to $7.6 million in costs associated with higher headcount, $0.8 million in higher stock-based compensation expenses, $2.6 million in higher lab supplies, $2.2 million in higher allocable expenses, $1.1 million increase in outside services, and $1.0 million in higher depreciation expenses, which was partially offset by a $3.7 million decrease in costs associated with outside services related to CMC and regulatory expenses.

Selling, General and Administrative Expenses

Selling, general and administrative expenses consist of employee-related costs, which include salaries and other personnel-related expenses (including stock-based compensation), hiring and training costs, consulting and outside services expenses (including audit and legal counsel related costs), marketing costs, building lease costs, and depreciation and amortization expenses.

2022 compared to 2021

Selling, general and administrative expenses were $52.2 million in 2022 compared to $49.3 million in 2021, an increase of $2.8 million, or 6%. The increase was primarily due to an increase of $6.0 million in costs associated with higher headcount, $1.8 million in higher stock-based compensation costs, $0.8 million in higher outside and temporary services, which was partially offset by a decrease of $3.5 million in allocable expenses due to higher expenses allocated to research and development activities in 2022 and $3.3 million in lower legal fees. Some of these cost increases are a result of the impact of inflation seen in 2022.

2021 compared to 2020

Selling, general and administrative expenses were $49.3 million in 2021 compared to $35.0 million in 2020, an increase of $14.3 million, or 41%. The increase was primarily due to an increase of $6.6 million in costs associated with higher headcount to support our growth, $3.1 million in higher stock-based compensation costs, $5.1 million increase in legal fees, $1.1 million in higher outside and temporary services, $1.0 million in higher facilities cost, and $0.4 million increase in allowance for credit losses, which was partially offset by a decrease of $3.0 million in allocable expenses due to higher expenses allocated to research and development activities in 2021.

Restructuring Charges

Restructuring charges in 2022 consist of one-time employee severance and other termination benefits due to a workforce reduction plan that occurred in the fourth quarter of 2022.

Interest Income and Other Income (Expense), ne (in thousands, except percentages):

	Year Ended December 31,			Change			
				2022		2021	
	2022	2021	2020	$	%	$	%
Interest income	$ 1,441	$ 459	$ 405	$ 982	214 %	$ 54	13 %
Other income (expense), net	124	1,148	(156)	(1,024)	89 %	1,304	836 %
Total other income (expense), net	$ 1,565	$ 1,607	$ 249	$ (42)	(3) %	$ 1,358	545 %

Interest Income

Interest income increased by $1.0 million in 2022 compared to 2021, primarily due to higher average interest rates on cash balances and was partially offset by earned interest income on a non-marketable debt security in the prior year. Interest income increased by $0.1 million in 2021 compared to 2020, primarily due to earned interest income on a non-marketable debt security, which was partially offset by a reduction in interest income from lower average interest rates on lower average cash balances

Other Income (Expense), net

Other income (expense), net, decreased by $1.0 million in 2022 compared to 2021, primarily due to a higher gain from remeasurement on the carrying value of our investment in MAI in the prior year compared to this year. Other income (expense), net increased by $1.3 million in 2021 compared to 2020,primarily due to a $1.0 million gain from remeasurement on the carrying value of our investment in MAI.

Provision for Income Taxes (in thousands, except percentages):

	Year Ended December 31,			Change			
				2022		2021	
	2022	2021	2020	$	%	$	%
Provision for income taxes	$ 276	$ 189	$ 339	$ 87	46 %	(150)	(44) %

The provision for income taxes for 2022 was primarily due to the income tax withholding imposed by foreign taxing authorities on income earned in certain countries outside of the Unites Stated and remitted to the United States and the accrual of interest and penalties on historic uncertain tax positions, as well as current year state income taxes.

Starting in 2022, changes to Internal Revenue Code Section 174 made by the Tax Cuts and Jobs Act of 2017 no longer permit an immediate deduction for research and development expenditures in the tax year that such costs are incurred. As a result, the Company capitalized such costs in its 2022 income tax provision resulting in an increase in deferred tax assets and state income taxes. However, as we have recorded a full valuation allowance on our deferred tax assets, this did not have an impact on our net deferred tax assets.

The provision for income taxes in 2021 wasprimarily due to the income tax withholding imposed by foreign taxing authorities on income earned in certain countries outside of the Unites Stated and remitted to the United States and the accrual of interest and penalties on historic uncertain tax positions. The provision for income taxes in 2020 was primarily due to foreign withholding taxes on certain sales to non-U.S. customers.

Net Loss

Net loss for 2022 was $33.6 million, or a net loss per basic and diluted share of $0.51. This compared to a net loss of $21.3 million, or $0.33 per basic and diluted share for 2021. The increase in net loss was primarily related to lower research and development revenues and higher operating expenses.

Net loss for 2021 was $21.3 million, or a net loss per basic and diluted share of $0.33. This compared to a net loss of $24.0 million, or $0.40 per basic and diluted share for 2020. The decrease in net loss was primarily related to an increase in product revenue with higher margins, which was partially offset by higher operating expenses and lower research and development revenues.

Results of Operations by Segment (in thousands, except percentages)

Revenues by segment

	Year Ended December 31, 2022			Year Ended December 31, 2021			Change					
	Performance Enzymes	Novel Biotherapeutics	Total	Performance Enzymes	Novel Biotherapeutics	Total	Performance Enzymes			Novel Biotherapeutics		
							$	%		$	%	
Revenues:												
Product revenue	$ 116,676	$ —	$ 116,676	$ 70,657	$ —	$ 70,657	$ 46,019	65	%	$ —	—	%
Research and development revenue	9,936	11,978	21,914	19,858	14,239	34,097	(9,922)	(50)	%	(2,261)	(16)	%
Total revenues	$ 126,612	$ 11,978	$ 138,590	$ 90,515	$ 14,239	$ 104,754	$ 36,097	40	%	$ (2,261)	(16)	%

	Year Ended December 31, 2021			Year Ended December 31, 2020			Change			
	Performance Enzymes	Novel Biotherapeutics	Total	Performance Enzymes	Novel Biotherapeutics	Total	Performance Enzymes		Novel Biotherapeutics	
							$	%	$	%
Revenues:										
Product revenue	$ 70,657	$ —	$ 70,657	$ 30,220	$ —	$ 30,220	$ 40,437	134 %	$ —	— %
Research and development revenue	19,858	14,239	34,097	17,886	20,950	38,836	1,972	11 %	(6,711)	(32)%
Total revenues	$ 90,515	$ 14,239	$ 104,754	$ 48,106	$ 20,950	$ 69,056	$ 42,409	88 %	$ (6,711)	(32)%

2022 compared to 2021

Revenues from the Performance Enzymes segment increased by $36.1 million, or 40%, to $126.6 million in 2022, compared to $90.5 million in 2021. The increase in product revenue of $46.0 million, or 65%, to $116.7 million in 2022, compared to $70.7 million in 2021 was primarily due to $40.9 million higher revenue from Pfizer sales related to the purchase of CDX-616. The decrease in research and development revenue of $9.9 million, or 50%, to $9.9 million in 2022, compared to $19.9 million in 2021 was primarily due to lower revenues from Novartis under the Novartis CodeEvolver® Agreement as we completed the technology transfer to Novartis during the third quarter of 2021, decreased revenue from milestone payments received from GSK and lower research and development fees from other existing collaboration agreements compared to 2021.

Revenues from the Novel Biotherapeutics segment decreased by $2.3 million, or 16%, to $12.0 million in 2022, compared to $14.2 million in 2021. The decrease in revenue was primarily due to lower research and development fees from Takeda and lower research and development revenue from Nestlé Health Science recognized this year compared to the prior year.

2021 compared to 2020

Revenues from the Performance Enzymes segment increased by $42.4 million, or 88%, to $90.5 million in 2021, compared to $48.1 million in 2020. The increase in product revenue of $40.4 million, or 134%, to $70.7 million in 2021, compared to $30.2 million in 2020 was primarily due to $34.5 million in revenue from Pfizer and higher customer demand for enzymes used in the manufacture of branded pharmaceutical products. The increase in research and development revenue of $2.0 million, or 11%, to $19.9 million in 2021, compared to $17.9 million in 2020 was primarily due to higher licenses fees from existing collaboration arrangements, which was partially offset by lower revenues from Novartis.

Revenues from the Novel Biotherapeutics segment decreased by $6.7 million, or 32%, to $14.2 million in 2021, compared to $21.0 million in 2020. The decrease in revenue was primarily due to lower license and research and development fees from Takeda and a decrease in research and development revenue from Nestlé Health Science in 2021 compared to 2020.

Costs and operating expenses by segment

	Year Ended December 31, 2022			Year Ended December 31, 2021			Change			
	Performance Enzymes	Novel Biotherapeutics	Total	Performance Enzymes	Novel Biotherapeutics	Total	Performance Enzymes		Novel Biotherapeutics	
							$	%	$	%
Cost of product revenue	$ 38,033	$ —	$ 38,033	$ 22,209	$ —	$ 22,209	$ 15,824	71%	$ —	—%
Research and development[1]	25,786	49,770	75,556	23,140	30,219	53,359	2,646	11%	19,551	65%
Selling, general and administrative[1]	14,724	2,421	17,145	12,105	2,755	14,860	2,619	22%	(334)	(12)%
Restructuring Charges	$ 1,708	$ 966	2,674	$ —	$ —	—	$ 1,708	100%	$ 966	100%
Total segment costs and operating expenses	$ 80,251	$ 53,157	133,408	$ 57,454	$ 32,974	90,428	$ 22,797	40%	$ 20,183	61%
Corporate costs[2]			34,645			33,808				
Unallocated depreciation and amortization			5,418			3,215				
Total costs and operating expenses			$ 173,471			$ 127,451				

[1] Research and development expenses and selling, general and administrative expenses exclude depreciation and amortization of finance leases.
[2] Corporate costs include unallocated selling, general and administrative expense and restructuring charges.

	Year Ended December 31, 2021			Year Ended December 31, 2020			Change			
	Performance Enzymes	Novel Biotherapeutics	Total	Performance Enzymes	Novel Biotherapeutics	Total	Performance Enzymes		Novel Biotherapeutics	
							$	%	$	%
Cost of product revenue	$ 22,209	$ —	$ 22,209	$ 13,742	$ —	$ 13,742	$ 8,467	62%	$ —	—%
Research and development[1]	23,140	30,219	53,359	20,923	21,705	42,628	2,217	11%	8,514	39%
Selling, general and administrative[1]	12,105	2,755	14,860	9,597	2,355	11,952	2,508	26%	400	17%
Total segment costs and operating expenses	$ 57,454	$ 32,974	90,428	$ 44,262	$ 24,060	68,322	$ 13,192	30%	$ 8,914	37%
Corporate costs[2]			33,808			22,555				
Unallocated depreciation and amortization			3,215			2,099				
Total costs and operating expenses			$ 127,451			$ 92,976				

[1] Research and development expenses and selling, general and administrative expenses exclude depreciation and amortization of finance leases.
[2] Corporate costs include unallocated selling, general and administrative expenses.

For a discussion of product cost of revenue, see *"Results of Operations"*.

2022 compared to 2021

Research and development expense in the Performance Enzymes segment increased by $2.6 million, or 11%, to $25.8 million in 2022, compared to $23.1 million in 2021. The increase was primarily due to an increase in costs associated with outside services and higher headcount but partially offset by lower allocable expenses.

Selling, general and administrative expense in the Performance Enzymes segment increased by $2.6 million, or 22%, to $14.7 million in 2022, compared to $12.1 million in 2021. The increase was primarily due to an increase in costs associated with higher headcount and higher outside services expenses.

Research and development expense in the Novel Biotherapeutics segment increased by $19.6 million, or 65%, to $49.8 million in 2022, compared to $30.2 million in 2021. The increase was primarily due to higher costs associated with higher headcount, higher facilities cost and lab supplies, increase in outside services related to CMC and regulatory expenses and higher allocable expenses.

Selling, general and administrative expense in the Novel Biotherapeutics segment decreased by $0.3 million, or 12%, to $2.4 million in 2022, compared to $2.8 million in 2021. The decrease was primarily due to lower outside services expenses.

2021 compared to 2020

Research and development expense in the Performance Enzymes segment increased by $2.2 million, or 11%, to $23.1 million in 2021, compared to $20.9 million in 2020. The increase was primarily due to an increase in costs associated with higher headcount, higher outside services expenses, and higher lab supplies, which was partially offset by lower allocable expenses.

Selling, general and administrative expense in the Performance Enzymes segment increased by $2.5 million, or 26%, to $12.1 million in 2021, compared to $9.6 million in 2020. The increase was primarily due to an increase in costs associated with higher headcount and allocable expenses, which was partially offset by lower outside services expenses.

Research and development expense in the Novel Biotherapeutics segment increased by $8.5 million, or 39%, to $30.2 million in 2021, compared to $21.7 million in 2020. The increase was primarily due to higher costs associated with higher headcount and allocable expenses but partially offset by reduction in costs associated with outside services relating to CMC and regulatory expenses.

Selling, general and administrative expense in the Novel Biotherapeutics segment increased by $0.4 million, or 17%, to $2.8 million in 2021, compared to $2.4 million in 2020. The increase was primarily due to increase in costs associated with higher headcount and higher allocable expenses, which was partially offset by lower outside services expenses.

Income (loss) from operations by segment

	Year Ended December 31, 2022			Year Ended December 31, 2021			Change			
	Performance Enzymes	Novel Biotherapeutics	Total	Performance Enzymes	Novel Biotherapeutics	Total	Performance Enzymes		Novel Biotherapeutics	
							$	%	$	%
Income (loss) from operations	$ 46,361	$ (41,179)	$ 5,182	$ 33,061	$ (18,735)	$ 14,326	$ 13,300	40%	$ (22,444)	(120)%

	Year Ended December 31, 2021			Year Ended December 31, 2020			Change			
	Performance Enzymes	Novel Biotherapeutics	Total	Performance Enzymes	Novel Biotherapeutics	Total	Performance Enzymes		Novel Biotherapeutics	
							$	%	$	%
Income (loss) from operations	$ 33,061	$ (18,735)	$ 14,326	$ 3,844	$ (3,110)	$ 734	$ 29,217	760%	$ (15,625)	(502)%

2022 compared to 2021

Income from operations in the Performance Enzymes segment increased by $13.3 million, or 40%, to$46.4 million, in 2022, compared to $33.1 million in 2021. The increase in income from operations was primarily due to higher product revenue from Pfizer sales partially offset by lower research and development revenue and higher costs and operating expenses.

Loss from operations in the Novel Biotherapeutics segment increased by $22.4 million, or 120%, to $41.2 million in 2022 compared to a loss from operations of $18.7 million in 2021, primarily due to lower research and development revenue from Takeda and Nestlé Health Science and higher research and development expenses associated with higher headcount, higher facilities cost and lab supplies and higher allocable expenses.

2021 compared to 2020

Income from operations in the Performance Enzymes segment increased by $29.2 million, or 760%, to $33.1 million, in 2021, compared to $3.8 million in 2020. The increase in income from operations was primarily due to higher product revenue and research and development revenue, which was partially offset by higher costs and operating expenses.

Loss from operations in the Novel Biotherapeutics segment increased by $15.6 million, or 502%, to $18.7 million in 2021 compared to a loss from operations of $3.1 million in 2020. The increase in loss from operations was primarily due to lower research and development revenue from Takeda and decrease in research and development revenue from Nestlé Health Science, and higher research and development expenses associated with higher headcount and allocable expenses.

LIQUIDITY AND CAPITAL RESOURCES

Liquidity is the measurement of our ability to meet working capital needs and to fund capital expenditures. We have historically funded our operations primarily through cash generated from operations, stock option exercises and public and private offerings of our common stock. We also have the ability to borrow up to $5.0 million under our Credit Facility (defined below). We actively manage our cash usage and investment of liquid cash to ensure the maintenance of sufficient funds to meet our working capital needs. Our cash and cash equivalents are held in U.S banks. Our primary uses of capital are, and we expect will continue to be for the near future, compensation and related expenses, research and development expenses including costs related to the potential clinical development of our product candidates, manufacturing costs, laboratory and related supplies, legal and other regulatory expenses, and general overhead costs. We expect our cash requirements to increase in the near term as we continue to invest in high potential research and development activities with long-term commercial potential, if approved, and see less cash revenue from sales of CDX-616 to Pfizer for PAXLOVID™.

The following summarizes our cash and cash equivalents balance and working capital as of December 31, 2022, 2021 and 2020 (in thousands):

	December 31,		
	2022	2021	2020
Cash and cash equivalents	$ 113,984	$ 116,797	$ 149,117
Working capital	$ 113,828	$ 128,517	$ 159,442

Sources of Capital

In addition to our existing cash and cash equivalents and revenue generated through our existing operations, we are eligible to earn milestone and other contingent payments for the achievement of defined collaboration objectives and certain royalty payments under our collaboration agreements with Merck, Novartis and Nestlé Health Science of up to $439.0 million in aggregate. In addition, under the GSK CodeEvolver® Agreement, we have the potential to receive additional contingent payments that range from $5.8 million to $38.5 million per project. Our ability to earn these milestone and contingent payments and the timing of achieving these milestones is primarily dependent upon the outcome of our collaborators' research and development activities and is uncertain at this time.

In addition, pursuant to the terms of the Pfizer Supply Agreement, we received a fee of $25.9 million in August 2022. The fee is creditable against future orders of CDX-616 used to manufacture PAXLOVID™ with shipment dates prior to December 31, 2023 and for fees associated with any new development and licensing agreements with Pfizer entered into prior to March 31, 2023 that are invoiced prior to December 31, 2023. Up to 50% of any portion of the fee which has not been credited pursuant to credits granted under the preceding sentence is creditable against future orders of CDX-616 used to manufacture PAXLOVID™ with shipment dates prior to December 31, 2024. In the fourth quarter of 2022, we and Pfizer agreed to adjust the terms of certain existing non-cancelable purchase orders of CDX-616 issued under the Pfizer Supply Agreement pursuant to which Pfizer will pay us $36.8 million in lieu of the delivery of certain quantities of CDX-616 under those purchase orders, upon which we collected $19.8 million in December 2022 and the remaining amount is expected to be received in the first quarter of 2023.

We are actively collaborating with new and existing customers. We believe that we can utilize our current products and services, and develop new products and services, to increase our revenues and gross margins in future periods.

We have historically experienced negative cash flows from operations as we continue to invest in key technology development projects and improvements to our CodeEvolver® protein engineering technology platform, and expand our business development and collaboration with new customers. Our cash flows from operations will continue to be affected principally by product sales and product gross margins, sales from licensing our technology to major pharmaceutical companies, and collaborative research and development services provided to customers, as well as our headcount costs, primarily in research and development. Our primary source of cash flows from operating activities is cash receipts from our customers for purchases of products, collaborative research and development services, and licensing our technology to major pharmaceutical companies. Our largest uses of cash from operating activities are for employee-related expenditures, rent payments, inventory purchases to support our product sales and non-payroll research and development costs.

Equity Distribution Agreement

In May 2021, we entered into an Equity Distribution Agreement ("EDA") with Piper Sandler & Co ("PSC"), under which PSC, as our exclusive agent, at our discretion and at such times that we may determine from time to time, may sell over a three-year period from the execution of the EDA up to a maximum of $50.0 million of shares of our common stock. During the year ended December 31, 2022, no shares of our common stock were issued pursuant to the EDA, and as of December 31, 2022, $50.0 million worth of shares remained available for sale under the EDA. Sales of our common stock under this arrangement could be subject to business, economic or competitive uncertainties and contingencies, many of which may be beyond our control, and which could cause actual results from the sale of our common stock to differ materially from expectations.

Credit Facility

In June 2017, we entered into the Credit Facility with Western Alliance Bank consisting of term loans up to $10.0 million, and advances under a revolving credit facility up to $5.0 million with accounts receivable borrowing base of 80% of eligible accounts receivable. Our right to take draws on the term debt expired on December 31, 2021. On October 1, 2024, loans drawn, if any, under the Revolving Line of Credit terminate.

The Credit Facility requires us to maintain compliance with certain financial covenants including attainment of certain lender-approved projections or maintenance of certain minimum cash levels. Restrictive covenants in the Credit Facility restrict the payment of dividends or other distributions. As of December 31, 2022, no amounts were borrowed under the Credit Facility and we were in compliance with the covenants for the Credit Facility. For additional information about our contractual obligations, see Note 13, “Commitments and Contingencies” in the Notes to the Consolidated Financial Statements included in Item 8 of this Annual Report on Form 10-K.

We believe that our existing cash and cash equivalents, combined with our future expectations for product revenues, research and development revenue, and expense management will provide adequate funds for ongoing operations, planned capital expenditures and working capital requirements for at least the next twelve months. We have based this estimate on assumptions that may prove to be wrong, and we could utilize our capital resources sooner than we expect.

However, we may need additional capital if our current plans and assumptions change. In addition, we may choose to seek other sources of capital even if we believe we have generated sufficient cash flows to support our operating needs. Our need for additional capital will depend on many factors, including the financial success of our business, the spending required to develop and commercialize new and existing products, the effect of any acquisitions of other businesses, technologies or facilities that we may make or develop in the future, our spending on new market opportunities, and the potential costs for the filing, prosecution, enforcement and defense of patent claims, if necessary. If our capital resources are insufficient to meet our longer term capital requirements, and we are unable to enter into or maintain collaborations with partners that are able or willing to fund our development efforts or commercialize any products that we develop or enable, we will have to raise additional funds to continue the development of our technology and products and complete the commercialization of products, if any, resulting from our technologies. If future financings involve the issuance of equity securities, our existing stockholders would suffer dilution. If we raise debt financing or enter into credit facilities, we may be subject to restrictive covenants that limit our ability to conduct our business. We may not be able to raise sufficient additional funds on terms that are favorable to us, if at all. If we fail to raise sufficient funds and fail to generate sufficient revenues to achieve planned gross margins and to control operating costs, our ability to fund our operations, take advantage of strategic opportunities, develop products or technologies, or otherwise respond to competitive pressures could be significantly limited. If this happens, we may be forced to delay or terminate research or development programs or the commercialization of products resulting from our technologies, curtail or cease operations or obtain funds through collaborative and licensing arrangements that may require us to relinquish commercial rights, or grant licenses on terms that are not favorable to us. If adequate funds are not available, we will not be able to successfully execute our business plan or continue our business.

Cash Flows

The following is a summary of cash flows for the years ended December 31, 2022, 2021 and 2020 (in thousands):

	Year Ended December 31,		
	2022	2021	2020
Net cash provided by (used in) operating activities	$ 11,284	$ (14,267)	$ (16,464)
Net cash used in investing activities	(13,578)	(21,422)	(5,748)
Net cash provided by (used in) financing activities	(575)	3,767	80,808
Net increase (decrease) in cash, cash equivalents and restricted cash	$ (2,869)	$ (31,922)	$ 58,596

Cash Flows from Operating Activities

The $25.6 million increase in net cash provided by operating activities in 2022 as compared to 2021 was primarily due to the receipt of a $25.9 million fee from Pfizer in August 2022 creditable against future orders and increases in cash received from revenue, which was partially offset by increased payments associated with higher operating costs.

The $2.2 million decrease in net cash used by operating activities in 2021 as compared to 2020 was primarily due to increases in cash received from revenue, which was partially offset by increased payments associated with higher operating costs.

Cash Flows from Investing Activities

The $7.8 million decrease in net cash used in investing activities in 2022 as compared to 2021, was primarily due to higher cash utilized for additional investments in equity securities and purchases of property and equipment in 2021.

The $15.7 million increase in net cash used in investing activities in 2021 as compared to 2020, was primarily due to higher cash utilized for the additional investments in MAI's Series A and B preferred stock for $7.6 million and higher purchases of property and equipment during 2021.

Cash Flows from Financing Activities

The $4.3 million decrease in net cash provided by financing activities in 2022 as compared to 2021 was primarily due to higher cash paid on taxes related to net share settlement of equity awards and lower proceeds from exercises of stock options.

The $77.0 million decrease in net cash provided by financing activities in 2021 as compared to 2020 was primarily due to the receipt of $80.8 million in net proceeds from our offering of common stock in 2020.

OFF-BALANCE SHEET ARRANGEMENTS

As of December 31, 2022, we had no off-balance sheet arrangements as defined in Item 303 of Regulation S-K as promulgated by the SEC.

CRITICAL ACCOUNTING POLICIES AND ESTIMATES

Management’s discussion and analysis of our financial condition and results of operations are based upon our consolidated financial statements. The consolidated financial statements have been prepared in conformity with generally accepted accounting principles in the United States and include our accounts and the accounts of our wholly owned subsidiaries. The preparation of our consolidated financial statements requires our management to make estimates, assumptions, and judgments that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements, and the reported amounts of revenues and expenses during the applicable periods. Management bases its estimates, assumptions and judgments on historical experience and on various other factors that are believed to be reasonable under the circumstances. Different assumptions and judgments would change the estimates used in the preparation of our consolidated financial statements, which, in turn, could change the results from those reported. Our management evaluates its estimates, assumptions and judgments on an ongoing basis.

The critical accounting policies requiring estimates, assumptions, and judgments that we believe have the most significant impact on our consolidated financial statements are described below.

Revenue Recognition

Our revenues are derived primarily from product revenue and collaborative research and development agreements. The majority of our contracts with customers typically contain multiple products and services.

The majority of our collaborative contracts contain multiple revenue streams such as upfront and/or annual license fees, research and development services, contingent milestone payments upon achievement of contractual criteria, and royalty fees based on the licensees' product revenue or usage, among others. We determine the stand-alone selling price ("SSP") and allocate consideration to distinct performance obligations.

We measure revenue based on the consideration specified in the contract with each customer, net of any sales incentives and taxes collected on behalf of government authorities. We recognize revenue in a manner that best depicts the transfer of promised goods or services to the customer, when control of the product or service is transferred to a customer. We make significant judgments when determining the appropriate timing of revenue recognition.

Product Revenue

Certain of our agreements provide options to customers which they can exercise at a future date, such as the option to purchase our product during the contract duration at discounted prices and an option to extend their contract, among others. In accounting for customer options, we determine whether an option is a material right and this requires us to exercise significant judgment. If a contract provides the customer an option to acquire additional goods or services at a discount that exceeds the range of discounts that we typically give for that product or service, or if the option provides the customer certain additional goods or services for free, the option may be considered a material right. If the contract gives the customer the option to acquire additional goods or services at their normal SSPs, we would likely determine that the option is not a material right and, therefore, account for it as a separate performance obligation when the customer exercises the option. We primarily account for options which provide material rights using the alternative approach available under ASC 606, as we concluded we meet the criteria for using the alternative approach. Therefore, the transaction price is calculated as the expected consideration to be received for all the goods and services we expect to provide. We update the transaction price for expected consideration, subject to constraint, each reporting period if our estimate of future goods to be ordered by customers change. Estimating expected consideration to be received under the alternative approach involves significant judgment.

Research and Development Revenue

The majority of our research and development agreements are based on a contractual rate per dedicated project team working on the project. The underlying product that we develop for customers does not create an asset with an alternative use to us and the customer receives benefits as we perform the work towards completion. Thus, our performance obligations are generally satisfied over time as the service is performed. We utilize an appropriate method of measuring progress towards the completion of our performance obligations to determine the timing of revenue recognition. For each performance obligation that is satisfied over time, we recognize revenue using a single measure of progress either based on hours incurred or based on stage of progress under the project.

Our contracts frequently provide customers with rights to use or access our products or technology, along with other promises or performance obligations. If we determine that the customer cannot benefit from the license without our services, the license will be accounted for as combined with the other performance obligations. If we determine that a license is distinct, we would recognize an allocable portion of the transaction price when the license is transferred to the customer, and the customer can use and benefit from it. We estimate the SSP for license rights by using historical information if licenses have been previously sold to customers and for new licenses, we consider multiple methods, a discounted cash flow method which includes the following key assumptions: the development timelines, revenue forecasts, commercialization expenses, discount rate, and the probability of technical and regulatory success.

At the inception of each arrangement that includes variable consideration such as development milestone payments, we evaluate whether the milestones are considered probable of being reached and estimate the amount to be included in the transaction price using the most likely amount method. If it is probable that a significant revenue reversal would not occur, the associated milestone value is included in the transaction price. Milestone payments that are not within our control or the licensee, such as regulatory approvals, are not considered probable of being achieved until those approvals are received.

Our CodeEvolver® platform technology transfer collaboration agreements typically include license fees, upfront fees, and variable consideration in the form of milestone payments, and sales or usage-based royalties. We have recognized revenues from our platform technology transfer agreements over time.

We also have an agreement under which we have granted a functional license to some elements of our biocatalyst technology. We will recognize revenues for the functional license at a point in time when the control of the license transfers to the customer.

For license agreements that include sales or usage-based royalty payments to us for which the license is the predominant item to which the royalty relates, we do not recognize revenue until the underlying sales of the product or usage has occurred. At the end of each reporting period, we estimate the royalty amount. We recognize revenue at the later of (i) when the related sale of the product occurs, or (ii) when the performance obligation to which some or all of the royalty has been allocated has been satisfied, or partially satisfied.

Investment in Non-Marketable Securities

Investment in Non-Marketable Equity Securities

We measure investments in non-marketable equity securities without a readily determinable fair value using a measurement alternative that measures these securities at the cost method minus impairment, if any, plus or minus changes resulting from observable price changes on a non-recurring basis. Gains and losses on these securities are recognized in other income (expense), net.

We evaluate equity securities for impairment when circumstances indicate that we may not be able to recover the carrying value. We may impair these securities and establish an allowance for a credit loss when we determine that there has been an "other-than-temporary" decline in estimated fair value of the debt or equity security compared to its carrying value. We calculate the estimated fair value of these securities using information from the investee, which may include:

- Audited and unaudited financial statements;
- Projected technological developments of the company;
- Projected ability of the company to service its debt obligations;
- If a deemed liquidation event were to occur;
- Current fundraising transactions;
- Current ability of the company to raise additional financing if needed;
- Changes in the economic environment which may have a material impact on the operating results of the company;
- Contractual rights, obligations or restrictions associated with the investment; and
- Other factors deemed relevant by our management to assess valuation.

The valuation may be reduced if the company's potential has deteriorated significantly. If the factors that led to a reduction in valuation are overcome, the valuation may be readjusted.

Recent Accounting Pronouncements

See Note 2, “Basis of Presentation and Summary of Significant Accounting Policies” in the Notes to the Consolidated Financial Statements set forth in Item 8 of this Annual Report on Form 10-K for a full description of recent accounting standards, including the respective dates of adoption and effects on our consolidated financial position, results of operations and cash flows.

ITEM 7A. QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK

Interest Rate Sensitivity

Our unrestricted cash and cash equivalents total $114.0 million at December 31, 2022. We primarily invest these amounts in money market funds which are held for working capital purposes. We do not enter into investments for trading or speculative purposes. As of December 31, 2022, the effect of a hypothetical 10% decrease in market interest rates would have an $316 thousand impact on a potential loss in future interest income and cash flows.

In June 2017, we entered into a Credit Facility with Western Alliance Bank consisting of term loans up to $10.0 million, and advances under a revolving line of credit up to $5.0 million. Our right to take draws on the long term debt expired on December 31, 2021. On October 1, 2024, loans drawn, if any, under the Revolving Line of Credit terminate. Advances made under the Revolving Line of Credit bear interest at a variable annual rate equal to the greater of (i) 4.25% or (ii) the sum of (A) the prime rate plus (B) 1.00%. Increases in these variable interest rates will increase our future interest expense and decrease our results of operations and cash flows. Our exposure to interest rates risk relates to our 2017 Credit Facility with variable interest rates, where an increase in interest rates may result in higher borrowing costs. Since we have no outstanding borrowings under our 2017 Credit Facility as of December 31, 2022, the effect of a hypothetical 10% change in interest rates would have an impact of nil on our interest expense.

Foreign Currency Risk

Our results of operations and cash flows are subject to fluctuations due to changes in foreign currency exchange rates. In periods when the USD declines in value as compared to the foreign currencies in which we incur expenses, our foreign-currency based expenses increase when translated into United States dollars. Although substantially all of our sales are denominated in United States dollars, future fluctuations in the value of the USD may affect the price competitiveness of our products outside the United States. Our most significant foreign currency exposure is due to non-functional currency denominated monetary assets, primarily currencies denominated in other than their functional currency. These non-functional currency denominated monetary assets are subject to re-measurement which may create fluctuations in other expense, net, a component in our consolidated statement of operations and in the fair value of the assets in the consolidated balance sheets. As of December 31, 2022, the effect of a hypothetical 10% unfavorable change in exchange rates on currencies denominated in other than their functional currency would result in a potential loss in future earnings in our consolidated statement of operations and a reduction in the fair value of the assets of approximately $42 thousand. We did not engage in hedging transactions in 2022, 2021 and 2020.

Investment in Non-Marketable Equity Securities

We own investments in non-marketable equity securities without readily determinable fair values. We may value these equity securities based on significant recent arms-length equity transactions with sophisticated non-strategic unrelated investors, providing the terms of these security transactions are substantially similar to the security transactions terms between the investors and us. The impact of the difference in transaction terms on the market value of the portfolio company may be difficult or impossible to quantify.

ITEM 8. FINANCIAL STATEMENTS AND SUPPLEMENTARY DATA

Codexis, Inc.

INDEX TO CONSOLIDATED FINANCIAL STATEMENTS

Report of Independent Registered Public Accounting Firm

Shareholders and Board of Directors
Codexis, Inc.
Redwood City, California

Opinion on the Consolidated Financial Statements

We have audited the accompanying consolidated balance sheets of Codexis, Inc. (the "Company") as of December 31, 2022 and 2021, the related consolidated statements of operations, stockholders' equity, and cash flows for each of the three years in the period ended December 31, 2022, 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, 2022 and 2021, and the results of its operations and its cash flows for each of the three years in the period ended December 31, 2022, in conformity with accounting principles generally accepted in the United States of America.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) ("PCAOB"), the Company's internal control over financial reporting as of December 31, 2022, based on criteria established in Internal Control – Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission ("COSO") and our report dated February 27, 2023 expressed an unqualified opinion thereon.

Basis for Opinion

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

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the consolidated financial statements are free of material misstatement, whether due to error or fraud.

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

Critical Audit Matter

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

Revenue Recognition

As described in Notes 2 and 3 to the consolidated financial statements, the Company recognizes revenue in a manner that best depicts the transfer of promised goods or services to the customer when control of the product or service is transferred to a customer. The Company's contracts with customers include enzyme supply, licensing, and collaborative research and development agreements. Contracts with customers may contain multiple performance obligations, options, up-front or annual license fees, fees for full time employee research and development services, contingent milestone payments upon achievement of contractual criteria, and royalty fees based on the licensees' product revenue or usage. The Company makes significant judgments in determining revenue recognition for certain customer contracts.

We identified management's significant judgments and estimates related to revenue recognition for contracts with customers as a critical audit matter. Auditing the evaluation of distinct performance obligations, allocation of transaction price to distinct performance obligations, determination and estimation of material rights, determination of the pattern of transfer of control for each distinct performance obligation and estimation of variable consideration required significant audit effort and subjective judgments in evaluating management's estimates.

The primary procedures we performed to address this critical audit matter included:

- Testing the design and operating effectiveness of internal controls relating to the identification of distinct performance obligations and material rights, the determination of the timing of revenue recognition, allocation of transaction price to distinct performance obligations, and the estimation of variable consideration.
- Examining a sample of revenue contracts and other source documents to test management's identification of significant terms for completeness, including the identification of distinct performance obligations, material rights and variable consideration including sending confirmations to a sample of customers to confirm our understanding of the parties' rights and obligations.
- Evaluating the reasonableness and accuracy of management's judgments and estimates used in accounting for identified material rights.
- Assessing the reasonableness of management's judgments and estimates to calculate variable consideration, and the timing of recognizing the related revenue subject to any constraints.
- Evaluating the appropriateness of management's allocation of the transaction price to the distinct performance obligation and determination of whether identified performance obligations meet the criteria for over-time revenue recognition.

/s/ BDO USA, LLP

We have served as the Company's auditor since 2013.

San Jose, California
February 27, 2023

Report of Independent Registered Public Accounting Firm

Shareholders and Board of Directors
Codexis, Inc.
Redwood City, California

Opinion on Internal Control over Financial Reporting

We have audited Codexis, Inc.'s (the "Company's") internal control over financial reporting as of December 31, 2022, based on criteria established in *Internal Control – Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission (the "COSO criteria"). In our opinion, the Company maintained, in all material respects, effective internal control over financial reporting as of December 31, 2022, based on the COSO criteria.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) ("PCAOB"), the consolidated balance sheets of the Company as of December 31, 2022 and 2021, the related consolidated statements of operations, stockholders' equity, and cash flows for each of the three years in the period ended December 31, 2022, and the related notes and our report dated February 27, 2023 expressed an unqualified opinion thereon.

Basis for Opinion

The Company's management is responsible for maintaining effective internal control over financial reporting and for its assessment of the effectiveness of internal control over financial reporting, included in the accompanying "Item 9A, Controls and Procedures". Our responsibility is to express an opinion on the Company's internal control over financial reporting based on our audit. We are a public accounting firm registered with the PCAOB and are required to be independent with respect to the Company in accordance with U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audit of internal control over financial reporting in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether effective internal control over financial reporting was maintained in all material respects. Our audit included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, and testing and evaluating the design and operating effectiveness of internal control based on the assessed risk. Our audit also included performing such other procedures as we considered necessary in the circumstances. We believe that our audit provides a reasonable basis for our opinion.

Definition and Limitations of Internal Control over Financial Reporting

A company's internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. A company's internal control over financial reporting includes those policies and procedures that (1) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (2) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (3) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company's assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

/s/ BDO USA, LLP

San Jose, California
February 27, 2023

Codexis, Inc.
Consolidated Balance Sheets
(In Thousands, Except Per Share Amounts)

	December 31,	
	2022	**2021**
Assets		
Current assets:		
Cash and cash equivalents	$ 113,984	$ 116,797
Restricted cash, current	521	579
Financial assets:		
Accounts receivable	31,904	24,953
Contract assets	2,116	4,557
Unbilled receivables	7,016	8,558
Total financial assets	41,036	38,068
Less: allowances	(163)	(416)
Total financial assets, net	40,873	37,652
Inventories	2,029	1,160
Prepaid expenses and other current assets	5,487	5,700
Total current assets	162,894	161,888
Restricted cash	1,521	1,519
Investment in non-marketable equity securities ($13,921 and $12,713 with a related party)	20,510	14,002
Right-of-use assets - Operating leases, net	39,263	44,095
Right-of-use assets - Finance leases, net	—	17
Property and equipment, net	22,614	21,345
Goodwill	3,241	3,241
Other non-current assets	350	276
Total assets	$ 250,393	$ 246,383
Liabilities and Stockholders' Equity		
Current liabilities:		
Accounts payable	$ 3,246	$ 2,995
Accrued compensation	11,453	11,119
Other accrued liabilities	15,279	12,578
Current portion of lease obligations - Operating leases	5,360	4,093
Deferred revenue ($0 and $245 to a related party)	13,728	2,586
Total current liabilities	49,066	33,371
Deferred revenue, net of current portion	16,881	3,749
Long-term lease obligations - Operating leases	38,278	43,561
Other long-term liabilities	1,371	1,311
Total liabilities	105,596	81,992
Commitments and contingencies (Note 13)		
Stockholders' equity:		
Preferred stock, $0.0001 par value per share; 5,000 shares authorized, none issued and outstanding	—	—
Common stock, $0.0001 par value per share; 100,000 shares authorized; 65,811 and 65,109 shares issued and outstanding at December 31, 2022 and December 31, 2021, respectively	6	6
Additional paid-in capital	566,081	552,083
Accumulated deficit	(421,290)	(387,698)
Total stockholders' equity	144,797	164,391
Total liabilities and stockholders' equity	$ 250,393	$ 246,383

See accompanying notes to consolidated financial statements

Codexis, Inc.
Consolidated Statements of Operations
(In Thousands, Except Per Share Amounts)

	Year Ended December 31,		
	2022	**2021**	**2020**
Revenues:			
Product revenue ($514, $0 and $0 from a related party)	$ 116,676	$ 70,657	$ 30,220
Research and development revenue ($1,245, $1,955 and $900 from a related party)	21,914	34,097	38,836
Total revenues	138,590	104,754	69,056
Costs and operating expenses:			
Cost of product revenue	38,033	22,209	13,742
Research and development	80,099	55,919	44,185
Selling, general and administrative	52,172	49,323	35,049
Restructuring charges	3,167	—	—
Total costs and operating expenses	173,471	127,451	92,976
Loss from operations	(34,881)	(22,697)	(23,920)
Interest income	1,441	459	405
Other income (expense), net ($208, $983 and $0 from a related party)	124	1,148	(156)
Loss before income taxes	(33,316)	(21,090)	(23,671)
Provision for income taxes	276	189	339
Net loss	$ (33,592)	$ (21,279)	$ (24,010)
Net loss per share, basic and diluted	$ (0.51)	$ (0.33)	$ (0.40)
Weighted average common stock shares used in computing net loss per share, basic and diluted	65,344	64,568	59,360

See accompanying notes to consolidated financial statements

Codexis, Inc.
Consolidated Statements of Stockholders' Equity
(In Thousands)

	Common Stock		Additional Paid-in Capital	Accumulated Deficit	Total Stockholders' Equity
	Shares	Amount			
December 31, 2019	58,877	$ 6	$ 447,920	$ (342,409)	$ 105,517
Exercise of stock options	210	—	1,323	—	1,323
Release of stock awards	370	—	—	—	—
Employee stock-based compensation	—	—	7,622	—	7,622
Non-employee stock-based compensation	—	—	106	—	106
Taxes paid related to net share settlement of equity awards	(103)	—	(1,257)	—	(1,257)
Issuance of common stock, net of issuance costs of $5,448	4,929	—	80,802	—	80,802
Net loss	—	—	—	(24,010)	(24,010)
December 31, 2020	64,283	6	536,516	(366,419)	170,103
Exercise of stock options	699	—	5,180	—	5,180
Release of stock awards	181	—	—	—	—
Employee stock-based compensation	—	—	11,346	—	11,346
Non-employee stock-based compensation	—	—	247	—	247
Taxes paid related to net share settlement of equity awards	(54)	—	(1,206)	—	(1,206)
Net loss	—	—	—	(21,279)	(21,279)
December 31, 2021	65,109	6	552,083	(387,698)	164,391
Exercise of stock options	410	—	955	—	955
Release of stock awards	373	—	—	—	—
Employee stock-based compensation	—	—	14,398	—	14,398
Non-employee stock-based compensation	—	—	133	—	133
Taxes paid related to net share settlement of equity awards	(81)	—	(1,488)	—	(1,488)
Net loss	—	—	—	(33,592)	(33,592)
December 31, 2022	65,811	$ 6	$ 566,081	$ (421,290)	$ 144,797

See accompanying notes to consolidated financial statements

Codexis, Inc.
Consolidated Statements of Cash Flows
(In Thousands)

	Year Ended December 31,		
	2022	**2021**	**2020**
Operating activities:			
Net loss	$ (33,592)	$ (21,279)	$ (24,010)
Adjustments to reconcile net loss to net cash provided by (used in) operating activities:			
Depreciation	5,402	3,113	1,950
Amortization expense - right-of-use assets - operating and finance leases	4,849	2,834	2,604
Stock-based compensation	14,531	11,593	7,728
Provision for credit losses	4	342	40
Equity securities earned from research and development activities from a related party	(1,245)	(1,955)	(900)
Unrealized gain on non-marketable securities (($208) and ($983) from a related party)	(208)	(1,272)	—
Other non-cash items	(29)	(19)	15
Changes in operating assets and liabilities:			
Financial assets ($0, $0 and ($450) from a related party)	(3,225)	(9,156)	(8,723)
Inventories	(869)	(196)	(593)
Prepaid expenses and other assets	181	(2,268)	(1,012)
Accounts payable	207	268	101
Accrued compensation and other accrued liabilities	5,983	6,575	6,175
Other long-term liabilities	(5,223)	(4,147)	(2,586)
Deferred revenue ($0, $245, $0 to a related party)	24,518	1,300	2,747
Net cash provided by (used in) operating activities	11,284	(14,267)	(16,464)
Investing activities:			
Purchase of property and equipment	(8,307)	(13,828)	(3,748)
Proceeds from sale of property and equipment	29	36	—
Investment in non-marketable securities ($0, ($7,630) and ($1,000) in a related party)	(5,300)	(7,630)	(2,000)
Net cash used in investing activities	(13,578)	(21,422)	(5,748)
Financing activities:			
Proceeds from exercises of stock options	955	5,180	1,323
Proceeds from issuance of common stock in connection with public offering	—	—	86,250
Costs incurred in connection with equity financing	(42)	(207)	(5,448)
Payments of lease obligations - Finance leases	—	—	(60)
Taxes paid related to net share settlement of equity awards	(1,488)	(1,206)	(1,257)
Net cash provided by (used in) financing activities	(575)	3,767	80,808
Net increase (decrease) in cash, cash equivalents and restricted cash	(2,869)	(31,922)	58,596
Cash, cash equivalents and restricted cash at the beginning of the year	118,895	150,817	92,221
Cash, cash equivalents and restricted cash at the end of the year	$ 116,026	$ 118,895	$ 150,817
Supplemental disclosure of cash flow information:			
Interest paid	$ 34	$ 14	$ 52
Income taxes	$ 100	$ 102	$ 312
Supplemental non-cash investing and financing activities:			
Capital expenditures incurred but not yet paid	$ 897	$ 2,533	$ 1,750

The following table provides a reconciliation of cash, cash equivalents and restricted cash reported within the consolidated balance sheets to the total of the same such amounts shown above (in thousands):

	Year Ended December 31,		
	2022	**2021**	**2020**
Cash and cash equivalents	$ 113,984	$ 116,797	$ 149,117
Restricted cash, current and non-current	2,042	2,098	1,700
Total cash, cash equivalents and restricted cash at the end of the period	$ 116,026	$ 118,895	$ 150,817

See accompanying notes to consolidated financial statements

Note 1. Description of Business

In these notes to the Consolidated Financial Statements, the "Company," "we," "us," and "our" refers to Codexis, Inc. and its subsidiaries on a consolidated basis.

We discover, develop and sell enzymes and other proteins that deliver value to our clients in a growing set of industries to commercialize an increasing number of novel enzymes, both as proprietary Codexis products and in partnership with our customers.

We report our financial results based on two reportable segments: Performance Enzymes and Novel Biotherapeutics. The segment information aligns with how the chief operating decision maker (CODM), who is our Chief Executive Officer (CEO), reviews and manages the business.

Business Update Regarding COVID-19

In March 2020, the World Health Organization declared COVID-19 a global pandemic and recommended containment and mitigation measures worldwide. The spread of COVID-19 has affected segments of the global economy and may affect our operations, including the potential interruption of our supply chain. We are monitoring this situation closely, and although operations have not been materially affected by the COVID-19 outbreak to date, the ultimate duration and severity of the outbreak and its impact on the economic environment and our business is uncertain.

As a result of the COVID-19 pandemic, we have received purchase orders from Pfizer Inc. (“Pfizer”) for large quantities of our proprietary enzyme product, CDX-616, for use by Pfizer in the manufacture of a critical intermediate for its proprietary API, nirmatrelvir, used by Pfizer in combination with the API ritonavir, as its PAXLOVID™ (nirmatrelvir tablets; ritonavir tablets) product for the treatment of COVID-19 infections in humans. In July 2022, we entered into an Enzyme Supply Agreement with Pfizer Ireland Pharmaceuticals, a subsidiary of Pfizer, Inc. (the “Pfizer Supply Agreement”), covering the manufacture, sale and purchase of CDX-616 for use by Pfizer in the manufacture of nirmatrelvir. Under the terms of the Pfizer Supply Agreement, Pfizer paid us a fee of $25.9 million in August 2022 which is creditable against future orders of CDX-616 used to manufacture PAXLOVID™. Revenues in 2023 and in future years from our sales of CDX-616 to Pfizer and other potential customers (including sublicensees of Pfizer technology from The Medicine Patent Pool) are subject to a number of factors which are outside of our control and could reduce or eliminate our sales of CDX-616.

The near-and-long term impact of COVID-19 to our financial condition, liquidity, or results of operations remains uncertain. Although some of the government orders that were enacted to control the spread of COVID-19 have been scaled back and the vaccine rollout has expanded, surges in the spread of COVID-19 due to the emergence of new more contagious or virulent variants or the ineffectiveness of the vaccines against such strains, may result in the reimplementation of certain government orders, which could adversely impact our business. The extent to which the COVID-19 pandemic may materially impact our financial condition, liquidity, or results of operations in the future is uncertain.

Note 2. Basis of Presentation and Summary of Significant Accounting Policies

Basis of Presentation and Principles of Consolidation

The accompanying consolidated financial statements have been prepared in accordance with generally accepted accounting principles in the United States of America ("GAAP") and the applicable rules and regulations of the Securities and Exchange Commission ("SEC") and include the accounts of Codexis, Inc. and its wholly-owned subsidiaries.

The consolidated financial statements include the accounts of Codexis, Inc. and its wholly owned subsidiaries. All intercompany balances and transactions have been eliminated in consolidation.

Use of Estimates

The preparation of our consolidated financial statements in conformity with GAAP requires us to make estimates, judgments and assumptions that may affect the reported amounts of assets, liabilities, equity, revenues and expenses and related disclosure of contingent assets and liabilities. We regularly assess these estimates which primarily affect revenue recognition, inventories, valuation of equity investments, goodwill arising out of business acquisitions, accrued liabilities, stock awards, and the valuation allowances associated with deferred tax assets. Actual results could differ from those estimates and such differences may be material to the consolidated financial statements. The full extent to which the COVID-19 pandemic will directly or indirectly impact our business, results of operations and financial condition, including sales, expenses, reserves and allowances, manufacturing, research and development costs and employee-related amounts, will depend on future developments that are highly uncertain, and may not be accurately predicted, including as a result of new information that may emerge concerning COVID-19 and the actions taken to contain or treat COVID-19, as well as the economic impact on local, regional, national and international customers, markets and economies.

Segment Reporting

We report two business segments, Performance Enzymes and Novel Biotherapeutics, which are based on our operating segments. Operating segments are defined as components of an enterprise about which separate financial information is available that is evaluated regularly by the CODM, in deciding how to allocate resources, and in assessing performance. Our business segments are primarily based on our organizational structure and our operating results as used by our CODM in assessing performance and allocating resources for the Company. We do not allocate or evaluate assets by segment.

The Novel Biotherapeutics segment focuses on new opportunities in the pharmaceutical industry to discover or improve novel biotherapeutic drug candidates that will target human diseases that are in need of improved therapeutic interventions. Similarly, we believe that we can deploy our platform technology to improve specific characteristics of a customer's pre-existing biotherapeutic drug candidate, such as its activity, stability, or immunogenicity. The Performance Enzymes segment consists of biocatalyst products and services with focus on pharmaceutical, molecular diagnostics, and other industrial markets.

Foreign Currency Translation

The USD is the functional currency for our operations outside the United States. Accordingly, non-monetary assets and liabilities originally acquired or assumed in other currencies are recorded in USD at the exchange rates in effect at the date they were acquired or assumed. Monetary assets and liabilities denominated in other currencies are translated into United States dollars at the exchange rates in effect at the balance sheet date. Translation adjustments are recorded in other expense in the consolidated statements of operations. Gains and losses realized from non-USD transactions, including intercompany balances not considered as permanent investments, are included in other expense in the accompanying consolidated statements of operations.

Revenue Recognition

Our revenues are derived primarily from product revenue and collaborative research and development agreements. The majority of our contracts with customers typically contain multiple products and services. We account for individual products and services separately if they are distinct-that is, if a product or service is separately identifiable from other items in the contract and if a customer can benefit from it on its own or with other resources that are readily available to the customer.

In determining the appropriate amount of revenue to be recognized as we fulfill our obligations under our product revenue and collaborative research and development agreements, we perform the following steps: (i) identification of the promised goods or services in the contract; (ii) determination of whether the promised goods or services are performance obligations, including whether they are distinct in the context of the contract; (iii) measurement of the transaction price, including the constraint on variable consideration; (iv) allocation of the transaction price to the performance obligations based on estimated selling prices; and (v) recognition of revenue when (or as) we satisfy each performance obligation.

The majority of our collaborative contracts contain multiple revenue streams such as upfront and/or annual license fees, fees for research and development services, contingent milestone payments upon achievement of contractual criteria, and royalty fees based on the licensees' product revenue or usage, among others. We determine the stand-alone selling price ("SSP") and allocate consideration to distinct performance obligations. Typically, we base our SSPs on our historical sales. If an SSP is not directly observable, then we estimate the SSP taking into consideration market conditions, forecasted sales, entity-specific factors and available information about the customer. We estimate the SSP for license rights by using historical information if licenses have been previously sold to customers and for new licenses, we consider multiple methods, including a discounted cash flow method which includes the following key assumptions: the development timelines, revenue forecasts, commercialization expenses, discount rate, and the probability of technical and regulatory success.

We account for a contract with a customer when there is approval and commitment from both parties, the rights of the parties are identified, payment terms are identified, the contract has commercial substance and collectability of consideration is probable. Non-cancellable purchase orders received from customers to deliver a specific quantity of product, when combined with our order confirmation, in exchange for future consideration, create enforceable rights and obligations on both parties and constitute a contract with a customer.

We measure revenue based on the consideration specified in the contract with each customer, net of any sales incentives and taxes collected on behalf of government authorities. We recognize revenue in a manner that best depicts the transfer of promised goods or services to the customer, when control of the product or service is transferred to a customer. We make significant judgments when determining the appropriate timing of revenue recognition.

The following is a description of principal activities from which we generate revenue:

Product Revenue

Product revenue consist of sales of biocatalysts, pharmaceutical intermediates and Codex® biocatalyst panels and kits. A majority of our product revenue is made pursuant to purchase orders or supply agreements and is recognized either at a point in time when the control of the product has been transferred to the customer typically upon shipment or over time as the product is manufactured because we have a right to payment from the customer under a binding, non-cancellable purchase order, and there is no alternate use of the product for us as it is specifically made for the customer's use.

Certain of our agreements provide options to customers which they can exercise at a future date, such as the option to purchase our product during the contract duration at discounted prices and an option to extend their contract, among others. In accounting for customer options, we determine whether an option is a material right and this requires us to exercise significant judgment. If a contract provides the customer an option to acquire additional goods or services at a discount that exceeds the range of discounts that we typically give for that product or service for the same class of customer, or if the option provides the customer certain additional goods or services for free, the option may be considered a material right. If the contract gives the customer the option to acquire additional goods or services at their normal SSPs, we would likely determine that the option is not a material right and, therefore, account for it as a separate performance obligation when the customer exercises the option. We primarily account for options which provide material rights using the alternative approach available pursuant to the applicable accounting guidance, as we concluded we meet the criteria for using the alternative approach. Therefore, the transaction price is calculated as the expected consideration to be received for all the goods and services we expect to provide under the contract. We update the transaction price for expected consideration, subject to constraint, each reporting period if our estimates of future goods to be ordered by customers change.

Research and Development Revenue

We perform research and development activities as specified in each respective customer agreement. We identify each performance obligation in our research and development agreements at contract inception. We allocate the consideration to each distinct performance obligation based on the SSP of each performance obligation. Performance obligations included in our research and services agreements typically include research and development services for a specified term, periodic reports and small samples of enzyme produced.

The majority of our research and development agreements are based on a contractual rate per dedicated project team working on the project. The underlying product that we develop for customers does not create an asset with an alternative use to us and the customer receives benefits as we perform the work towards completion. Thus, our performance obligations are generally satisfied over time as the service is performed. We utilize an appropriate method of measuring progress towards the completion of our performance obligations to determine the timing of revenue recognition. For each performance obligation that is satisfied over time, we recognize revenue using a single measure of progress either based on hours incurred or based on stage of progress under the project.

Our contracts frequently provide customers with rights to use or access our products or technology, along with other promises or performance obligations. We must first determine whether the license is distinct from other promises, such as our promise to manufacture a product. If we determine that the customer cannot benefit from the license without our manufacturing capability, the license will be accounted for as combined with the other performance obligations. If we determine that a license is distinct and has significant standalone functionality, we recognize revenues from a functional license at a point in time when the license is transferred to the customer, and the customer can use and benefit from it. We estimate the SSP for license rights by using historical information if licenses have been previously sold to customers and for new licenses, we consider multiple methods, including a discounted cash flow method which includes the following key assumptions: the development timelines, revenue forecasts, commercialization expenses, discount rate, and the probability of technical and regulatory success. For licenses that have been previously sold to other customers, we use historical information to determine SSP.

At the inception of each arrangement that includes variable consideration such as development milestone payments, we evaluate whether the milestones are considered probable of being reached and estimate the amount to be included in the transaction price using the most likely amount method. If it is probable that a significant revenue reversal would not occur, the associated milestone value is included in the transaction price. Milestone payments that are not within our control or the licensee, such as regulatory approvals, are not considered probable of being achieved until those approvals are received. The transaction price is then allocated to each performance obligation on a relative stand-alone selling price basis, for which we recognize revenue as or when the performance obligations under the contract are satisfied. At the end of each subsequent reporting period, we re-evaluate the probability of achievement of such development milestones and any related constraint, and if necessary, adjust our estimate of the overall transaction price. Any such adjustments are recorded on a cumulative catch-up basis, which would affect license, collaboration and other revenues and earnings in the period of adjustment.

Our CodeEvolver® platform technology transfer collaboration agreements typically include license fees, upfront fees, and variable consideration in the form of milestone payments, and sales or usage-based royalties. We have recognized revenues from our platform technology transfer agreements over time as our customer uses our technology.

For license agreements that include sales or usage-based royalty payments to us, we do not recognize revenue until the underlying sales of the product or usage has occurred. At the end of each reporting period, we estimate the royalty amount. We recognize revenue at the later of (i) when the related sale of the product occurs, or (ii) when the performance obligation to which some or all of the royalty has been allocated has been satisfied, or partially satisfied.

Practical Expedients, Elections, and Exemptions

We apply certain practical expedients available which permit us not to adjust the amount of consideration for the effects of a significant financing component if, at contract inception, the expected period between the transfer of promised goods or services and customer payment is one year or less.

We perform monthly services under our research and development agreements, and we use a practical expedient permitting us to recognize revenue at the same time that we have the right to invoice our customer for monthly services completed to date.

We have elected to treat shipping and handling activities as fulfillment costs.

We have elected to record revenue net of sales and other similar taxes.

Contract Assets

Contract assets include amounts related to our contractual right to consideration for completed performance obligations not yet invoiced. Contract assets are reclassified to receivables when the rights become unconditional.

Contract Liabilities

Contract liabilities are recorded as deferred revenues and include payments received in advance of performance under the contract. Contract liabilities are realized when the development services are provided to the customer or control of the products has been transferred to the customer. A portion of our contract liabilities relate to supply arrangements that contain material rights that are recognized using the alternative method, under which the aggregate amount invoiced to the customer for shipped products, including contractual fees, is higher than the amount of revenue recognized based on the transaction price allocated to the shipped products.

Contract Costs

We recognize a non-current asset for the incremental costs of obtaining a contract with a customer if the entity expects to recover such costs and if those costs would not have been incurred if the contract had not been obtained, such as commissions paid to sales personnel. We do not typically incur significant incremental costs because the compensation of our salespeople is not based on contracts closed but on a mixture of company goals, individual goals, and sales goals. If a commission paid is directly related to obtaining a specific contract, our policy is to capitalize and amortize such costs on a systematic basis, consistent with the pattern of transfer of the good or service to which the asset relates, and over a period beyond 12 months. Contract costs are reported in other non-current assets and were not significant in any of the periods presented.

Cost of Product Revenue

Cost of product revenue comprises both internal and third party fixed and variable costs including materials and supplies, labor, facilities, and other overhead costs associated with our product sales. Shipping costs are included in our cost of product revenue. Shipping costs were $3.0 million, $1.8 million, and $0.1 million for the years ended December 31, 2022, 2021, and 2020, respectively.

Fulfillment costs, such as shipping and handling, are recognized at a point in time and are included in cost of product revenue.

Cost of Research and Development Services

Cost of research and development services related to services under research and development agreements approximate the research funding over the term of the respective agreements and is included in research and development expense. Costs of services provided under license and platform technology transfer agreements are included in research and development expenses and are expensed in the periods in which such costs are incurred.

Research and Development Expenses

Research and development expenses consist of costs incurred for internal projects and partner-funded collaborative research and development activities, as well as license and platform technology transfer agreements, as mentioned above. These costs include our direct and research-related overhead expenses, which include salaries and other personnel-related expenses (including stock-based compensation), occupancy-related costs, supplies, and depreciation of facilities and laboratory equipment, as well as external costs, and are expensed as incurred. Costs to acquire technologies that are utilized in research and development and that have no alternative future use are expensed when incurred.

Advertising

Advertising costs are expensed as incurred and included in selling, general and administrative expenses in the consolidated statements of operations.Advertising costs were $0.3 million for each of the years ended December 31, 2022, 2021 and 2020.

Stock-Based Compensation

We use the Black-Scholes-Merton option pricing model to estimate the fair value of options granted under our equity incentive plans. The Black-Scholes-Merton option pricing model requires the use of assumptions, including the expected term of the award and the expected stock price volatility. The expected term is based on historical exercise behavior for similar awards, giving consideration to the contractual terms, vesting schedules and expectations of future employee behavior. We use historical volatility to estimate expected stock price volatility. The risk-free rate assumption is based on United States Treasury instruments whose terms are consistent with the expected term of the stock options. The expected dividend assumption is based on our history and expectation of dividend payouts.

Restricted Stock Units ("RSUs"), Restricted Stock Awards ("RSAs") and performance-contingent restricted stock units ("PSUs") are measured based on the fair market values of the underlying stock on the dates of grant. Performance based options ("PBOs") are measured using the Black-Scholes-Merton option pricing model. The vesting of PBOs and PSUs awarded is conditioned upon the attainment of one or more performance objectives over a specified period and upon continued employment through the applicable vesting date. At the end of the performance period, shares of stock subject to the PBOs and PSUs vest based upon both the level of achievement of performance objectives within the performance period and continued employment through the applicable vesting date.

Stock-based compensation expense is calculated based on awards ultimately expected to vest and is reduced for estimated forfeitures at the time of grant and revised, if necessary, in subsequent periods if actual forfeitures differ from those estimates. The estimated annual forfeiture rates for stock options, RSUs, PSUs, PBOs, and RSAs are based on historical forfeiture experience.

The estimated fair value of stock options, RSUs and RSAs are expensed on a straight-line basis over the vesting term of the grant and the estimated fair value of PSUs and PBOs are expensed using an accelerated method over the term of the award once management has determined that it is probable that the performance objective will be achieved. Compensation expense is recorded over the requisite service period based on management's best estimate as to whether it is probable that the shares awarded are expected to vest. Management assesses the probability of the performance milestones being met on a continuous basis.

Cash and Cash Equivalents

We consider all highly liquid investments with maturity dates of three months or less at the date of purchase to be cash equivalents. Cash and cash equivalents consist of cash on deposit with banks and money market funds. The majority of cash and cash equivalents is maintained with major financial institutions in the United States. Deposits with these financial institutions may exceed the amount of insurance provided on such deposits.

Restricted Cash

In 2016, we began the process of liquidating our Indian subsidiary. The local legal requirements for liquidation required us to maintain our subsidiary's cash balance in an account managed by a legal trustee to satisfy our financial obligations. This balance is recorded as current restricted cash on the consolidated balance sheets of$0.5 million and $0.6 million as of December 31, 2022 and 2021, respectively.

Pursuant to the terms of the lease agreements for our Redwood City and San Carlos facilities, we obtained letters of credit collateralized by cash deposit balances of $1.5 million as of December 31, 2022 and 2021. These cash deposits balances are recorded as non-current restricted cash on the consolidated balance sheets. For additional information, see Note 13, "Commitments and Contingencies".

Fair Value Measurements

Fair value is defined as the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date. In determining fair value, we utilize valuation techniques that maximize the use of observable inputs and minimize the use of unobservable inputs to the extent possible and we consider counterparty credit risk in our assessment of fair value. Carrying amounts of financial instruments, including cash equivalents, accounts receivable, accounts payable, and accrued liabilities, approximate their fair values as of the balance sheet dates because of their short maturities.

The fair value hierarchy distinguishes between (1) market participant assumptions developed based on market data obtained from independent sources (observable inputs) and (2) an entity’s own assumptions about market participant assumptions developed based on the best information available in the circumstances (unobservable inputs). The fair value hierarchy consists of three broad levels, giving the highest priority to unadjusted quoted prices in active markets for identical assets or liabilities (Level 1) and the lowest priority to unobservable inputs (Level 3). The three levels of the fair value hierarchy are described below:

- Level 1: Inputs that are unadjusted, quoted prices in active markets for identical assets or liabilities at the measurement date.
- Level 2: Inputs that are either directly or indirectly observable for the asset or liability through correlation with market data at the measurement date and for the duration of the instrument’s anticipated life.
- Level 3: Unobservable inputs that are supported by little or no market activity and that are significant to the fair value of the assets or liabilities and which reflect management’s best estimate of what market participants would use in pricing the asset or liability at the measurement date.

Concentrations of Credit Risk

Financial instruments that potentially subject us to significant concentrations of credit risk consist primarily of cash and cash equivalents, accounts receivable and unbilled receivables, contract assets, non-marketable securities, and restricted cash. Cash that is not required for immediate operating needs is invested principally in money market funds. Cash and cash equivalents are invested through banks and other financial institutions in the United States, India, and the Netherlands. Such deposits in those countries may be in excess of insured limits. The Company has not experienced material losses on its deposits of cash and cash equivalents.

We perform ongoing credit evaluations of our customer's financial condition whenever deemed necessary. We maintain an allowance for doubtful accounts based on the expected collectability of all financial assets, which takes into consideration an analysis of historical bad debts, specific customer creditworthiness and current economic trends. As of December 31, 2022, we had two customers that accounted for 63% of our accounts receivable balance. As of December 31, 2021, one customer accounted for62% of our accounts receivable balance. We believe the accounts receivable balances from our largest customers do not represent a significant credit risk, based on cash flow forecasts, balance sheet analysis, and past collection experience.

Financial Assets and Allowances

We currently sell enzymes primarily to pharmaceutical and fine chemicals companies throughout the world by the extension of trade credit terms based on an assessment of each customer's financial condition. Trade credit terms are generally offered without collateral and may include an insignificant discount for prompt payment for specific customers. To manage our credit exposure, we perform ongoing evaluations of our customers' financial conditions. In addition, accounts receivable include amounts owed to us under our collaborative research and development agreements.

We recognize accounts receivable at invoiced amounts and we maintain a valuation allowance for credit losses using an impairment model (known as the "current expected credit loss model" or "CECL") based on estimates and forecasts of future conditions requiring recognition of a lifetime of expected credit losses at inception on our financing receivables measured at amortized costs which consisted of accounts receivable, contract assets, and unbilled receivables. We have determined that our financing receivables share similar risk characteristics including: (i) customer origination in the pharmaceutical and fine chemicals industry, (ii) similar historical credit loss pattern of customers (iii) no meaningful trade receivable differences in terms, (iv) similar historical credit loss experience and (v) our belief that the composition of certain assets are comparable to our historical portfolio used to develop loss history. As a result, we measured the allowance for credit loss ("ACL") on a collective basis. Our ACL methodology considers how long the asset has been past due, the financial condition of the customers, which includes ongoing quarterly evaluations and assessments of changes in customer credit ratings, and other market data that we believe are relevant to the collectability of the assets. Nearly all financing receivables are due from customers that are highly rated by major rating agencies and have a long history of no credit loss. We derive our ACL by establishing an impairment rate attributable to assets not yet identified as impaired.

Unbilled Receivable

The timing of revenue recognition may differ from the timing of invoicing to our customers. When we satisfy (or partially satisfy) a performance obligation, prior to being able to invoice the customer, we recognize an unbilled receivable when the right to consideration is unconditional.

Inventories

Inventories are stated at the lower of cost or net realizable value. Cost is determined using a weighted-average approach, assuming full absorption of direct and indirect manufacturing costs, or based on cost of purchasing from our vendors. If inventory costs exceed expected net realizable value due to obsolescence or lack of demand, valuation adjustments are recorded for the difference between the cost and the expected net realizable value.

Concentrations of Supply Risk

We rely on a limited number of suppliers for our products. We believe that other vendors would be able to provide similar products; however, the qualification of such vendors may require substantial start-up time. In order to mitigate any adverse impacts from a disruption of supply, we attempt to maintain an adequate supply of critical single-sourced materials. For certain materials, our vendors maintain a supply for us. We outsource the large-scale manufacturing of our products to contract manufacturers with facilities in Austria and Italy.

Property and Equipment

Property, equipment and leasehold improvements are stated at cost less accumulated depreciation and amortization calculated using the straight-line method over their estimated useful lives as follows:

Asset classification	Estimated useful life
Laboratory equipment	5 years
Computer equipment and software	3 to 5 years
Office equipment and furniture	5 years
Leasehold improvements	Lesser of useful life or lease term

Property and equipment classified as construction in process includes equipment that has been received but not yet placed in service. Normal repairs and maintenance costs are expensed as incurred.

Impairment of Long-Lived Assets

We have not identified property and equipment by segment since these assets are shared or commingled. We evaluate the carrying values of long-lived assets, which include property and equipment and right-of-use assets, whenever events, changes in business circumstances or our planned use of long-lived assets indicate that their carrying amounts may not be fully recoverable or that their useful lives are no longer appropriate. If these facts and circumstances exist, we assess for recovery by comparing the carrying values of long-lived assets with their future net undiscounted cash flows. If the comparison indicates that impairment exists, long-lived assets are written down to their respective fair values based on discounted cash flows. Management judgment is required in the forecast of future operating results that are used in the preparation of undiscounted cash flows.

As of December 31, 2022 and 2021, there were no events or changes in circumstances which indicated that the carrying amount of our asset group might not be recoverable. No impairment charges for long-lived assets were recorded during the years ended December 31, 2022, 2021 and 2020.

Investment in Non-Marketable Securities

Investment in Non-Marketable Equity Securities

We measure investments in non-marketable equity securities without a readily determinable fair value using a measurement alternative that measures these securities at the cost method minus impairment, if any, plus or minus changes resulting from observable price changes on a non-recurring basis. Gains and losses on these securities are recognized in other income (expense), net.

Investment in Non-Marketable Debt Securities

We measure available-for-sale investments in non-marketable debt securities at fair value. Unrealized gains and losses on these securities are recognized in other comprehensive income until realized. Non-marketable debt securities are classified as available-for-sale securities.

We classify non-marketable debt securities as Level 3 in the fair value hierarchy because we estimate the fair value based on a qualitative analysis using the most recent observable transaction price and other significant unobservable inputs including volatility, rights, and obligations of the securities we hold. Significant changes to the unobservable inputs may result in a significantly higher or lower fair value estimate. We may value these securities based on significant recent arms-length transactions with sophisticated non-strategic unrelated new investors.

We evaluate both equity and debt securities for impairment when circumstances indicate that we may not be able to recover the carrying value. We may impair these securities and establish an allowance for a credit loss when we determine that there has been an "other-than-temporary" decline in the estimated fair value of the debt or equity security compared to its carrying value. We calculate the estimated fair value of these securities using information from the investee, which may include:

- Audited and unaudited financial statements;
- Projected technological developments of the company;
- Projected ability of the company to service its debt obligations;
- If a deemed liquidation event were to occur;
- Current fundraising transactions;
- Current ability of the company to raise additional financing if needed;
- Changes in the economic environment which may have a material impact on the operating results of the company;
- Contractual rights, obligations or restrictions associated with the investment; and
- Other factors deemed relevant by our management to assess valuation.
- The valuation may be reduced if the company's potential has deteriorated significantly. If the factors that led to a reduction in valuation are overcome, the valuation may be readjusted.

Goodwill

Goodwill represents the excess of the consideration transferred over the fair value of net assets of businesses acquired and is assigned to reporting units. We test goodwill for impairment considering amongst other things, whether there have been sustained declines in our share price. If we conclude it is more likely than not that the fair value of a reporting unit is less than its carrying amount, a quantitative fair value test is performed. We manage our business as two reporting units and we test goodwill for impairment at the reporting unit level. We allocated goodwill to the two reporting units using a relative fair value allocation methodology that primarily relied on our estimates of revenue and future earnings for each reporting unit. Using the relative fair value allocation methodology, we have determined that approximately $2.4 million, or 76%, of the goodwill is allocated to the Performance Enzymes segment and $0.8 million, or 24%, is assigned to the Novel Biotherapeutics segment.

We test goodwill for impairment annually on a reporting unit basis, on the last day of the fourth fiscal quarter, and between annual tests if events and circumstances indicate it is more likely than not that the fair value of a reporting unit is less than its carrying amount. The annual impairment test is completed using either: a qualitative "Step 0" assessment based on reviewing relevant events and circumstances; or a quantitative "Step 1" assessment, which determines the fair value of the reporting unit. To the extent the carrying amount of a reporting unit is less than its estimated fair value, an impairment charge is recorded. Using the relative fair value allocation methodology for assets and liabilities used in both of our reporting units, we compare the allocated carrying amount of each reporting unit's net assets and the assigned goodwill to its fair value. If the fair value of the reporting unit exceeds its carrying amount, goodwill of the reporting unit is considered not impaired. Any excess of the reporting unit's carrying amount of goodwill over its fair value is recognized as an impairment. During 2022, 2021 and 2020, we did not record impairment charges related to goodwill.

Lease Accounting

We determine if an arrangement is a lease at inception. Where an arrangement is a lease, we determine if it is an operating lease or a finance lease. At lease commencement, we record a lease liability and ROU asset. Lease liabilities represent the present value of our future lease payments over the expected lease term which includes options to extend or terminate the lease when it is reasonably certain those options will be exercised. The present value of our lease liability is determined using our incremental collateralized borrowing rate at lease inception. ROU assets represent our right to control the use of the leased asset during the lease and are recognized in an amount equal to the lease liability for leases with an initial term greater than 12 months. Over the lease term, we use the effective interest rate method to account for the lease liability as lease payments are made and the ROU asset is amortized to the consolidated statement of operations in a manner that results in straight-line expense recognition. We do not apply lease recognition requirements for short-term leases. Instead, we recognize payments related to these arrangements in the consolidated statement of operations as lease costs on a straight-line basis over the lease term.

Income Taxes

We use the liability method of accounting for income taxes, whereby deferred tax asset or liability account balances are calculated at the balance sheet date using current tax laws and rates in effect for the year in which the differences are expected to affect taxable income. Valuation allowances are provided when necessary to reduce deferred tax assets to the amount that will more likely than not be realized.

We make certain estimates and judgments in determining income tax expense for financial statement purposes. These estimates and judgments occur in the calculation of tax credits, benefits and deductions and in the calculation of certain tax assets and liabilities, which arise from differences in the timing of recognition of revenues and expenses for tax and financial statement purposes. Significant changes to these estimates may result in an increase or decrease to our tax provision in a subsequent period.

In assessing the realizability of deferred tax assets, we consider whether it is more likely than not that some portion or all of the deferred tax assets will be realized on a jurisdiction by jurisdiction basis. The ultimate realization of deferred tax assets is dependent upon the generation of taxable income in the future. We have recorded a valuation allowance against these deferred tax assets in jurisdictions where ultimate realization of deferred tax assets is more likely than not to occur. As of December 31, 2022, we maintain a full valuation allowance in all jurisdictions against the net deferred tax assets as we believe that it is more likely than not that the majority of deferred tax assets will not be realized.

We make estimates and judgments about our future taxable income that are based on assumptions that are consistent with our plans and estimates. Should the actual amounts differ from our estimates, the amount of our valuation allowance may be materially impacted. Any adjustment to the deferred tax asset valuation allowance would be recorded in the statements of operations for the periods in which the adjustment is determined to be required.

We account for uncertainty in income taxes as required by the provisions of ASU 2009-06*Income Taxes (Topic 740) Implementation Guidance on Accounting for Uncertainty in Income Taxes and Disclosure Amendments for Nonpublic Entities*, which clarifies the accounting for uncertainty in income taxes recognized in an enterprise's financial statements. The first step is to evaluate the tax position for recognition by determining if the weight of available evidence indicates that it is more likely than not that the position will be sustained on audit, including resolution of related appeals or litigation processes, if any. The second step is to estimate and measure the tax benefit as the largest amount that is more than 50% likely of being realized upon ultimate settlement. It is inherently difficult and subjective to estimate such amounts, as this requires us to determine the probability of various possible outcomes. We consider many factors when evaluating and estimating our tax positions and tax benefits, which may require periodic adjustments and may not accurately anticipate actual outcomes.

The Tax Reform Act of 1986 and similar state provisions limit the use of net operating loss ("NOL") carryforwards in certain situations where equity transactions result in a change of ownership as defined by Internal Revenue Code Section 382. In the event we should experience such a change of ownership, utilization of our federal and state NOL carryforwards could be limited.

Accounting Pronouncements

Recently adopted accounting pronouncements

In May 2021, FASB issued ASU No. 2021-04,*Earnings Per Share (Topic 260), Debt—Modifications and Extinguishments (Subtopic 470-50), Compensation—Stock Compensation (Topic 718), and Derivatives and Hedging—Contracts in Entity's Own Equity (Subtopic 815-40), Issuer's Accounting for Certain Modifications or Exchanges of Freestanding Equity-Classified Written Call Options, a consensus of the Emerging Issues Task Force*. The standard establishes a principles-based framework in accounting for modifications of freestanding equity-classified written call options on the basis of the economic substance of the underlying transaction. The standard also requires incremental financial statement disclosures. The standard affects entities that present earnings per share in accordance with the guidance in Topic 260, Earnings Per Share. The standard was adopted beginning January 1, 2022 on a prospective basis. The adoption of ASU 2021-04 did not have an impact on our consolidated financial statements and related disclosures.

In August 2020, FASB issued ASU No. 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) No. 2020-06 August 2020 Accounting for Convertible Instruments and Contracts in an Entity's Own Equity*, to reduce the complexity and to simplify the accounting for convertible debt instruments and convertible preferred stock, and the derivatives scope exception for contracts in an entity's own equity. In addition, the guidance on calculating diluted earnings per share has been simplified and made more internally consistent. The standard was adopted beginning January 1, 2022 on a modified retrospective basis. The adoption of ASU 2020-06 did not have an impact on our consolidated financial statements and related disclosures.

In March 2020, the FASB issued ASU No. 2020-04, Reference Rate Reform (Topic 848):*Facilitation of the Effects of Reference Rate Reform on Financial Reporting* The standard provides optional expedients and exceptions for applying GAAP to contracts, hedging relationships, and other transactions in which the reference LIBOR or another reference rate are expected to be discontinued as a result of the Reference Rate Reform. The standard was adopted beginning January 1, 2022 on a prospective basis. The adoption of ASU 2020-04 had no significant impact on our consolidated financial statements and related disclosures. In December 2022, the FASB issued ASU 2022-06, *Reference Rate Reform (Topic 848): Deferral of the Sunset Date of Topic 848*, which extends the period of time preparers can utilize the reference rate reform guidance in Topic 848. The standard was adopted upon its issuance on a prospective basis. The adoption of ASU 2022-06 did not have an impact on our consolidated financial statements and related disclosures.

Recently issued accounting pronouncements not yet adopted

There have been no other recent accounting pronouncements or changes in accounting pronouncements during the year ended December 31, 2022 that are of significance or potential significance to us.

Note 3. Revenue Recognition

Disaggregation of Revenue

The following table provides information about disaggregated revenue from contracts with customers into the nature of the products and services, and geographic regions, and includes a reconciliation of the disaggregated revenue with reportable segments. The geographic regions that are tracked are the Americas (United States, Canada, and Latin America), EMEA (Europe, Middle East, and Africa), and APAC (Australia, New Zealand, Southeast Asia, and China).

Segment information is as follows (in thousands):

	Year Ended December 31, 2022		
	Performance Enzymes	Novel Biotherapeutics	Total
Major products and service:			
Product revenue	$ 116,676	$ —	$ 116,676
Research and development revenue	9,936	11,978	21,914
Total revenues	$ 126,612	$ 11,978	$ 138,590
Primary geographical markets:			
Americas	$ 12,089	$ 4,911	$ 17,000
EMEA	49,473	7,067	56,540
APAC	65,050	—	65,050
Total revenues	$ 126,612	$ 11,978	$ 138,590

	Year Ended December 31, 2021		
	Performance Enzymes	Novel Biotherapeutics	Total
Major products and service:			
Product revenue	$ 70,657	$ —	$ 70,657
Research and development revenue	19,858	14,239	34,097
Total revenues	$ 90,515	$ 14,239	$ 104,754
Primary geographical markets:			
Americas	$ 16,114	$ 7,367	$ 23,481
EMEA	13,315	6,872	20,187
APAC	61,086	—	61,086
Total revenues	$ 90,515	$ 14,239	$ 104,754

	Year Ended December 31, 2020		
	Performance Enzymes	Novel Biotherapeutics	Total
Major products and service:			
Product revenue	$ 30,220	$ —	$ 30,220
Research and development revenue	17,886	20,950	38,836
Total revenues	$ 48,106	$ 20,950	$ 69,056
Primary geographical markets:			
Americas	$ 11,111	$ 13,241	$ 24,352
EMEA	11,548	7,709	19,257
APAC	25,447	—	25,447
Total revenues	$ 48,106	$ 20,950	$ 69,056

Contract Balances

The following table presents balances of contract assets, unbilled receivables, contract costs, and contract liabilities (in thousands):

	December 31, 2022	December 31, 2021
Contract assets	$ 2,116	$ 4,557
Unbilled receivables	$ 7,016	$ 8,558
Contract costs	$ 19	$ 56
Contract liabilities: deferred revenue	$ 30,609	$ 6,335

We recognize accounts receivable when we have an unconditional right to recognize revenue and have issued an invoice to the customer. Our payment terms are generally between 30 and 90 days. We recognize unbilled receivables when we have an unconditional right to recognize revenue and have not issued an invoice to our customer. Unbilled receivables are transferred to accounts receivable on issuance of an invoice. Unbilled receivables are classified separately on the consolidated balance sheets as an asset. We maintain a valuation allowance on accounts receivables and unbilled receivables.

Contract assets represent our right to recognize revenue for custom products with no alternate use and under binding non-cancellable contracts and are largely related to our procurement of product. We recognize contract assets when we have a conditional right to recognize revenue. The transfer of control of certain products occurs in advance of the invoicing process, which generates contract assets. In addition, we recognize a contract asset related to milestones not eligible for royalty accounting when we assess it is probable of being achieved and there will be no significant reversal of cumulative revenues. Contract assets are classified separately on the consolidated balance sheets as an asset and transferred to accounts receivables when our rights to payment become unconditional.

Contract liabilities, or deferred revenue, represent our obligation to transfer a product or service to the customer, and for which we have received consideration from the customer. We recognize a contract liability when we receive advance customer payments under development agreements for research and development services, upfront license payments, and from upfront customer payments received under product supply agreements. Contract liabilities are classified as a liability on the consolidated balance sheets.

Contract costs relate to incremental costs of obtaining a contract with a customer. Contract costs are amortized along with the associated revenue over the term of the contract.

During the years ended December 31, 2022, 2021 and 2020, we hadno asset impairment charges related to contract assets.

We recognized the following revenues (in thousands):

	Year Ended December 31,	
Revenue recognized in the period for:	**2022**	**2021**
Amounts included in contract liabilities at the beginning of the period:		
Performance obligations satisfied	$ 2,038	$ 1,858
Changes in the period:		
Changes in the estimated transaction price allocated to performance obligations satisfied in prior periods	279	7,645
Performance obligations satisfied from new activities in the period - contract revenue	136,273	95,251
Total revenues	$ 138,590	$ 104,754

Performance Obligations

The following table includes estimated revenue expected to be recognized in the future related to performance obligations that are unsatisfied or partially unsatisfied at the end of the reporting periods. The estimated revenue does not include contracts with original durations of one year or less, amounts of variable consideration attributable to royalties, or contract renewals that are unexercised as of December 31, 2022.

The balances in the table below are partially based on judgments involved in estimating future orders from customers subject to the exercise of material rights pursuant to respective contracts (in thousands):

	2023	2024	2025	2026 and Thereafter	Total
Product revenue	$ 12,136	$ 13,080	$ 140	$ 3,640	$ 28,996
Research and development revenue	1,592	21	—	—	1,613
Total revenues	$ 13,728	$ 13,101	$ 140	$ 3,640	$ 30,609

Note 4. Net Loss per Share

Basic net loss per share is computed by dividing the net loss by the weighted-average number of shares of common stock outstanding, less restricted stock awards ("RSAs") subject to forfeiture. Diluted net loss per share is computed by dividing net loss by the weighted-average number of shares of common stock shares outstanding, less RSAs subject to forfeiture, plus all additional common shares that would have been outstanding, assuming dilutive potential common stock shares had been issued for other dilutive securities. For all periods presented, diluted and basic net loss per share are identical since potential common stock shares are excluded from the calculation, as their effect was anti-dilutive.

Anti-Dilutive Securities

In periods of net loss, the weighted average number of shares outstanding, prior to the application of the treasury stock method, excludes potentially dilutive securities from the computation of diluted net loss per common share because including such shares would have an anti-dilutive effect.

The following shares were not considered in the computation of diluted net loss per share because their effect was anti-dilutive (in thousands):

	Year Ended December 31,		
	2022	2021	2020
Shares issuable under the Equity Incentive Plan	7,442	5,215	5,348

Note 5. Collaborative Arrangements

GSK Platform Technology Transfer, Collaboration and License Agreement

In July 2014, we entered into a CodeEvolver® protein engineering platform technology transfer collaboration and license agreement (the "GSK CodeEvolver® Agreement") with GSK. Pursuant to the terms of the agreement, we granted GSK a non-exclusive license to use the CodeEvolver® protein engineering platform technology to develop novel enzymes for use in the manufacture of GSK's pharmaceutical and health care products. We completed the transfer of the CodeEvolver® protein engineering platform technology to GSK in April 2016 and all revenues relating to the technology transfer have been recognized as of April 2016. Depending upon GSK's successful application of the licensed technology, we have the potential to receive additional contingent payments that range from $5.75 million to $38.5 million per project.

In 2019, we received a $2.0 million milestone payment relating to the advancement of an enzyme developed by GSK using our CodeEvolver® protein engineering platform technology. In 2021, we received two additional milestone payments from GSK under the agreement. We recognized research and development revenue ofnil, $4.3 million, and nil in the years ended December 31, 2022, 2021, and 2020, respectively.

Merck Platform Technology Transfer and License Agreement

In August 2015, we entered into a CodeEvolver® platform technology transfer collaboration and license agreement (the "Merck CodeEvolver® Agreement") with Merck, Sharp & Dohme ("Merck") which allows Merck to use the CodeEvolver® protein engineering technology platform in the field of human and animal healthcare. In 2016, we completed the final phase in the transfer of CodeEvolver® technology to Merck under the Merck CodeEvolver® Agreement.

We recognized research and development revenues of $40 thousand, $0.6 million, and $3.1 million in the years ended December 31, 2022, 2021 and 2020, respectively, for various research projects under our collaborative arrangement.

We have the potential to receive payments of up to a maximum of $15.0 million for each commercial active pharmaceutical ingredient ("API") that is manufactured by Merck using one or more novel enzymes developed by Merck using the CodeEvolver® protein engineering technology platform. The API payments, which are currently not recognized in revenue, are based on the quantity of API developed and manufactured by Merck and will be recognized as usage-based royalties.

In October 2018, we entered into an amendment to the Merck CodeEvolver® Agreement which amended certain licensing provisions and one exhibit. In January 2019, we amended the Merck CodeEvolver® Agreement to install certain CodeEvolver® protein engineering technology upgrades into Merck's platform license installation and maintain those upgrades for a multi-year term that expired in January 2022. The license installation was completed in 2019. We recognized nil, $0.1 million and $0.1 million in research and development revenues under the terms of the amendment in 2022, 2021 and 2020 respectively.

Merck Sitagliptin Catalyst Supply Agreement

In February 2012, we entered into a five-year Sitagliptin Catalyst Supply Agreement ("Sitagliptin Supply Agreement") with Merck whereby Merck may obtain commercial scale enzyme for use in the manufacture of Januvia®, its product based on the active ingredient Sitagliptin. In December 2015, Merck exercised its options under the terms of the Sitagliptin Catalyst Supply Agreement to extend the agreement for an additional five years through February 2022. In September 2021, the Sitagliptin Catalyst Supply Agreement was amended to extend the agreement through December 2026.

Effective as of January 2016, we and Merck amended the Sitagliptin Supply Agreement to prospectively provide for variable pricing based on the cumulative volume of sitagliptin enzyme purchased by Merck. We have previously determined that the variable pricing, which provides a discount based on the cumulative volume of sitagliptin enzyme purchased by Merck, provides Merck material rights and we recognized product revenues using the alternative method wherein we estimated the total expected consideration and allocated it proportionately with the expected sales. Pursuant to the latest amendment of the Sitagliptin Supply Agreement, we have determined that the latest price per volume of sitagliptin enzyme to be purchased by Merck no longer provides Merck material rights, and as such we are recognizing product revenue based on contractually stated prices effective as of February 2022.

We recognized $5.9 million, $9.8 million and $13.4 million in product revenue under this contract for the years ended December 31, 2022, 2021 and 2020, respectively. Revenues recognized by us under the Sitagliptin Supply Agreement comprised 4%, 9%, and 19% of our total revenues for the years ended December 31, 2022, 2021 and 2020, respectively.

During the year ended December 31, 2022, we recorded revenue of $1.6 million from sitagliptin enzyme sales that were recognized over time based on the progress of the manufacturing process. These products will be shipped in the first quarter of 2023.

Enzyme Supply Agreement

In November 2016, we entered into a supply agreement whereby our customer may purchase quantities of one of our proprietary enzymes for use in its commercial manufacture of a product. Pursuant to the supply agreement, we received an upfront payment in December 2016 which was recorded as deferred revenue. Such upfront payment will be recognized over the period of the supply agreement as the customer purchases our proprietary enzyme. We additionally have determined that the volume discounts under the supply agreement provide the customer material rights and we are recognizing revenues using the alternative method. As of December 31, 2022 and 2021, we had deferred revenue balances from the supply agreement of $3.3 million and $2.6 million.

Commercial Agreement

In April 2019, we entered into a multi-year commercial agreement with Tate & Lyle under which Tate & Lyle has received an exclusive license to use a suite of Codexis novel performance enzymes in the manufacture of Tate & Lyle's zero-calorie stevia sweetener, TASTEVA® M, and other stevia products. Under the agreement, we will supply Tate & Lyle with its requirements for these enzymes over a multiple year period and receive royalties on stevia products. In November 2020, we amended the commercial agreement based on Tate & Lyle's intent to use a specific Codexis novel performance enzyme in its production of TASTEVA® M Stevia Sweetener and became eligible to receive milestone payments of up to $1.1 million. In the fourth quarter of 2020, we became eligible to receive a milestone payment of $0.4 million which we subsequently received in February 2021.

Global Development, Option and License Agreement and Strategic Collaboration Agreement

In October 2017, we entered into the Nestlé License Agreement with Nestlé Health Science and, solely for the purpose of the integration and the dispute resolution clauses of the Nestlé License Agreement, Nestlé Health Science S.A., to advance CDX-6114, our enzyme biotherapeutic product candidate for the potential treatment of PKU.

In January 2019, we received notice from the U.S. Food and Drug Administration ("FDA") that it had completed its review of our IND for CDX-6114 and concluded that we may proceed with the proposed Phase 1b multiple ascending dose study in healthy volunteers in the United States. In February 2019, Nestlé Health Science exercised its option to obtain an exclusive, worldwide, royalty-bearing, sub-licensable license for the global development and commercialization of CDX-6114 for the management of PKU. Upon exercising its option, Nestlé Health Science made an option payment and assumed all responsibilities for future clinical development and commercialization of CDX-6114. We are also eligible to receive payments from Nestlé Health Science under the Nestlé License Agreement that include (i) development and approval milestones of up to $85.0 million, (ii) sales-based milestones of up to $250.0 million in the aggregate, which aggregate amount is achievable if net sales exceed $1.0 billion in a single year, and (iii) tiered royalties, at percentages ranging from the mid-single digits to low double-digits of net sales of product.

In October 2017, we entered into the Nestlé SCA pursuant to which we and Nestlé Health Science are collaborating to leverage the CodeEvolver® protein engineering technology platform to develop novel enzymes for Nestlé Health Science's established Consumer Care and Medical Nutrition business areas. The term of the Nestlé SCA has been extended through December 2023 with an automatic renewal through December 2024.

In January 2020, we entered into a development agreement with Nestlé Health Science pursuant to which we and Nestlé Health Science are collaborating to advance CDX-7108, targeting a gastrointestinal disorder discovered through our Nestlé SCA, into preclinical and early clinical studies. We, together with Nestlé Health Science, are continuing to advance CDX-7108 and initiated a Phase 1 clinical trial with the first subject being dosed in the fourth quarter of 2021. The term of the development agreement has been extended through December 2023 with an automatic renewal through December 2024.

Under the Nestlé SCA and the development agreement, we recognized $7.1 million, $6.9 million and $7.9 million in research and development revenue for the years ended December 31, 2022, 2021 and 2020, respectively.

Strategic Collaboration Agreement

In April 2018, we entered into the Porton Agreement with Porton to license key elements of our biocatalyst technology for use in Porton's global custom intermediate and API development and manufacturing business. Under the Porton Agreement, we are eligible to receive annual collaboration fees and research and development revenues. We received initial collaboration payments of $0.5 million and $0.5 million within 30 days of the effective date and on the first anniversary of the effective date of the Porton Agreement, respectively. We also received annual collaboration payments of $1.0 million each during the first through third anniversaries of the effective date of the Porton Agreement and are eligible to receive $1.0 million on the fourth anniversary of the effective date of the Porton Agreement. We completed the technical transfer in the fourth quarter of 2018 and recognized the related revenue in 2018. We recognized revenue related to the functional license provided to Porton at a point in time when control of the license was transferred to the customer. The initial term of the Porton Agreement will expire on April 22, 2023 and is not being renewed for an extended term. We recognized research and development revenue related to the Porton Agreement of $0.1 million, $1.1 million and $1.1 million in the years ended December 31, 2022, 2021 and 2020, respectively.

Platform Technology Transfer and License Agreement

In May 2019, we entered into a Platform Technology Transfer and License Agreement (the "Novartis CodeEvolver® Agreement") with Novartis. The Agreement allows Novartis to use our proprietary CodeEvolver® protein engineering platform technology in the field of human healthcare. In July 2021, we announced the completion of the technology transfer period during which we transferred our CodeEvolver® protein engineering platform technology to Novartis (the "Technology Transfer Period"). As a part of this technology transfer, we provided to Novartis our proprietary enzymes, proprietary protein engineering protocols and methods, and proprietary software algorithms. In addition, our teams and Novartis scientists participated in technology training sessions and collaborative research projects at our laboratories in Redwood City, California and at a designated Novartis laboratory in Basel, Switzerland. Novartis has now installed the CodeEvolver® protein engineering platform technology at its designated laboratory.

Pursuant to the agreement, we received an upfront payment of $5.0 million shortly after the effective date of the Novartis CodeEvolver® Agreement. We completed the second technology milestone transfer under the agreement in 2020 and received a milestone payment of $4.0 million. We have also received an aggregate of $5.0 million for the completion of the third technology milestone in 2021. In consideration for the continued disclosure and license of improvements to the technology and materials during a multi-year period that began on the conclusion of the Technology Transfer Period ("Improvements Term"), Novartis will pay Codexis annual payments over four years which amount to an additional $8.0 million in aggregate. We received the first annual payment of $2.0 million in the fourth quarter of 2022. The Company also has the potential to receive quantity-dependent, usage payments for each API that is manufactured by Novartis using one or more enzymes that have been developed or are in development using the CodeEvolver® protein engineering platform technology during the period that began on the conclusion of the Technology Transfer Period and ends on the expiration date of the last to expire licensed patent. Revenue for the combined initial license and technology transfer performance obligation was recognized using a single measure of progress that depicted our performance in transferring control of the services. Revenue allocated to improvements made during the Improvements Term are being recognized during the Improvement Term.

We recognized $1.0 million, $1.6 million and $6.2 million in research and development revenue in the year ended December 31, 2022, 2021 and 2020, respectively.

License Agreement

In December 2019, we entered a license agreement with Roche Sequencing Solutions, Inc. ("Roche") to provide Roche with our EvoT4 DNA™ ligase high-performance molecular diagnostic enzyme. The royalty bearing license grants Roche worldwide rights to include the EvoT4 DNA™ ligase in its nucleic acid sequencing products and workflows. Under the license agreement, we received an initial collaboration fee payment of $0.8 million within 45 days of the effective date of the agreement, and we received an additional $0.9 million milestone payment after the completion of technology transfer in October 2020. The agreement also contemplates milestone payments to Codexis upon the achievement of various development and commercialization events and royalty payments from commercial sales of the enzyme. We recognized research and development fees of nil, $0.9 million and $0.9 million for the years ended December 31, 2022, 2021 and 2020, respectively.

Strategic Collaboration and License Agreement

In March 2020, we entered into a Strategic Collaboration and License Agreement (the "Takeda Agreement") with Takeda under which we are collaborating to research and develop protein sequences for use in gene therapy products for certain diseases (each, a "Field") in accordance with each applicable program plan (each, a "Program Plan").

On execution of the Takeda Agreement in March 2020, we received an upfront nonrefundable cash payment of $8.5 million and we initiated activities under three Program Plans for Fabry Disease, Pompe Disease, and an undisclosed blood factor deficiency respectively (the "Initial Programs"). In May 2021, Takeda elected to exercise its option to initiate an additional program for a certain undisclosed rare genetic disorder; as a result, we received the option exercise fee during the third quarter of 2021. Pursuant to the Takeda Agreement, we are eligible to receive other payments that include (i) reimbursement of research and development fees and preclinical development milestones for the three initial programs of $10.5 million, in aggregate, and $3.4 million for the fourth program, (ii) clinical development and commercialization-based milestones, per target gene, of up to $104.0 million and (iii) tiered royalty payments based on net sales of applicable products at percentages ranging from the mid-single digits to low single-digits.

Revenue relating to the functional licenses provided to Takeda was recognized at a point in time when the control of the license transferred to the customer. We recognized research and development revenue related to the Takeda Agreement of $4.9 million, $7.4 million and $13.2 million in the years ended December 31, 2022, 2021, and 2020, respectively. As of December 31, 2022 and 2021, we had deferred revenue balances of $0.9 million and $2.2 million, respectively.

Master Collaboration and Research Agreement, Stock Purchase Agreement and Enzyme Supply Agreement

In June 2020, we entered into a Stock Purchase Agreement with MAI in which we purchased1,587,050 shares of MAI's Series A preferred stock for $1.0 million. In connection with the June 2020, transaction, John Nicols, our former President and Chief Executive Officer, joined MAI's board of directors. For additional information, see Note 14, "Related Party Transactions".

Concurrently with our initial equity investment, we entered into the MAI Agreement, pursuant to which we performed services utilizing our CodeEvolver® protein engineering platform technology to improve DNA polymerase enzymes in exchange for compensation in the form of additional shares of MAI's Series A and B preferred stock which are valued based on the observed transaction price of similar securities of MAI issued to third parties. Under the MAI Agreement, we will have the right to use and sell the engineered enzymes to third parties for any purpose other than for the synthesis of native DNA. Under the MAI Agreement, we would make a $0.5 million payment to MAI upon our achievement of a milestone of $5.0 million in aggregate commercial sales to third parties of the engineered enzymes or any product incorporating or derived from the engineered enzymes for any purpose other than the synthesis of native DNA. As contemplated in the MAI Agreement, we executed the Commercial License and Enzyme Supply Agreement with MAI ("MAI Supply Agreement") in July 2022 following the completion of certain timelines specified in the SOW.

We completed the R&D service with MAI pursuant to the MAI Agreement during the first quarter of 2022. In December 2021, we received the primary milestone payment pursuant to the MAI Agreement of $1.0 million in the form of an additional 1,587,049 shares of Series B preferred stock. Upon execution of the MAI Supply Agreement in July 2022, we received the commercialization and enzyme supply agreement milestone payment pursuant to the MAI Agreement of $1.0 million in the form of an additional 1,587,049 shares of Series B preferred stock. We recognized $1.2 million, $2.0 million and $0.9 million in research and development revenue from transactions with MAI in the years ended December 31, 2022, 2021 and 2020, respectively. Payment for the services rendered was received in the form of additional MAI Series A and Series B preferred stock. We received an aggregate of 1,587,049, 3,491,505 and 714,171 shares of MAI's Series A and B preferred stock in the years ended December 31, 2022, 2021 and 2020, respectively.

In July 2022, we and MAI executed the MAI Supply Agreement that will enable MAI to utilize an evolved terminal deoxynucleotidyl transferase ("TdT") enzyme in MAI's Fully Enzymatic Synthesis™ ("FES™") technology. We recognized $0.5 million in product revenue for the year ended December 31, 2022.

Pfizer Enzyme Supply Agreement

During 2021 and 2022, we received purchase orders from Pfizer, Inc. ("Pfizer") for large quantities of our proprietary enzyme product, CDX-616, for use by Pfizer in the manufacture of a critical intermediate for its proprietary active pharmaceutical ingredient, nirmatrelvir, used by Pfizer in combination with the active pharmaceutical ingredient ritonavir, as its PAXLOVID™ (nirmatrelvir tablets; ritonavir tablets) product for the treatment of COVID-19 infections in humans.

We are a party to an Enzyme Supply Agreement with Pfizer Ireland Pharmaceuticals, a subsidiary of Pfizer (the "Pfizer Supply Agreement"), covering the manufacture, sale and purchase of CDX-616 for use by Pfizer in the manufacture of nirmatrelvir. Under the terms of the Pfizer Supply Agreement, Pfizer paid us a fee of $25.9 million in August 2022 which was recorded as deferred revenue. The fee is creditable against future orders of CDX-616 used to manufacture PAXLOVID™ with shipment dates prior to December 31, 2023 and for fees associated with any new development and licensing agreements with Pfizer entered into prior to March 31, 2023 that are invoiced prior to December 31, 2023. Up to 50% of any portion of the fee which has not been credited pursuant to credits granted under the preceding sentence is creditable against future orders of CDX-616 used to manufacture PAXLOVID™ with shipment dates prior to December 31, 2024.

In the fourth quarter of 2022, we and Pfizer agreed to adjust the terms of certain existing non-cancelable purchase orders of CDX-616 issued under the Pfizer Supply Agreement pursuant to which Pfizer will pay us $36.8 million in lieu of the delivery of certain quantities of CDX-616 under those purchase orders, thereby relieving both parties of further obligations under those purchase orders. We recognized $36.8 million in product revenue in 2022 for these existing orders that were invoiced in 2022, of which $19.8 million was collected in December 2022 and the remaining amount was included in accounts receivable as of December 31, 2022, as our right to payment became unconditional upon modification. We expect to receive the $16.9 million in accounts receivable in the first quarter of 2023.

We recognized product revenue of $75.4 million and $34.5 million in the years ended December 31, 2022 and 2021, respectively, from the sale of quantities of CDX-616 to Pfizer. Revenues recognized by us from sale of CDX-616 to Pfizer comprised 54% and 33% of our total revenues for the years ended December 31, 2022 and 2021, respectively.

As of December 31, 2022, we had $24.4 million in deferred revenue related to the $25.9 million fee received from Pfizer, net of $1.5 million of product revenue recognized from the fee during the year ended December 31, 2022. We had nil and $1.7 million in contract assets as of December 31, 2022 and 2021, respectively.

Note 6. Investments in Non-Marketable Securities

Non-Marketable Debt Securities

We classify non-marketable debt securities, which are accounted for as available-for-sale, within Level 3 in the fair value hierarchy because we estimate the fair value based on a qualitative analysis using the most recent observable transaction price and other significant unobservable inputs including volatility, rights, and obligations of the securities we hold.

We determine gains or losses on the sale or extinguishment of non-marketable debt securities using a specific identification method. Unrealized gains and losses from bifurcated embedded derivatives, which represent share-settled redemption features, are recorded as other expense, net, in the consolidated statements of operations. Unrealized gains and losses on non-marketable debt securities are recorded as a component of other comprehensive loss until realized. Realized gains or losses are recorded as a component of other income (expense), net.

In November 2020, we purchased convertible subordinated notes issued by Arzeda Corp. ("Arzeda"), an early-stage computational protein design company, for $1.0 million and the investment was classified as available-for-sale non-marketable interest-bearing debt securities. In July 2021, we converted the non-marketable debt security with a carrying value of $1.3 million into 207,070 shares of Series B-2 preferred stock of Arzeda. During the year ended December 31, 2021, we recognized $0.3 million in interest income from interest earned on our investment in this debt security.

There were no investments in non-marketable debt securities as of December 31, 2022 and 2021.

Non-Marketable Equity Securities

Our non-marketable equity securities are investments in privately held companies without readily determinable market value. These investments are accounted for under the measurement alternative and are measured at cost minus impairment, if any, plus or minus changes resulting from observable price changes for identical or similar securities of the same issuer. Non-marketable equity securities are measured at fair value on a non-recurring basis and classified within Level 2 in the fair value hierarchy because we estimate the fair value of these investments using the observable transaction price paid by third party investors for the same or similar security of the same issuers. We adjust the carrying value of non-marketable equity securities which have been remeasured during the period and recognize resulting gains or losses as a component of other income (expense), net in the consolidated statements of operations.

In March 2022, we entered into a Stock Purchase Agreement with seqWell Inc. ("seqWell"), a privately held biotechnology company, pursuant to which we purchased1,000,000 shares of seqWell's Series C preferred stock for $5.0 million.

For the year ended December 31, 2022, we recognized a $0.2 million unrealized gain in other income, net, and included as adjustment to the carrying value of our investment in MAI, for the remeasurement of the additional 1,587,049 shares of Series B preferred stock received as a milestone payment during the third quarter of 2022 based on the latest observed transaction price of MAI's preferred stock. For the year ended December 31, 2021, we recognized a $1.0 million unrealized gain in other income, net, due to an adjustment to the carrying value of our investment in MAI based on an analysis of the observed transaction price from MAI's round of financing during the third and fourth quarters of 2021. See Note 14 "Related Party Transactions" for additional information on our investment in MAI. Other than as disclosed above, there were no remeasurement events for our investments in MAI and other non-marketable equity securities in 2022 and 2021. We recognized no realized gains or losses during the years ended December 31, 2022 and 2021.

The following table presents the carrying value of our non-marketable equity securities (in thousands):

	December 31, 2022	December 31, 2021
MAI	$ 13,921	$ 12,713
seqWell	5,000	—
Arzeda	1,289	1,289
Other investments in non-marketable equity securities	300	—
Total non-marketable equity securities	$ 20,510	$ 14,002

Note 7. Fair Value Measurements

The following tables present the financial instruments that were measured at fair value on a recurring basis within the fair value hierarchy (in thousands):

	December 31, 2022			
	Level 1	Level 2	Level 3	Total
Money market funds	$ 77,309	$ —	$ —	$ 77,309

	December 31, 2021			
	Level 1	Level 2	Level 3	Total
Money market funds	$ 86,095	$ —	$ —	$ 86,095

During the years ended December 31, 2022 and 2021, we did not recognize any significant credit losses nor other-than-temporary impairment losses on non-marketable securities.

Note 8. Balance Sheet Details

Cash Equivalents

Cash equivalents consisted of the following (in thousands):

	December 31, 2022		December 31, 2021	
	Adjusted Cost	Estimated Fair Value	Adjusted Cost	Estimated Fair Value
Money market funds [1]	$ 77,309	$ 77,309	$ 86,095	$ 86,095

[1] Money market funds are classified in cash and cash equivalents on our consolidated balance sheets. Average contractual maturities (in days) is not applicable.

As of December 31, 2022, the total cash and cash equivalents balance of $114.0 million consisted of money market funds of $77.3 million and cash of $36.7 million held with major financial institutions. As of December 31, 2021, the total cash and cash equivalents balance of $116.8 million consisted of money market funds of $86.1 million and cash of $30.7 million held with major financial institutions.

Inventories

Inventories consisted of the following (in thousands):

	December 31,	
	2022	2021
Raw materials	$ 108	$ 49
Work in process	91	65
Finished goods	1,830	1,046
Total inventories	$ 2,029	$ 1,160

Inventories are recorded net of reserves of $1.2 million and $1.4 million as of December 31, 2022 and December 31, 2021 respectively.

Property and Equipment, net

Property and equipment, net consisted of the following (in thousands):

	December 31,	
	2022	2021
Laboratory equipment [1]	$ 39,679	$ 33,101
Leasehold improvements	16,633	16,117
Computer equipment and software	3,039	3,481
Office equipment and furniture	1,345	1,297
Construction in progress [2]	1,739	3,231
Property and equipment	62,435	57,227
Less: accumulated depreciation and amortization	(39,821)	(35,882)
Property and equipment, net	$ 22,614	$ 21,345

[1] Fully depreciated property and equipment with a cost of $.5 million and $0.6 million were retired during the years ended December 31, 2022 and 2021, respectively.
[2] Construction in progress includes equipment received but not yet placed into service pending installation.

Depreciation expense included in both research and development expenses and selling, general and administrative expenses in the consolidated statements of operations was as follows (in thousands):

	Year Ended December 31,		
	2022	2021	2020
Depreciation expense	$ 5,402	$ 3,113	$ 1,950

Goodwill

Goodwill had a carrying value of $3.2 million as of December 31, 2022 and 2021.

Other Accrued Liabilities

Other accrued liabilities consisted of the following (in thousands):

	December 31,	
	2022	2021
Accrued purchases	$ 10,852	$ 6,755
Accrued professional and outside service fees	3,495	5,147
Other	932	676
Total other accrued liabilities	$ 15,279	$ 12,578

Note 9. Stock-based Compensation

Equity Incentive Plans

In 2019, our board of directors (the "Board") and stockholders approved the 2019 Incentive Award Plan (the "2019 Plan"). The 2019 Plan superseded and replaced in its entirety our 2010 Equity Incentive Plan (the “2010 Plan") which was effective in March 2010, and no further awards will be granted under the 2010 Plan; however, the terms and conditions of the 2010 Plan will continue to govern any outstanding awards thereunder.

The 2019 Plan provides for the grant of stock options, including incentive stock options and non-qualified stock options, stock appreciation rights, restricted stock awards ("RSAs"), restricted stock units ("RSUs"), performance-contingent restricted stock units ("PSUs"), performance-based options ("PBOs"), other stock or cash-based awards and dividend equivalents to eligible employees and consultants of the Company or any parent or subsidiary, as well as members of the Board.

The number of shares of our common stock available for issuance under the 2019 Plan is equal to the sum of (i) 7,897,144 shares and (ii) any shares subject to awards granted under the 2010 Plan that were outstanding as of April 22, 2019 and thereafter terminate, expire, lapse or are forfeited; provided that no more than 14,000,000 shares may be issued upon the exercise of incentive stock options ("ISOs"). In June 2019, 8.1 million shares authorized for issuance under the 2019 Plan were registered under the Securities Act of 1933, as amended (the "Securities Act").

The 2010 Plan provided for the grant of incentive stock options, non-statutory stock options, RSUs, RSAs, PSUs, PBOs,

stock appreciation rights, and stock purchase rights to our employees, non-employee directors and consultants.

As of December 31, 2022, total shares remaining available for issuance under the 2019 Plan were 2.8 million shares.

Stock Options

The option exercise price for incentive stock options must be at least 100% of the fair value of our common stock on the date of grant and the option exercise price for non-statutory stock options is at least 85% of the fair value of our common stock on the date of grant, as determined by the Board. If, at the time of a grant, the optionee directly or by attribution owns stock possessing more than 10% of the total combined voting power of all of our outstanding capital stock, the exercise price for these options must be at least 110% of the fair value of the underlying common stock. Stock options granted to employees generally have a maximum term of ten years and vest over four years from the date of grant, of which 25% vest at the end of one year, and 75% vest monthly over the remaining three years. We may grant options with different vesting terms from time to time. Unless an employee's termination of service is due to disability or death, upon termination of service, any unexercised vested options will be forfeited at the end of three months or the expiration of the option, whichever is earlier.

Restricted Stock Units ("RSUs")

We also grant employees RSUs, which generally vest over either a three year period with 33% of the shares subject to the RSUs vesting on each yearly anniversary of the vesting commencement date or over a four-year period with 25% of the shares subject to the RSU vesting on each yearly anniversary of the vesting commencement date, in each case contingent upon such employee’s continued service on such vesting date. RSUs are generally subject to forfeiture if employment terminates prior to the release of vesting restrictions. We may grant RSUs with different vesting terms from time to time.

Performance-contingent Restricted Stock Units ("PSUs") and Performance Based Options ("PBOs")

The compensation committee of the Board, solely in respect of non-executive employees, delegated to our Chief Executive Officer the authority to approve grants of PSUs. The compensation committee of the Board also approves grants of PBOs and PSUs to our executives. The PSUs and PBOs vest based upon both the successful achievement of certain corporate operating milestones in specified timelines and continued employment through the applicable vesting date. When the performance goals are deemed to be probable of achievement for these types of awards, recognition of stock-based compensation expense commences. Once the number of shares eligible to vest is determined, those shares vest in two equal installments with 50% vesting upon achievement and the remaining 50% vesting on the first anniversary of achievement, in each case, subject to the recipient’s continued service through the applicable vesting date. If the performance goals are achieved at the threshold level, the number of shares eligible to vest in respect of the PSUs and PBOs would be equal to half the number of PSUs granted and one-quarter the number of shares underlying the PBOs granted. If the performance goals are achieved at the target level, the number of shares eligible to vest in respect of the PSUs and PBOs would be equal to the number of PSUs granted and half of the shares underlying the PBOs granted. If the performance goals are achieved at the superior level, the number of shares eligible to vest in respect of the PSUs would be equal to two times the number of PSUs granted and equal to the number of PBOs granted. The number of shares issuable upon achievement of the performance goals at the levels between the threshold and target levels for the PSUs and PBOs or between the target level and superior levels for the PSUs would be determined using linear interpolation. Achievement below the threshold level would result in no shares being eligible to vest in respect of the PSUs and PBOs.

In 2022, we awarded PSUs ("2022 PSUs") and PBOs ("2022 PBOs"), each of which commence vesting based upon the achievement of various weighted performance goals, including finance and corporate strategy, performance enzymes and biotherapeutics deliverables, research plans, and organizational development. As of December 31, 2022, we estimated that the 2022 PSUs and 2022 PBOs performance goals would be achieved at 85.0% and 42.5% of the target level, respectively, and recognized stock-based compensation expenses accordingly.

In 2021, we awarded PSUs ("2021 PSUs") and PBOs ("2021 PBOs"), each of which commence vesting based upon the achievement of various weighted performance goals, including total revenues, product revenue, performance enzymes pipeline advancements, biotherapeutics pipeline advancements, organization and infrastructure upgrades, and significant events that can be publicly announced. In the first quarter of 2022, we determined that the 2021 PSUs and 2021 PBOs performance goals had been achieved at 146% and 73% of the target level, respectively, and recognized stock-based compensation expenses accordingly. Accordingly, 50% of the shares underlying the 2021 PSUs and PBOs vested in the first quarter of 2022 and 50% of the shares underlying the 2021 PSUs and PBOs will vest in the first quarter of 2023, in each case, subject to the recipient’s continued service on each vesting date.

In 2020, we awarded PSUs ("2020 PSUs") and PBOs ("2020 PBOs"), each of which commenced vesting based upon the achievement of various weighted performance goals, including total revenues, performance enzyme segment gross margin, major new biotherapeutics publicity events, strategic performance enzyme and biotherapeutics deliverables, and strategic plan development. In the first quarter of 2021, we determined that the 2020 PSUs and 2020 PBOs performance goals had been achieved at 88% and 44% of the target level, respectively, and recognized stock-based compensation expenses accordingly. Accordingly, 50% of the shares underlying the 2020 PSUs and PBOs vested in the first quarter of 2021 and50% of the shares underlying the 2020 PSUs and PBOs vested in the first quarter of 2022, in each case, subject to the recipient's continued service on each vesting date.

Stock-Based Compensation Expense

Stock-based compensation expense is included in the consolidated statements of operations as follows (in thousands):

	Year Ended December 31,		
	2022	2021	2020
Costs of product revenue	$ 452	$ 224	$ 104
Research and development	$ 3,907	$ 2,663	$ 1,843
Selling, general and administrative	10,172	8,706	5,781
Total	$ 14,531	$ 11,593	$ 7,728

The following table presents total stock-based compensation expense by security type included in the consolidated statements of operations (in thousands):

	Year Ended December 31,		
	2022	2021	2020
Stock options	$ 4,167	$ 2,764	$ 2,381
RSUs and RSAs	4,807	2,768	2,231
PSUs	3,268	2,333	1,160
PBOs	2,289	3,728	1,956
Total	$ 14,531	$ 11,593	$ 7,728

In connection with the retirement of John Nicols, our former President and Chief Executive Officer, in August 2022, and the Transition and Separation Agreement between Mr. Nicols and the Company, certain supplementary modifications were made to Mr. Nicols' vested and unvested stock option and PBOs awards including voluntary forfeiture of certain unvested stock option and PBOs awards and the extension of the post-termination exercise period of certain vested stock option and PBOs awards. During the year ended December 31, 2022, we recorded a one-time, non-cash incremental compensation expense of $1.0 million, net of the required reversal of previously recognized stock-based compensation expenses attributed to unvested shares, in selling, general and administrative expenses related to these stock option award modifications.

Grant Award Activities:

Stock Option Awards

We estimated the fair value of stock options using the Black-Scholes-Merton option-pricing model based on the date of grant.The following summarizes the weighted-average assumptions used to estimate the fair value of employee stock options granted:

	Year Ended December 31,		
	2022	2021	2020
Expected life (years)	5.7	5.6	5.3
Volatility	62.1 %	52.5 %	50.4 %
Risk-free interest rate	3.1 %	0.8 %	1.0 %
Expected dividend yield	0.0 %	0.0 %	0.0 %

No stock options were granted to non-employees for services during year ended December 31, 2022. The following summarizes the weighted-average assumptions used to estimate the fair value of 9,000 and 76,000 shares of stock options granted to non-employees for services valued at $0.1 million and $0.4 million during the years ended December 31, 2021 and 2020 respectively:

	Year Ended December 31,			
	2021		2020	
Expected life (years)	5.6		5.4	
Volatility	54.1	%	51.6	%
Risk-free interest rate	0.9	%	0.4	%
Expected dividend yield	0.0	%	0.0	%

The weighted average grant date fair value per share of non-employee stock options granted respectively in 2021 and 2020 was $11.29 and $5.04.

The following tables summarizes stock option activities:

	Number of Shares	Weighted Average Exercise Price Per Share
	(In Thousands)	
Outstanding at December 31, 2019	3,147	$ 6.31
Granted	496	$ 13.30
Exercised	(210)	$ 6.30
Forfeited/Expired	(48)	$ 16.71
Outstanding at December 31, 2020	3,385	$ 7.19
Granted	286	$ 26.85
Exercised	(664)	$ 6.96
Forfeited/Expired	(72)	$ 17.99
Outstanding at December 31, 2021	2,935	$ 8.90
Granted	2,000	$ 8.90
Exercised	(410)	$ 2.33
Forfeited/Expired	(275)	$ 19.01
Outstanding at December 31, 2022	4,250	$ 8.88

	Number of Shares	Weighted Average Exercise Price Per Share	Weighted Average Remaining Contractual Term	Aggregate Intrinsic Value
	(In Thousands)		(In Years)	(In Thousands)
Outstanding at December 31, 2022	4,250	$ 8.88	6.2	$ 1,556
Exercisable at December 31, 2022	2,162	$ 8.26	3.1	$ 1,556
Vested and expected to vest at December 31, 2022	3,898	$ 8.91	5.9	$ 1,556

The weighted average grant date fair value per share of employee stock options granted in 2022, 2021 and 2020 were $8.99, $12.80 and $6.03, respectively. The total intrinsic value of options exercised in 2022, 2021 and 2020 were $3.1 million, $14.9 million and $1.8 million, respectively.

As of December 31, 2022, there was $8.1 million of unrecognized stock-based compensation, net of expected forfeitures, related to unvested stock options, which we expect to recognize over a weighted average period of 3.4 years.

Restricted Stock Awards ("RSAs")

The following table summarizes RSA activities:

	Number of Shares	Weighted Average Grant Date Fair Value Per Share
	(In Thousands)	
Non-vested balance at December 31, 2019	35	$ 17.18
Granted	96	$ 11.44
Vested	(35)	$ 17.18
Non-vested balance at December 31, 2020	96	$ 11.44
Granted	46	$ 21.91
Vested	(62)	$ 11.31
Non-vested balance at December 31, 2021	80	$ 17.53
Granted	159	$ 7.53
Vested	(58)	$ 18.42
Non-vested balance at December 31, 2022	181	$ 8.45

The total fair value, as of the vesting date, of RSAs vested in fiscal years 2022, 2021 and 2020 were $0.5 million, $1.3 million and $0.4 million respectively.

As of December 31, 2022, there was $0.8 million of unrecognized stock-based compensation cost related to non-vested RSAs, which we expect to recognize over a weighted average period of 1.4 years.

Restricted Stock Units ("RSUs")

The following table summarizes RSU activities:

	Number of Shares	Weighted Average Grant Date Fair Value Per Share
	(In Thousands)	
Non-vested balance at December 31, 2019	201	$ 10.76
Granted	156	$ 14.22
Vested	(168)	$ 10.05
Forfeited/Expired	(13)	$ 15.16
Non-vested balance at December 31, 2020	176	$ 14.17
Granted	163	$ 26.59
Vested	(70)	$ 13.57
Forfeited/Expired	(37)	$ 21.89
Non-vested balance at December 31, 2021	232	$ 21.83
Granted	518	$ 17.46
Vested	(106)	$ 21.21
Forfeited/Expired	(126)	$ 19.55
Non-vested balance at December 31, 2022	518	$ 18.15

The total fair value, as of the vesting date, of RSUs vested in fiscal years 2022, 2021 and 2020 were $1.8 million, $1.8 million and $2.1 million respectively.

As of December 31, 2022, there was $5.2 million of unrecognized stock-based compensation cost related to non-vested RSUs, which we expect to recognize over a weighted average period of 1.9 years.

Performance-Contingent Restricted Stock Units ("PSUs")

The following table summarizes PSU activities:

	Number of Shares	Weighted Average Grant Date Fair Value Per Share
	(In Thousands)	
Non-vested balance at December 31, 2019	120	$ 13.88
Granted	124	$ 13.59
Vested	(107)	$ 11.28
Forfeited/Expired	(6)	$ 21.80
Non-vested balance at December 31, 2020	131	$ 15.34
Granted	82	$ 26.16
Vested	(66)	$ 16.14
Forfeited/Expired	(19)	$ 19.38
Non-vested balance at December 31, 2021	128	$ 21.24
Granted	686	$ 9.55
Vested	(107)	$ 20.52
Forfeited/Expired	(40)	$ 19.93
Non-vested balance at December 31, 2022	667	$ 9.41

The total fair value, as of the vesting date, of PSUs vested in the years ended December 31, 2022, 2021, and 2020 were $2.1 million, $1.3 million, and $1.3 million, respectively.

As of December 31, 2022, there was $2.2 million of unrecognized stock-based compensation cost related to non-vested PSUs, which we expect to recognize over a weighted average period of 0.7 years.

Performance Based Options ("PBOs")

We estimated the fair value of PBOs using the Black-Scholes-Merton option-pricing model based on the date of grant.The following summarize the weighted-average assumptions used to estimate the fair value of PBOs granted:

	Year Ended December 31,		
	2022	2021	2020
Expected life (years)	5.6	5.5	5.3
Volatility	54.9 %	51.9 %	49.9 %
Risk-free interest rate	1.8 %	0.7 %	1.3 %
Expected dividend yield	0.0 %	0.0 %	0.0 %

The following tables summarizes PBOs activities:

	Number of Shares	Weighted Average Grant Date Fair Value Per Share
	(In Thousands)	
Outstanding at December 31, 2019	1,260	$ 4.75
Granted	689	$ 6.37
Forfeited/Expired	(389)	$ 6.42
Outstanding at December 31, 2020	1,560	$ 5.05
Granted	433	$ 12.23
Exercised	(35)	$ 9.02
Forfeited/Expired	(118)	$ 12.23
Outstanding at December 31, 2021	1,840	$ 4.11
Granted	733	$ 9.89
Forfeited/Expired	(747)	$ 8.29
Outstanding at December 31, 2022	1,826	$ 4.70

	Number of Shares	Weighted Average Exercise Price Per Share	Weighted Average Remaining Contractual Term	Aggregate Intrinsic Value
	(In Thousands)		(In Years)	(In Thousands)
Exercisable at December 31, 2022	1,674	$ 11.09	5.4	$ 40
Vested and expected to vest at December 31, 2022	1,808	$ 11.85	5.7	$ 40

The total fair value of exercised PBOs for 2022, 2021 and 2020, wasnil, $0.3 million and nil, respectively.

As of December 31, 2022, there was $0.4 million of unrecognized stock-based compensation cost related to non-vested PBOs, which we expect to recognize over a weighted average period of 1.0 years.

Note 10. Capital Stock

Equity Distribution Agreement

We filed a shelf Registration Statement on Form S-3 with the SEC, under which we may sell common stock, preferred stock, debt securities, warrants, purchase contracts, and units from time to time in one or more offerings. The registration statement became effective on May 7, 2021. In May 2021, we entered into an Equity Distribution Agreement ("EDA") with Piper Sandler & Co ("PSC"), under which PSC, as our exclusive agent, at our discretion and at such times that we may determine from time to time, may sell over a three-year period from the execution of the EDA up to a maximum of $50.0 million of shares of our common stock. Under the terms of the EDA, PSC may sell the shares at market prices by any method that is deemed to be an "at the market offering" as defined in Rule 415 under the Securities Act of 1933, as amended.

We are not required to sell any shares at any time during the term of the EDA. The EDA will terminate upon the earlier of: (i) the issuance and sale of all shares through PSC on the terms and conditions of the EDA, or (ii) the termination of the EDA in accordance with its terms. Either party may terminate the EDA at any time upon written notification to the other party in accordance with the EDA, and upon such notification, the offering will terminate. Under no circumstances shall any shares be sold pursuant to the EDA after the date which is three years after the registration statement is first declared effective by the SEC. We agreed to pay PSC a commission of 3% of the gross sales price of any shares sold pursuant to the EDA. With the exception of certain expenses, we will pay PSC up to 8% of the gross sales price of the shares sold pursuant to the EDA for a combined amount of commission and reimbursement of PSC's expenses and fees.

During the year ended December 31, 2022, no shares of our common stock were issued pursuant to the EDA. As of December 31, 2022, $50.0 million worth of shares remained available for sale under the EDA.

Public Offerings

In December 2020, we completed an underwritten public offering in which we issued and sold 4.9 million shares of our common stock, par value $0.0001 per share, at a public offering price of $17.50 per share. We received gross proceeds of $86.3 million, net of underwriting discounts and commissions of $5.2 million and direct offering expenses of $0.3 million for net proceeds of $80.8 million.

Note 11. 401(k) Plan

In January 2005, we implemented a 401(k) Plan covering certain employees. Currently, all of our United States based employees over the age of 18 are eligible to participate in the 401(k) Plan. Under the 401(k) Plan, eligible employees may elect to reduce their current compensation up to a certain annual limit and contribute these amounts to the 401(k) Plan. We may make matching or other contributions to the 401(k) Plan on behalf of eligible employees. We recorded employer matching contributions expense of $1.6 million, $1.1 million, and $0.8 million in the years ended December 31, 2022, 2021, and 2020, respectively.

Note 12. Income Taxes

Our loss before provision for income taxes were as follows (in thousands):

	Year Ended December 31,		
	2022	2021	2020
United States	$ (33,269)	$ (21,037)	$ (23,452)
Foreign	(47)	(53)	(219)
Loss before provision for income taxes	$ (33,316)	$ (21,090)	$ (23,671)

The tax provision for the year ended December 31, 2022 consists primarily of current year state and foreign income taxes. The tax provision for the years ended December 31, 2021 and 2020 consists primarily of taxes attributable to foreign operations. The components of the provision for income taxes are as follows (in thousands):

	Year Ended December 31,		
	2022	2021	2020
Current provision:			
State	$ 141	$ —	$ 5
Foreign	142	198	342
Total current provision	$ 283	$ 198	$ 347
Deferred benefit:			
Foreign	(7)	(9)	(8)
Total deferred benefit	$ (7)	$ (9)	$ (8)
Provision for income taxes	$ 276	$ 189	$ 339

Reconciliation of the provision for income taxes calculated at the statutory rate to our provision for income taxes is as follows (in thousands):

	Year Ended December 31,		
	2022	2021	2020
Tax benefit at federal statutory rate	$ (6,996)	$ (4,429)	$ (4,971)
State taxes	(494)	(2,235)	(708)
Research and development credits	(1,793)	(1,132)	(811)
Foreign operations taxed at different rates	78	80	245
Stock-based compensation	239	(2,698)	140
Other nondeductible items	(238)	711	61
Executive compensation	80	257	24
Change in valuation allowance	9,400	9,635	6,359
Provision for income taxes	$ 276	$ 189	$ 339

Deferred income taxes reflect the net tax effects of (a) temporary differences between the carrying amounts of assets and liabilities for financial reporting purposes and the amounts used for income tax purposes, and (b) operating losses and tax credit carryforwards.

Significant components of our deferred tax assets and liabilities are as follows (in thousands):

	December 31,	
	2022	2021
Deferred tax assets:		
Net operating losses	$ 69,915	$ 78,525
Credits	14,806	11,895
Deferred revenues	1,123	1,490
Stock-based compensation	4,967	3,946
Reserves and accruals	2,487	2,928
Depreciation	—	514
Intangible assets	866	1,356
Capital losses	413	26
R&D Capitalization	16,502	—
Unrealized gain/loss	1	418
Lease liability	9,586	11,206
Other assets	124	122
Total deferred tax assets:	120,790	112,426
Valuation allowance	(111,183)	(101,762)
Deferred tax liabilities:		
Right-of-use assets	(8,624)	(10,373)
Property and Equipment	(736)	—
Other	(263)	(314)
Total deferred tax liabilities:	(9,623)	(10,687)
Net deferred tax liabilities	$ (16)	$ (23)

ASC 740 requires that the tax benefit of NOLs, temporary differences and credit carryforwards be recorded as an asset to the extent that management assesses that realization is "more likely than not." Realization of the future tax benefits is dependent on our ability to generate sufficient taxable income within the carryforward period. Because of our history of operating losses, management believes that recognition of the deferred tax assets arising from the above-mentioned future tax benefits is currently not more likely than not to be realized and, accordingly, has provided a valuation allowance against our deferred tax assets. Accordingly, the net deferred tax assets in all our jurisdictions have been fully reserved by a valuation allowance. The net valuation allowance increased by $9.4 million during the year ended December 31, 2022, increased by $9.6 million during the year ended December 31, 2021, and increased by $6.4 million during the year ended December 31, 2020. At such time as it is determined that it is more likely than not that the deferred tax assets are realizable, the valuation allowance will be reduced.

The following table sets forth our federal, state and foreign NOL carryforwards and federal research and development tax credits as of December 31, 2022 (in thousands):

	December 31, 2022	
	Amount	Expiration Years
Net operating losses, federal	$ 183,022	2026-2037
Net operating losses, federal	$ 109,069	Do not expire
Net operating losses, state	$ 138,775	2028-2041
Tax credits, federal	$ 16,228	2023-2041
Tax credits, state	$ 17,168	Do not expire

Current U.S. federal and California tax laws include substantial restrictions on the utilization of NOLs and tax credit carryforwards in the event of an ownership change of a corporation. Accordingly, the Company's ability to utilize NOLs and tax credit carryforwards may be limited as a result of such ownership changes. We performed an analysis in 2022 and determined that there was not a limitation that would result in the expiration of carryforwards before they are utilized.

Income tax expense or benefit from continuing operations is generally determined without regard to other categories of earnings, such as discontinued operations and other comprehensive income. An exception is provided in ASC 740 when there is aggregate income from categories other than continuing operations and a loss from continuing operations in the current year. In this case, the tax benefit allocated to continuing operations is the amount by which the loss from continuing operations reduces the tax expenses recorded with respect to the other categories of earnings, even when a valuation allowance has been established against the deferred tax assets. In instances where a valuation allowance is established against current year losses, income from other sources is considered when determining whether sufficient future taxable income exists to realize the deferred tax assets.

In 2014, we determined that the undistributed earnings of our India subsidiary will be repatriated to the United States, and accordingly, we have provided a deferred tax liability totaling $16 thousand and $23 thousand as of December 31, 2022 and 2021 respectively, for local taxes that would be incurred upon repatriation.

We apply the provisions of ASC 740 to account for uncertain income taxes. A reconciliation of the beginning and ending amount of unrecognized tax benefits is as follows (in thousands):

	December 31,		
	2022	2021	2020
Balance at beginning of year	$ 15,261	$ 12,683	$ 11,330
Additions based on tax positions related to current year	3,553	2,206	1,357
Additions to tax position of prior years	—	372	—
Reductions to tax position of prior years	(243)	—	(4)
Balance at end of year	$ 18,571	$ 15,261	$ 12,683

We recognize interest and penalties as a component of our income tax expense. Total interest and penalties recognized in the consolidated statements of operations were $42 thousand, $61 thousand and $39 thousand in 2022, 2021 and 2020, respectively. Total penalties and interest recognized in the balance sheet was $0.5 million, $0.5 million and $0.4 million as of December 31, 2022, 2021 and 2020, respectively. The total unrecognized tax benefits that, if recognized currently, would impact our company's effective tax rate were $0.3 million as of December 31, 2022, 2021 and 2020. We do not expect any material changes to our uncertain tax positions within the next 12 months. We are not subject to examination by United States federal or state tax authorities for years prior to 2002 and foreign tax authorities for years prior to 2014.

Note 13. Commitments and Contingencies

Operating Leases

Our headquarters are located in Redwood City, California, where we occupy approximately 77,300 square feet of office and laboratory space in multiple buildings within the same business park of Metropolitan Life Insurance Company ("MetLife"). Our lease agreement with MetLife ("RWC Lease") includes approximately 28,200 square feet of space located at 200 and 220 Penobscot Drive, Redwood City, California (the "200/220 Penobscot Space") and approximately 37,900 square feet of space located at 400 Penobscot Drive, Redwood City, California (the "400 Penobscot Space") (the 200/220 Penobscot Space and the 400 Penobscot Space are collectively referred to as the "Penobscot Space"), and approximately 11,200 square feet of space located at 501 Chesapeake Drive, Redwood City, California (the "501 Chesapeake Space").

We entered into the initial lease with MetLife for our facilities in Redwood City in 2004 and the RWC Lease has been amended multiple times since then to adjust the leased space and terms of the Lease. In February 2019, we entered into an Eighth Amendment to the Lease (the "Eighth Amendment") with MetLife with respect to the Penobscot Space and the 501 Chesapeake Space to extend the term of the Lease for additional periods. Pursuant to the Eighth Amendment, the term of the lease of the Penobscot Space has been extended through May 2027. The lease term for the 501 Chesapeake Space has been extended to May 2029. We have one (1) option to extend the term of the lease for the Penobscot Space for five (5) years, and one (1) separate option to extend the term of the lease for the 501 Chesapeake Space for five (5) years.

Pursuant to the terms of the RWC Lease, we exercised our right to deliver a letter of credit in lieu of a security deposit. The letter of credit is collateralized by deposit balances held by the bank in the amount of $1.1 million as of December 31, 2022 and 2021, and are recorded as non-current restricted cash on the consolidated balance sheets.

We entered into a short-term office lease in San Carlos, California during the second quarter of 2021 and this lease expired in April 2022.

In January 2021, we entered into a lease agreement with ARE-San Francisco No. 63, LLC ("ARE") to lease a portion of a facility consisted of approximately 36,593 rentable square feet in San Carlos, California to serve as additional office and research and development laboratory space (the "San Carlos Space"). The lease has a 10-year term from the lease commencement date of November 30, 2021 with one option to extend the term for an additional period of 5 years. We have provided ARE with a $0.5 million security deposit in the form of a letter of credit and is recorded as non-current restricted cash on the consolidated balance sheets.

We are required to restore certain areas of the Redwood City and San Carlos facilities that we are renting to their original form. We are expensing the asset retirement obligation over the terms of the respective leases. We review the estimated obligation each reporting period and make adjustments if our estimates change. We recorded asset retirement obligations of $0.5 million and $0.4 million as of December 31, 2022 and 2021, respectively, which are included in other liabilities on the consolidated balance sheets. Accretion expense related to our asset retirement obligations was nominal in 2022 and 2021.

Lease and other information

Lease costs, amounts included in measurement of lease obligations and other information related to non-cancellable operating leases and finance leases were as follows (in thousands):

	Year Ended December 31,		
	2022	2021	2020
Amortization of right-of-use assets	$ 18	$ 106	$ 152
Interest on lease obligations	—	—	1
Finance lease costs	18	106	153
Operating lease cost	7,321	4,396	3,879
Short-term lease costs [1]	40	70	47
Sublease income	—	—	(55)
Total lease cost [2]	$ 7,379	$ 4,572	$ 4,024

[1] Short-term lease costs on leases with terms of over one month and less than one year.
[2] The Company had no variable lease costs.

Amounts included in measurement of lease obligations (in thousands):

	Year Ended December 31,		
	2022	2021	2020
Cash paid:			
Operating cash flows from operating leases	$ 6,506	$ 4,197	$ 2,816
Operating cash flow from finance leases	$ —	$ —	$ 1
Financing cash flows from finance leases	$ —	$ —	$ 60
Non-cash activity:			
Operating Lease - Right-of-use assets obtained in exchange for lease liabilities	$ —	$ 25,445	$ —
Finance Lease - Right-of-use assets obtained in exchange for lease liabilities	$ —	$ —	$ —

	Operating Lease
Other information:	
Weighted-average remaining lease term (in years)	7.1 years
Weighted-average discount rate	5.4 %

As of December 31, 2022, our maturity analysis of annual undiscounted cash flows of the non-cancellable operating leases are as follows (in thousands):

Years ending December 31,		**Operating Leases**
2023	$	7,568
2024		7,783
2025		8,004
2026		8,232
2027		5,835
Thereafter		14,871
Total minimum lease payments		52,293
Less: imputed interest		8,655
Lease obligations	$	43,638

Reconciliation of operating lease liabilities as shown within the audited consolidated balance sheets:

Current portion of lease obligations - Operating leases	$	5,360
Long-term lease obligations - Operating leases		38,278
Total operating lease liabilities	$	43,638

Other Commitments

We enter into supply and service arrangements in the normal course of business. Supply arrangements are primarily for fixed-price manufacture and supply. Service agreements are primarily for the development of manufacturing processes and certain studies. Commitments under service agreements are subject to cancellation at our discretion which may require payment of certain cancellation fees. The timing of completion of service arrangements is subject to variability in estimates of the time required to complete the work.

The following table provides quantitative data regarding our other commitments. Future minimum payments reflect amounts that we expect to pay including potential obligations under services agreements subject to risk of cancellation by us (in thousands):

	Payments Due by Period					
	Total		**2023**		**2024 and Thereafter**	
Development and manufacturing services agreements	$	3,093	$	2,938	$	155
Facility maintenance agreement		2,249		2,249		—
Total other commitments	$	5,342	$	5,187	$	155

Credit Facility

In June 30, 2017, we entered into a credit facility (the "Credit Facility") with Western Alliance Bank consisting of term loans ("Term Debt") up to $0.0 million, and advances ("Advances") under a revolving line of credit ("Revolving Line of Credit") up to $5.0 million with an accounts receivable borrowing base of80% of eligible accounts receivable. The right to take draws on the Term Debt expired on December 31, 2021. On October 1, 2024, loans drawn, if any, under the Revolving Line of Credit terminate. Advances made under the Revolving Line of Credit bear interest at a variable annual rate equal to the equal to the greater of (i) 4.25% or (ii) the sum of (A) the prime rate plus (B)1.00%. As of December 31, 2022 and 2021, we have not drawn from the Credit Facility.

Our obligations under the Credit Facility are secured by a lien on substantially all of our personal property other than our intellectual property. The Credit Facility includes a number of customary covenants and restrictive financial covenants including meeting minimum product revenue levels and maintaining certain minimum cash levels with the lender. The Credit Facility's financial covenants restrict the ability of the Company to transfer collateral, incur additional indebtedness, engage in mergers or acquisitions, pay dividends or make other distributions, make investments, create liens, sell assets, or sell certain assets held at foreign subsidiaries. A failure to comply with these covenants could permit the lender to exercise remedies against us and the collateral securing the Credit Facility, including foreclosure of our properties securing the Credit Facilities and our cash. As of December 31, 2022 and 2021, we were in compliance with the covenants for the Credit Facility.

Legal Proceedings

We may be involved in legal actions in the ordinary course of business, including inquiries and proceedings concerning business practices and intellectual property infringement, employee relations and other claims. We will recognize a loss contingency in the condensed consolidated financial statements when it is probable a liability has been incurred and the amount of the loss can be reasonably estimated. We will disclose any loss contingencies that do not meet both conditions if there is a reasonable possibility that a material loss may have been incurred. Gain contingencies are not recorded until they are realized.

In April 2022, we reached a settlement resolving a non-material dispute involving the Company's trademark. The terms of the settlement are not material to our business or the results of operations. We are currently not a party to any material pending litigation of other material proceedings.

Indemnifications

We are required to recognize a liability for the fair value of any obligations we assume upon the issuance of a guarantee. We have certain agreements with licensors, licensees and collaborators that contain indemnification provisions. In such provisions, we typically agree to indemnify the licensor, licensee and collaborator against certain types of third party claims. The maximum amount of the indemnifications is not limited. We accrue for known indemnification issues when a loss is probable and can be reasonably estimated. There were no accruals for expenses related to indemnification issues for any periods presented.

Note 14. Related Party Transactions

Molecular Assemblies, Inc.

In June 2020, we entered into a Stock Purchase Agreement with MAI pursuant to which we purchased1,587,050 shares of MAI's Series A preferred stock for $1.0 million. In connection with the transaction, Mr. Nicols, our former President and Chief Executive Officer, also joined MAI's board of directors. Concurrently with our initial equity investment, we entered into the MAI Agreement, pursuant to which we performed services utilizing our CodeEvolver® protein engineering platform technology to improve DNA polymerase enzymes in exchange for compensation in the form of additional shares of MAI's Series A and B preferred stock which are valued based on the observed transaction price of similar securities of MAI issued to third parties. We completed the R&D service with MAI pursuant to the MAI Agreement during the first quarter of 2022. In December 2021, we received the primary milestone payment pursuant to the MAI Agreement of $1.0 million in the form of an additional 1,587,049 shares of Series B preferred stock. Upon execution of the Commercial License and Enzyme Supply Agreement with MAI ("MAI Supply Agreement") in July 2022, we received the commercialization and enzyme supply agreement milestone payment pursuant to the MAI Agreement of $1.0 million in the form of an additional 1,587,049 shares of Series B preferred stock. In addition to our initial equity investment and the shares we have received under the MAI Agreement, in April 2021, we purchased an additional 1,000,000 shares of MAI's Series A preferred stock for $0.6 million and in September 2021, we purchased 9,198,423 shares of MAI's Series B preferred stock for $7.0 million.

We recognized $1.2 million, $2.0 million and $0.9 million in research and development revenue from transactions with MAI in the years ended December 31, 2022, 2021 and 2020, respectively. Payment for the R&D services rendered under the MAI Agreement was received in the form of additional shares of MAI's Series A and Series B preferred stock. We received an aggregate of 1,587,049, 3,491,505 and 714,171 shares of MAI's Series A and B preferred stock for the years ended December 31, 2022, 2021 and 2020, respectively. As of December 31, 2022, we hold an aggregate 18,292,369 shares of MAI's Series A and B preferred stock that we have earned or purchased since executing the Stock Purchase Agreement with MAI.

In April 2022, we received a purchase order from MAI for the delivery of certain enzyme products to MAI in 2022. In July 2022, we and MAI executed the MAI Supply Agreement that will enable MAI to utilize an evolved terminal deoxynucleotidyl transferase (TdT) enzyme in MAI's Fully Enzymatic Synthesis™ (or FES™) technology. We recognized $0.5 million in product revenue for the year ended December 31, 2022.

The carrying value of our investment in MAI's Series A and B preferred stock was $13.9 million and $12.7 million at December 31, 2022 and 2021, respectively. We hadnil and $0.2 million in deferred revenue as of December 31, 2022 and 2021, respectively.

Note 15. Segment, Geographical and Other Revenue Information

Segment Information

We manage our business as two business segments: Performance Enzymes and Novel Biotherapeutics. Our chief operating decision maker ("CODM") is our Chief Executive Officer. Our business segments are primarily based on our organizational structure and our operating results as used by our CODM in assessing performance and allocating resources for the Company.

We report corporate-related expenses such as legal, accounting, information technology, and other costs that are not otherwise included in our reportable business segments as "corporate costs." All items not included in income (loss) from operations are excluded from the business segments.

All of our long lived assets are located in the United States. We manage our assets on a total company basis, not by business segment, as the majority of our operating assets are shared or commingled. Our CODM does not review asset information by business segment in assessing performance or allocating resources, and accordingly, we do not report asset information by business segment.

Factors considered in determining the two reportable segments of the Company include the nature of business activities, the management structure directly accountable to our CODM for operating and administrative activities, availability of discrete financial information and information presented to the Board of Directors. Our CODM regularly reviews our segments and the approach provided by management for performance evaluation and resource allocation.

Operating expenses that directly support the segment activity are allocated based on segment headcount, revenue contribution or activity of the business units within the segments, based on the corporate activity type provided to the segment. The expense allocation excludes certain corporate costs that are separately managed from the segments. This provides the CODM with more meaningful segment profitability reporting to support operating decisions and allocate resources.

The following table provides financial information by our reportable business segments along with a reconciliation to consolidated loss before income taxes (in thousands):

	Year Ended December 31, 2022			Year Ended December 31, 2021		
	Performance Enzymes	Novel Biotherapeutics	Total	Performance Enzymes	Novel Biotherapeutics	Total
Revenues:						
Product revenue	$ 116,676	$ —	$ 116,676	$ 70,657	$ —	$ 70,657
Research and development revenue	9,936	11,978	21,914	19,858	14,239	34,097
Total revenues	126,612	11,978	138,590	90,515	14,239	104,754
Costs and operating expenses:						
Cost of product revenue	38,033	—	38,033	22,209	—	22,209
Research and development [1]	25,786	49,770	75,556	23,140	30,219	53,359
Selling, general and administrative[1]	14,724	2,421	17,145	12,105	2,755	14,860
Restructuring charges	1,708	966	2,674	—	—	—
Total segment costs and operating expenses	80,251	53,157	133,408	57,454	32,974	90,428
Income (loss) from operations	$ 46,361	$ (41,179)	5,182	$ 33,061	$ (18,735)	14,326
Corporate costs [2]			(33,080)			(32,201)
Depreciation and amortization			(5,418)			(3,215)
Loss before income taxes			$ (33,316)			$ (21,090)

[1] Research and development expenses and selling, general and administrative expenses exclude depreciation and amortization of finance leases.
[2] Corporate costs include unallocated selling, general and administrative expense and restructuring charges, interest income, and other income (expense), net.

	Year Ended December 31, 2021			Year Ended December 31, 2020		
	Performance Enzymes	Novel Biotherapeutics	Total	Performance Enzymes	Novel Biotherapeutics	Total
Revenues:						
Product revenue	$ 70,657	$ —	$ 70,657	$ 30,220	$ —	$ 30,220
Research and development revenue	19,858	14,239	34,097	17,886	20,950	38,836
Total revenues	90,515	14,239	104,754	48,106	20,950	69,056
Costs and operating expenses:						
Cost of product revenue	22,209	—	22,209	13,742	—	13,742
Research and development [1]	23,140	30,219	53,359	20,923	21,705	42,628
Selling, general and administrative [1]	12,105	2,755	14,860	9,597	2,355	11,952
Total segment costs and operating expenses	57,454	32,974	90,428	44,262	24,060	68,322
Income (loss) from operations	$ 33,061	$ (18,735)	14,326	$ 3,844	$ (3,110)	734
Corporate costs [2]			(32,201)			(22,306)
Depreciation and amortization			(3,215)			(2,099)
Loss before income taxes			$ (21,090)			$ (23,671)

[1] Research and development expenses and selling, general and administrative expenses exclude depreciation and amortization of finance leases.
[2] Corporate costs include unallocated selling, general and administrative expense, interest income, and other income (expense), net.

The following table provides stock-based compensation expense included in income (loss) from operations (in thousands):

	Year Ended December 31,		
	2022	2021	2020
Performance Enzymes	$ 6,035	$ 5,047	$ 3,296
Novel Biotherapeutics	903	1,100	768
Corporate cost	7,593	5,446	3,664
Total	$ 14,531	$ 11,593	$ 7,728

Significant Customers

Customers that each accounted for 10% or more of our total revenues were as follows:

	Percentage of Total Revenues For the Year Ended December 31,		
	2022	2021	2020
Customer A	56 %	33 %	*
Customer B	*	11 %	26 %
Customer C	*	*	19 %
Customer D	*	*	11 %

** Percentage was less than 10%*

Customers that each accounted for 10% or more of accounts receivable balances as of the periods presented are as follows:

	As of December 31,	
	2022	2021
Customer A	53 %	62 %
Customer D	10 %	*

** Percentage was less than 10%*

Geographical Information

Geographic revenues are identified by the location of the customer and consist of the following (in thousands):

	Year Ended December 31,		
	2022	2021	2020
Revenues			
Americas	$ 17,000	$ 23,481	$ 24,352
EMEA	56,540	20,187	19,257
APAC	65,050	61,086	25,447
Total revenues	$ 138,590	$ 104,754	$ 69,056

Identifiable long-lived assets by location was as follows (in thousands):

	December 31,	
	2022	2021
United States	$ 61,877	$ 65,457

Identifiable goodwill by reporting unit was as follows (in thousands):

	December 31, 2022			December 31, 2021		
	Performance Enzymes	Novel Biotherapeutics	Total	Performance Enzymes	Novel Biotherapeutics	Total
Goodwill	$ 2,463	$ 778	$ 3,241	$ 2,463	$ 778	$ 3,241

Note 16. Allowance for Credit Losses

The following table summarizes the financial assets allowance for credit losses (in thousands):

	December 31,		
	2022	2021	2020
Balance at beginning of period	$ 416	$ 74	$ 34
Provision for credit losses	54	342	40
Write-offs	(257)	—	—
Recoveries collected	(50)	—	—
Balance at end of period	$ 163	$ 416	$ 74

The following tables summarize accounts receivable by aging category (in thousands):

	December 31, 2022					
	Current	31-60 Days	61-90 Days	91 Days and Over	Total over 31 Days	Total Balance
Accounts receivable	$ 28,896	$ 1,747	$ 469	$ 792	$ 3,008	$ 31,904

	December 31, 2021					
	Current	31-60 Days	61-90 Days	91 Days and Over	Total over 31 Days	Total Balance
Accounts receivable	$ 22,697	$ 536	$ 569	$ 1,151	$ 2,256	$ 24,953

Note 17. Restructuring Charges

In November 2022, we announced a plan for a workforce reduction of approximaely 18% of our total employee to realign and optimize our workforce requirements in alignment with our refined corporate strategy.

During the year ended December 31, 2022, we recorded a restructuring charge of $3.2 million related to severance, bonus and other termination benefits in connection with the workforce reduction. As of December 31, 2022, we have accrued $1.2 million as a current liability within accrued compensation on our consolidated balance sheets and is expected to be paid in the first quarter of 2023. We do not expect to record any significant future charges related to the restructuring plan.

Note 18. Subsequent Events

On January 23, 2023, we announced the appointment of Sriram Ryali as our new Chief Financial Officer, effective immediately. In connection with Mr. Ryali's appointment as Chief Financial Officer, Ross Taylor ceased to serve as our Chief Financial Officer and principal financial and accounting officer, effective as of January 23, 2023. Mr. Taylor will provide transition and advisory services on an as-needed basis until March 6, 2023.

ITEM 9. CHANGES IN AND DISAGREEMENTS WITH ACCOUNTANTS ON ACCOUNTING AND FINANCIAL DISCLOSURES

None.

ITEM 9A. CONTROLS AND PROCEDURES

Evaluation of Disclosure Controls and Procedures

Our management, under the supervision of our Chief Executive Officer and Chief Financial Officer and with the participation of our disclosure committee, evaluated the effectiveness of the design and operation of our disclosure controls and procedures as of December 31, 2022. The term "disclosure controls and procedures," as defined in Rules 13a-15(e) and 15d-15(e) under the Exchange Act, means controls and other procedures of a company that are designed to ensure that information required to be disclosed by us in the reports that we file or submit under the Exchange Act is recorded, processed, summarized and reported within the time periods specified in the SEC's rules and forms. Disclosure controls and procedures include, without limitation, controls and procedures designed to ensure that information required to be disclosed by us in the reports that we file or submit under the Exchange Act is accumulated and communicated to our management, including our Chief Executive Officer and Chief Financial Officer, as appropriate, to allow timely decisions regarding required disclosure. Based on this evaluation, our Chief Executive Officer and Chief Financial Officer concluded that our disclosure controls and procedures were effective as of December 31, 2022 at the reasonable assurance level.

Remediation of Previously Reported Material Weakness

A material weakness in internal control over financial reporting was identified in the first quarter of 2022 related to management's controls over the revenue recognition process in the three months ended March 31, 2022. Specifically, our controls addressing the completeness and accuracy of reports used to calculate product revenue from arrangements subject to over time revenue recognition did not operate at the proper level of precision to identify material errors. The control deficiency resulted in a material misstatement of revenue related accounts in the three months ended March 31, 2022, which management corrected before the financial statements for the three months ended March 31, 2022 were issued

We implemented a detailed plan for the remediation of the material weakness identified in the first quarter of 2022, including an enhancement of management's review controls over revenue and the level of detail and precision applied when reviewing the completeness and accuracy of reports used to determine product revenue for arrangements subject to over time revenue recognition. We believe that our remediation efforts to enhance the controls surrounding product revenue for arrangements subject to over time revenue recognition are significant improvements to our processes and controls which address the material weakness. The remediation process was complete as of December 31, 2022, when our enhanced controls were operational for a sufficient period of time and tested, which enabled management to conclude that the enhanced controls related to revenue recognition are operating effectively.

Management's Report on Internal Control over Financial Reporting

Our management is responsible for establishing and maintaining adequate internal control over financial reporting, as such term is defined in Exchange Act Rules 13a-15(f) and 15d-15(f). Internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external reporting purposes in accordance with United States generally accepted accounting principles.

Under the supervision and with the participation of our management, including our Chief Executive Officer and Chief Financial Officer, we conducted an evaluation of the effectiveness of our internal control over financial reporting as of December 31, 2022 based on the guidelines established in *Internal Control-Integrated Framework* (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission ("COSO"). Based on the results of our evaluation, our management concluded that our internal control over financial reporting was effective as of December 31, 2022. We reviewed the results of management's assessment with our Audit Committee.

Our internal control over financial reporting as of December 31, 2022 has been audited by BDO USA, LLP, an independent registered public accounting firm, as stated in their report which is included in Item 8 of this Annual Report.

Inherent Limitations on Effectiveness of Controls

In designing and evaluating the disclosure controls and procedures, management recognizes that any controls and procedures, even if determined effective and no matter how well designed and operated, can provide only reasonable assurance of achieving the desired control objectives to prevent or detect misstatements. In addition, the design of disclosure controls and procedures must reflect the fact that there are resource constraints and that management is required to apply judgment in evaluating the benefits of possible controls and procedures relative to their costs. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

Changes in Internal Control over Financial Reporting

Other than as described above, there were no changes in our internal control over financial reporting (as defined in Rule 13a-15(f) of the Exchange Act) identified in connection with the evaluation required by paragraph (d) of Rule 13a-15 or 15d-15 of the Exchange Act, which occurred during the fourth fiscal quarter of the year ended December 31, 2022, which has materially affected, or is reasonably likely to materially affect, our internal control over financial reporting.

ITEM 9B. OTHER INFORMATION

Not applicable.

ITEM 9C. DISCLOSURE REGARDING FOREIGN JURISDICTIONS THAT PREVENT INSPECTIONS

Not applicable.

PART III

ITEM 10. DIRECTORS, EXECUTIVE OFFICERS AND CORPORATE GOVERNANCE

We have adopted a code of conduct applicable to our principal executive, financial and accounting officers and all persons performing similar functions. A copy of our code of ethics is available on our principal corporate website at www.codexis.com in the Investors section under "Corporate Governance."

The information required by this item concerning our directors, executive officers, compliance with Section 16 of the Exchange Act, our code of ethics and our Nominating and Corporate Governance Committee, and our Audit Committee is incorporated by reference from the information that will be set forth in the sections under the headings "Election of Directors," "Other Matters—Section 16(a) Beneficial Ownership Reporting Compliance" and "Corporate Governance Matters" in the 2023 Proxy Statement.

ITEM 11. EXECUTIVE COMPENSATION

The information required by this item concerning executive compensation and our Compensation Committee is incorporated by reference from the information that will be set forth in the 2023 Proxy Statement under the headings "Executive Compensation," and "Corporate Governance Matters."

ITEM 12. SECURITY OWNERSHIP OF CERTAIN BENEFICIAL OWNERS AND MANAGEMENT AND RELATED STOCKHOLDER MATTERS

The information required by this item concerning securities authorized for issuance under equity compensation plans and security ownership of certain beneficial owners and management is incorporated by reference from the information that will be set forth in the 2023 Proxy Statement under the headings "Executive Compensation—Equity Compensation Plan Information" and "Information Concerning Voting and Solicitation—Security Ownership of Certain Beneficial Owners and Management."

ITEM 13. CERTAIN RELATIONSHIPS AND RELATED TRANSACTIONS,

AND DIRECTOR INDEPENDENCE

The information required by this item concerning transactions with related persons and director independence is incorporated by reference from the information that will be set forth in the 2023 Proxy Statement under the headings "Certain Relationships and Related Transactions" and "Corporate Governance Matters."

ITEM 14. PRINCIPAL ACCOUNTING FEES AND SERVICES

The information required by this item is incorporated by reference from the information that will be set forth in the 2023 Proxy Statement under the heading "Ratification of Independent Registered Public Accounting Firm—Principal Accounting Fees and Services."

PART IV

ITEM 15. EXHIBITS AND FINANCIAL STATEMENT SCHEDULES

1. Financial Statements: See "Index to Consolidated Financial Statements" in Part II, Item 8 of this Annual Report on Form 10-K

2. Exhibits: The exhibits listed in the accompanying index to exhibits are filed or incorporated by reference as part of this Annual Report on Form 10-K.

EXHIBIT INDEX

Exhibit No.	Description
3.1	Amended and Restated Certificate of Incorporation of Codexis, Inc. filed with the Secretary of the State of the State of Delaware on April 27, 2010 and effective as of April 27, 2010 (incorporated by reference to Exhibit 3.1 to the Company's Quarterly Report on Form 10-Q for the quarter ended March 31, 2010, filed on May 28, 2010).
3.2	Certificate of Designations of Series A Junior Participating Preferred Stock of Codexis, Inc., filed with the Secretary of State of the State of Delaware on September 4, 2012 (incorporated by reference to Exhibit 3.1 to the Company's Current Report on Form 8-K, filed on September 4, 2012).
3.3	Amended and Restated Bylaws of Codexis, Inc. effective as of April 27, 2010 (incorporated by reference to Exhibit 3.2 to the Company's Quarterly Report on Form 10-Q for the quarter ended March 31, 2010, filed on May 28, 2010).
4.1	Reference is made to Exhibits 3.1 through 3.3.
4.2	Form of the Company's Common Stock Certificate (incorporated by reference to Exhibit 4.1 to the Company's Quarterly Report on Form 10-Q for the quarter ended June 30, 2012, filed on August 9, 2012).
4.3	Description of Codexis' Securities Registered Pursuant to Section 12 of the Securities Exchange Act of 1934(incorporated by reference to Exhibit 4.3 to the Company's Annual Report on Form 10-K for the year ended December 31, 2022, filed on February 28, 2022).
10.1A*	Lease Agreement by and between the Company and Metropolitan Life Insurance Company dated as of February 1, 2004.
10.1B*	Amendment to Lease Agreement by and between the Company and Metropolitan Life Insurance Company dated as of June 1, 2004.
10.1C*	Amendment to Lease Agreement by and between the Company and Metropolitan Life Insurance Company dated as of March 9, 2007.
10.1D*	Amendment to Lease Agreement by and between the Company and Metropolitan Life Insurance Company dated as of March 31, 2008.
10.1E	Fourth Amendment to Lease Agreement by and between the Company and Metropolitan Life Insurance Company dated as of September 17, 2010 (incorporated by reference to Exhibit 10.1 to the Company's Quarterly Report on Form 10-Q for the quarter ended September 30, 2010, filed on November 4, 2010).
10.1F	Fifth Amendment to Lease Agreement by and between the Company and Metropolitan Life Insurance Company dated as of March 16, 2011 (incorporated by reference to Exhibit 10.1 to the Company's Quarterly Report on Form 10-Q for the quarter ended March 31, 2011, filed on May 6, 2011).
10.1G	Sixth Amendment to Lease by and between the Company and Metropolitan Life Insurance Company dated as of September 27, 2012 (incorporated by reference to Exhibit 10.6 to the Company's Quarterly Report on Form 10-Q for the quarter ended September 30, 2012, filed on November 7, 2012).
10.1H	Seventh Amendment to Lease by and between the Company and Metropolitan Life Insurance Company dated as of October 11, 2016 (incorporated by reference to Exhibit 10.3 to the Company's Quarterly Report on Form 10-Q for the quarter ended September 30, 2016, filed on November 8, 2016).
10.1I***	Eighth Amendment to Lease, dated as of February 8, 2019, by and between the Company and Metropolitan Life Insurance Company (incorporated by reference to Exhibit 10.3 to the Company's Quarterly Report on Form 10-Q for the quarter ended March 31, 2019, filed on May 8, 2019).
10.2+*	Codexis, Inc. 2010 Equity Incentive Award Plan and Form of Stock Option Agreement.

Exhibit No.	Description
10.3A+	Codexis, Inc. 2019 Incentive Award Plan (incorporated by reference to Exhibit 99.1 to the Company's Registration Statement on Form S-8 (File No. 333-232262) filed with the SEC on June 21, 2019).
10.3B+	Form of Restricted Stock Unit Award Grant Notice and Restricted Stock Unit Award Agreement under 2019 Incentive Award Plan (incorporated by reference to Exhibit 99.2 to the Company's Registration Statement on Form S-8 (File No. 333-232262) filed with the SEC on June 21, 2019).
10.3C+	Form of Stock Option Grant Notice and Stock Option Agreement under 2019 Incentive Award Plan (incorporated by reference to Exhibit 99.3 to the Company's Registration Statement on Form S-8 (File No. 333-232262) filed with the SEC on June 21, 2019).
10.3D+	Form of Stock Option Grant Notice and Stock Option Agreement under 2019 Incentive Award Plan (incorporated by reference to Exhibit 99.4 to the Company's Registration Statement on Form S-8 (File No. 333-232262) filed with the SEC on June 21, 2019).
10.3E+	Form of Performance Stock Unit Award Grant Notice and Performance Stock Unit Award Agreement under 2019 Incentive Award Plan (incorporated by reference to Exhibit 99.5 to the Company's Registration Statement on Form S-8 (File No. 333-232262) filed with the SEC on June 21, 2019).
10.3F+	Form of Restricted Stock Award Grant Notice and Restricted Stock Award Agreement under 2019 Incentive Award Plan (incorporated by reference to Exhibit 99.6 to the Company's Registration Statement on Form S-8 (File No. 333-232262) filed with the SEC on June 21, 2019).
10.3G+	Codexis, Inc. 2022 Employment Inducement Award Plan (incorporated by reference to Exhibit 99.1 to the Company's Registration Statement on Form S-8 (File No. 333-269163) filed with the SEC on January 9, 2023).
10.3H+	Form of Stock Option Grant Notice and Stock Option Agreement under the 2022 Employment Inducement Award Plan (incorporated by reference to Exhibit 99.2 to the Company's Registration Statement on Form S-8 (File No. 333-269163) filed with the SEC on January 9, 2023).
10.3I+	Form of Restricted Stock Unit Award Grant Notice and Restricted Stock Unit Award Agreement under the 2022 Employment Inducement Award Plan (incorporated by reference to Exhibit 99.3 to the Company's Registration Statement on Form S-8 (File No. 333-269163) filed with the SEC on January 9, 2023).
10.4	Form of Indemnification Agreement between the Company and each of its directors, officers and certain employees.
10.5+	Form of Amended and Restated Change in Control Severance Agreement between the Company and certain of its officers (incorporated by reference to Exhibit 10.2 to the Company's Quarterly Report on Form 10-Q for the quarter ended September 30, 2019, filed on November 6, 2019).
10.6	Asset Purchase Agreement, dated October 28, 2010, by and among the Company, Codexis Mayflower Holdings, LLC and Maxygen, Inc. (incorporated by reference to Exhibit 2.1 to the Company's Current Report on Form 8-K, filed on October 28, 2010).
10.7A†	Manufacture and Supply Agreement, dated May 16, 2011, by and between the Company and Lactosan GmbH & Co. KG (incorporated by reference to Exhibit 10.1 to the Company's Quarterly Report on Form 10-Q for the quarter ended June 30, 2011, filed on August 3, 2011).
10.7B	Amendment No. 1 to the Manufacture and Supply Agreement by and between the Company and Lactosan GmbH & Co. KG dated as of March 9, 2012 (incorporated by reference to Exhibit 10.1 to the Company's Quarterly Report on Form 10-Q for the quarter ended March 31, 2012, filed on May 10, 2012).
10.8A+	Employment Agreement by and between the Company and Ross Taylor effective as of August 4, 2019(incorporated by reference to Exhibit 10.3 to the Company's Quarterly Report on Form 10-Q for the quarter ended September 30, 2019, filed on November 6, 2019).
10.8B+	Transition and Separation Agreement by and between the Company and Ross Taylor, dated as of February 3, 2023

Exhibit No.	Description
10.9A+	Employment Agreement by and between the Company and John Nicols effective as of May 28, 2012 (incorporated by reference to Exhibit 10.2 to the Company's Quarterly Report on Form 10-Q for the quarter ended June 30, 2012, filed on August 9, 2012).
10.9B+	John Nicols Stock Option Grant Notice and Stock Option Agreement dated June 13, 2012 between John J. Nicols and the Company (incorporated by reference to Exhibit 10.3 to the Company's Quarterly Report on Form 10-Q for the quarter ended June 30, 2012, filed on August 9, 2012).
10.9C+	Amendment to Employment Agreement between the Company and John Nicols, dated April 21, 2016 (incorporated by reference to Exhibit 10.1 to the Company's Quarterly Report on Form 10-Q for the quarter ended June 30, 2016, filed on August 9, 2016).
10.9D+	Amendment to Employment Agreement between the Company and John Nicols, dated November 16, 2017 (incorporated by reference to Exhibit 10.8E to the Company's Annual Report on Form 10-K for the year ended December 31, 2017, filed on March 15, 2018).
10.9E+	Amendment to Employment Agreement between the Company and John Nicols, effective as of June 28, 2019(incorporated by reference to Exhibit 10.4 to the Company's Quarterly Report on Form 10-Q for the quarter ended September 30, 2019, filed on November 6, 2019).
10.9F+	Transition and Separation Agreement by and between the Company and John Nicols, dated as of July 18, 2022 (incorporated by reference to Exhibit 10.1 to the Company's Quarterly Report on Form 10-Q for the quarter ended September 30, 2022, filed on November 4, 2022).
10.10A†	Sitagliptin Catalyst Supply Agreement by and between Merck Sharp and Dohme Corp. and the Company dated as of February 1, 2012 (incorporated by reference to Exhibit 10.25 to the Company's Annual Report on Form 10-K for the year ended December 31, 2012, filed on April 2, 2013).
10.10B†	Amendment to Sitagliptin Catalyst Supply Agreement between Merck Sharp and Dohme Corp. and the Company dated as of October 1, 2013 (incorporated by reference to Exhibit 10.2 to the Company's Quarterly Report on Form 10-Q for the quarter ended September 30, 2013, filed on November 12, 2013).
10.10C	Amendment No. 2 to Sitagliptin Catalyst Supply Agreement between Merck Sharp and Dohme Corp. and the Company dated as of February 25, 2015 (incorporated by reference to Exhibit 10.1 to the Company's Quarterly Report on Form 10-Q for the quarter ended March 31, 2015, filed on May 7, 2015).
10.10D	Amendment No. 3 to Sitagliptin Catalysts Supply Agreement between Merck Sharp and Dohme Corp. and the Company dated as of December 17, 2015 (incorporated by reference to Exhibit 10.11D to the Company's Annual Report on Form 10-K for the year ended December 31, 2015, filed on March 8, 2016).
10.10E	Amendment No. 4 to Sitagliptin Catalysts Supply Agreement, effective as of January 1, 2016, by and between the Company and Merck Sharp and Dohme Corp. (incorporated by reference to Exhibit 10.1 to the Company's Quarterly Report on Form 10-Q for the quarter ended September 30, 2016, filed on November 8, 2016).
10.10F	Amendment No. 5 to Sitagliptin Catalysts Supply Agreement, effective as of July 1, 2021, by and between the Company and Merck Sharp and Dohme Corp. (incorporated by reference to Exhibit 10.1 to the Company's Quarterly Report on Form 10-Q for the quarter ended September 30, 2021, filed on November 5, 2021).
10.11A†	Global Development, Option and License Agreement by and among the Company,Societé des Produits Nestlé S.A., formerly known as Nestec Ltd. ("Nestlé Health Science"), effective as of October 12, 2017 (incorporated by reference to Exhibit 10.10 to the Company's Annual Report on Form 10-K for the year ended December 31, 2017, filed on March 15, 2018).
10.11B†	Amendment No. 1 to Global Development, Option and License Agreement by and among the Company, Nestec Ltd. and Nestlé Amendment No. 1 to Global Development, Option and License Agreement by and among the Company, Nestec Ltd. and Nestlé Health Science S.A., effective as of July 26, 2018 (incorporated by reference to Exhibit 10.12B to the Company's Annual Report on Form 10-K for the year ended December 31, 2018, filed on March 3, 2019).

Exhibit No.	Description
10.11C†	Letter Agreement to Global Development, Option and License Agreement by and among the Company, Nestec Ltd. and Nestlé Health Science S.A., effective as of December 12, 2018. (incorporated by reference to Exhibit 10.12C to the Company's Annual Report on Form 10-K for the year ended December 31, 2018, filed on March 3, 2019).
10.12A†	Platform Technology Transfer, Collaboration and License Agreement by and between the Company and GlaxoSmithKline Intellectual Property Limited, effective as of July 10, 2014 (incorporated by reference to Exhibit 10.1 to the Company's Quarterly Report on Form 10-Q for the quarter ended September 31, 2014, filed on November 6, 2014).
10.12B†	Letter Agreement, effective as of February 21, 2020, by and between Codexis, Inc. and GlaxoSmithKline Intellectual Property Development Limited (incorporated by reference to Exhibit 10.2 to the Company's Quarterly Report on Form 10-Q for the quarter ended March 31, 2020, filed on May 8, 2020).
10.13A***	Platform Technology Transfer and License Agreement by and between the Company and Merck Sharp & Dohme Corp., dated as of August 3, 2015 (incorporated by reference to Exhibit 10.13A to the Company's Annual Report on Form 10-K for the year ended December 31, 2021, filed on February 28, 2022).
10.13B†	Amendment No. 1 to Platform Technology Transfer and License Agreement by and between the Company and Merck Sharp & Dohme Corp., dated as of October 10, 2018 (incorporated by reference to Exhibit 10.14A to the Company's Annual Report on Form 10-K for the year ended December 31, 2018, filed on March 3, 2019).
10.13C***	Amendment No. 2 to Platform Technology Transfer and License Agreement by and between Merck and the Company dated as of January 1, 2019 (incorporated by reference to Exhibit 10.1 to the Company's Quarterly Report on Form 10-Q for the quarter ended March 31, 2019, filed on May 8, 2019).
10.14***	Platform Technology Transfer and License Agreement, dated May 2, 2019, by and between the Company and Novartis Pharma AG (incorporated by reference to Exhibit 10.4 to the Company's Quarterly Report on Form 10-Q for the quarter ended June 30, 2019, filed on August 6, 2019).
10.15***	Strategic Collaboration and License Agreement by and between Shire Human Genetic Therapies, Inc., a wholly-owned subsidiary of Takeda Pharmaceutical Company Limited and the Company, dated March 23, 2020 (incorporated by reference to Exhibit 10.1 to the Company's Quarterly Report on Form 10-Q for the quarter ended March 31, 2020, filed on May 8, 2020).
10.16A†	Loan and Security Agreement effective as of June 30, 2017 by and between the Company and Western Alliance Bank (incorporated by reference to Exhibit 10.1 to the Company's Quarterly Report on Form 10-Q for the quarter ended June 30, 2017, filed on August 9, 2017).
10.16B†	First Amendment to Loan and Security Agreement effective as of September 28, 2017 by and between the Company and Western Alliance Bank (incorporated by reference to Exhibit 10.1 to the Company's Quarterly Report on Form 10-Q for the quarter ended September 30, 2017, filed on November 9, 2017).
10.16C†	Second Amendment to Loan and Security Agreement effective as of November 7, 2017 by and between the Company and Western Alliance Bank (incorporated by reference to Exhibit 10.15B to the Company's Annual Report on Form 10-K for the year ended December 31, 2017, filed on March 15, 2018).
10.16D†	Third Amendment to Loan and Security Agreement by and between the Company and Western Alliance Bank dated as of June 29, 2018 (incorporated by reference to Exhibit 10.1 to the Company's Quarterly Report on Form 10-Q for the quarter ended June 30, 2018, filed on August 9, 2018).
10.16E†	Fourth Amendment to Loan and Security Agreement effective as of September 28, 2018 by and between the Company and Western Alliance Bank (incorporated by reference to Exhibit 10.1 to the Company's Quarterly Report on Form 10-Q for the quarter ended September 30, 2018, filed on November 9, 2018).
10.16F	Fifth Amendment to Loan and Security Agreement effective as of January 23, 2019 by and between the Company and Western Alliance Bank (incorporated by reference to Exhibit 10.2 to the Company's Quarterly Report on Form 10-Q for the quarter ended March 31, 2019, filed on May 8, 2019).

Exhibit No.	Description
10.16G	Sixth Amendment to Loan and Security Agreement by and between the Company and Western Alliance Bank dated as of July 11, 2019 (incorporated by reference to Exhibit 10.1A to the Company's Quarterly Report on Form 10-Q for the quarter ended September 30, 2019, filed on November 6, 2019).
10.16H	Seventh Amendment to Loan and Security Agreement by and between the Company and Western Alliance Bank dated as of September 30, 2019 (incorporated by reference to Exhibit 10.1B to the Company's Quarterly Report on Form 10-Q for the quarter ended September 30, 2019, filed on November 6, 2019).
10.16I	Eighth Amendment to Loan and Security Agreement by and between the Company and Western Alliance Bank dated as of September 30, 2020 (incorporated by reference to Exhibit 10.1 to the Company's Quarterly Report on Form 10-Q for the quarter ended September 30, 2020, filed on November 6, 2020.)
10.16J	Ninth Amendment to Loan and Security Agreement by and between the Company and Western Alliance Bank dated as of September 30, 2021 (incorporated by reference to Exhibit 10.2 to the Company's Quarterly Report on Form 10-Q for the quarter ended September 30, 2021, filed on November 5, 2021).
10.17	Lease Agreement by and between the Company and ARE-SAN FRANCISCO NO. 63, LLC dated as of January 29, 2021 (incorporated by reference to Exhibit 10.1 to the Company's Quarterly Report on Form 10-Q for the quarter ended March 31, 2021, filed on May 7, 2021).
10.18***	Platform Technology Transfer, Collaboration and License Agreement by and between the Company and GlaxoSmithKline Intellectual Property Limited, effective as of July 10, 2014 (incorporated by reference to Exhibit 10.1 to the Company's Quarterly Report on Form 10-Q for the quarter ended June 30, 2022, filed on August 5, 2022).
10.19A***	Enzyme Supply Agreement by and between the Company and Pfizer Ireland Pharmaceuticals, dated as of July 14, 2022.
10.19B	Amendment No. 1 to the Enzyme Supply Agreement by and between the Company and Pfizer Ireland Pharmaceuticals, effective as of December 19, 2022.
10.19C	Amendment No. 2 to the Enzyme Supply Agreement by and between the Company and Pfizer Ireland Pharmaceuticals, effective as of February 1, 2023.
10.20+	Employment Agreement by and between the Company and Stephen Dilly dated as of August 9, 2022 (incorporated by reference to Exhibit 10.2 to the Company's Quarterly Report on Form 10-Q for the quarter ended September 30, 2022, filed on November 4, 2022).
10.21A+	Offer Letter by and between the Company and Kevin Norrett dated as of September 12, 2022 (incorporated by reference to Exhibit 10.3 to the Company's Quarterly Report on Form 10-Q for the quarter ended September 30, 2022, filed on November 4, 2022).
10.21B+	Change in Control Severance Agreement by and between the Company and Kevin Norrett dated September 12, 2022 (incorporated by reference to Exhibit 10.4 to the Company's Quarterly Report on Form 10-Q for the quarter ended September 30, 2022, filed on November 4, 2022).
10.22A+	Offer Letter by and between the Company and Margaret Fitzgerald dated as of October 5, 2022.
10.22B+	Change in Control Severance Agreement by and between the Company and Margaret Fitzgerald dated October 10, 2022.
10.23A+	Offer Letter by and between the Company and Sriram Ryali dated as of December 30, 2023.
10.23B+	Change in Control Severance Agreement by and between the Company and Sriram Ryali dated January 27, 2023
23.1	Consent of BDO USA, LLP, independent registered public accounting firm.
24.1	Power of Attorney (see signature page to this Annual Report on Form 10-K).

Exhibit No.	Description
31.1	Certification of Principal Executive Officer Required Under Rule 13a-14(a) and 15d-14(a) of the Securities Exchange Act of 1934, as amended.
31.2	Certification of Principal Financial Officer Required Under Rule 13a-14(a) and 15d-14(a) of the Securities Exchange Act of 1934, as amended.
32.1**	Certification of Principal Executive Officer and Principal Financial Officer Required Under Rule 13a-14(b) of the Securities Exchange Act of 1934, as amended, and 18 U.S.C. §1350.
101	The following materials from Registrant's Annual Report on Form 10-K for the fiscal year ended December 31, 2022 formatted in Inline Extensible Business Reporting Language (iXBRL) includes: (i) Consolidated Balance Sheets at December 31, 2022 and December 31, 2021, (ii) Consolidated Statements of Operations for the years ended December 31, 2022, December 31, 2021 and December 31, 2020, (iii) Consolidated Statements of Cash Flows for the years ended December 31, 2022, December 31, 2021 and December 31, 2020, (vi) Consolidated Statements of Stockholders' Equity for the years ended December 31, 2022, December 31, 2021 and December 31, 2020 and (vii) Notes to Consolidated Financial Statements.
101.SCH	Inline XBRL Taxonomy Extension Schema Document
101.CAL	Inline XBRL Taxonomy Extension Calculation Linkbase Document
101.DEF	Inline XBRL Taxonomy Extension Definition Linkbase Document
101.LAB	Inline XBRL Taxonomy Extension Label Linkbase Document
101.PRE	Inline XBRL Taxonomy Extension Presentation Linkbase Document
104	The cover page from the Company's Annual Report on Form 10-K for the fiscal year ended December 31, 2022, formatted in Inline XBRL and contained in Exhibit 101.

+ Indicates a management contract or compensatory plan or arrangement.

† Confidential treatment has been granted for certain information contained in this exhibit. Such information has been omitted and filed separately with the Securities and Exchange Commission.

* Filed as exhibits to the registrant's Registration Statement on Form S-1 (File No. 333-164044), effective April 21, 2010, and incorporated herein by reference.

** Pursuant to Item 601(b)(32) of Regulation S-K this exhibit is furnished rather than filed with this report.

*** Portions of the exhibit, marked by brackets, have been omitted because the omitted information is (i) not material and (ii) would be competitively harmful if publicly disclosed.

ITEM 16. FORM 10-K SUMMARY

Not applicable.

SIGNATURES

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

CODEXIS, INC.

Date: February 27, 2023

By: /s/ Stephen Dilly
President and Chief Executive Officer
(Principal Executive Officer)

POWER OF ATTORNEY

Each person whose individual signature appears below hereby authorizes and appoints Stephen Dilly, Sriram Ryali and Margaret Fitzgerald, and each of them, with full power of substitution and resubstitution and full power to act without the other, as his or her true and lawful attorney-in-fact and agent to act in his or her name, place and stead and to execute in the name and on behalf of each person, individually and in each capacity stated below, and to file any and all amendments to this annual report on Form 10-K and to file the same, with all exhibits thereto, and other documents in connection therewith, with the Securities and Exchange Commission, granting unto said attorneys-in-fact and agents, and each of them, full power and authority to do and perform each and every act and thing, ratifying and confirming all that said attorneys-in-fact and agents or any of them or their or his substitute or substitutes may lawfully do or cause to be done by virtue thereof.

Pursuant to the requirements of the Securities 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 indicated.

SIGNATURE	TITLE		DATE
/s/ Stephen Dilly Stephen Dilly	President, Chief Executive Officer and Director (Principal Executive Officer)	Date:	February 27, 2023
/s/ Sriram Ryali Sriram Ryali	Chief Financial Officer (Principal Financial and Accounting Officer)	Date:	February 27, 2023
/s/ Byron L. Dorgan Byron L. Dorgan	Chairman of the Board of Directors	Date:	February 27, 2023
/s/ Jennifer Aaker Jennifer Aaker	Director	Date:	February 27, 2023
/s/ Esther Martinborough Esther Martinborough	Director	Date:	February 27, 2023
/s/ Alison Moore Alison Moore	Director	Date:	February 27, 2023
/s/ John J. Nicols John J. Nicols	Director	Date:	February 27, 2023
/s/ H. Stewart Parker H. Stewart Parker	Director	Date:	February 27, 2023
/s/ Rahul Singhvi Rahul Singhvi	Director	Date:	February 27, 2023
/s/ David V. Smith David V. Smith	Director	Date:	February 27, 2023
/s/ Dennis P. Wolf Dennis P. Wolf	Director	Date:	February 27, 2023
/s/ Patrick Y. Yang Patrick Y. Yang	Director	Date:	February 27, 2023

CODEXIS, INC.

INDEMNIFICATION AGREEMENT

This Indemnification Agreement ("*Agreement*") is effective as of December 16, 2022, by and between Codexis, Inc., a Delaware corporation (the "*Company*"), and [INDEMNITEE] ("*Indemnitee*").

A. The Company recognizes the continued difficulty in obtaining liability insurance for its directors, officers, employees, controlling persons, fiduciaries and other agents and affiliates, the significant increases in the cost of such insurance and the general reductions in the coverage of such insurance.

B. The Company further recognizes the substantial increase in corporate litigation in general, subjecting directors, officers, employees, controlling persons, fiduciaries and other agents and affiliates to expensive litigation risks at the same time as the availability and coverage of liability insurance has been severely limited.

C. The current protection available to directors, officers, employees, controlling persons, fiduciaries and other agents and affiliates of the Company may not be adequate under the present circumstances, and directors, officers, employees, controlling persons, fiduciaries and other agents and affiliates of the Company (or persons who may be alleged or deemed to be the same), including the Indemnitee, may not be willing to continue to serve or be associated with the Company in such capacities without additional protection.

D. The Company (a) desires to attract and retain the involvement of highly qualified persons, such as Indemnitee, to serve and be associated with the Company, and (b) accordingly, wishes to provide for the indemnification and advancement of expenses to the Indemnitee to the maximum extent permitted by law.

E. In view of the considerations set forth above, the Company desires that Indemnitee shall be indemnified and advanced expenses by the Company as set forth herein.

In consideration of the mutual promises and covenants contained herein, the receipt and sufficiency of which are hereby acknowledged, the parties hereto agree as follows:

1. CERTAIN DEFINITIONS.

(a) "*Change in Control*" shall be deemed to have occurred if, on or after the date of this Agreement, (i) any "person" (as such term is used in Sections 13(d) and 14(d) of the Securities Exchange Act of 1934, as amended), other than a trustee or other fiduciary holding securities under an employee benefit plan of the Company acting in such capacity or a corporation owned directly or indirectly by the stockholders of the Company in substantially the same proportions as their ownership of stock of the Company, becomes the "beneficial owner" (as defined in Rule 13d-3 under said Act), directly or indirectly, of securities of the Company representing more than 50% of the total voting power represented by the Company's then outstanding Voting Securities (as defined below), (ii) during any period of two (2) consecutive years, individuals who at the beginning of such period constitute the Board of Directors of the Company and any new director whose election by the Board of Directors or nomination for election by the Company's stockholders was approved by a vote of at least two thirds (2/3) of the directors then still in office who either were directors at the beginning of the period or whose election or nomination for election was previously so approved, cease for any reason to constitute a majority thereof, or (iii) the stockholders of the Company approve a merger

or consolidation of the Company with any other corporation other than a merger or consolidation which would result in the Voting Securities of the Company outstanding immediately prior thereto continuing to represent (either by remaining outstanding or by being converted into Voting Securities of the surviving entity) at least 80% of the total voting power represented by the Voting Securities of the Company or such surviving entity outstanding immediately after such merger or consolidation, or (iv) the stockholders of the Company approve a plan of complete liquidation of the Company or an agreement for the sale or disposition by the Company of (in one transaction or a series of related transactions) all or substantially all of the Company's assets.

(b) "*Claim*" shall mean with respect to a Covered Event (as defined below): any threatened, asserted, pending or completed action, suit, proceeding or alternative dispute resolution mechanism, or any hearing, inquiry or investigation that Indemnitee in good faith believes might lead to the institution of any such action, suit, proceeding or alternative dispute resolution mechanism, whether civil, criminal, administrative, investigative or other.

(c) References to the "*Company*" shall include, in addition to Codexis, Inc., any constituent corporation (including any constituent of a constituent) absorbed in a consolidation or merger to which Codexis, Inc. (or any of its wholly owned subsidiaries) is a party, which, if its separate existence had continued, would have had power and authority to indemnify its directors, officers, employees, agents or fiduciaries, so that if Indemnitee is or was a director, officer, employee, agent or fiduciary of such constituent corporation, or is or was serving at the request of such constituent corporation as a director, officer, employee, agent or fiduciary of another corporation, partnership, joint venture, employee benefit plan, trust or other enterprise, Indemnitee shall stand in the same position under the provisions of this Agreement with respect to the resulting or surviving corporation as Indemnitee would have with respect to such constituent corporation if its separate existence had continued.

(d) "*Covered Event*" shall mean any event or occurrence related to the fact that Indemnitee is or was a director, officer, employee, agent or fiduciary of the Company, or any subsidiary, direct or indirect, of the Company, or is or was serving at the request of the Company as a director, officer, employee, agent or fiduciary of another corporation, partnership, joint venture, trust or other enterprise, or by reason of any action or inaction on the part of Indemnitee while serving in such capacity.

(e) "*Expenses*" shall mean any and all direct and indirect costs, losses, claims, damages, fees, expenses, and liabilities, joint or several (including attorneys' fees and all other costs, expenses and obligations incurred in connection with investigating, defending, being a witness in or participating in (including on appeal), or preparing to defend, to be a witness in or to participate in, any action, suit, proceeding, alternative dispute resolution mechanism, hearing, inquiry or investigation), judgments, fines, penalties and amounts paid in settlement (if such settlement is approved in advance by the Company, which approval shall not be unreasonably withheld) actually and reasonably incurred, of any Claim and any federal, state, local or foreign taxes imposed on the Indemnitee as a result of the actual or deemed receipt of any payments under this Agreement.

(f) "*Expense Advance*" shall mean a payment to Indemnitee pursuant to Section 3 of Expenses in advance of the settlement of or final judgement in any action, suit, proceeding or alternative dispute resolution mechanism, hearing, inquiry or investigation, which constitutes a Claim.

(g) "*Independent Legal Counsel*" shall mean an attorney or firm of attorneys, selected in accordance with the provisions of Section 2(d) hereof, who shall not have otherwise performed services for the Company or Indemnitee within the last three (3) years (other than

with respect to matters concerning the rights of Indemnitee under this Agreement, or of other indemnitees under similar indemnity agreements).

(h) References to "*other enterprises*" shall include employee benefit plans; references to "*fines*" shall include any excise taxes assessed on Indemnitee with respect to an employee benefit plan; and references to "*serving at the request of the Company*" shall include any service as a director, officer, employee, agent or fiduciary of the Company which imposes duties on, or involves services by, such director, officer, employee, agent or fiduciary with respect to an employee benefit plan, its participants or its beneficiaries; and if Indemnitee acted in good faith and in a manner Indemnitee reasonably believed to be in the interest of the participants and beneficiaries of an employee benefit plan, Indemnitee shall be deemed to have acted in a manner "*not opposed to the best interests of the Company*" as referred to in this Agreement.

(i) "*Reviewing Party*" shall mean, subject to the provisions of Section 2(d), any person or body appointed by the Board of Directors in accordance with applicable law to review the Company's obligations hereunder and under applicable law, which may include a member or members of the Company's Board of Directors, Independent Legal Counsel or any other person or body not a party to the particular Claim for which Indemnitee is seeking indemnification, exoneration or hold harmless rights.

(j) "*Section*" refers to a section of this Agreement unless otherwise indicated.

(k) "*Voting Securities*" shall mean any securities of the Company that vote generally in the election of directors.

2. INDEMNIFICATION**.**

(a) Indemnification of Expenses. Subject to the provisions of Section 2(b) below, the Company shall indemnify, exonerate or hold harmless Indemnitee for Expenses to the fullest extent permitted by law if Indemnitee was or is or becomes a party to or witness or other participant in, or is threatened to be made a party to or witness or other participant in, any Claim (whether by reason of or arising in part out of a Covered Event), including all interest, assessments and other charges incurred in connection with or in respect of such Expenses.

(b) Review of Indemnification Obligations. Notwithstanding the foregoing, in the event any Reviewing Party shall have determined (in a written opinion, in any case in which Independent Legal Counsel is the Reviewing Party) that Indemnitee is not entitled to be indemnified, exonerated or held harmless hereunder under applicable law, (i) the Company shall have no further obligation under Section 2(a) to make any payments to Indemnitee not made prior to such determination by such Reviewing Party and (ii) the Company shall be entitled to be reimbursed by Indemnitee (who hereby agrees to reimburse the Company) for all Expenses theretofore paid in indemnifying, exonerating or holding harmless Indemnitee (within thirty (30) days after such determination); provided, however, that if Indemnitee has commenced or thereafter commences legal proceedings in a court of competent jurisdiction to secure a determination that Indemnitee is entitled to be indemnified, exonerated or held harmless hereunder under applicable law, any determination made by any Reviewing Party that Indemnitee is not entitled to be indemnified hereunder under applicable law shall not be binding and Indemnitee shall not be required to reimburse the Company for any Expenses theretofore paid in indemnifying, exonerating or holding harmless Indemnitee until a final judicial determination is made with respect thereto (as to which all rights of appeal therefrom have been exhausted or lapsed). Indemnitee's obligation to reimburse the Company for any Expenses shall be unsecured and no interest shall be charged thereon.

(c) Indemnitee Rights on Unfavorable Determination; Binding Effect. If any Reviewing Party determines that Indemnitee substantively is not entitled to be indemnified, exonerated or held harmless hereunder in whole or in part under applicable law, Indemnitee shall have the right to commence litigation seeking an initial determination by the court or challenging any such determination by such Reviewing Party or any aspect thereof, including the legal or factual bases therefor, and, subject to the provisions of Section 15, the Company hereby consents to service of process and to appear in any such proceeding. Absent such litigation, any determination by any Reviewing Party shall be conclusive and binding on the Company and Indemnitee.

(d) Selection of Reviewing Party; Change in Control. If there has not been a Change in Control, any Reviewing Party shall be selected by the Board of Directors, and if there has been such a Change in Control (other than a Change in Control which has been approved by a majority of the Company's Board of Directors who were directors immediately prior to such Change in Control), any Reviewing Party with respect to all matters thereafter arising concerning Indemnitee's indemnification, exoneration or hold harmless rights for Expenses under this Agreement or any other agreement or under the Company's Certificate of Incorporation or bylaws as now or hereafter in effect, or under any other applicable law, if desired by Indemnitee, shall be Independent Legal Counsel selected by the Indemnitee and approved by Company (which approval shall not be unreasonably withheld). Such counsel, among other things, shall render its written opinion to the Company and Indemnitee as to whether and to what extent Indemnitee would be entitled to be indemnified, exonerated or held harmless hereunder under applicable law and the Company agrees to abide by such opinion. The Company agrees to pay the reasonable fees of the Independent Legal Counsel referred to above and to fully indemnify, exonerate and hold harmless such counsel against any and all expenses (including attorneys' fees), claims, liabilities and damages arising out of or relating to this Agreement or its engagement pursuant hereto. Notwithstanding any other provision of this Agreement, the Company shall not be required to pay Expenses of more than one Independent Legal Counsel in connection with all matters concerning a single Indemnitee, and such Independent Legal Counsel shall be the Independent Legal Counsel for any or all other Indemnitees unless (i) the Company otherwise determines or (ii) any Indemnitee shall provide a written statement setting forth in detail a reasonable objection to such Independent Legal Counsel representing other Indemnitees.

(e) Mandatory Payment of Expenses. Notwithstanding any other provision of this Agreement other than Section 10 hereof, to the extent that Indemnitee has been successful on the merits or otherwise, including, without limitation, the dismissal of an action without prejudice, in defense of any Claim, Indemnitee shall be indemnified, exonerated and held harmless against all Expenses incurred by Indemnitee in connection therewith.

(f) Contribution. If the indemnification, exoneration or hold harmless rights provided for in this Agreement is for any reason held by a court of competent jurisdiction to be unavailable to an Indemnitee, then in lieu of indemnifying, exonerating or holding harmless Indemnitee thereunder, the Company shall contribute to the amount paid or payable by Indemnitee as a result of such Expenses (i) in such proportion as is appropriate to reflect the relative benefits received by the Company and Indemnitee, or (ii) if the allocation provided by clause (i) above is not permitted by applicable law, in such proportion as is appropriate to reflect not only the relative benefits referred to in clause (i) above but also the relative fault of the Company and Indemnitee in connection with the action or inaction which resulted in such Expenses, as well as any other relevant equitable considerations. In connection with the registration of the Company's securities, the relative benefits received by the Company and Indemnitee shall be deemed to be in the same respective proportions that the net proceeds from the offering (before deducting expenses) received by the Company and Indemnitee, in each case as set forth in the table on the cover page of the applicable prospectus, bear to the aggregate public offering price of the securities so offered. The relative fault of the Company and

Indemnitee shall be determined by reference to, among other things, whether the untrue or alleged untrue statement of a material fact or the omission or alleged omission to state a material fact relates to information supplied by the Company or Indemnitee and the parties' relative intent, knowledge, access to information and opportunity to correct or prevent such statement or omission.

The Company and Indemnitee agree that it would not be just and equitable if contribution pursuant to this Section 2(f) were determined by pro rata or by any other method of allocation which does not take account of the equitable considerations referred to in the immediately preceding paragraph. In connection with the registration of the Company's securities, in no event shall Indemnitee be required to contribute any amount under this Section 2(f) in excess of the net proceeds received by Indemnitee from its sale of securities under such registration statement. No person found guilty of fraudulent misrepresentation (within the meaning of Section 11(1) of the Securities Act) shall be entitled to contribution from any person who was not found guilty of such fraudulent misrepresentation.

3. EXPENSE ADVANCES**.**

(a) Obligation to Make Expense Advances. The Company shall make Expense Advances to Indemnitee upon receipt of a written undertaking by or on behalf of the Indemnitee to repay such amounts if it shall ultimately be determined that the Indemnitee is not entitled to be indemnified, exonerated or held harmless therefor by the Company.

(b) Form of Undertaking. Any written undertaking by the Indemnitee to repay any Expense Advances hereunder shall be unsecured and no interest shall be charged thereon.

4. PROCEDURES FOR INDEMNIFICATION AND EXPENSE ADVANCES**.**

(a) Timing of Payments. All payments of Expenses (including without limitation Expense Advances) by the Company to the Indemnitee pursuant to this Agreement shall be made to the fullest extent permitted by law as soon as practicable after written demand by Indemnitee therefor is presented to the Company, but in no event later than forty-five (45) days after such written demand by Indemnitee is presented to the Company, except in the case of Expense Advances, which shall be made no later than twenty (20) days after such written demand by Indemnitee is presented to the Company.

(b) Notice/Cooperation by Indemnitee. Indemnitee shall, as a condition precedent to Indemnitee's right to be indemnified, exonerated or held harmless or Indemnitee's right to receive Expense Advances under this Agreement, give the Company notice in writing as soon as practicable of any Claim made against Indemnitee for which indemnification, exoneration or hold harmless right will or could be sought under this Agreement. Notice to the Company shall be directed to the President or Chief Executive Officer of the Company at the address shown on the signature page of this Agreement (or such other address as the Company shall designate in writing to Indemnitee). In addition, Indemnitee shall give the Company such information and cooperation as it may reasonably require and as shall be within Indemnitee's power.

(c) No Presumptions; Burden of Proof. For purposes of this Agreement, the termination of any Claim by judgment, order, settlement (whether with or without court approval) or conviction, or upon a plea of *nolo contendere*, or its equivalent, shall not create a presumption that Indemnitee did not meet any particular standard of conduct or have any particular belief or that a court has determined that indemnification, exoneration or hold harmless right is not permitted by this Agreement or applicable law. In addition, neither the failure of any Reviewing Party to have made a determination as to whether Indemnitee has met any particular

standard of conduct or had any particular belief, nor an actual determination by any Reviewing Party that Indemnitee has not met such standard of conduct or did not have such belief, prior to the commencement of legal proceedings by Indemnitee to secure a judicial determination that Indemnitee should be indemnified, exonerated or held harmless under this Agreement or applicable law, shall be a defense to Indemnitee's claim or create a presumption that Indemnitee has not met any particular standard of conduct or did not have any particular belief. In connection with any determination by any Reviewing Party or otherwise as to whether the Indemnitee is entitled to be indemnified, exonerated or held harmless hereunder, the burden of proof shall be on the Company to establish that Indemnitee is not so entitled.

(d) Notice to Insurers. If, at the time of the receipt by the Company of a notice of a Claim pursuant to Section 4(b) hereof, the Company has liability insurance in effect which may cover such Claim, the Company shall give prompt notice of the commencement of such Claim to the insurers in accordance with the procedures set forth in the respective policies. The Company shall thereafter take all necessary or desirable action to cause such insurers to pay, on behalf of the Indemnitee, all amounts payable as a result of such Claim in accordance with the terms of such policies.

(e) Selection of Counsel. In the event the Company shall be obligated hereunder to provide indemnification for or make any Expense Advances with respect to the Expenses of any Claim, the Company, if appropriate, shall be entitled to assume the defense of such Claim with counsel approved by Indemnitee (which approval shall not be unreasonably withheld) upon the delivery to Indemnitee of written notice of the Company's election to do so. After delivery of such notice, approval of such counsel by Indemnitee and the retention of such counsel by the Company, the Company will not be liable to Indemnitee under this Agreement for any fees or expenses of separate counsel subsequently employed by or on behalf of Indemnitee with respect to the same Claim; *provided, however*, that (i) Indemnitee shall have the right to employ Indemnitee's separate counsel in any such Claim at Indemnitee's expense and (ii) if (A) the employment of separate counsel by Indemnitee has been previously authorized by the Company, (B) Indemnitee shall have reasonably concluded that there may be a conflict of interest between the Company and Indemnitee in the conduct of any such defense, or (C) the Company shall not continue to retain such counsel to defend such Claim, then the fees and expenses of Indemnitee's separate counsel shall be Expenses for which Indemnitee may receive indemnification, exoneration or hold harmless rights or Expense Advances hereunder. The Company shall have the right to conduct such defense as it sees fit in its sole discretion, including the right to settle any claim, action or proceeding against Indemnitee without the consent of Indemnitee, provided that the terms of such settlement include either: (i) a full release of Indemnitee by the claimant from all liabilities or potential liabilities under such claim; or (ii), in the event such full release is not obtained, the terms of such settlement do not limit any indemnification, exoneration or hold harmless rights Indemnitee may now, or hereafter, be entitled to under this Agreement, the Company's Certificate of Incorporation, bylaws, any agreement, any vote of stockholders or disinterested directors, the General Corporation Law of the State of Delaware (the "DGCL") or otherwise.

5. Additional Indemnification Rights; Nonexclusivity**.**

(a) Scope. The Company hereby agrees to indemnify, exonerate and hold harmless the Indemnitee to the fullest extent permitted by law, notwithstanding that such indemnification, exoneration or hold harmless right is not specifically authorized by the other provisions of this Agreement, the Company's Certificate of Incorporation, the Company's bylaws or by statute. In the event of any change after the date of this Agreement in any applicable law, statute or rule which expands the right of a Delaware corporation to indemnify, exonerate or hold harmless a member of its board of directors or an officer, employee, agent or fiduciary, it is the intent of the parties hereto that Indemnitee shall enjoy by this Agreement the

greater benefits afforded by such change. In the event of any change in any applicable law, statute or rule which narrows the right of a Delaware corporation to indemnify, exonerate or hold harmless a member of its board of directors or an officer, employee, agent or fiduciary, such change, to the extent not otherwise required by such law, statute or rule to be applied to this Agreement, shall have no effect on this Agreement or the parties' rights and obligations hereunder except as set forth in Section 10(a) hereof.

(b) Nonexclusivity. The indemnification, exoneration or hold harmless rights and the payment of Expense Advances provided by this Agreement shall be in addition to any rights to which Indemnitee may be entitled under the Company's Certificate of Incorporation, its bylaws, any other agreement, any vote of stockholders or disinterested directors, the DGCL, or otherwise. The indemnification, exoneration or hold harmless rights and the payment of Expense Advances provided under this Agreement shall continue as to Indemnitee for any action taken or not taken while serving in an indemnified, exonerated or held harmless capacity even though subsequent thereto Indemnitee may have ceased to serve in such capacity.

6. No Duplication of Payments**.** The Company shall not be liable under this Agreement to make any payment in connection with any Claim made against Indemnitee to the extent Indemnitee has otherwise actually received payment (under any insurance policy, provision of the Company's Certificate of Incorporation, bylaws or otherwise) of the amounts otherwise payable hereunder.

7. Partial Indemnification**.** If Indemnitee is entitled under any provision of this Agreement to indemnification, exoneration or hold harmless rights by the Company for some or a portion of Expenses incurred in connection with any Claim, but not, however, for the total amount thereof, the Company shall nevertheless indemnify, exonerate or hold harmless Indemnitee for the portion of such Expenses to which Indemnitee is entitled.

8. Mutual Acknowledgment**.** Both the Company and Indemnitee acknowledge that in certain instances, federal law or applicable public policy may prohibit the Company from indemnifying, exonerating or holding harmless its directors, officers, employees, agents or fiduciaries under this Agreement or otherwise. Indemnitee understands and acknowledges that the Company may be required in the future to undertake with the Securities and Exchange Commission to submit the question of indemnification, exoneration or hold harmless rights to a court in certain circumstances for a determination of the Company's right under public policy to indemnify, exonerate or hold harmless Indemnitee.

9. Liability Insurance**.** To the extent the Company maintains liability insurance applicable to directors, officers, employees, agents or fiduciaries, Indemnitee shall be covered by such policies in such a manner as to provide Indemnitee the same rights and benefits as are provided to the most favorably insured of the Company's directors, if Indemnitee is a director; or of the Company's officers, if Indemnitee is not a director of the Company but is an officer; or of the Company's key employees, agents or fiduciaries, if Indemnitee is not an officer or director but is a key employee, agent or fiduciary.

10. Exceptions**.** Notwithstanding any other provision of this Agreement, the Company shall not be obligated pursuant to the terms of this Agreement:

(a) Excluded Action or Omissions. To indemnify, exonerate or hold harmless Indemnitee for Expenses resulting from acts, omissions or transactions for which Indemnitee is prohibited from receiving indemnification, exoneration or hold harmless rights under this Agreement or applicable law; *provided, however*, that notwithstanding any limitation set forth in this Section 10(a) regarding the Company's obligation to provide indemnification, exoneration or hold harmless rights to Indemnitee shall be entitled under Section 3 to receive Expense Advances

hereunder with respect to any such Claim unless and until a court having jurisdiction over the Claim shall have made a final judicial determination (as to which all rights of appeal therefrom have been exhausted or lapsed) that Indemnitee has engaged in acts, omissions or transactions for which Indemnitee is prohibited from receiving indemnification under this Agreement or applicable law.

(b) Claims Initiated by Indemnitee. To indemnify, exonerate or hold harmless or make Expense Advances to Indemnitee with respect to Claims initiated or brought voluntarily by Indemnitee and not by way of defense, counterclaim or cross claim, except (i) with respect to actions or proceedings brought to establish or enforce an indemnification, exoneration or hold harmless right under this Agreement or any other agreement or insurance policy or under the Company's Certificate of Incorporation or bylaws now or hereafter in effect relating to Claims for Covered Events, (ii) in specific cases if the Board of Directors has approved the initiation or bringing of such Claim, or (iii) as otherwise required under Section 145 of the DGCL, regardless of whether Indemnitee ultimately is determined to be entitled to such indemnification, exoneration, hold harmless right, Expense Advances or insurance recovery, as the case may be.

(c) Lack of Good Faith. To indemnify, exonerate or hold harmless Indemnitee for any Expenses incurred by the Indemnitee with respect to any action instituted (i) by Indemnitee to enforce or interpret this Agreement, if a court having jurisdiction over such action determines as provided in Section 13 that each of the material assertions made by the Indemnitee as a basis for such action was not made in good faith or was frivolous, or (ii) by or in the name of the Company to enforce or interpret this Agreement, if a court having jurisdiction over such action determines as provided in Section 13 that each of the material defenses asserted by Indemnitee in such action was made in bad faith or was frivolous.

(d) Claims Under Section 16(b). To indemnify, exonerate or hold harmless Indemnitee for expenses and the payment of profits arising from the purchase and sale by Indemnitee of securities in violation of Section 16(b) of the Securities Exchange Act of 1934, as amended, or any similar successor statute; *provided, however*, that notwithstanding any limitation set forth in this Section 10(d) regarding the Company's obligation to provide indemnification or exoneration or hold harmless, Indemnitee shall be entitled under Section 3 to receive Expense Advances hereunder with respect to any such Claim unless and until a court having jurisdiction over the Claim shall have made a final judicial determination (as to which all rights of appeal therefrom have been exhausted or lapsed) that Indemnitee has violated said statute.

11. Counterparts**.** This Agreement may be executed in counterparts and by facsimile or electronic transmission, each of which shall constitute an original and all of which, together, shall constitute one instrument.

12. Binding Effect; Successors and Assigns**.** This Agreement shall be binding upon and inure to the benefit of and be enforceable by the parties hereto and their respective successors, assigns, including any direct or indirect successor by purchase, merger, consolidation or otherwise to all or substantially all of the business and/or assets of the Company, spouses, heirs, and personal and legal representatives. The Company shall require and cause any successor (whether direct or indirect by purchase, merger, consolidation or otherwise) to all, substantially all, or a substantial part, of the business and/or assets of the Company, by written agreement in form and substance satisfactory to Indemnitee, expressly to assume and agree to perform this Agreement in the same manner and to the same extent that the Company would be required to perform if no such succession had taken place. This Agreement shall continue in effect regardless of whether Indemnitee continues to serve as a director, officer, employee, agent or fiduciary (as applicable) of the Company or of any other enterprise at the Company's request.

13. Expenses Incurred in Action Relating to Enforcement or Interpretation**.** In the event that any action is instituted by Indemnitee under this Agreement or under any liability insurance policies maintained by the Company to enforce or interpret any of the terms hereof or thereof, Indemnitee shall be entitled to be indemnified for all Expenses incurred by Indemnitee with respect to such action (including without limitation attorneys' fees), regardless of whether Indemnitee is ultimately successful in such action, unless as a part of such action a court having jurisdiction over such action makes a final judicial determination (as to which all rights of appeal therefrom have been exhausted or lapsed) that each of the material assertions made by Indemnitee as a basis for such action was not made in good faith or was frivolous; *provided, however,* that until such final judicial determination is made, Indemnitee shall be entitled under Section 3 to receive payment of Expense Advances hereunder with respect to such action. In the event of an action instituted by or in the name of the Company under this Agreement to enforce or interpret any of the terms of this Agreement, Indemnitee shall be entitled to be indemnified, exonerated or held harmless for all Expenses incurred by Indemnitee in defense of such action (including without limitation costs and expenses incurred with respect to Indemnitee's counterclaims and cross-claims made in such action), unless as a part of such action a court having jurisdiction over such action makes a final judicial determination (as to which all rights of appeal therefrom have been exhausted or lapsed) that each of the material defenses asserted by Indemnitee in such action was made in bad faith or was frivolous; *provided, however,* that until such final judicial determination is made, Indemnitee shall be entitled under Section 3 to receive payment of Expense Advances hereunder with respect to such action.

14. Notices**.** All notices, requests, demands and other communications under this Agreement shall be in writing and shall be deemed duly given (i) if delivered by hand and signed for by the party addressed, on the date of such delivery, or (ii) if mailed by domestic certified or registered mail with postage prepaid, on the third business day after the date postmarked. Addresses for notice to either party are as shown on the signature page of this Agreement or as subsequently modified by written notice.

15. Consent to Jurisdiction**.** The Company and Indemnitee each hereby irrevocably consent to the jurisdiction of the courts of the State of Delaware for all purposes in connection with any action or proceeding which arises out of or relates to this Agreement and agree that any action instituted under this Agreement shall be commenced, prosecuted and continued only in the Court of Chancery of the State of Delaware in and for Kent County, which shall be the exclusive and only proper forum for adjudicating such a claim.

16. Severability**.** The provisions of this Agreement shall be severable in the event that any of the provisions hereof (including any provision within a single section, paragraph or sentence) are held by a court of competent jurisdiction to be invalid, void or otherwise unenforceable, and the remaining provisions shall remain enforceable to the fullest extent permitted by law. Furthermore, to the fullest extent possible, the provisions of this Agreement (including without limitation each portion of this Agreement containing any provision held to be invalid, void or otherwise unenforceable, that is not itself invalid, void or unenforceable) shall be construed so as to give effect to the intent manifested by the provision held invalid, illegal or unenforceable.

17. Choice of Law**.** This Agreement, and all rights, remedies, liabilities, powers and duties of the parties to this Agreement, shall be governed by and construed in accordance with the laws of the State of Delaware without regard to principles of conflicts of laws.

18. Amendment and Termination**.** No amendment, modification, termination or cancellation of this Agreement shall be effective unless it is in writing signed by both the parties hereto. No waiver of any of the provisions of this Agreement shall be deemed to be or shall

constitute a waiver of any other provisions hereof (whether or not similar), nor shall such waiver constitute a continuing waiver.

19. Integration and Entire Agreement**.** This Agreement sets forth the entire understanding between the parties hereto and supersedes and merges all previous written and oral negotiations, commitments, understandings and agreements relating to the subject matter hereof between the parties hereto.

20. No Construction as Employment Agreement**.** Nothing contained in this Agreement shall be construed as giving Indemnitee any right to employment by the Company or any of its subsidiaries or affiliated entities.

21. Additional Acts. If for the validation of any of the provisions in this Agreement any act, resolution, approval or other procedure is required, the Company undertakes to cause such act, resolution, approval or other procedure to be affected or adopted in a manner that will enable the Company to fulfill its obligations under this Agreement.

(The remainder of this page is intentionally left blank.)

IN WITNESS WHEREOF, the parties hereto have executed this Indemnification Agreement as of the date first above written.

CODEXIS, INC.

By: __
Name: Stephen Dilly
Title: President and CEO

Agreed to and accepted by:

INDEMNITEE:

__
Name: [INDEMNITEE]

TRANSITION AND SEPARATION AGREEMENT

This Transition and Separation Agreement (the " Agreement") by and between Ross Taylor (" Executive") and Codexis, Inc., a Delaware corporation (the "Company"), is made effective as of the eighth day following the date Executive signs this Agreement (the " Effective Date") with reference to the following facts:

A. Executive's employment with the Company will end as of the Termination Date (as defined below);

B. Executive and the Company are parties to that certain Change of Control Severance Agreement (the " Change of Control Agreement");

C. Executive has agreed to continue to serve as the Company's Senior Vice President and Chief Financial Officer through the date the Company appoints a new Chief Financial Officer; and

D. Executive and the Company want to end their relationship amicably and also to establish the obligations of the parties including, without limitation, all amounts due and owing to Executive.

NOW, THEREFORE, in consideration of the mutual covenants and agreements hereinafter set forth, the parties agree as follows:

1. Termination Date. Executive and the Company acknowledge and agree that Executive's status as an employee of the Company shall continue through the earliest of (a) March 6, 2023 (the "Planned Termination Date"), (b) the date the Company terminates Executive's employment with the Company for other than Cause (as defined in the Change of Control Agreement) (together with the Planned Terminate Date, a "Covered Termination Date"), (c) the date the Company terminates Executive's employment for Cause or (d) the date Executive voluntarily terminates Executive's employment (the earliest such date, the "Termination Date"). Executive further acknowledges and agrees that Executive's status as an officer of the Company and of each of its affiliates, shall end effective as of the earlier of the Termination Date. Executive hereby agrees to execute such further document(s) as shall be determined by the Company as necessary or desirable to give effect to the termination of Executive's status as an officer of the Company and each of its affiliates as of such earlier date; provided that such documents shall not be inconsistent with any of the terms of this Agreement.

2. Chief Financial Officer Employment.

(a) *Chief Financial Officer Employment Period; Duties*. During the period (the "Chief Financial Officer Employment Period") commencing on the date hereof and ending on the earlier of (i) the date the Company appoints a new interim or permanent Chief Financial Officer or (ii) the Termination Date (such earlier date, the "Chief Financial Officer Service End Date"), Executive shall continue to be employed by the Company as the Company's Senior Vice President and Chief Financial Officer reporting to the Company's Chief Executive Officer ("CEO") and shall perform such duties as are customarily associated with such positions and such other duties as are assigned to Executive by the CEO. During the Chief Financial Officer Employment Period, Executive shall devote Executive's best efforts and substantially all of Executive's business time and attention to the business of the Company. On the Chief Financial Officer Service End Date, Executive shall cease to serve as an officer of the Company and each of its subsidiaries. Executive agrees to execute such further documents as determined necessary or appropriate by the Company to evidence such cessation of officer status.

(b) *Advisor Employment Period; Duties*. In the event the Chief Financial Officer Service End Date occurs prior to the Termination Date, then during the period (the "Advisor Employment Period" and, together with the Chief Financial Officer Employment

Period, the "Continued Employment Period") commencing on the Chief Financial Officer Service End Date and ending on the Termination Date, Executive shall continue to be employed as an advisor to the CEO and shall perform such duties as are requested by the CEO. During the Advisor Employment Period, Executive shall devote Executive's best efforts and such amount of Executive's business time and attention as reasonably necessary to fulfill such duties to the business of the Company.

(c) *Salary and Benefits Continuation*. During the Continued Employment Period, Executive will continue to be paid base salary at the rate in effect on the date of this Agreement in accordance with the Company's regular payroll procedures, accrue paid vacation, be eligible for all employee benefit plans available to senior executives of the Company and continue to vest into outstanding equity awards, in each case, in accordance with their terms. All payments made to Executive during the Continued Employment Period will be subject to required withholding taxes and authorized deductions.

(d) *Protection of Information*. Executive reaffirms Executive's commitment to remain in compliance with that certain Confidential Information and Inventions Assignment Agreement entered into between Executive and the Company (the "Confidentiality Agreement"). Without limiting the foregoing, Executive acknowledges and agrees that, during the Continued Employment Period, Executive shall not, directly or indirectly, become employed by or provide assistance to any competitor of the Company.

3. Final Paycheck; Payment of Accrued Wages and Expenses.

(a) *Final Paycheck.* As soon as administratively practicable on or after the Termination Date, the Company will pay Executive all accrued but unpaid wages and accrued and unused vacation earned through the Termination Date, subject to standard payroll deductions and withholdings. Executive is entitled to retain these payments regardless of whether Executive executes this Agreement.

(b) *Business Expenses*. The Company shall reimburse Executive for all outstanding, unreimbursed expenses incurred prior to the Termination Date which are consistent with the Company's policies in effect from time to time with respect to travel, entertainment and other business expenses, subject to the Company's requirements with respect to reporting and documenting such expenses. Executive is entitled to these reimbursements regardless of whether Executive executes this Agreement.

(c) *Unvested Equity Awards*. Executive acknowledges that on the Termination Date, the unvested portion of each outstanding equity award (after giving effect to any accelerated vesting provided under Section 4 of this Agreement), including, without limitation, the unvested portion of each stock option, restricted stock unit award and performance stock unit award held by Executive will be automatically terminated without payment of any consideration therefor.

4. Separation Benefits. Without admission of any liability, fact or claim, the Company hereby agrees, subject to the execution of this Agreement and the delivery to the Company of a copy of the General Release of Claims attached hereto as Exhibit A (the "Release of Claims") signed on or after the Termination Date that becomes effective and irrevocable within thirty days following the Termination Date, and further subject to Executive remaining employed hereunder through the Covered Termination Date and continued compliance with the terms and conditions of the Confidentiality Agreement, to provide Executive the severance benefits set forth below. For the avoidance of doubt, in the event the Company terminates Executive's employment for other than Cause or Executive terminates Executive's employment with the Company before the Covered Termination Date, then Executive shall be entitled to the Separation Payments and Benefits described in this Section 4. Specifically, the Company and Executive agree as follows:

(a) *Cash Severance.* On the first payroll date that is at least five (5) business days following the date the Release of Claims becomes effective and irrevocable,

the Company shall pay to Executive an amount equal to twelve (12) months of Executive's base salary, subject to continuing compliance by Executive with the terms hereof. Such payment shall be made in a single cash lump sum, subject to withholding taxes and authorized deductions.

(b) *Annual Bonus.* Executive shall be paid an amount equal to $185,725, which represents 85% of Executive's target annual bonus for fiscal year 2022 and shall be paid in full satisfaction thereof, irrespective of the Company's or Executive's performance. Such payment shall be made in a single cash lump sum, subject to withholding taxes and authorized deductions.

(c) *Restricted Stock Units and Performance Stock Units*. To the extent the Covered Termination Date occurs prior to March 6, 2023, then the vesting of any restricted stock units and performance stock units scheduled to vest on or prior to March 6, 2023 shall be accelerated as of immediately prior to the Covered Termination Date. The shares of Company common stock underlying any restricted stock units and performance stock units for which vesting is accelerated pursuant to the preceding sentence shall be issued in accordance with the agreement evidencing such restricted and performance stock units.

(d) *Continued Healthcare.* If Executive elects to receive continued healthcare coverage pursuant to the provisions of the Consolidated Omnibus Budget Reconciliation Act of 1985, as amended ("COBRA"), the Company shall directly pay, or reimburse Executive for, the premium for Executive and Executive's covered dependents from the Termination Date through the earlier of (i) the twelve (12) month anniversary of the Termination Date and (ii) the date Executive, Executive's covered dependents, if any, become eligible for healthcare coverage under another employer's plan(s), provided, however, that if (1) any plan pursuant to which such benefits are provided is not, or ceases prior to the expiration of the continuation coverage period to be, exempt from the application of Section 409A of the Internal Revenue Code of 1986, as amended (the "Code") under Treasury Regulation Section 1.409A-1(a)(5), (2) the Company is otherwise unable to continue to cover Executive or Executive's dependents under its group health plans, or (3) the Company cannot provide the benefit without violating applicable law (including, without limitation, Section 2716 of the Public Health Service Act), then, in any such case, an amount equal to each remaining Company subsidy shall thereafter be paid to Executive in substantially equal monthly installments over the remaining period the Company would otherwise directly pay or reimburse Executive. After the Company ceases to pay premiums pursuant to the preceding sentence, Executive may, if eligible, elect to continue healthcare coverage at Executive's expense in accordance with the provisions of COBRA.

(e) *Taxes*. Executive understands and agrees that all benefits under this Agreement will be subject to appropriate tax withholding and other deductions. To the extent any taxes may be payable by Executive for the benefits provided to Executive by this Agreement beyond those withheld by the Company, Executive agrees to pay them and to indemnify and hold the Company and the other entities released herein harmless for any tax claims or penalties, and associated attorneys' fees and costs, resulting from any failure by Executive to make required payments.

(f) *Sole Separation Benefit*. Executive agrees that the benefits provided by this Section 4 are not required under the Company's normal policies and procedures and are provided as a severance solely in connection with this Agreement. Executive acknowledges and agrees that the benefits referenced in this Section 4 constitute adequate and valuable consideration, in and of themselves, for the promises contained in this Agreement.

5. Full Payment. Executive acknowledges that the payment and arrangements herein shall constitute full and complete satisfaction of any and all amounts properly due and owing to Executive as a result of Executive's employment with the Company and the termination thereof. Executive further acknowledges that, other than the Confidentiality Agreement, agreements

evidencing Executive's equity awards (as modified under Section 4(c) hereof) and as explicitly set forth in Section 11 hereof, this Agreement shall supersede each agreement entered into between Executive and the Company regarding Executive's employment, including, without limitation, the offer letter entered into between the Company and Executive as of August 4, 2019, the Change of Control Agreement and any other employment agreement, bonus plan or arrangement, severance and/or change in control agreement, and each such agreement shall be deemed terminated and of no further effect as of the Effective Date.

6. *Executive's Release of the Company*. Executive understands that by agreeing to the release provided by this Section 6, Executive is agreeing not to sue, or otherwise file any claim against, the Company or any of its directors, officers, employees, investors or other agents for any reason whatsoever based on anything that is the subject of this release and that has occurred as of the date Executive signs this Agreement.

(a) *Released Claims.* On behalf of Executive and Executive's heirs, assigns, executors, administrators, trusts, spouse and estate, Executive hereby releases and forever discharges the "Releasees" hereunder, consisting of the Company and each of its owners, affiliates, subsidiaries, predecessors, successors, assigns, agents, directors, officers, partners, employees, and insurers, and all persons acting by, through, under or in concert with them, or any of them, of and from any and all manner of action or actions, cause or causes of action, in law or in equity, suits, debts, liens, contracts, agreements, promises, liability, claims, demands, damages, loss, cost or expense, of any nature whatsoever, known or unknown, fixed or contingent (hereinafter called "Claims"), which Executive now has or may hereafter have against the Releasees, or any of them, by reason of any matter, cause, or thing whatsoever from the beginning of time to the date hereof, including, without limiting the generality of the foregoing, any Claims arising out of, based upon, or relating to Executive's hire, employment, remuneration or termination by the Releasees, or any of them, Claims arising under federal, state, or local laws relating to employment, Claims of any kind that may be brought in any court or administrative agency, including any Claims arising under Title VII of the Civil Rights Act of 1964, as amended, 42 U.S.C. § 2000, et seq.; Americans with Disabilities Act, as amended, 42 U.S.C. § 12101 et seq.; the Rehabilitation Act of 1973, as amended, 29 U.S.C. § 701 et seq.; the Age Discrimination in Employment Act, as amended, 29 U.S.C. § 621, et seq.; Civil Rights Act of 1866, and Civil Rights Act of 1991; 42 U.S.C. § 1981, et seq.; Equal Pay Act, as amended, 29 U.S.C. § 206(d); regulations of the Office of Federal Contract Compliance, 41 C.F.R. Section 60, et seq.; The Family and Medical Leave Act, as amended, 29 U.S.C. § 2601 et seq.; the Fair Labor Standards Act of 1938, as amended, 29 U.S.C. § 201 et seq.; the Employee Retirement Income Security Act, as amended, 29 U.S.C. § 1001 et seq.; the Worker Adjustment and Retraining Notification Act, as amended, 29 U.S.C. § 2101 et seq.; the California Fair Employment and Housing Act, as amended, Cal. Lab. Code § 12940 et seq.; the California Equal Pay Law, as amended, Cal. Lab. Code §§ 1197.5(a),199.5; the Moore-Brown-Roberti Family Rights Act of 1991, as amended, Cal. Gov't Code §§12945.2, 19702.3; California Labor Code §§ 1101, 1102; the California WARN Act, California Labor Code §§ 1400 et. seq; California Labor Code §§ 1102.5(a),(b); Claims for wages under the California Labor Code and any other federal, state or local laws of similar effect; the employment and civil rights laws of California; Claims for breach of implied or express contract; Claims arising in tort, including, without limitation, Claims of wrongful dismissal or discharge, discrimination, harassment, retaliation, fraud, misrepresentation, defamation, libel, slander, defamation, infliction of emotional distress, violation of public policy, and/or breach of the implied covenant of good faith and fair dealing; and Claims for damages or other remedies of any sort, including, without limitation, compensatory damages, punitive damages, injunctive relief and attorney's fees.

(b) *Unreleased Claims.* Notwithstanding the generality of the foregoing, Executive does not release the following claims:

(i) Claims for unemployment compensation or any state disability insurance benefits pursuant to the terms of applicable state law;

(ii) Claims for workers' compensation insurance benefits under the terms of any worker's compensation insurance policy or fund of the Company;

(iii) Claims to continued participation in certain of the Company's group benefit plans pursuant to the terms and conditions of COBRA;

(iv) Claims to accrued but unpaid base salary or any benefit entitlements vested as the date Executive signs this Agreement, pursuant to written terms of any Company or affiliate employee benefit plan, program, or policy, including to vested equity awards;

(v) Claims for indemnification under any indemnification agreement, the Company's Bylaws or other organizational documents, applicable directors' and officers' insurance coverage, or any applicable law;

(vi) Executive's right to enforce the terms of this Agreement; and

(vii) Executive's right to bring to the attention of the Equal Employment Opportunity Commission claims of discrimination; *provided*, *however*, that Executive does release Executive's right to secure any damages for alleged discriminatory treatment.

(c) *Acknowledgement.* In accordance with the Older Workers Benefit Protection Act of 1990, Executive has been advised of the following:

(i) Executive should consult with an attorney before signing this Agreement;

(ii) Executive has been given at least twenty-one (21) days to consider this Agreement; and

(iii) Executive has seven (7) days after signing this Agreement to revoke it. If Executive wishes to revoke this Agreement, Executive must deliver notice of Executive's revocation in writing, no later than 5:00 p.m. on the 7th day following Executive's execution of this Agreement to Karen Frechou-Armijo at karen.armijo@codexis.com. Executive understands that if Executive revokes this Agreement, it will be null and void in its entirety, and Executive will not be entitled to any payments or benefits provided in this Agreement that are not otherwise required by applicable law.

(d) EXECUTIVE ACKNOWLEDGES THAT EXECUTIVE HAS BEEN ADVISED OF AND IS FAMILIAR WITH THE PROVISIONS OF CALIFORNIA CIVIL CODE SECTION 1542, WHICH PROVIDES AS FOLLOWS:

"A GENERAL RELEASE DOES NOT EXTEND TO CLAIMS WHICH THE CREDITOR OR RELEASING PARTY DOES NOT KNOW OR SUSPECT TO EXIST IN HIS OR HER FAVOR AT THE TIME OF EXECUTING THE RELEASE AND THAT, IF KNOWN BY HIM OR HER, WOULD HAVE MATERIALLY AFFECTED HIS OR HER SETTLEMENT WITH THE DEBTOR OR RELEASED PARTY."

BEING AWARE OF SAID CODE SECTION, EXECUTIVE HEREBY EXPRESSLY WAIVES ANY RIGHTS EXECUTIVE MAY HAVE THEREUNDER, AS WELL AS UNDER ANY OTHER STATUTES OR COMMON LAW PRINCIPLES OF SIMILAR EFFECT.

7. Non-Disparagement, Transition and Transfer of Company Property. Executive further agrees that:

(a) *Non-Disparagement.* Executive agrees that Executive shall not disparage, criticize or defame the Company, its affiliates and their respective affiliates, directors, officers, agents, partners, stockholders, employees, products, services, technology or business, either publicly or privately. The Company agrees that it shall not, and shall instruct its officers and directors to not, disparage, criticize or defame Executive, either publicly or privately. Nothing in this Section 7(a) shall have application to any evidence or testimony required by any court, arbitrator or government agency.

(b) *Transition.* Each of the Company and Executive shall use their respective reasonable efforts to cooperate with each other in good faith to facilitate a smooth transition of Executive's duties to other executive(s) of the Company, including but not limited to assisting in the filing of the upcoming Form 10-K.

(c) *Transfer of Company Property*. On or before the Termination Date, Executive shall turn over to the Company all files, memoranda, records, and other documents, and any other physical or personal property which are the property of the Company and which Executive had in Executive's possession, custody or control at the time Executive signed this Agreement.

8. Executive Representations. Executive warrants and represents that (a) Executive has not filed or authorized the filing of any complaints, charges or lawsuits against the Company or any affiliate of the Company with any governmental agency or court, and that if, unbeknownst to Executive, such a complaint, charge or lawsuit has been filed on Executive's behalf, Executive will immediately cause it to be withdrawn and dismissed, (b) Executive has reported all hours worked as of the date of this Agreement and has been paid all compensation, wages, bonuses, commissions, and/or benefits to which Executive may be entitled and no other compensation, wages, bonuses, commissions and/or benefits are due to Executive, except as provided in this Agreement, (c) Executive has no known workplace injuries or occupational diseases and has been provided and/or has not been denied any leave requested under the Family and Medical Leave Act or any similar state law, (d) the execution, delivery and performance of this Agreement by Executive does not and will not conflict with, breach, violate or cause a default under any agreement, contract or instrument to which Executive is a party or any judgment, order or decree to which Executive is subject, and (e) upon the execution and delivery of this Agreement by the Company and Executive, this Agreement will be a valid and binding obligation of Executive, enforceable in accordance with its terms.

9. No Assignment by Executive. Executive warrants and represents that no portion of any of the matters released herein, and no portion of any recovery or settlement to which Executive might be entitled, has been assigned or transferred to any other person, firm or corporation not a party to this Agreement, in any manner, including by way of subrogation or operation of law or otherwise. If any claim, action, demand or suit should be made or instituted against the Company or any other Releasee because of any actual assignment, subrogation or transfer by Executive, Executive agrees to indemnify and hold harmless the Company and all other Releasees against such claim, action, suit or demand, including necessary expenses of investigation, attorneys' fees and costs. In the event of Executive's death, this Agreement shall inure to the benefit of Executive and Executive's executors, administrators, heirs, distributees, devisees, and legatees. None of Executive's rights or obligations may be assigned or transferred by Executive, other than Executive's rights to payments hereunder, which may be transferred only upon Executive's death by will or operation of law.

10. Governing Law. This Agreement shall be construed and enforced in accordance with, and the rights of the parties shall be governed by, the laws of the State of California or, where applicable, United States federal law, in each case, without regard to any conflicts of laws provisions or those of any state other than California.

11. Miscellaneous. Executive acknowledges that there are no other agreements, written, oral or implied, and that Executive may not rely on any prior negotiations, discussions,

representations or agreements. This Agreement may be modified only in writing, and such writing must be signed by both parties and recited that it is intended to modify this Agreement. This Agreement may be executed in separate counterparts, each of which is deemed to be an original and all of which taken together constitute one and the same agreement.

12. Company Assignment and Successors. The Company shall assign its rights and obligations under this Agreement to any successor to all or substantially all of the business or the assets of the Company (by merger or otherwise). This Agreement shall be binding upon and inure to the benefit of the Company and its successors, assigns, personnel and legal representatives.

13. Maintaining Confidential Information. Executive reaffirms Executive's obligations under the Confidentiality Agreement. For the avoidance of doubt, nothing in this Agreement or the Confidentiality Agreement will be construed to prohibit Executive from filing a charge with, reporting possible violations to, or participating or cooperating with any governmental agency or entity, including but not limited to the EEOC, the Department of Justice, the Securities and Exchange Commission, Congress, or any agency Inspector General, or making other disclosures that are protected under the whistleblower, anti-discrimination, or anti-retaliation provisions of federal, state or local law or regulation; provided, however, that Executive may not disclose information of the Company or any of their affiliates that is protected by the attorney-client privilege, except as otherwise required by law. Executive does not need the prior authorization of the Company to make any such reports or disclosures, and Executive is not required to notify the Company that Executive has made such reports or disclosures. Furthermore, in accordance with 18 U.S.C. § 1833, notwithstanding anything to the contrary in the Confidentiality Agreement or this Agreement: (i) Executive will not be in breach of the Confidentiality Agreement or this Agreement, and will not be held criminally or civilly liable under any federal or state trade secret law (x) for the disclosure of a trade secret that is made in confidence to a federal, state, or local government official or to an attorney solely for the purpose of reporting or investigating a suspected violation of law, or (y) for the disclosure of a trade secret that is made in a complaint or other document filed in a lawsuit or other proceeding, if such filing is made under seal; and (ii) if Executive files a lawsuit for retaliation by the Company for reporting a suspected violation of law, Executive may disclose the trade secret to Executive's attorney, and may use the trade secret information in the court proceeding, if Executive files any document containing the trade secret under seal, and does not disclose the trade secret, except pursuant to court order.

14. Executive's Cooperation. After the Termination Date, Executive shall cooperate with the Company and its affiliates, upon the Company's reasonable request, with respect to any internal investigation or administrative, regulatory or judicial proceeding involving matters within the scope of Executive's duties and responsibilities to the Company or its affiliates during Executive's employment with the Company (including, without limitation, Executive being available to the Company upon reasonable notice for interviews and factual investigations, appearing at the Company's reasonable request to give testimony without requiring service of a subpoena or other legal process, and turning over to the Company all relevant Company documents which are or may have come into Executive's possession during Executive's employment); *provided*, *however*, that (i) any such request by the Company shall not be unduly burdensome or interfere with Executive's personal schedule or ability to engage in gainful employment and (ii) this provision shall not apply to any such investigation or proceeding that arises out of or relates to a dispute between Executive and the Company and/or any of its affiliates or if Executive's reasonable interests are adverse to the Company or its affiliates in any such investigation or proceeding. The Company agrees to promptly pay or reimburse Executive upon demand for all of Executive's reasonable travel and other direct expenses reasonably incurred, or to be reasonably incurred, to comply with Executive's obligations under this Section 14.

(Signature page(s) follow)

IN WITNESS WHEREOF, the undersigned have caused this Transition and Separation Agreement to be duly executed and delivered as of the date indicated next to their respective signatures below.

DATED: _____, 2023

_____
Ross Taylor

CODEXIS, INC.

DATED: _____, 2023

By: _____[Signature page to Codexis, Inc. - Transition and Separation Agreement]
Name:
Title:

EXHIBIT A

GENERAL RELEASE OF CLAIMS

This General Release of Claims ("Release") is entered into as of _____, 2023, between Ross Taylor (" Executive") and Codexis, Inc., a Delaware corporation (the "Company" and, together with Executive, the "Parties"), effective as of the eighth (8th) day after the date of Executive's signature hereto.

1. Executive's Release of the Company. Executive understands that by agreeing to this Release, Executive is agreeing not to sue, or otherwise file any claim against, the Company or any of its directors, officers, employees, investors or other agents for any reason whatsoever based on anything that has occurred in connection with Executive's employment or other relationship with the Company and the conclusion of that employment or other relationship that the Company as of the date Executive signs this Release.

(a) On behalf of Executive and Executive's heirs, assigns, executors, administrators, trusts, spouse and estate, Executive hereby releases and forever discharges the "Releasees" hereunder, consisting of the Company and each of its owners, affiliates, subsidiaries, predecessors, successors, assigns, agents, directors, officers, partners, employees, and insurers, and all persons acting by, through, under or in concert with them, or any of them, of and from any and all manner of action or actions, cause or causes of action, in law or in equity, suits, debts, liens, contracts, agreements, promises, liability, claims, demands, damages, loss, cost or expense, of any nature whatsoever, known or unknown, fixed or contingent (hereinafter called "Claims"), which Executive now has or may hereafter have against the Releasees, or any of them, by reason of any matter, cause, or thing whatsoever from the beginning of time to the date hereof, including, without limiting the generality of the foregoing, any Claims arising out of, based upon, or relating to Executive's hire, employment, remuneration or resignation by the Releasees, or any of them, Claims arising under federal, state, or local laws relating to employment, Claims of any kind that may be brought in any court or administrative agency, including any Claims arising under Title VII of the Civil Rights Act of 1964, as amended, 42 U.S.C. § 2000, et seq.; Americans with Disabilities Act, as amended, 42 U.S.C. § 12101 et seq.; the Rehabilitation Act of 1973, as amended, 29 U.S.C. § 701 et seq.; the Age Discrimination in Employment Act, as amended, 29 U.S.C. § 621, et seq.; Civil Rights Act of 1866, and Civil Rights Act of 1991; 42 U.S.C. § 1981, et seq.; Equal Pay Act, as amended, 29 U.S.C. § 206(d); regulations of the Office of Federal Contract Compliance, 41 C.F.R. Section 60, et seq.; the Family and Medical Leave Act, as amended, 29 U.S.C. § 2601 et seq.; the Fair Labor Standards Act of 1938, as amended, 29 U.S.C. § 201 et seq.; the Employee Retirement Income Security Act, as amended, 29 U.S.C. § 1001 et seq.; the Worker Adjustment and Retraining Notification Act, as amended, 29 U.S.C. § 2101 et seq.; the California Fair Employment and Housing Act, as amended, Cal. Lab. Code § 12940 et seq.; the California Equal Pay Law, as amended, Cal. Lab. Code §§ 1197.5(a),199.5; the Moore-Brown-Roberti Family Rights Act of 1991, as amended, Cal. Gov't Code §§12945.2, 19702.3; California Labor Code §§ 1101, 1102; the California WARN Act, California Labor Code §§ 1400 et. seq; California Labor Code §§ 1102.5(a),(b); Claims for wages under the California Labor Code and any other federal, state or local laws of similar effect; the employment and civil rights laws of California; Claims for breach of contract; Claims arising in tort, including, without limitation, Claims of wrongful dismissal or discharge, discrimination, harassment, retaliation, fraud, misrepresentation, defamation, defamation, infliction of emotional distress, violation of public policy, and/or breach of the implied covenant of good faith and fair dealing; and Claims for damages or other remedies of any sort, including, without limitation, compensatory damages, punitive damages, injunctive relief and attorney's fees.

(b) Notwithstanding the generality of the foregoing, Executive does not release the following claims:

(i) Claims to enforce Executive's rights under the Transition and Separation Agreement entered into between the Company and Executive on [_____], 2023 (the "Transition and Separation Agreement").

(ii) Claims for unemployment compensation or any state disability insurance benefits pursuant to the terms of applicable state law;

(iii) Claims for workers' compensation insurance benefits under the terms of any worker's compensation insurance policy or fund of the Company;

(iv) Claims to continued participation in certain of the Company's group benefit plans pursuant to the terms and conditions of COBRA;

(v) Claims to any benefit entitlements vested as the date of Executive's employment termination, pursuant to written terms of any Company or affiliate employee benefit plan, program or policy;

(vi) Claims for indemnification under the Company's Bylaws, California Labor Code Section 2802 or any other applicable law; and

(vii) Executive's right to bring to the attention of the Equal Employment Opportunity Commission claims of discrimination; *provided*, *however*, that Executive does release Executive's right to secure any damages for alleged discriminatory treatment.

(c) *Acknowledgement.* In accordance with the Older Workers Benefit Protection Act of 1990, Executive has been advised of the following:

(i) Executive should consult with an attorney before signing this Release;

(ii) Executive has been given at least twenty-one (21) days to consider this Release; and

(iii) Executive has seven (7) days after signing this Release to revoke it. If Executive wishes to revoke this Release, Executive must deliver notice of Executive's revocation in writing, no later than 5:00 p.m. on the 7th day following Executive's execution of this Release to Karen Frechou-Armijo at karen.armijo@codexis.com. Executive understands that if Executive revokes this Release, it will be null and void in its entirety, and Executive will not be entitled to any payments or benefits provided in the Transition and Separation Agreement, other than as provided in Sections 2 and 3 thereof.

(d) EXECUTIVE ACKNOWLEDGES THAT EXECUTIVE HAS BEEN ADVISED OF AND IS FAMILIAR WITH THE PROVISIONS OF CALIFORNIA CIVIL CODE SECTION 1542, WHICH PROVIDES AS FOLLOWS:

"A GENERAL RELEASE DOES NOT EXTEND TO CLAIMS THAT THE CREDITOR OR RELEASING PARTY DOES NOT KNOW OR SUSPECT TO EXIST IN HIS OR HER FAVOR AT THE TIME OF EXECUTING THE RELEASE AND THAT, IF KNOWN BY HIM OR HER, WOULD HAVE MATERIALLY AFFECTED HIS OR HER SETTLEMENT WITH THE DEBTOR OR RELEASED PARTY."

BEING AWARE OF SAID CODE SECTION, EXECUTIVE HEREBY EXPRESSLY WAIVES ANY RIGHTS EXECUTIVE MAY HAVE THEREUNDER, AS WELL AS UNDER ANY OTHER STATUTES OR COMMON LAW PRINCIPLES OF SIMILAR EFFECT.

2. Executive Representations. Executive warrants and represents that (a) Executive has not filed or authorized the filing of any complaints, charges or lawsuits against the Company or any of its affiliates with any governmental agency or court, and that if, unbeknownst to Executive, such a complaint, charge or lawsuit has been filed on Executive's behalf, Executive will immediately cause it to be withdrawn and dismissed, (b) Executive has been paid all compensation, wages, bonuses, commissions, and/or benefits to which Executive may be entitled and no other compensation, wages, bonuses, commissions and/or benefits are due to Executive, except as provided in Sections 2 and 3 of the Transition and Separation Agreement, (c) Executive has no known workplace injuries or occupational diseases and has been provided and/or has not been denied any leave requested under the Family and Medical Leave Act or any similar state law, (d) the execution, delivery and performance of this Release by Executive does not and will not conflict with, breach, violate or cause a default under any agreement, contract or instrument to which Executive is a party or any judgment, order or decree to which Executive is subject, and (e) upon the execution and delivery of this Release by the Company and Executive, this Release will be a valid and binding obligation of Executive, enforceable in accordance with its terms.

3. Maintaining Confidential Information. Executive reaffirms Executive's obligations under the Confidentiality Agreement (as defined in the Transition and Separation Agreement). Executive acknowledges and agrees that the payments provided in Section 3 of the Transition and Separation Agreement shall be subject to Executive's continued compliance with Executive's obligations under the Confidentiality Agreement. For the avoidance of doubt, nothing in this Release, the Transition and Separation Agreement or the Confidentiality Agreement will be construed to prohibit Executive from filing a charge with, reporting possible violations to, or participating or cooperating with any governmental agency or entity, including but not limited to the EEOC, the Department of Justice, the Securities and Exchange Commission, Congress, or any agency Inspector General, or making other disclosures that are protected under the whistleblower, anti-discrimination, or anti-retaliation provisions of federal, state or local law or regulation; *provided*, however, that Executive may not disclose information of the Company or any of their affiliates that is protected by the attorney-client privilege, except as otherwise required by law. Executive does not need the prior authorization of the Company to make any such reports or disclosures, and Executive is not required to notify the Company that Executive has made such reports or disclosures. Furthermore, in accordance with 18 U.S.C. § 1833, notwithstanding anything to the contrary in the Confidentiality Agreement, this Release or the Transition and Separation Agreement: (i) Executive will not be in breach of the Confidentiality Agreement, this Release or the Transition and Separation Agreement, and will not be held criminally or civilly liable under any federal or state trade secret law (x) for the disclosure of a trade secret that is made in confidence to a federal, state, or local government official or to an attorney solely for the purpose of reporting or investigating a suspected violation of law, or (y) for the disclosure of a trade secret that is made in a complaint or other document filed in a lawsuit or other proceeding, if such filing is made under seal; and (ii) if Executive files a lawsuit for retaliation by the Company for reporting a suspected violation of law, Executive may disclose the trade secret to Executive's attorney, and may use the trade secret information in the court proceeding, if Executive files any document containing the trade secret under seal, and does not disclose the trade secret, except pursuant to court order.

4. Cooperation With the Company. Executive reaffirms Executive's obligations to cooperate with the Company pursuant to Section 14 of the Transition and Separation Agreement.

5. Severability. The provisions of this Release are severable. If any provision is held to be invalid or unenforceable, it shall not affect the validity or enforceability of any other provision.

6. Choice of Law. This Release shall in all respects be governed and construed in accordance with the laws of the State of California, including all matters of construction, validity and performance, without regard to conflicts of law principles.

7. Integration Clause. This Release, the Transition and Separation Agreement and the Confidentiality Agreement contain the Parties' entire agreement with regard to the transition and separation of Executive's employment, and supersede and replace any prior

agreements as to those matters, whether oral or written, including the Offer Letter (as defined in the Transition and Separation Agreement). This Release may not be changed or modified, in whole or in part, except by an instrument in writing signed by Executive and the Chief Executive Officer of the Company.

8. Execution in Counterparts. This Release may be executed in counterparts with the same force and effectiveness as though executed in a single document. Facsimile signatures shall have the same force and effectiveness as original signatures.

9. Intent to be Bound. The Parties have carefully read this Release in its entirety; fully understand and agree to its terms and provisions; and intend and agree that it is final and binding on all Parties.

(*Signature page(s) follow*)

IN WITNESS WHEREOF, and intending to be legally bound, the Parties have executed the foregoing on the dates shown below.

DATED: _____, 2023

_____
Ross Taylor

DATED: _____, 2023

By: _____

CONFIDENTIAL
Certain information is this document, marked by brackets, has been omitted because it is both (i) not material and (ii) is the type that the registrant treats as private or confidential.

ENZYME SUPPLY AGREEMENT

THIS ENZYME SUPPLY AGREEMENT, including the exhibits attached hereto (the "**Agreement**"), effective as of October 30, 2021 (the "**Effective Date**"), is made and entered into by and between **Codexis, Inc.**, a Delaware corporation, having a place of business at 200 Penobscot Drive, Redwood City, California 94063, United States of America ("**Codexis**"), and Pfizer Ireland Pharmaceuticals, an Irish corporation, with its principal place of business at Operations Support Group, Ringaskiddy, Cork, Ireland, and its Affiliates ("**Pfizer**"). Codexis and Pfizer each may be referred to herein individually as a "**Party**," or collectively as the "**Parties.**"

WHEREAS, Codexis has proprietary rights in certain enzymes, chemical synthesis and biocatalysis process technology, and possesses certain valuable business and/or technical knowledge, information, and/or expertise, relating to enzymatically catalyzed manufacturing processes;

WHEREAS, Pfizer and its Affiliates are engaged in the business of manufacturing and supplying pharmaceutical ingredients and intermediates thereof and has proprietary rights in certain compounds, including the Intermediate and the Product, methods of manufacturing the Intermediate and the Product and methods of use of the Intermediate and the Product; and

WHEREAS, Codexis desires to supply Codexis Enzyme to Pfizerand its Affiliates, and Pfizer desires to use (whether through itself, its Affiliates or Pfizer Designees) such Codexis Enzyme in the manufacture and supply of Intermediate for use by Pfizer and its Affiliates in the manufacture and supply of Product to customers in the Territory, as more fully set forth in this Agreement.

NOW, THEREFORE, in consideration of the mutual covenants and obligations set forth herein, and for other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the Parties agree as follows:

1. DEFINITIONS

1.1 **"Accounting Standards"** means IFRS or U.S. GAAP, as applicable.

1.2 **"Acquisition Cost"** shall mean Pfizer's or it's Affiliate's [***], payable to Codexis during the Quarter for which the Acquisition Cost is being measured, to acquire a kilogram of Codexis Enzyme from either a Qualified Enzyme Manufacturing Facility (pursuant to Section 4.3(a)) or a Third Party Enzyme Manufacturing Facility (pursuant to Section 4.3 (c)) under a Technology Transfer for use by Pfizer and its Affiliates in the manufacture of Intermediate for use in the manufacture of Product, as such actual average cost is calculated in accordance with the Accounting Standards, consistently applied.

1.3 "**[***]**" [***].

1.4 "**[***] Facility**" means, [***], the Qualified Enzyme Production Facility owned by [***] and located at [***].

1.5 **"Affiliate"** shall mean any entity that is controlled by, controls, or is under common control with a Party on or after the Effective Date, as the case may be. For purposes of this Section 1.5, the term "control" means (a) direct or indirect ownership of more than fifty percent (50%) of the voting interest in the entity in question, or more than fifty percent (50%) interest in the income of the entity in question; provided, however,

that, if local law requires a minimum percentage of local ownership of greater than fifty percent (50%), control will be established by direct or indirect beneficial ownership of one hundred percent (100%) of the maximum ownership percentage that may, under local law, be owned by foreign interests, or (b) possession, directly or indirectly, of the power to direct or cause the direction of management or policies of the entity in question (whether through ownership of securities or other ownership interests, by contract or otherwise).

1.6 "Agency" shall mean any applicable local, national or supranational Government Authority involved in granting approvals for the manufacturing, marketing and/or pricing of Product.

1.7 "Applicable Law" shall mean all international, supranational, national, federal, state, provincial, regional and local laws, statutes, ordinances, codes, rules, regulations, orders, decrees or other pronouncements of any governmental, administrative or judicial authority having the effect of law, including, without limitation, Environmental Laws, and Global Trade Control Laws, in each case to the extent that the same are applicable to the performance by the Parties of their respective obligations under this Agreement.

1.8 "[***]" [***].

1.9 "Calendar Year " shall mean any twelve (12) consecutive month period commencing on January 1 and ending December 31 during the Term. For example, Calendar Year 2022, for purposes of this Agreement, shall mean the period from January 1, 2022 through December 31, 2022.

1.10 "Claims" shall have the meaning set forth in Section 12.1.

1.11 "Codexis Enzyme" shall mean Codexis' proprietary CDX-616 lyophilized enzyme powder.

1.12 "Codexis Enzyme Technology" shall mean (a) the Licensed Patents, and (b) know-how and other information further to the Licensed Patents required to implement the manufacturing process of making Codexis Enzyme [***].

1.13 "Codexis Inventions" shall have the meaning set forth in Section 10.1.

1.14 "Codexis Rolling Forecast" shall have the meaning set forth in Section 2.4.

1.15 "Codexis Technology" shall mean (a) the Licensed Patents, and (b) know-how and other information further to the Licensed Patents required to implement the manufacturing process of making Intermediate from the Codexis Enzyme as described in [***].

1.16 "Confidential Information" shall mean any information of a confidential and/or proprietary nature, including without limitation the data, results, inventories, know-how, processes, machines, methods, developments, compositions of matter, inventions, invention disclosures, patent applications, proprietary materials and/or techniques, economic information, business or research strategies, purchase orders (and any information included therein), trade secrets, or other information of any type or kind, and material embodiments thereof, disclosed by a Party, either directly or indirectly to the

other Party in written form marked "confidential," or in oral form if designated as "confidential" at the time of disclosure, or which, under the circumstances of disclosure, is reasonably apparent to be confidential.

1.17 "Conflict Minerals" means (a) cassiterite, columbite-tantalite (coltan), gold, wolframite, and the derivatives tantalum, tin and tungsten, and (b) any other mineral or its derivatives designated (i) by the U.S. Secretary of State as a Conflict Mineral for purposes of Rule 13p-1 under the Securities Exchange Act of 1934, as amended, or (ii) under any other conflict minerals regime to which Pfizer may become subject, in each case irrespective of the location of origin of the mineral or derivative metal.

1.18 "Control" shall mean, with respect to an item, information or intellectual property right, possession of the ability, whether arising by ownership or license, to grant a license or sublicense as provided for herein under such item, information or intellectual property right without violating the terms of a written agreement with any Third Party.

1.19 "Environmental Laws" means all laws or other legal requirements of any kind, whether currently in existence or hereafter promulgated, enacted, adopted or amended, relating to (i) safety (including occupational health and safety); (ii) pollution, conservation, preservation or protection of human health, drinking water, natural resources, biota and the environment; (iii) the introduction of any chemical substances, products or finished articles into the stream of commerce; (vi) the imposition of any discharge levy or other economic instrument to prevent or reduce discharge or Release of pollutants or Hazardous Materials; (v) the conduct of environmental impact assessment in connection with the design, development and operation of any facility or project; (vi) the notification, classification, registrations and labeling of new chemical substances; and/or (vii) the generation, use, storage, handling, treatment, transportation or disposal of Waste including without limitation any matters related to Releases or threatened Releases of Hazardous Materials.

1.20 "Environmental Losses" means any and all fines, penalties, costs, liabilities, damages or losses incurred by Pfizer or an Affiliate of Pfizer, or for which Pfizer or an Affiliate of Pfizer is liable or obligated pursuant to or in connection with any Environmental Law or Release or threatened Release of Hazardous Materials (i) arising out of the operation or ownership of Qualified Enzyme Manufacturing Facilities supplying Codexis Enzyme to Codexis or (ii) relating to, arising from, or in any way connected with testing, manufacture, packaging, generation, processing, storage, transportation, distribution, treatment, disposal or other handling of the Codexis Enzyme or materials used in the manufacture, packaging, handling or storage of the Codexis Enzyme, or associated by-products, raw materials, intermediates, Wastes or returned Codexis Enzyme, by Codexis, Affiliates of Codexis, or subcontractors of Codexis or such subcontractor's Affiliates, or their respective officers, directors, employees, agents or contractors.

1.21 "Enzyme Specification(s)" shall have the meaning set forth in Section 2.6.

1.22 "Excluded List(s)" means the Department of Health and Human Service's List of Excluded Individuals/Entities and the General Services Administration's Lists of Parties Excluded from Federal Procurement and Non-Procurement Programs**.**

1.23 "Existing Order" shall have the meaning set forth in Section 2.5(a).

1.24 "FD&C Act" means the United States Federal Food, Drug and Cosmetic Act and regulations promulgated thereunder, as each may be amended from time to time.

1.25 "Global Trade Control Laws" shall mean applicable economic sanctions, import, and export control laws, regulations, and orders.

1.26 "Government Authority" shall mean any supranational, national, regional, state or local government, court, governmental agency, authority, board, bureau, instrumentality, regulatory body, or other government entity, including without limitation any of the foregoing that is involved in the granting of approvals, licenses, registrations, or authorizations including but not limited to Regulatory Authority.

1.27 "**Government Official**" shall be broadly interpreted and means: (i) any elected or appointed non-U.S. Government official (e.g., a legislator or a member of a non-U.S. Government ministry); (ii) any employee or individual acting for or on behalf of a non-U.S. Government official, non-U.S. Government agency, or enterprise performing a function of, or owned or controlled by, a non-U.S. Government (e.g., a healthcare professional employed by a non-U.S. Government hospital or researcher employed by a non-U.S. Government university); (iii) any non-U.S. political party officer, candidate for non-U.S. public office, or employee or individual acting for or on behalf of a non-U.S. political party or candidate for public office; (iv) any employee or individual acting for or on behalf of a public international organization; (v) any member of a royal family or a member of a non-U.S. military, and (vi) any individual otherwise categorized as a Government Official under applicable Law.

1.28 "Hazardous Materials" means any and all materials (including without limitation substances, chemicals compounds, mixtures, products, byproducts, biologic agents, living or genetically modified materials, wastes, pollutants and contaminants), that (A) (i) are listed, classified, characterized or regulated pursuant to Environmental Laws; (ii) are identified, defined, or classified as "hazardous," "dangerous," "toxic," "pollutant," "contaminant," "waste," "irritant," "corrosive," "flammable," "radioactive," "reactive," "carcinogenic," "mutagenic," "bio-accumulative," or "persistent" in the environment; or (iii) harm, endanger or cause injury to human health, natural resources or the environment; or (B) petroleum products and their derivatives, asbestos-containing material, lead-based paint, polychlorinated biphenyls, urea formaldehyde, or viral, bacterial or fungal material.

1.29 "IFRS" shall mean International Financial Reporting Standards, consistently applied.

1.30 "Initial Term" shall have the meaning set forth in Section 11.1.

1.31 "Intermediate" shall mean methyl (1*R*,2*S*,5*S*) 6,6-dimethyl-3-azabicyclo[3.1.0]hexane-2-carboxylate hydrochloride (CAS # 565456-77-1) (Pfizer Identifier: PF-04349713-01).

1.32 "[***] **Facility**" shall mean the manufacturing facility owned by Pfizer or its Affiliates which has been Qualified to manufacture Codexis Enzyme for Pfizer and its Affiliates under a Technology Transfer and is located [***].

1.33 "[***]" [***].

1.34 **"[***] Facility"** means the Qualified Enzyme Manufacturing Facility owned by [***] and located at [***].

1.35 "**Latent Defect**" means defects in the Codexis Enzyme which are not readily discoverable based on, as applicable, Pfizer's, Pfizer Affiliates' or Pfizer Designees' normal incoming-goods inspections.

1.36 **"Licensed Patents"** means those patents listed at Exhibit 1.36.

1.37 **"Marketing Authorization"** shall mean, with respect to any country in the Territory, a marketing authorization or similar, registration or certification necessary to market Product in such country.

1.38 **"Minimum Order Quantity"** shall have the meaning set forth in Section 2.5(b).

1.39 **"[***]"** shall mean that certain [***].

1.40 **"New Order"** shall have the meaning set forth in Section 2.5(e).

1.41 **"New Qualified Enzyme Manufacturing Facility"** shall mean any new Qualified Enzyme Manufacturing Facility ([***]) that is Qualified after the Effective Date to manufacture and supply Codexis Enzyme for supply by Codexis to Pfizer and its Affiliates.

1.42 **"Order"** shall mean a binding commitment in writing through issuance of a purchase order, made by Pfizer or its Affiliates, to purchase a specified amount of Codexis Enzyme from Codexis. Orders may be either **Existing Orders** or **New Orders**.

1.43 **"Pfizer Designee'** shall mean a Third Party who is under written contract with either Pfizer or an Affiliate of Pfizer to perform one or more manufacturing activities in respect of manufacture of the Intermediate on behalf of Pfizer or its Affiliates. Pfizer Designee(s) are shown in Exhibit 1.43 which may be updated from time to time upon prior written notification by Pfizer to Codexis, subject to Codexis' approval within thirty days of receipt (such approval not to be unreasonably withheld and approval to be considered as given in absence of any negative response within such thirty days).

1.44 **"Pfizer Rolling Forecast"** shall have the meaning set forth in Section 2.4.

1.45 **"Third Party Enzyme Manufacturing Facility"** shall mean a Third Party manufacturing facility (other than a Qualified Enzyme Manufacturing Facility) which is under written contract with Pfizer or an Affiliate of Pfizer to manufacture and supply Codexis Enzyme to Pfizer and its Affiliates under a Technology Transfer.

1.46 **"Product"** shall mean (1R,2S,5S)-N-{(1S)-1-cyano-2-[(3S)-2-oxopyrrolidin3-yl]ethyl}-6,6-dimethyl-3-[3-methyl-N-(trifluoroacetyl)-L-valyl]-3-azabicyclo[3.1.0]hexane-2-carboxamide ("nirmatrelvir") (CAS # 2628289040-8) (Pfizer Identifier: PF-07321332).

1.47 **"Qualified,"** and the correlative terms "Qualification,", "Qualify" and "Qualifying," shall mean, in relation to a facility seeking to manufacture Codexis Enzyme under this Agreement, a facility meeting the then required standards for quality and quality assurance established by Codexis for the manufacture of Codexis Enzyme,

which has produced, at commercially relevant scale, Codexis Enzyme which meets the Enzyme Specification and which Codexis Enzyme has been tested by Pfizer, its Affiliates and/or its Pfizer Designee manufacturing Intermediate for Pfizer and confirmed in writing (e-mail being acceptable) by Pfizer as acceptable for use in the manufacture of Intermediate.

1.48 "Qualified Enzyme Manufacturing Facility" shall mean a manufacturing facility that has been Qualified to manufacture and supply Codexis Enzyme for supply by Codexis to Pfizer and its Affiliates. Qualified Enzyme Manufacturing Facilities include the [***] Facility and, [***], the [***] Facility and any New Qualified Enzyme Manufacturing Facility.

1.49 "Quarter" shall mean each of the three consecutive calendar months ending March 31, June 30, September 30, and December 31.

1.50 "**Regulatory Authority**" means the FDA with respect to the United States and the corresponding agencies or authorities responsible for regulation of the Product with respect to jurisdictions in the applicable country in the Territory other than the United States where the Product is to be marketed and sold.

1.51 "Release" means the release, spill, emission, leaking, pumping, pouring, emptying, escaping, dumping, injection, deposit, disposal, discharge, dispersal, leaching or migration into the indoor or outdoor environment, including the uncontrolled presence or the movement of Hazardous Materials through the ambient air, soil, subsurface water, groundwater, wetlands, lands or subsurface strata or threat thereof.

1.52 "Renewal Term" shall have the meaning set forth in Section 11.1.

1.53 "Restricted Market(s)" for purposes of this Agreement means the Crimean Peninsula, Cuba, the Donbass Region, Iran, North Korea, and Syria, or any other country or region subject to sanctions by the United States or European Union.

1.54 "Restricted Party(ies)" for purposes of this Agreement means the means an individual or entity on the list of sanctioned entities maintained by the United Nations; the Specially Designated Nationals List and the Sectoral Sanctions Identifications List of the U.S. Treasury Department's Office of Foreign Assets Control; the U.S. Denied Persons List, the U.S. Entity List, and the U.S. Unverified List of the U.S. Department of Commerce; entities subject to restrictive measures and the Consolidated List of Persons, Groups and Entities Subject to E.U. Financial Sanctions, as implemented by the E.U. Common Foreign and Security Policy; the List of Excluded Individuals / Entities published by the U.S. Health and Human Services Office of Inspector General; any lists of prohibited or debarred parties established under the U.S. Federal Food Drug and Cosmetic Act; the list of parties suspended or debarred from contracting with the U.S. government; and similar lists of restricted parties maintained by the governmental entities of the countries that have jurisdiction over the activities conducted under this Agreement.

1.55 "**Retest Date**" means for each lot of the Codexis Enzyme the required retest date as specified on the CoA of such lot, and "**Retest Period**" shall mean the period from delivery of the Enzyme until the first Retest Date and subsequent to the first Retest Date the period between Retest Dates.

1.56 "Section 4.3 Replacement Quantities" means those quantities of Codexis Enzyme (i) which are purchased by or for Pfizer or its Affiliates directly from a Qualified Enzyme Manufacturing Facility (pursuant to Section 4.3(a)), (ii) self-manufactured by Pfizer (or Pfizer Inc.) at the [***] Facility (pursuant to Section 4.3(b)), or (iii) sourced by Pfizer or its Affiliates from a Third Party Enzyme Manufacturing Facility (pursuant to Section 4.3(c)).

1.57 "Section 4.6(a) Use Fee" shall have the meaning set forth in Section 4.6(a).

1.58 "Section 4.6(b) Use Fee" shall have the meaning set forth in Section 4.6(b).

1.59 "Services" means the manufacturing, testing, and packaging of Codexis Enzyme to the applicable Enzyme Specification.

1.60 "Technology Transfer" shall mean a technology transfer (pursuant to Section 4.5 or Section 5.4) by Codexis of technology and know-how reasonably necessary for the manufacture of the Codexis Enzyme at the [***] Facility or at a Third Party Enzyme Manufacturing Facility.

1.61 "Term" shall have the meaning set forth in Section 11.1.

1.62 "Territory" shall mean all of the countries of the world.

1.63 "Third Party" (and with its correlative meaning, "**Third Parties**") shall mean any party other than Codexis, Pfizer, or an Affiliate of either Codexis or Pfizer.

1.64 "Trigger Event" means (a) any failure by Codexis to supply the quantities of Codexis Enzyme which are the subject of an Existing Order or an accepted New Order [***] or (b) the good faith belief by Codexis that it will not be capable of supplying the quantities of Codexis Enzyme which are the subject of an Existing Order on or before the delivery date(s) set forth in the Existing Order [***] or (c) the good faith belief by Codexis that it is not capable during any [***] period of supplying to Pfizer or its Affiliates a cumulative quantity of Codexis Enzyme equivalent to [***].

1.65 "U.S." means the 50 States of the United States of America, the District of Columbia, and U.S. territories.

1.66 "U.S. GAAP" means United States generally accepted accounting principles, consistently applied.

1.67 "Waste" means all wastes which arise from the manufacture, handling or storage by Codexis, Affiliates of Codexis, or subcontractors of Codexis or such subcontractor's Affiliates, or their respective officers, directors, employees, agents or contractors, of the Codexis Enzyme hereunder, or which is otherwise produced through the operations of Codexis, Affiliates of Codexis, or subcontractors of Codexis or such subcontractor's Affiliates, or their respective officers, directors, employees, agents or contractors. or such through implementation of this Agreement including Hazardous Materials.

2. ENZYME SUPPLY

2.1 Codexis Enzyme Supply. Subject to the terms and conditions of this Agreement, Codexis shall supply Codexis Enzyme to Pfizer, its Affiliates and the Pfizer Designees in accordance with Orders placed by Pfizer or its Affiliates, and Pfizer shall purchase from Codexis, and cause Pfizer's Affiliates to purchase from Codexis, all of Pfizer's, its Affiliates' and the Pfizer Designees' requirements for Codexis Enzyme, for use in the manufacture of Intermediate by or for Pfizer, its Affiliates or the Pfizer Designees for use in the manufacture and sale of Product in the Territory during the Term.

2.2 Terms and Conditions. All supply of Codexis Enzyme by Codexis to Pfizer, its Affiliates and, under Orders placed by Pfizer or its Affiliates, the Pfizer Designees, shall be subject to the terms and conditions of this Agreement. Any terms of any Order or acknowledgement given or received which are inconsistent with this Agreement given by either Party shall have no effect, and such terms are hereby excluded and rejected.

2.3 Restricted Rights. Codexis Enzyme transferred to Pfizer, its Affiliates and the Pfizer Designees (under Orders placed by Pfizer or its Affiliates) under this Agreement is intended to be used solely for the manufacture of Intermediate by or on behalf of Pfizer, its Affiliates and the Pfizer Designees for use in the manufacture and sale of Product in the Territory in accordance with the terms and conditions of this Agreement. Codexis Enzyme transferred to Pfizer, its Affiliates and the Pfizer Designees under this Agreement is not intended for use as a biocatalyst for other chemical reactions. [***]. Any other distribution, use, or other exploitation of Codexis Enzyme not in accordance with this Agreement shall be considered to be unlicensed and are hereby prohibited. Pfizer, its Affiliates and the Pfizer Designees shall not transfer any Codexis Enzyme to any Third Party (except to a Pfizer Designee, in which event Pfizer shall ensure that such Pfizer Designee complies with Pfizer's obligations under this Section 2.3, Section 2.8, Section 2.9, Section 2.14, Section 10.1 and Article 8). Pfizer, its Affiliates and the Pfizer Designees shall not manufacture Codexis Enzyme or acquire Codexis Enzyme from any Third Party, except as otherwise provided in the Agreement.

2.4 Forecasts. [***]. Therefore, [***], Pfizer agrees to provide to Codexis [***] a written (e-mail is acceptable), good faith, non-binding, rolling forecast of Pfizer's, its Affiliates' and the Pfizer Designees' anticipated demand for quantities (in kg) of Codexis Enzyme ("**Pfizer Rolling Forecast**") for the upcoming [***] and Codexis agrees to provide to Pfizer [***] a written (e-mail is acceptable), good faith, non-binding, rolling forecast of Codexis' anticipated production capacity (in kg) for Codexis Enzyme which is available to Pfizer ("**Codexis Rolling Forecast**") for the upcoming [***]. The Pfizer Rolling Forecast and the Codexis Rolling Forecast will be delivered to the other Party not later than [***] after the start of the first Quarter of the [***] forecast period and shall be updated as significant changes occur. See also Exhibit 3.1 for requirements for a separate annual forecast for pricing purposes.

2.5 Orders.

(a) Existing Orders. As of May 18, 2022, Pfizer or its Affiliates have placed with Codexis firm, binding, and non-cancelable written purchase orders for Codexis Enzyme as shown in Exhibit 2.5(a) ("**Existing Orders**"). The Existing Orders have been accepted by Codexis and at the time of acceptance constituted firm, binding and non-

cancelable purchase and sale obligations on the part of Codexis and Pfizer or its Affiliates.

(b) Existing Non-Cancelable Orders. As of the Effective Date, the Existing Orders listed in Exhibit 2.5(b) ("**Existing Non-Cancelable Orders**") continue to constitute firm, binding, and non-cancelable purchase and sale obligations on the part of Codexis and Pfizer or its Affiliates. The Existing Non-Cancelable Orders may not be changed or canceled.

(c) Existing Canceled Orders. As of the Effective Date, and subject to the provisions of Section 2.5(d), the Existing Orders listed in Exhibit 2.5(c) ("**Existing Canceled Orders**") are, by mutual agreement of Codexis and Pfizer or its Affiliates, canceled and no longer constitute firm, binding, and non-cancelable purchase obligations on the party of Codexis and Pfizer or its Affiliates.

(d) Retainer Fee.

(i) In consideration for cancelation of the Existing Canceled Orders, Pfizer shall pay to Codexis the following mutually agreed, non-refundable, non-creditable (except as provided in Section 2.5(d)(ii) and Section 2.5(d)(iii)) retainer fee (not as a penalty):

Retainer Fee for [***] ("**Retainer Fee")**	**US$25,880,000.00**

Codexis shall invoice Pfizer for the Retainer Fee within [***] of the Effective Date. Pfizer shall ensure the Retainer Fee payment is received by Codexis full by [***].

(ii) A total of 90% of the Retainer Fee paid by Pfizer to Codexis as provided in Section 2.5(d)(i) (i.e., US$23,292,000.00) ("**Creditable Amount**") is creditable against:

(a) [***] of the Adjusted Enzyme Price of any New Order(s) (as defined in Section 2.5(e)) placed by Pfizer or its Affiliates with and accepted by Codexis with a scheduled ship date (as reflected on the New Order) prior to December 31, 2023; and

(b) [***] of any fees invoiced by Codexis to Pfizer during the period January 1, 2022 through December 31, 2023 under mutually acceptable, executed, written definitive collaborative development(s)/licensing agreement(s) (not including this Agreement) executed by Codexis and Pfizer from the Effective Date through December 31, 2022. For clarity, such agreements may include standalone purchase orders.

(iii) A total of 50% of any portion of the Retainer Fee which has not been credited after the issuance of credits pursuant to Section 2.5(d)(ii) is creditable against the Adjusted Enzyme Price of any New Order(s) (as defined in Section 2.5(e)) placed by Pfizer or its Affiliates with and accepted by Codexis with a scheduled ship date (as reflected on the New Order) between January 1, 2024 and December 31, 2024.

(iv) Any portion of the Retainer Fee which had not been credited in the manner specified in Section 2.5(d)(ii) or Section 2.5(d)(iii) is non-creditable and non-refundable and will be retained by Codexis.

(e) New Orders. At any time during the Term, Pfizer or its Affiliates may place with Codexis a new written purchase order for Codexis Enzyme ("**New Order**"). Pfizer and its Affiliates are under no obligation to place New Orders. Unless otherwise agreed in writing (e-mail is acceptable), all New Orders shall be for a minimum of [***] of Codexis Enzyme and shall be in full lot quantities packaged in [***] ("**Minimum Order Quantity**").

(f) New Orders Acceptance. For New Orders which are for delivery of a quantity of Codexis Enzyme [***] and which [***], Codexis shall be deemed to have accepted the New Order. For New Orders which do not (i) [***] or which (ii) when the quantity of Codexis Enzyme which is the subject of the New Order is [***] and then existing New Orders then in place [***], Codexis shall have the right [***] to reject the New Order [***], in which case Codexis and Pfizer and its Affiliates shall work together in good faith to establish alternative delivery date(s) and/or alternative order quantities which can be accepted by Codexis. Once accepted by Codexis, each New Order shall become a firm, binding and non-cancelable purchase and sale obligation on the part of Codexis and Pfizer and its Affiliates and may not be changed or canceled except by mutual written consent. Each New Order shall specify the following:

1. [***];
2. [***];
3. [***]; and
4. [***].

(g) Form of Order. All New Orders shall be governed by the terms and conditions of this Agreement and any term or condition set forth in a New Order or acknowledgement that would materially amend or supplement the terms and conditions of this Agreement is rejected and without effect. All of Pfizer's and its Affiliates' orders for Codexis Enzyme shall be made pursuant to such written New Order form and shall provide for shipment in compliance with Section 2.8.

2.6 Enzyme Specification. Codexis shall manufacture and supply Codexis Enzyme in accordance with the Enzyme Specification (the "**Enzyme Specification(s)**") attached under **Exhibit 2.6**. The Parties may amend the Enzyme Specification(s) from time to time [***]. Codexis Enzyme shall be manufactured in accordance with appropriate quality controls, as may be mutually agreed upon by the Parties in a separate written Quality Agreement. Upon mutual execution of any Quality Agreement, such Quality Agreement shall be incorporated as an addendum to this Agreement. [***].

2.7 Retest Period. Except with the prior written consent of Pfizer, Codexis shall not make any delivery of Codexis Enzyme (i) [***] prior to the delivery date of the Codexis Enzyme to Pfizer, its Affiliates or Pfizer Designees, and (ii) for which the Retest Date is less than [***] after the delivery date of the Codexis Enzyme to Pfizer, its Affiliates or Pfizer Designees. Pfizer, its Affiliates and the Pfizer Designees shall have the right to refuse delivery of any Codexis Enzyme which does not meet the requirements of this Section 2.7. With Pfizer's consent, which will not be unreasonably withheld or delayed, Codexis will have the right to [***].

2.8 Delivery and Storage of Codexis Enzyme. Subject to Section 2.5, Codexis shall deliver to Pfizer, the Pfizer Affiliates or the Pfizer Designees the amount of Codexis Enzyme specified in each New Order no later than the date(s) specified therein. All Codexis Enzyme shall be shipped by Codexis [***]. Codexis shall provide any documentation required for shipment of Codexis Enzyme ([***]). Pfizer, its Affiliates and the Pfizer Designees shall store, handle and maintain the Codexis Enzyme in accordance with storage instructions as determined by Codexis (currently [***]), which storage instructions may be amended from time to time by Codexis in advance in writing. Pfizer, its Affiliates and the Pfizer Designees shall bear any and all costs from failure to comply with such storage instructions, including without limitation any payments required for additional quantities of Codexis Enzyme purchased by Pfizer or its Affiliates due to such failure.

2.9 Inspection. Prior to shipment of any Codexis Enzyme, Codexis and/or any Third Party referenced in Section 2.15 shall test and inspect such shipment to ensure compliance with the applicable Enzyme Specification. Upon receipt of shipment of Codexis Enzyme, Pfizer, Pfizer Affiliate(s) or Pfizer Designee(s) shall inspect such Codexis Enzyme for compliance with the applicable Enzyme Specification for such Codexis Enzyme corresponding to such shipment. Pfizer or Pfizer Affiliate shall inform Codexis of the result of the inspection, including any claim with respect to all or part of a shipment, in writing within [***] after the receipt of such shipment of Codexis Enzyme. In the event that Codexis receives a written notice of claim from Pfizer or Pfizer Affiliate, which notice must include sufficient detail identifying the basis for claim, the Parties shall determine if such claim is proper pursuant to the dispute resolution mechanism set forth in Section 2.13 and shall enter into good faith discussions regarding supply of replacement quantities of Codexis Enzyme during the dispute resolution process. If Pfizer or Pfizer Affiliate fails to notify Codexis in writing of a claim (other than for Latent Defects in the Codexis Enzyme) within such [***] period, Pfizer's or Pfizer Affiliates' right to submit a claim for the shipment for any basis that would have been discoverable through an inspection will be deemed to have been waived. Where any failure of Codexis Enzyme to conform to applicable Enzyme Specification(s) is not readily discoverable based on Pfizer's, it's Affiliates', or Pfizer Designee(s)' normal incoming-goods inspections but is a Latent Defect, Pfizer or Pfizer Affiliate(s) shall have the right to submit a claim with respect to all or part of a shipment within [***], but in no event later than the last day of the then current Retest Period for such shipment of Codexis Enzyme.

2.10 Refund, Replacement of Non-conforming Codexis Enzyme

Pfizer, Pfizer Affiliates or Pfizer Designee(s) may return to Codexis at Codexis' expense any Codexis Enzyme rejected pursuant to Section 2.9 and which is not subject to a disputed claim under Section 2.13. [***], Codexis shall, [***]: (i) replace any Codexis Enzyme rejected by Pfizer or Pfizer Affiliates, at no additional cost to Pfizer or its Affiliates, as soon as reasonably practicable [***]; or (ii) provide a credit or refund to Pfizer or its Affiliates for the full amount invoiced to Pfizer for such Codexis Enzyme, which shall be credited or refunded (as the case may be) to Pfizer or its Affiliates within [***].

2.11 Root Cause Analysis. Upon notice by Pfizer or its Affiliates to Codexis that the Codexis Enzyme does not conform to the Enzyme Specifications or has Latent Defects, Codexis shall use commercially reasonable efforts to promptly and diligently: (i) investigate and attempt to determine the root cause of such non-conformance or defect;

(ii) undertake corrective action; and (iii) at all times keep Pfizer or its Affiliates promptly information of such investigation and the progress of such corrective action. If a root cause is determined, then Codexis shall promptly notify and report the results to Pfizer or its Affiliates, and Codexis and Pfizer or its Affiliates will cooperate in good faith on a corrective action plan.

2.12 Change Control. [***].

2.13 Disputes. If Codexis disputes Pfizer's or Pfizer Affiliates conclusion to submit a claim with respect to all or part of any shipment of any Codexis Enzyme as set forth in Section 2.10, Codexis shall notify Pfizer or Pfizer Affiliates within [***] after receipt of Pfizer's or Pfizer Affiliates written notice of such rejection. Such dispute shall be resolved by a Third Party within [***] of such notice by Codexis. Such Third Party shall have expertise in the [***], the identity of whom shall be mutually agreed upon by the Parties, and the appointment of whom shall not be unreasonably delayed or conditioned by either Party. The determination of such Third Party with respect to all or part of any shipment of any Codexis Enzyme shall be final and binding upon the Parties and shall be strictly limited to the determination of the financial liability set forth in this Section 2.13. If such Third Party determines that Pfizer's or Pfizer Affiliates claim with respect to the shipment or part thereof was: (x) proper, then [***], Codexis shall replace such shipment or reimburse or credit to Pfizer or Pfizer Affiliates, Pfizer's or Pfizer Affiliates direct costs and expenses associated with the nonconforming Codexis Enzyme; or (y) not proper, then no refund or credit shall be due to Pfizer or Pfizer Affiliates. The fees and expenses of such Third Party shall be paid by [***]. [***].

2.14 Use of Codexis Enzymes.

(a) Except as expressly set forth in this Agreement, and only insofar as it relates to Codexis Enzymes in their actual possession, custody or control, Pfizer and its Affiliates will not, and will cause Pfizer Designees to not, without the prior written consent of Codexis, (i) extract information from, reverse engineer, deconstruct, disassemble, sequence or in any way determine, or attempt to extract information from, reverse engineer, deconstruct, disassemble, sequence or in any way determine, the biological, chemical or physical structure or composition of any of the Codexis Enzyme or its components; (ii) copy, alter, immobilize, stabilize, add to, alter, modify or otherwise design or create any derivative of Codexis Enzyme or its components; or (iii) transfer any Codexis Enzyme or its respective components, or sequence information pertaining thereto, to a Third Party (except as expressly provided for under Section 2.3) or otherwise sublicense or subcontract any of its rights or obligations under this Agreement to any Third Party in a manner not permitted hereunder.

(b) [***].

2.15 Third Party Contractors. Codexis may, with the prior written consent of Pfizer, which consent will not be unreasonably withheld or delayed, satisfy its supply obligations to Pfizer and its Affiliates under this Agreement either in whole or in part through arrangements with Third Parties engaged to perform services or supply facilities or goods in connection with the manufacture, testing, and/or packaging of Codexis Enzyme; provided, that Codexis shall remain responsible for the actions of such Third Parties and for compliance with its obligations under this Agreement. Pfizer and its Affiliates recognize that the [***] Facility is currently Codexis' Qualified Enzyme

Manufacturing Facility for the Codexis Enzyme and, subject to the terms and conditions set forth herein, including without limitation this Section 2.15, Pfizer and its Affiliates accept the use of the [***] Facility as a Qualified Enzyme Manufacturing Facility. Codexis shall, and shall cause all Third Party contractors, including without limitation [***], to perform Services: (a) in a professional and good scientific manner, meeting the standards of diligence, safety, and skill customary in the field; (b) in compliance with all Applicable Laws; and (c) in compliance with this Agreement and any Quality Agreement between the Parties. Without limiting the foregoing, Codexis shall use its commercially reasonable efforts to complete the objectives and activities agreed upon between the Parties, and to achieve the milestones and meet the timelines and schedules agreed upon between the Parties. [***].

3. PAYMENT; TAXES

3.1 Pricing. Pfizer and its Affiliates shall pay Codexis for Codexis Enzyme delivered hereunder as established in accordance with **Exhibit 3.1** of this Agreement. All deliveries are [***]. [***].

3.2 Invoicing. All invoices shall be sent to the address designated in the applicable purchase order, and shall include the following information: the applicable purchase order number and billing address; and shall also include, where applicable, the type, description, part number and quantity of the Codexis Enzyme shipped; the actual date of shipment; the prices; any applicable taxes, transportation charges or other charges provided for in the applicable purchase order; and the ship-to destination.

3.3 Payment. Codexis shall invoice Pfizer or the applicable Pfizer Affiliate upon [***]. Pfizer or the Pfizer Affiliate shall pay all undisputed amounts due within [***] from the date of receipt of the invoice by Pfizer or the Pfizer Affiliate. All payments made under this Agreement shall be made by direct wire transfer of United States Dollars in immediately available funds in the requisite amount to:

Bank Name: [***]
Bank Address: [***]
[***]
ABA#: [***]
Beneficiary: Codexis, Inc.
Account No.: [***]
SWIFT Code: [***]

or such other bank account as Codexis may from time to time designate in writing. If Pfizer or the Pfizer Affiliate disputes all or any portion of an invoice, Pfizer or its Affiliate shall notify Codexis promptly in writing of the amount and nature of the dispute and the Parties shall attempt to resolve the dispute in good faith. In the event of any unresolved dispute regarding an invoice, the Parties shall resolve the dispute in accordance with Section 13.4. Payment by Pfizer or its Affiliate shall not result in a waiver of any of its rights under this Agreement. [***].

3.4 Taxes.

(a) Each Party shall be responsible for its own taxes, duties, levies, imposts, assessments, deductions, fees, withholdings or similar charges imposed on or measured by net income or overall gross income (including branch profits), gross receipts, capital,

ability or right to do business, payroll, property and franchise or similar taxes pursuant to applicable law.

(b) Pfizer and its Affiliates shall be entitled to withhold or deduct from any payment due to Codexis any taxes, fees, duties, charges, or similar payments as required by applicable laws, such payment shall decrease by an equivalent amount, and such withheld amount shall be treated as paid to Codexis. Pfizer and its Affiliates will provide to Codexis reasonable documentation that evidences Pfizer's payment of any tax on behalf of Codexis. The Parties agree, upon request, to use all reasonable efforts to obtain or provide any valid certificate, form, or other document or information from any governmental entity or any other person as may be necessary to lawfully withhold, report, mitigate, reduce or eliminate any tax that could be imposed on the payments contemplated by this Agreement. Codexis shall indemnify and hold harmless Pfizer for any withholding agent liability for withholding taxes, including interest and penalties thereon.

(c) Except as otherwise agreed to in writing by the Parties, all costs and prices are exclusive of any value added tax, ad valorem, goods and services or similar tax chargeable on the supply or deemed supply of goods or services, sales taxes, transaction taxes, consumption taxes and other similar taxes required by applicable law to be imposed on the sale of the Codexis Enzyme and borne by Pfizer or its Affiliates, including any interest, penalties or other additions to tax thereon required under applicable Law ("**VAT**"). If any VAT is so required, Pfizer or its Affiliates shall pay such VAT at the applicable rate in respect of any such payments following the receipt of a valid VAT invoice in the appropriate form issued by the payee in respect of those payments, such VAT to be payable on the later of the due date of the payment to which such VAT relates and [***] after the receipt by Pfizer or its Affiliates of the applicable valid invoice relating to that VAT payment. If Codexis requires any Pfizer or its Affiliates location information in order to assess any VAT requirements, Codexis shall reasonably request such information from Pfizer or its Affiliates in advance of issuing such relevant valid invoices. Codexis hereby agrees to segregate and allocate VAT on each of its invoices, including between costs subject to VAT and amounts not subject to VAT. Pfizer and its Affiliates shall not be responsible for any penalties and interest resulting from the failure by the Codexis to collect (if not included on a timely and valid VAT invoice), report or remit any such VAT. Codexis shall provide notice to Pfizer or its Affiliates of the VAT it determines is required to be included on invoices, and the legal basis therefore, at least [***] prior to the first valid VAT invoice issued to Pfizer which include such determined VAT, or any changes to such determination, to provide Pfizer or its Affiliates a reasonable opportunity to furnish certificates, documentation or other information that would eliminate or minimize such VAT under applicable law. The Parties will reasonably cooperate to issue valid VAT invoices for all amounts due under this Agreement consistent with VAT requirements and to report, eliminate or minimize the amount of any such VAT imposed on the transactions contemplated in this Agreement, including the use of valid and sufficient certificates, documentation and other information under applicable law.

(d) Pfizer and its Affiliates shall be responsible for import VAT if Pfizer or its Affiliates are the importer of record of the Codexis Enzyme into the destination country.

4. SECURITY OF SUPPLY

4.1 Efforts by Codexis. Codexis shall use all commercially reasonable efforts to supply Codexis Enzyme in accordance with Article 2. If Codexis encounters any issues in respect of supply or delivery, including but not limited to feasibility issues

or scale-up issues, Codexis shall promptly notify Pfizer and its Affiliates, and the Parties shall work together in good faith to establish a timeline for supply and delivery of Codexis Enzyme by initiating supply from any Qualified Enzyme Manufacturing Facility.

4.2 Occurrence of a Trigger Event. Upon the occurrence of a Trigger Event, Codexis shall promptly notify Pfizer and its Affiliates in writing (e-mail is acceptable) of the details related to the Trigger Event and the failure or potential failure of Codexis to supply Codexis Enzyme under Order(s) which are the subject of a Trigger Event and Codexis' estimated timeline to correct the Trigger Event. In the event of a Trigger Event, Codexis shall use its best efforts to prioritize delivery to Pfizer and its Affiliates of quantities of Codexis Enzyme to be delivered under an Order. These efforts shall [***]:

(a) [***];

(b) [***];

(c) [***];

(d) [***].

4.3 Alternate Sourcing. Codexis shall promptly notify Pfizer or its Affiliates in writing (e-mail is acceptable) of Codexis' efforts to resolve the Trigger Event and provide updates as soon as available. If, despite Codexis' efforts, Codexis is unable to resolve the Trigger Event to Pfizer's reasonable satisfaction within [***], Pfizer and its Affiliates shall have the right, exercisable during the duration and within the scope of the Trigger Event (but not beyond) to source a quantity of Codexis Enzyme up to [***] the quantities of Codexis Enzyme that Codexis is unable to deliver under Order(s) which are the subject of the Trigger Event, from:

(a) first, directly from existing Qualified Enzyme Manufacturing Facilities;

(b) second, to the extent that Pfizer and its Affiliates are unable to source sufficient quantities of Codexis Enzyme directly from Qualified Enzyme Manufacturing Facilities under Section 4.3(a), request from Codexis a Technology Transfer, in order to utilize the [***] Facility as a manufacturing facility Qualified to self-manufacture such quantity of Codexis Enzyme, which quantities of Codexis Enzyme self-manufactured by Pfizer or its Affiliates may be used only by Pfizer and its Affiliates for the manufacture of Intermediate for use in the manufacture of Product for sale and distribution by Pfizer and its Affiliates.

(c) third, to the extent that Pfizer or its Affiliates are unable to source sufficient quantities of Codexis Enzyme directly from Qualified Enzyme Manufacturing Facilities under Section 4.3(a) or from self-manufacture of Codexis Enzyme at the [***] under Section 4.3(b), request from Codexis a Technology Transfer, in order to qualify and utilize a Third Party Enzyme Manufacturing Facility in order to have a Third Party manufacture for Pfizer and its Affiliates such quantity of Codexis Enzyme, which quantities of Codexis Enzyme manufactured by the Third Party for Pfizer or its Affiliates may be used only by Pfizer and its Affiliates for the manufacture of Intermediate for use in the manufacture of Product for sale and distribution by Pfizer and its Affiliates. [***].

4.4 Limitations. For clarity, any right of Pfizer and its Affiliates to source quantities of Codexis Enzyme directly from Qualified Enzyme Manufacturing Facilities pursuant to Section 4.3(a), any right of Pfizer or its Affiliates to manufacture quantities of Codexis Enzyme under a Technology Transfer pursuant to Section 4.3(b), and any right of Pfizer and its Affiliates to source Codexis Enzyme from a Third Party Enzyme Manufacturing Facility under a Technology Transfer pursuant to Section 4.3(c) shall be effective only during that period of time in which Codexis is unable to supply the quantities of Codexis Enzyme which are the subject of an Order affected by a Trigger Event and shall only be effective for those quantities of Codexis Enzyme that Codexis is unable to supply to Pfizer or its Affiliates under Orders that are the subject of the Trigger Event. Pfizer and its Affiliates shall continue to purchase from Codexis, under the terms of this Agreement, all quantities of Codexis Enzyme that Codexis makes available to Pfizer and its Affiliates for purchase in lieu of any quantities of Codexis Enzyme that Pfizer or its Affiliates would or could purchase directly from an existing Qualified Enzyme Manufacturing Facility (under Section 4.3(a)) or manufacture (under Section 4.3(b)) under a Technology Transfer utilizing the license granted to Pfizer or its Affiliates under Section 4.5, or have manufactured (under Section 4.3(c)) under a Technology Transfer utilizing the license granted to Pfizer or its Affiliates under Section 4.5.

4.5 Technology Transfer. Effective upon a Technology Transfer under Section 4.3(b) or under Section 4.3(c), and only during the time period(s) and to the extent specifically provided in Section 4.3(b) or Section 4.3(c), Codexis grants to Pfizer ([***]) a non-exclusive, fee-bearing, non-transferrable, non-sublicensable ([***]) right and license under Codexis Enzyme Technology to manufacture the Codexis Enzyme for Pfizer and Pfizer Affiliates as permitted by Section 4.3(b) or Section 4.3(c) above for use of such Codexis Enzyme in Pfizer's, Pfizer Affiliates' and Pfizer Designee's manufacture of the Intermediate for use in the manufacturing of Product by or for Pfizer and its Affiliates. For clarity, neither Pfizer nor its Affiliates shall have any right to sell, have sold, market, distribute or transfer any Codexis Enzyme or any Intermediate manufactured under a Technology Transfer to any Third Party (including, without limitation, the Pfizer Designees) other than for use in manufacturing the Intermediate for Pfizer or its Affiliates for use in the manufacturing of Product by or for Pfizer and its Affiliates.

4.6 Article 4 Use Fees.

(a) With respect to Section 4.3 Replacement Quantities used by or for Pfizer or its Affiliates to replace quantities of Codexis Enzyme covered by Existing Non-Cancelable Orders in the manufacture of Intermediate, Pfizer shall pay to Codexis (or cause its Affiliate(s) to pay to Codexis) a use fee ("**Section 4.6(a) Use Fee**"). The Section 4.6(a) Use Fee shall be equal to [***] of the then current ([***]) Codexis Enzyme price as established pursuant to **Exhibit 3.1** ([***]) ("**Section 4.6(a) Codexis Enzyme Price**"). [***]. The Section 4.6(a) Use Fee shall be paid by Pfizer or its Affiliates to Codexis on a Quarterly basis. Pfizer shall provide to Codexis a written report (with documentation supporting Pfizer's calculations in accordance with Accounting Standards) within [***] establishing the volume of Codexis Enzyme sourced or produced by Pfizer and its Affiliates (pursuant to Sections 4.3(a), 4.3(b) and/or 4.3(c)) during such Quarter that is actually used by or for Pfizer or its Affiliates in the manufacture of Intermediate ("**Quarterly Section 4.6(a) Use Fee Report**") and, to the extent applicable, shall pay to Codexis the aggregate Section 4.6(a) Use Fee for all such Codexis Enzyme produced and used in the manufacture of Intermediate during such

Quarter within [***]. [***]. Any disputes arising out of, relating to or in connection with the calculation or payment of the Section 4.6(a) Use Fee under this Section 4.6(a) shall be governed by arbitration as provided for under Section 13.3 of this Agreement. Any information disclosed to Codexis hereunder shall be deemed Pfizer Confidential Information and may not be disclosed by Codexis to any third parties without Pfizer's prior written consent.

(b) With respect to Section 4.3 Replacement Quantities used by or for Pfizer or its Affiliates to replace quantities of Codexis Enzyme covered by New Orders in the manufacture of Intermediate, Pfizer shall pay to Codexis (or cause its Affiliate(s) to pay to Codexis) a use fee ("**Section 4.6(b) Use Fee**"). The Section 4.6(b) Use Fee shall be [***]. The Section 4.6(b) Use Fee shall be paid by Pfizer or its Affiliates to Codexis on a Quarterly basis. Pfizer shall provide to Codexis a written report (with documentation supporting Pfizer's calculations in accordance with Accounting Standards) within [***] establishing the volume of Codexis Enzyme sourced or produced by Pfizer and its Affiliates (pursuant to Sections 4.3(a), 4.3(b) and/or 4.3(c)) during such Quarter that is actually used by or for Pfizer or its Affiliates in the manufacture of Intermediate ("**Quarterly Section 4.6(b) Use Fee Report**") and, to the extent applicable, shall pay to Codexis the aggregate Section 4.6(b) Use Fee for all such Codexis Enzyme produced and used in the manufacture of Intermediate during such Quarter within [***]. [***]. Any disputes arising out of, relating to or in connection with the calculation or payment of the Section 4.6(b) Use Fee under this Section 4.6(b) shall be governed by arbitration as provided for under Section 13.3 of this Agreement. Any information disclosed to Codexis hereunder shall be deemed Pfizer Confidential Information and may not be disclosed by Codexis to any third parties without Pfizer's prior written consent.

4.7 Risks and Costs. Pfizer and its Affiliates shall be solely responsible for arranging supply of Codexis Enzyme and all costs and expenses of acquiring or manufacturing Codexis Enzyme under Section 4.3. Except as provided in Section 4.5, Codexis shall have no obligations with respect to any Codexis Enzyme acquired by Pfizer or its Affiliates under Section 4.3 and makes no warranty, representation or guarantee with respect to Codexis Enzyme sourced by Pfizer or its Affiliates under Section 4.3, including without limitation no warranty of conformance to specifications, merchantability, or fitness for any particular purpose, or for any Intermediate and/or Product manufactured therefrom. Pfizer and its Affiliates assume all risks associated with the acquisition and use of the Codexis Enzyme produced by or for Pfizer and its Affiliates under the provisions of Section 4.3.

4.8 Reserve Inventory. Starting [***] following the Effective Date, the parties may mutually agree for Codexis to maintain in inventory an amount of Codexis Enzyme, which shall be no more than an amount sufficient to fulfill [***] of estimated Pfizer and Pfizer Affiliate demand for Codexis Enzyme based on the forecast provided pursuant to Section 2.4. Codexis reserves the right to deliver such reserve inventory of Codexis Enzyme to Pfizer and its Affiliates on a first-in, first-out basis. No later than [***] before the effective date of termination or expiration of this Agreement, the parties will mutually cooperate to reduce the quantities of Codexis Enzyme in reserve inventory to zero by the effective date of termination or expiration. Within [***] of any termination or expiration of this Agreement, Pfizer or its Affiliates shall be required to purchase all quantities of Codexis Enzyme that remain in the reserve inventory as of the effective date of termination or expiration at the price which was in effect as of the effective date of termination or expiration.

5. [***]

5.1 [***].

5.2 [***].

5.3 [***].

5.4 [***].

5.5 [***].

5.6 Risks and Costs. Pfizer and its Affiliates shall be solely responsible for arranging supply of Codexis Enzyme and all costs and expenses of acquiring or manufacturing Codexis Enzyme under Section 5.3. Except as provided in Section 5.4, Codexis shall have no obligations with respect to any Codexis Enzyme acquired by Pfizer or its Affiliates under Section 5.3 and makes no warranty, representation or guarantee with respect to Codexis Enzyme sourced by Pfizer or its Affiliates under Section 5.3, including without limitation no warranty of conformance to specifications, merchantability, or fitness for any particular purpose, or for any Intermediate and/or Product manufactured therefrom. Pfizer and its Affiliates assume all risks associated with the acquisition and use of the Codexis Enzyme produced by or for Pfizer and its Affiliates under the provisions of Section 5.3.

6. RELATIONSHIP; RECORDS; REGULATORY OBLIGATIONS; REGULATORY NOTIFICATIONS; AUDIT

6.1 Relationship. As between the Parties, Pfizer and the Pfizer Affiliates shall be solely responsible for the production of Intermediate using Codexis Enzyme and for the manufacture of Product using Intermediate.

6.2 Records. Codexis shall maintain complete, true, and accurate books, records, test and laboratory data, reports, and all other information relating to Services, including the technical records pertaining to the methods, facilities, and equipment used for processing, in accordance with Applicable Laws and as is reasonably necessary to support regulatory filings by Pfizer with respect to Product. Codexis shall store all such records and information for a period of at least [***] or longer if required under Applicable Laws.

6.3 Regulatory Obligations. Pfizer and Pfizer Affiliates shall be solely responsible for preparation and submission of applications to Regulatory Authorities regarding Product. Pfizer and Pfizer's Affiliates will advise Codexis of document requirements in support of such applications by Pfizer or its Affiliates. Codexis will use commercially reasonable efforts to provide documents and additional information needed for such applications, and to cooperate with and assist Pfizer and its Affiliates in preparation and submission of such applications to the FDA (and other Regulatory Authorities, as appropriate). All such applications to Regulatory Authorities and related filings by Pfizer and its Affiliates shall be the sole and exclusive property of Pfizer and its

Affiliates. Pfizer and its Affiliates shall be solely responsible for all contacts and communications with any Regulatory Authority with respect to all matters relating to Product and services provided under this Agreement. At the request of Pfizer or its Affiliates, Codexis shall make appropriate personnel reasonably available for meetings with Regulatory Authorities related to manufacturing of Codexis Enzyme and the related processing of Product.

6.4 Regulatory Notifications. Codexis shall notify Pfizer immediately, and in no event later than [***], after receiving any contact or communication from any governmental, administrative or Regulatory Authority that in any way relates to the Codexis Enzyme, Intermediate or the Product. Codexis shall advise Pfizer no later than the next day that is not a Saturday, Sunday, or federal or state holiday if an authorized agent of any governmental, administrative or Regulatory Authority or any other regulatory body plans to visit the Facility solely in relation to the Codexis Enzyme, Intermediate or Product for Pfizer, and/or makes an inquiry regarding manufacturing of Codexis Enzyme for use in manufacturing Intermediate for Pfizer or regarding any part of the Facility that is used in manufacturing of Codexis Enzyme for use in manufacturing of Intermediate for Pfizer. Pfizer and Pfizer Affiliates shall have the right to be present at any visit relating to Codexis Enzyme, Intermediate and Product and to review in advance and comment on any response to the communication or investigation submitted by Codexis (and Codexis shall endeavor in good faith to satisfactorily address and incorporate all Pfizer comments prior to submission). Codexis shall cooperate fully with such Regulatory Authority and with Pfizer and its Affiliates in providing the information needed for any such communication. Codexis shall provide to Pfizer copies of any document delivered by such Regulatory Authority or regulatory body as a result of such visit. If an authorized agent of any Regulatory Authority or any other regulatory body visits the Facility in connection with another product or another part of the Facility and such visit results in a finding or other action that could materially and adversely affect Codexis' performance of the Services under this Agreement, then Codexis shall notify Pfizer as soon as practicable and, within [***], shall provide Pfizer with information concerning Codexis' response to such finding or action.

6.5 Audits. During the Term and during any period thereafter during which Pfizer retains the license under Section 7.2(a), Pfizer or its authorized representatives, including its external auditors, at Pfizer's cost and expense, for the purposes of audit may visit the facilities of Codexis or its Third Party contractors where the Services are being performed, during normal business hours to ensure Codexis' compliance with the terms of this Agreement and Applicable Laws, including quality, business continuity, social responsibility (including labor and ethics), and/or environment, health, safety and sustainability requirements, which may be conducted together or separately. The detailed scope of audit shall be communicated to Codexis at least [***] prior to the requested date of audit and the Parties shall work in good faith to schedule a mutually agreeable date for such audit. Any such audit shall be conducted in accordance with Codexis' then-current policies (made available in writing to Pfizer prior to the anticipated audit date) and without material disruption to Codexis' or Codexis' Third Party contractor activities. Pfizer shall be entitled to conduct an audit hereunder once in any [***] during the Term of this Agreement, upon reasonable notice during regular business hours for a period not to exceed [***]; provided, however, that Pfizer shall be entitled to conduct audits following issuance of reports delivered by Regulatory Authorities to Codexis pertaining to manufacturing of Codexis Enzyme for use in manufacturing Intermediate for Pfizer or the occurrence of other events which are likely to adversely affect Pfizer's manufacturing of Intermediate or Product as frequently as requested by Pfizer at reasonable times and for reasonable duration (which may exceed [***]) until Codexis has corrected such

deficiencies. Upon request, Pfizer may conduct additional audits, provided that Pfizer shall reimburse Codexis for reasonable time and expenses incurred by Codexis in connection with such audits.

7. GOVERNMENTAL LAW AND REGULATIONS

7.1 Applicable Law. Codexis' and Pfizer's and its Affiliates' obligations hereunder shall be subject to all Applicable Law. Codexis shall secure such permits and licenses necessary, at its sole expense, for the manufacture, supply and sale of Codexis Enzyme hereunder, unless otherwise agreed by the Parties in writing.

7.2 Regulatory Filings. As between the Parties, Pfizer and its Affiliates will be responsible for filing any regulatory approval application in connection with Intermediate and Product, at their own cost.

8. CONFIDENTIALITY

8.1 In General. In connection with this Agreement each Party may provide to the other Party, Confidential Information. Codexis Technology shall constitute the Confidential Information of Codexis.

8.2 Non-Disclosure and Non-Use. The receiving Party shall maintain the Confidential Information of the disclosing Party in confidence, shall not disclose such Confidential Information to any Third Party, and shall not use such Confidential Information for any purpose except as expressly permitted under the terms and conditions of this Agreement. Notwithstanding the previous sentence, the receiving Party may disclose the Confidential Information of the disclosing Party solely on a "need to know basis" to its Affiliates and its officers, directors, employees, advisors, legal counsel, contractors and agents, and independent legal counsel, and Pfizer Designee(s), each of whom prior to disclosure must be bound by obligations of nondisclosure and non-use no less restrictive than the obligations set forth in this Article 8; provided, however, that, in each of the above situations, the receiving Party shall remain responsible for any failure by any person or entity who receives Confidential Information pursuant to this Section 8.2 to treat such Confidential Information as required under this Article 8. The receiving Party shall take the same degree of care that the receiving Party uses to protect its own confidential and proprietary information of a similar nature and importance, but in no event shall such care be less than reasonable care.

8.3 Exceptions. The obligations of non-disclosure and non-use under Section 8.2 will not apply as to particular Confidential Information of a disclosing Party to the extent that such Confidential Information: (a) is at the time of receipt, or thereafter becomes, through no fault of the receiving Party or its Affiliates, published or publicly known or available; (b) is known by the receiving Party or its Affiliates without any obligation of confidence to a Third Party at the time of receiving such information, as evidenced by competent records; (c) is hereafter furnished to the receiving Party or its Affiliates by a Third Party without breach of a duty to the disclosing Party; or (d) is independently discovered or developed by or for the receiving Party or its Affiliates without use of, application of, access to, or reference to Confidential Information of the disclosing Party, as evidenced by competent records.

8.4 Disclosure Required by Law. Disclosure of Confidential Information shall not be precluded if such disclosure (a) is in response to a valid order, or required under the regulations, of a court or other governmental body; or (b) is required by Applicable Law; provided, however, that the receiving Party, to the extent practicable,

first has given reasonable prior notice to the disclosing Party and at the disclosing Party's request, the receiving Party cooperates with the disclosing Party's efforts, as applicable, to obtain a protective order limiting the extent of such disclosure and requiring that the Confidential Information so disclosed be used only for the purposes for which such order was issued or as required by such Applicable Law. Any disclosure made pursuant to this Section 8.4 shall not affect the confidential nature of the disclosed Confidential Information (except to the extent the disclosure was made publicly available, such as but not limited to filings with the United States Securities and Exchange Commission, in which case such disclosed Confidential Information shall no longer be deemed confidential).

8.5 Remedies. The receiving Party agrees that its obligations under this Article 8 are necessary and reasonable to protect the disclosing Party's business interests and that the unauthorized disclosure or use of Confidential Information of the disclosing Party may cause irreparable harm and significant injury, the degree of which may be difficult to ascertain. The receiving Party further acknowledges and agrees that in the event of any actual or threatened breach of this Article 8, the disclosing Party may have no adequate remedy at law and, accordingly, that the disclosing Party will have the right to seek an immediate injunction, without an obligation to post a bond or any similar security, enjoining any breach or threatened breach of this Article 8, as well as the right to pursue any and all other rights and remedies available at law or in equity for such breach or threatened breach.

8.6 Agreement Terms. The terms and conditions of this Agreement shall be Confidential Information of each of the Parties, and subject to the terms of this Article 8; provided, however, that (a) each Party may disclose this Agreement, in confidence, (i) to legal, tax and financial advisors (including auditors and lenders) and governmental tax authorities and (ii) in connection with any proposed or actual transactions involving the disclosing Party in the form of mergers, offerings, acquisitions, collaborations, fundings and investments, provided that such disclosure to advisors and other parties would be limited to a strict "need to know" basis, would be on basis that such advisors and other parties receiving access to the terms and conditions of this Agreement would agree to hold the Confidential Information on terms of confidentiality equivalent to those in this Agreement and the disclosing Party would be responsible for any breach by any such advisor or other party to whom disclosure is made; and (b) each Party may disclose this Agreement, in its entirety or with portions redacted, as may be required by Applicable Law. The Parties recognize that either or both Parties may be required by Applicable Law (including the Securities Act of 1933, as amended, and the Securities Exchange Act of 1934, as amended, or the rules of a securities exchange or the Securities and Exchange Commission or the securities regulations of any state or other jurisdiction) to disclose (a) the existence of this Agreement, (b) the terms hereof, (c) financial information related to this Agreement (including, without limitation, sales and revenues earned hereunder) and (d) this Agreement (in its entirety or with portions redacted). Any such disclosure that is required by Applicable Law may be made by Codexis or Pfizer; provided that any such required disclosure will, to the extent consistent with Applicable Law, not contain any Confidential Information of, respectively, Pfizer or Codexis and, if disclosure of such information is required by Applicable Law or such rules or regulations, the Parties will use reasonable efforts to minimize such disclosure and obtain confidential treatment for any such information that is disclosed pursuant to Applicable Law, including the identities of the Parties or the other Party, as applicable.

8.7 Survival. All obligations of non-disclosure and non-use imposed pursuant to the terms and conditions of this Article 8 shall survive expiration or termination of this Agreement and continue in full force and effect for a period of [***] after the effective

date of such expiration or such termination. In the case of a Technology Transfer, the obligations of non-disclosure and non-use imposed pursuant to the terms of this Article 8 shall survive expiration or termination of this Agreement and continue in full force and effect for a period of [***] after the effective date of such expiration or such termination, and with respect to any Confidential Information identified as a trade secret by a Party, for so long as the applicable Confidential Information retains its status as a trade secret under Applicable Law.

9. REPRESENTATIONS AND WARRANTIES

9.1 Representations and Warranties

(a) By Each Party. Each Party represents and warrants that as of the Effective Date: (i) it is duly organized and validly existing under the laws of the jurisdiction of its incorporation and has full corporate power and authority to enter into this Agreement; (ii) it has taken all corporate actions necessary to authorize the execution and delivery of this Agreement and the performance of its obligations under this Agreement; (iii) the performance of its obligations under this Agreement do not conflict with, or constitute a default under, its charter documents, any contractual obligation of such Party or any court order and (iv) this Agreement has been duly executed and delivered on behalf of such Party and constitutes a legal, valid and binding obligation of such Party and is enforceable against it in accordance with its terms, subject to the effects of bankruptcy, insolvency or other similar laws of general application affecting the enforcement of creditor rights and judicial principles affecting the availability of specific performance and general principles of equity, whether enforceability is considered in a proceeding at law or equity. Pfizer Inc. is an equal opportunity employer and federal contractor. Consequently, the Parties agree that, as applicable, they will abide by the requirements of Executive Order 11246, 41 CFR 60-1.4(a); the Vietnam Era Veterans' Readjustment Assistance Act, 41 CFR 60-300.5(a); and Section 503 of the Rehabilitation Act of 1973, 41 CFR 60-741.5(a), and that these laws are incorporated herein by reference. These regulations prohibit discrimination against qualified individuals based on their status as protected veterans or individuals with disabilities, and prohibit discrimination against all individuals based on their race, color, religion, sex, sexual orientation, gender identity, or national origin. These regulations require that covered prime contractors and subcontractors take affirmative action to employ and advance in employment individuals without regard to race, color, religion, sex, sexual orientation, gender identity, national origin, protected veteran status or disability. The parties also agree that, as applicable, they will abide by the requirements of Executive Order 13496 (29 CFR Part 471, Appendix A to Subpart A), relating to the notice of employee rights under federal labor laws.

(b) By Codexis. Codexis represents and warrants to Pfizer and its Affiliates that:

(i) at the time of delivery of Codexis Enzyme and during the Retest Period such Codexis Enzyme shall meet the requirements therefor set forth in the applicable Enzyme Specification;

(ii) title to Codexis Enzyme will pass to Pfizer and its Affiliates free and clear of any security interest, lien or other encumbrance;

(iii) [***]; and

(iv) such Codexis Enzyme will have been manufactured in accordance with Applicable Law, this Agreement, and any Quality Agreement between the Parties and in facilities that are in compliance with Applicable Law at the time of such manufacture.

(c) Debarment; Exclusion List. Codexis represents, warrants and covenants to Pfizer and its Affiliates that:

(i) neither Codexis nor any of its Affiliates nor any of its contractors performing Services hereunder has been debarred or is subject to debarment pursuant to Section 306 of the FD&C Act or listed on any Excluded List, and

(ii) neither Codexis nor any of its Affiliates nor any of its contractors performing Services hereunder will use in any capacity, in connection with this Agreement, any person or entity who has been debarred pursuant to Section 306 of the FD&C Act, or who is the subject of a conviction described in such Section, or listed on any Excluded List.

Codexis shall inform Pfizer in writing immediately if it, its Affiliates or any person or entity who is involved in the manufacture of the Codexis Enzyme or otherwise performing services hereunder is debarred or is the subject of a conviction described in Section 306 of the FD&C Act or listed on any Excluded List, or if any claim or action is pending or is threatened, relating to the debarment or conviction Section 306 of the FD&C Act, or listing on any Excluded List, of Codexis or any person or entity who is involved in the manufacture of the Codexis Enzyme or otherwise performing services hereunder.

(d) Government Enforcement Action. Codexis represents and warrants that as of the Effective Date of this Agreement there is no pending or likely governmental enforcement action or private claim against Codexis or its Affiliates or, to Codexis' knowledge, [***], or any environmental conditions, events or circumstances that are reasonably likely to limit, impede or otherwise jeopardize Codexis' ability to meet its obligations under this Agreement.

(e) Anti-Bribery; Anti-Corruption. Codexis represents, warrants and covenants that Codexis has not and will not directly or indirectly offer or pay, or authorize such offer or payment of, any money or anything of value to improperly or corruptly seek to influence any Government Official or any other person in order to gain an improper business advantage, and has not accepted, and will not accept in the future, such a payment. Codexis will comply with Pfizer's Anti-Bribery and Anti-Corruption Principles set forth in **Exhibit 9.1(e)**.

(f) Environment, Health and Safety-General. Codexis represents, warrants and covenants that:

(i) Codexis shall perform all of its obligations herein in compliance with all Environmental Laws and all necessary environmental or other licenses, registrations, notifications, certificates, approvals, authorizations or permits required under Environmental Laws and any private permissions;

(ii) Codexis shall abate any condition or practice, regardless of whether such condition or practice constitutes non-compliance with Environmental Laws, which poses a significant threat to human health, safety, or the environment, or would be

reasonably likely to limit, impede, or otherwise jeopardize Codexis' ability to fulfill its obligations to Pfizer;

(iii) Codexis shall be solely responsible for all Environmental Losses incurred during the performance of this Agreement;

(iv) Codexis shall be solely responsible for the generation, collection, storage, handling, transportation, movement and disposal of all Hazardous Materials and Waste, as applicable, in compliance with Environmental Laws;

(v) Codexis agrees to release Pfizer and its Affiliates and Pfizer Designees from any liability and waive any claim, pursuant to statute, code, or common law, that Codexis is liable to it or to any Third Party, for any Environmental Loss arising out of the management of Codexis' Waste;

(vi) Codexis shall provide to Pfizer all information available to Codexis related to the safety, safe handling, environmental impact, and disposal of the Codexis Enzyme including, without limitation, material safety data sheets;

(vii) Throughout the term of this Agreement, Codexis shall promptly deliver to Pfizer, as it becomes available to Codexis, any updates or amendments to the information provided pursuant to this Section and any new information relating to the safety, safe handling, environmental impact, or disposal of the Codexis Enzyme;

(viii) Codexis shall provide prompt notification to Pfizer in the event of any significant condition or incident, which shall include any event, occurrence, or circumstance, including any governmental or private action, which could materially impact Codexis' ability to fulfill its obligations under this Agreement. These include, but are not limited to: (A) material revocation or modification of any licenses, registrations, notifications, certificates, approvals, authorizations or permits required by any applicable Law, (B) any action by governmental authorities that may reasonably lead to the material revocation or modification of Codexis' required permits, licenses, or authorizations, (C) above, any third party claim against the management or ownership of the facility that could reasonably impact Codexis' obligations under this Agreement, (D) any fire, explosion, significant accident, or catastrophic Release of Hazardous Substances, or significant "near miss" incident, (E) any significant non-compliance with Environmental Laws, and (F) any environmental condition or operating practice that may reasonably be believed to present a significant threat to human health, safety or the environment;

(ix) Codexis shall ensure that, to the extent applicable to the Codexis Enzyme, the Codexis Enzyme is in compliance with California Safe Drinking Water and Toxic Enforcement Act of 1986 (also known as Proposition 65), the European Regulation on Registration, Evaluation, Authorisation and Restriction of Chemicals (also known as REACH), and any other chemical registration laws, that may regulate, limit, or ban chemicals in the Codexis Enzyme. Codexis shall immediately disclose to Pfizer if it knows of or becomes aware of any detectible amount or possible generation of a material or chemical listed under Applicable Laws in the Codexis Enzyme including (a) upon customary use of the Codexis Enzyme, (b) that are naturally occurring, and/or (c) that are unavoidable constituents or contaminants of a raw material or ingredient of the Codexis Enzyme. For the avoidance of doubt, this disclosure is in addition to any Safety Data Sheets that may be provided to Pfizer. Codexis's failure to promptly disclose the foregoing to Pfizer shall constitute a material breach of the Agreement. Codexis agrees to consider, and implement if directed by Pfizer, Codexis Enzyme formulation alternatives.

Codexis shall monitor Applicable Laws for updates and timely advise Pfizer of new information that may impact the Codexis Enzyme.

(g) Responsible Supply Chain. Codexis represents, warrants, and covenants that it does not, as of the Effective Date, and shall not, during the Term of this Agreement:

(i) use involuntary, bonded or underage labor (defined in accordance with Laws and to the extent applicable Laws) at the Facility(ies); or

(ii) engage in human trafficking; or

(iii) maintain unsafe or unhealthy conditions in any dormitories or lodging that it provides for its employees.

In addition, Codexis agrees and covenants that during the Term of this Agreement:

(i) it shall promptly correct unsafe or unhealthy conditions in any dormitories or lodging that it provides for its employees;

(ii) disclose to Pfizer any use, whether intentional or unintentional, of involuntary, bonded or underage labor or instances of human trafficking, and shall correct unsafe or unhealthy conditions in any lodging that it provides for its employees;

(iii) use reasonable efforts to include similar prohibition and disclosure requirements in agreements with its own suppliers;

(iv) cooperate and provide such information and/or certifications as are reasonably necessary if Pfizer or its Affiliates are obligated to provide or post disclosures regarding labor practices, including, without limitation, disclosures under the California Transparency In Supply Chains Act of 2010, California Civil Code § 1714.43, and similar Applicable Laws; and

(v) perform its obligations under this Agreement in a manner consistent with the Pharmaceutical Industry Principles for Responsible Supply Chain Management, as codified as of the date of this Agreement at https:/pscinitiative.org/principles and Pfizer's Supplier Conduct Principles.

(h) Conflict Minerals. Codexis agrees and covenants to, to the extent applicable:

(i) adopt and maintain policies and procedures for the responsible sourcing and traceability of Conflict Minerals. Such policies and procedures shall include management systems and supplier outreach and due diligence processes that are at least as stringent as those contemplated by the Organization for Economic Co-operation and Development Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas;

(ii) follow any Conflict Minerals policy that may be adopted by Pfizer from time to time,

(iii) provide to Pfizer such information as Pfizer may from time to time request, including information concerning the origin of any Conflict Minerals in products,

components or raw materials supplied to Pfizer and Codexis' related compliance procedures, and

(iv) adopt such procedures relating to the responsible sourcing and traceability of Conflict Minerals as may be requested by Pfizer from time to time. If Codexis determines that Conflict Minerals contained in any of the products, components or raw materials supplied to Pfizer are from sources that are believed to support conflict, Codexis shall immediately notify Pfizer at cmcompliance@pfizer.com, which notice shall contain reasonable supporting detail to enable Pfizer to assess such determination. Codexis shall not seek to embargo the sourcing of Conflict Minerals from any country or region without the prior approval of Pfizer.

(i) Environment, Health, Safety, and Sustainability Policies. **Environment, Health, Safety, and Sustainability Policies**. All Codexis Enzyme to be supplied hereunder will be manufactured at Qualified Enzyme Manufacturing Facilities. For the [***] Facility and any New Qualified Enzyme Manufacturing Facility, Codexis shall, at Pfizer's written request, work in good faith with the operators of Qualified Enzyme Manufacturing Facilities to implement mutually acceptable environment, health, safety and sustainability policies which address, among other things, an ongoing commitment to sustainability, including understanding and mitigating environmental impact, elimination of workplace injuries and illnesses, and the protection of local communities from potential impacts of the Qualified Enzyme Manufacturing Facility's operations. As and when they become available, Codexis shall identify and bring to Pfizer's attention Codexis Enzyme options that have a reduced environment, health and/or safety impact. In the event Codexis receives a New Order for Codexis Enzyme for which Codexis has an option with a reduced environmental footprint or a more favorable health and safety profile, Codexis shall promptly notify Pfizer of such option(s). Codexis shall discuss with Pfizer the feasibility, efficacy, regulatory and cost implications of any of the foregoing alternate Codexis Enzyme options and shall provide such options if and as directed by Pfizer.

(j) Global Trade Controls Laws. Codexis represents, warrants, and covenants that:

(i) activities under this Agreement will not take place in a Restricted Market; will not involve companies, organizations, or governmental entities from a Restricted Market; and will not involve that are individuals ordinarily resident in a Restricted Market;

(ii) Codexis is not a Restricted Party and is not owned or controlled by a Restricted Party;

(iii) with respect to activities performed under this Agreement, Codexis confirms that no Restricted Parties will be engaged or delegated any activities under this Agreement;

(iv) in the event that any of these representations change, Codexis will immediately inform Pfizer in writing and suspend all affected activities, including but not limited to making any related payments, under this Agreement, until Pfizer agrees to move forward and end the suspension of the affected activities; and

(v) Codexis will not knowingly transfer any goods, software, technology, or services to Pfizer that are (A) controlled under the U.S. International

Traffic in Arms Regulations or at a level other than EAR99 under the U.S. Export Administration Regulations; or (B) specifically identified as an E.U. Dual Use Item or on an applicable export control list of another country.

9.2 Disclaimer of Warranties. EXCEPT AS SPECIFICALLY SET FORTH IN THIS AGREEMENT, NEITHER PARTY MAKES ANY REPRESENTATION OR WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTY OF MERCHANTABILITY, ANY WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE OR USE, OR ANY OTHER SIMILAR STATUTORY WARRANTY. EACH PARTY EXPRESSLY DISCLAIMS ANY AND ALL IMPLIED WARRANTIES.

10. INTELLECTUAL PROPERTY

10.1 Ownership by Codexis. As between the Parties, subject only to the license set forth in Section 10.2, Codexis shall retain and own all right, title and interest in, to and under the Codexis Technology, and Codexis shall have the right, but not the obligation, to file applications for, and to control the prosecution and maintenance of, the Codexis Technology and to enforce all rights therein. Pfizer and its Affiliates hereby assign to Codexis all its right, title and interest in, to and under any and all discovery, invention, contribution, method, finding or improvement, whether or not patentable, and all related intellectual property, including without limitation patents, trade secrets, and/or know-how, that is conceived, reduced to practice, or otherwise developed by Pfizer and/or its Affiliates, either solely or jointly with Codexis and/or a Third Party, during the Term that claim the Codexis Enzyme (collectively, the "**Codexis Inventions**"). Pfizer and its Affiliates agree to cooperate with Codexis, at Codexis' reasonable request and expense, in the preparation of any patent application claiming any subject matter within such Codexis Inventions.

10.2 License to Codexis Technology.

(a) Subject to the terms and conditions of this Agreement, Codexis hereby grants to Pfizer a non-exclusive, non-transferrable (except to a permitted assignee of this Agreement by Pfizer pursuant to Section 13.7), non-sublicensable (except to Affiliates of Pfizer and Pfizer Designees manufacturing Intermediate for Pfizer and its Affiliates for use in the manufacture and sale of Product), worldwide, royalty-free, fully-paid, perpetual, irrevocable (subject to Section 11.7(a)), license under the Codexis Technology to use and import (but not to make, have made, improve, have improved, sell, or have sold) Codexis Enzyme in order to make, have made, use, import, offer for sale, sell or have sold Intermediate solely for the manufacture and sale of Product by or for Pfizer and its Affiliates in the Territory. For clarity, no license is granted under the Codexis Technology to offer for sale, sell or have sold Intermediate to Third Parties. For clarity, no license is granted under the Codexis Technology to use or import enzymes other than Codexis Enzyme in order to make, have made, use, import, offer for sale, sell or have sold Intermediate solely for the manufacture and sale of Product by or for Pfizer and its Affiliates in the Territory.

(b) Codexis hereby represents and warrants as follows:

(i) Codexis has the right to grant the licenses granted herein;

(ii) Codexis has not granted and will not grant any rights to any Third Parties which would conflict with the rights granted to Pfizer herein;

(iii) Codexis [***] Controls the Codexis Technology, and, as of the Effective Date, the patents set forth in **Exhibit 1.36** are a complete and correct listing of all patent rights in the Codexis Technology in the Territory;

(iv) [***];

(v) to Codexis' actual knowledge, [***];

(vi) to Codexis' actual knowledge, [***]; and

(vii) to Codexis' actual knowledge, [***].

(c) Enforcement of Codexis Technology

(i) Notice. Each Party shall provide to the other Party prompt written notice of any actual or threatened infringement of any Codexis Technology for use of the Codexis Enzyme to manufacture the Intermediate in the Territory (the "**Intermediate Infringement**") as such Party becomes aware.

(d) Invalidity or Unenforceability Actions.

(i) Notice. Codexis shall promptly notify Pfizer in writing of any actual, alleged or threatened assertion of invalidity or unenforceability, including any inter partes review, post-grant review, reexamination, opposition or any other similar action before a patent office or a court, by a Third Party of any of the Codexis Technology or the Codexis Enzyme.

10.3 No Other Rights. Except for the rights expressly granted in this Agreement, no right, title or interest of any nature whatsoever is or shall be granted whether as a result of sale or transfer, by implication, estoppels, reliance or otherwise, with respect to the Codexis Technology. All rights with respect to Codexis Technology that are not specifically granted in this Agreement are reserved to Codexis.

11. TERM AND TERMINATION

11.1 Term. The term of this Agreement shall commence on the Effective Date and shall continue until the longer of ten (10) years and the last expiration date of the licensed patents under the Codexis Technology unless earlier terminated in accordance with Sections 11.2, 11.3, 11.4, 11.5 or 11.6 (the "**Initial Term**"). If Pfizer desires to extend this Agreement for one or more three (3) year periods beyond the Initial Term (each three (3) year period being a "**Renewal Term**"), it shall so notify Codexis in writing not later than [***] prior to the end of the Initial Term (or any subsequent Renewal Term). Upon any such request, the Parties shall use their good faith, commercially reasonable efforts to reach agreement on any Renewal Term (and the terms and conditions associated with such Renewal Term) not later than [***] prior to the end of the Initial Term or any Renewal Term. The Initial Term and any agreed Renewal Term(s) are collectively, referred to as the "**Term**".

11.2 Termination for Convenience. Pfizer may terminate this Agreement at any time without cause and in its sole discretion upon not less than [***] prior written notice to Codexis.

11.3 Termination for Cause. Either Party may terminate this Agreement upon [***] written notice to the other Party if the other Party materially breaches any obligation set forth herein, which breach has not been cured within [***] after receipt of written notice of such breach from the non-breaching Party, or within such additional cure period as the non-breaching Party may so authorize in writing.

11.4 Termination for Insolvency. To the extent permitted under Applicable Law, a Party may terminate this Agreement upon [***] written notice to the other Party if the other Party becomes insolvent, makes a general assignment for the benefit of creditors, files a voluntary petition in bankruptcy, suffers or permits the appointment of a receiver for its business or assets, becomes subject to any proceeding under any bankruptcy or any insolvency law, whether domestic or foreign, or has wound up or liquidated its business voluntarily or otherwise. All rights and licenses granted under or pursuant to this Agreement by Codexis are and shall otherwise be deemed to be, for purposes of Section 365(n) of the U.S. Bankruptcy Code or any analogous provisions in any other country or jurisdiction, licenses of right to "intellectual property" as defined under Section 101 of the U.S. Bankruptcy Code. The Parties agree that Pfizer, as licensee of such rights under this Agreement, shall retain and may fully exercise all of their rights and elections under the U.S. Bankruptcy Code or any analogous provisions in any other country or jurisdiction.

11.5 Termination for Breach of Anti-bribery/Anti-Corruption Representation. Pfizer may terminate this Agreement and/or any or all New Orders effective immediately upon notice to Codexis, if: (i) Codexis breaches any of the representations and warranties set forth in Section 9.1(e), or (ii) Pfizer learns (a) that improper payments are being or have been made or offered to Government Officials or any other person by Codexis or those acting on behalf of Codexis with respect to this Agreement, or (b) that Codexis or those acting on behalf of Codexis with respect to this Agreement has accepted any payment, item, or benefit, regardless of value, as an improper inducement to award, obtain or retain business or otherwise gain or grant an improper business advantage from or to any other person or entity. Further, in the event of such termination, Codexis shall not be entitled to any further payment, regardless of any activities undertaken or agreements with additional Third Parties entered into by Codexis prior to such termination.

11.6 Termination for Change of Control of Codexis. Pfizer may in its absolute discretion terminate this Agreement immediately by notice in writing to Codexis in the event of a change in Control of Codexis. Codexis undertakes and agrees to notify Pfizer in writing as soon as it becomes aware of any proposed or actual change of Control of Codexis. For the purposes of this Section 11.6, "Control" means, with respect to any person, the power to direct or cause the direction of the management and policies of such person, whether directly or indirectly and whether through the ownership of voting securities, by contract or otherwise.

11.7 Consequences of Expiration or Termination.

(a) Licenses.

(i) Upon termination of this Agreement by Codexis pursuant to Section 11.3 or Section 11.4, the licenses granted to Pfizer under Section 10.1, and, to the extent applicable, Sections 1 and 5.4, shall immediately terminate and Pfizer and its Affiliates shall cease use of any and all Codexis Technology and the Codexis Enzyme Technology;

(ii) Upon termination of this Agreement by Pfizer pursuant to Section 11.2, or upon expiration of this Agreement pursuant to Section 11.1, the license granted under Section 10.2 shall remain in effect for a period of up to [***] after the effective date of termination or expiration for the purpose of allowing Pfizer, Pfizer Affiliates and Pfizer Designees to manufacturing Intermediate using Codexis Enzyme that was in their possession, custody or control as of the effective date of termination or expiration. Thereafter, such license shall terminate and Pfizer, the Pfizer Affiliates and the Pfizer Designees shall cease use of any and all Codexis Technology;

(iii) Upon termination of this Agreement by Pfizer pursuant to Section 11.3, 11.4 or 11.5, the license granted under Section 10.2 shall remain in effect for a period of [***] after the effective date of termination for the purpose of allowing Pfizer, Pfizer Affiliates and Pfizer Designees to manufacture Intermediate using Codexis Enzyme that was in their possession, custody or control as of the effective date of termination. Thereafter, such license shall terminate and Pfizer, the Pfizer Affiliates and the Pfizer Designees shall cease use of any and all Codexis Technology;

(b) Return of Materials. Subject to what may be required by Pfizer under Section 11.7(a), upon expiration or termination of this Agreement by either Party for any reason, each Party shall promptly return, or destroy, any and all Confidential Information of the other Party in such first Party's possession or control at the time of such expiration or termination except to the extent provided for in any Technology Transfer.

(c) Accrued Liability. Expiration or termination of this Agreement for any reason shall not release either Party hereto from any liability which at the time of such termination has already accrued to the other Party prior to such time. Such expiration or termination will not relieve a Party from accrued payment obligations or from obligations which are expressly indicated in this Agreement to survive expiration or termination of this Agreement.

11.8 Survival. In addition to any sections of this Agreement which by their terms survive expiration or termination of this Agreement, the following Articles and Sections of this Agreement shall survive its expiration or termination: Articles 1, 3, 8 (for the period set forth in Section 8.7) and 13, and Sections 2.3, 2.13, 2.14, 4.8 (last sentence only), 6.1, 6.2, 6.4, 6.5, 8.7, 9.2, 1, 10.2(a), 10.3, 11.7, 11.8, 12.1, 12.2, 12.3 and 12.4. All obligations to make payments to Codexis shall survive expiration or termination of this Agreement.

12. INDEMNIFICATION

12.1 Indemnification by Codexis. Codexis shall indemnify, defend, and hold Pfizer, its directors, officers, employees, agents, advisors, contractors, Affiliates and Pfizer Designees harmless from and against all Third Party claims, demands, damages,

liabilities, losses, costs, and expenses, including without limitation attorney's fees (collectively, "**Claims**") in connection with or arising from (a) a breach by Codexis of any of its representations, warranties or obligations under this Agreement, (b) any negligence, gross negligence, fraud or willful misconduct of Codexis or its subcontractors or agents in the performance of its obligations under this Agreement; (c) the manufacture, supply, or delivery of Codexis Enzyme; (d) Codexis' supply of Codexis Enzyme which is defective or does not conform to Enzyme Specification; (e) claims made by employees or representatives of Codexis or its subcontractors based on employment contract, or any Applicable Laws prohibiting discrimination in employment, or under worker's compensation or similar Applicable Laws; (f) failure of Codexis or its employees or subcontractors to comply with any Applicable Law, including but not limited to Environmental Laws, failure to pay taxes, duties, or fees, or to comply with employee safety regulations; (g) [***]; or (h) [***]; provided, however, that Codexis' indemnification obligations under this Section 12.1 shall not apply to the extent such Claims are solely the responsibility of Pfizer under Section 12.2.

12.2 Indemnification by Pfizer. Pfizer shall indemnify, defend, and hold Codexis, its directors, officers, employees, agents, and Affiliates harmless from and against all Claims to the extent arising from (a) a material breach by Pfizer of their representations, warranties or obligations under this Agreement, or (b) any negligence, gross negligence, fraud or willful misconduct by Pfizer or is Affiliates or their subcontractors or agents in the performance of its obligations under this Agreement, (c) product liability related to the use of the Intermediate or any Product (except to the extent caused by the Codexis Enzyme or the Codexis Technology) or (d) infringement or improper appropriation or use by Pfizer, its Affiliates or their subcontractors or agents of a Third Party's intellectual property rights in the manufacture of Codexis Enzyme, Intermediate or Product, where the infringement is caused solely by acts outside the use of Codexis Enzyme, Codexis Technology or Technology transferred by Codexis hereunder as Technology Transfer; provided, however, that Pfizer's indemnification obligations under this Section 12.2 shall not apply to the extent such Claims are solely the responsibility of Codexis under Section 12.1.

12.3 Indemnification Procedures. The indemnified Party claiming an indemnity hereunder shall: (a) promptly notify the indemnifying Party of any such Claim; (b) permit the indemnifying Party to direct the defense or settlement of such Claim, except that it may not settle any such suit or claim or consent to the entry of any judgment without the indemnified Party's prior written approval where such settlement involves more than financial compensation or where there is an adverse consequence to the operation of this Agreement, such approval not to be unreasonably withheld; (c) not take any action to prejudice the indemnifying Party's defense or settlement of such Claim; and (d) upon request by the indemnifying Party, provide reasonable cooperation, information, and assistance (at the indemnifying Party's expense) in connection with the indemnifying Party's defense or settlement of any Claim.

12.4 Infringement, Misappropriation, Misuse. Without limiting any other of Codexis's obligations or Pfizer's rights under this Agreement, if the Codexis Enzyme, Codexis Technology, or any part thereof, becomes or, in Codexis' reasonable opinion, is likely to become the subject of an infringement, misappropriation or misuse claim, suit or cause of action, Codexis, at its expense, promptly shall either (a) procure for Pfizer the right to continue using such Codexis Enzyme and Codexis Technology free of any liability for infringement, misappropriation or misuse; or (b) replace or modify such Codexis Enzyme or Codexis Technology with a non-infringing substitute of equivalent or

better functionality that is reasonably satisfactory to Pfizer, provided that it does not have any regulatory consequences for Pfizer's Intermediate or Product.

12.5 Insurance by Pfizer. Pfizer shall at all times maintain all necessary insurance coverage with sound and reputable independent insurers at commercially reasonable levels of coverage or shall be self-insured, having regard to the nature, type, scope and size of the business it conducts and all its respective activities and obligations under this Agreement.

12.6 Insurance by Codexis

(a) Maintenance of Coverage. During the Term of this Agreement, Codexis shall provide and maintain such insurance coverage, in minimum types and amounts as described below in this Section, as will protect it and Pfizer, to the extent Pfizer is included as an additional insured, (including Pfizer's Affiliates, its and their employees, directors, officers and agents) from all claims which may arise out of or result from Codexis's performance under this Agreement, whether such operations are conducted by Codexis itself or by its Personnel or by or by anyone directly or indirectly employed by any of them, or by anyone for whose acts or omissions they may be liable. Codexis will permit no subcontractor to commence or continue the performance of any services, obligations or other activities hereunder unless such subcontractor is and remains insured as outlined in this Section. Any and all deductibles for such insurance policies shall be assumed by, for the account of, and at Codexis's sole risk.

(b) Waiver of Subrogation. Such commercial general liability and automobile liability insurance policies shall be primary and non-contributing with respect to any other similar insurance policies available to Pfizer or its Affiliates. Except for Workers Compensation/Employers' Liability and Errors & Omissions/Professional Liability, all such policies shall include Pfizer and its Affiliates and any other such entities as Pfizer may reasonably request, as additional insureds. All such polices shall provide a waiver of subrogation in favor of Pfizer and its Affiliates.

(c) Insurance Certificate. Codexis shall furnish to Pfizer original certificates and additional insurance endorsements (blanket endorsements acceptable) evidencing the specified insurance coverage, upon execution of this Agreement and at contract renewal or expiration of any one coverage, whichever occurs first. Such certificates shall provide that notice of cancelation shall be given to Pfizer in accordance with the cancelation provisions of each required policy. The Certificate(s) of Insurance shall be signed by a person authorized by the insurer(s) to evidence coverage on its (their) behalf. Codexis shall provide, pay for, and maintain in effect the policies with minimum "A-" A.M. Best rated insurance carriers, or insurance companies otherwise satisfactory to Pfizer.

(d) Limits. The insurance required under this Section 12.6 shall be written for not less than any limits of liability specified herein or as required by applicable Law, whichever is greater. Codexis shall have the right to provide the total limits required by any combination of primary and Umbrella/Excess coverage; said insurance to include, without limitation, the following:

(i) Insurance for liability under the Workers' Compensation or occupational disease laws of any state or other jurisdiction in which services are performed (or be a qualified self-insurer in those states and jurisdictions) or otherwise applicable with respect to persons performing the services, and Employer's Liability insurance covering all claims by or in respect to the employees of Codexis, providing:

1. Coverage for the statutory limits of all claims under the applicable State Workers' Compensation Act or Acts. If the scope of work will result in exposures under the U.S. Longshoreman's Act and its amendments (work dockside or on water), the Jones Act (involving seaman, masters and crew of vessels) or the Federal Employer's Liability Act (railroad exposure), coverage shall be extended to include insurance coverages mandated thereby;

2. Employer's Liability Insurance with a limit of not less than $[***];

3. Voluntary Compensation insurance covering all employees not subject to the applicable state Workers' Compensation Act or Acts.

(ii) Commercial General Liability insurance with the following limits and forms/endorsements:

Each Occurrence $[***]

Products and Completed Operations Aggregate $[***]

(a) Occurrence form including premises and operations coverage, products and completed operations, broad form property damage, , personal injury coverage, blanket contractual liability, and watercraft liability coverage if services are performed on or near a body of water.

(b) Products and completed operations coverage shall be maintained for a period of not less than [***] following the date of the last delivery of Product to Pfizer hereunder.

(c) including Pfizer and its Affiliates as additional insureds with respect to any legal liability of Pfizer or its Affiliates, arising out of Codexis' performance.

(iii) **Automobile Liability Insurance**: $[***] combined single limit for bodily injury and property damage arising out of all owned, non-owned and hired vehicles, including coverage for all automobiles used in the performance of this Agreement and including the loading and unloading of same.

(iv) **Umbrella (Excess) Liability Coverage** (follow form) in an amount not less than $[***] per occurrence and in the aggregate

(v) **Care, Custody and Control**. If Codexis has care, custody or control of Pfizer property or inventory, Codexis shall be responsible for any loss or damage to it, and provide all risk Property Coverage at full replacement cost for same.

(vi) **Acceptance of Certificate**. Acceptance of any insurance certificate by Pfizer shall not constitute acceptance of the adequacy of coverage, compliance with the requirements of this Agreement, or serve as an amendment to this Agreement.

13. MISCELLANEOUS

13.1 Further Assurances. From time to time on and after the Effective Date, each Party shall at the reasonable request of the other Party: (a) deliver to the other Party such records, data, or other documents; (b) execute, and deliver or cause to be delivered, all assignments, consents, documents or further instruments of transfer or license; and (c) take or cause to be taken all other actions as such other Party may reasonably deem necessary or desirable in order for such Party to obtain the full benefits of this Agreement and the transactions contemplated hereby; each to the extent as required under the provisions of this Agreement.

13.2 Limitation of Liability. EXCEPT FOR BREACHES OF ARTICLE 8 (CONFIDENTIALITY), SECTION 2.14 OR INDEMNIFICATION PURSUANT TO ARTICLE 12, IN NO EVENT SHALL EITHER PARTY BE LIABLE FOR INCIDENTAL, CONSEQUENTIAL, INDIRECT, PUNITIVE, EXEMPLARY, OR SPECIAL DAMAGES OF THE OTHER PARTY ARISING OUT OF OR RELATED TO THIS AGREEMENT, HOWEVER CAUSED, UNDER ANY THEORY OF LIABILITY, WHETHER FORESEEABLE OR NOT. FURTHERMORE, EXCEPT FOR BREACHES OF ARTICLE 8, SECTION 2.14 OR INDEMNIFICATION PURSUANT TO ARTICLE 12, IN NO EVENT SHALL EITHER PARTY BE LIABLE TO THE OTHER PARTY FOR ANY CLAIM FOR DAMAGES SUCH PARTY SUFFERS UNDER THIS AGREEMENT IN AN AMOUNT EXCEEDING THE LESSER OF TWICE THE AGGREGATE AMOUNT OF THE PAYMENTS MADE BY PFIZER TO CODEXIS RELATED TO SUCH CLAIM OR US$[***], PROVIDED THAT NO LIMITATION OF LIABILITY HEREIN SHALL BE APPLICABLE TO ACTS OF GROSS NEGLIGENCE OR WILLFUL MISCONDUCT.

13.3 Governing Law. This Agreement shall be governed by, and construed and interpreted in accordance with, the internal laws of the State of New York, without giving effect to any choice of law rule that would cause the application of the laws of any jurisdiction other than the internal laws of New York to the rights and duties of the Parties. The Parties agree that the United Nations Convention on Contracts for the International Sale of Goods shall not apply to this Agreement.

13.4 Dispute Resolution.

(a) Any dispute, controversy, or claim arising out of, relating to, or in connection with this Agreement, including with respect to the formation, applicability, breach, termination, validity or enforceability thereof, which cannot be amicably resolved, shall be finally resolved by arbitration.

(b) The arbitration shall be conducted by three arbitrators, in accordance with the Commercial Arbitration Rules of the American Arbitration Association ("AAA"). The claimant shall nominate an arbitrator in its request for arbitration. The respondent shall nominate an arbitrator within [***] of the receipt of the request for arbitration. The two arbitrators nominated by the Parties shall nominate a third arbitrator within [***] after the nomination of the later-nominated arbitrator. The third arbitrator shall act as chair of the tribunal. If any of the three arbitrators are not nominated within the time prescribed above, then the AAA shall appoint the arbitrator(s).

(c) The seat of the arbitration shall be New York, and it shall be conducted in the English language. The costs of the arbitration, including the Parties' reasonable legal fees, shall be borne by the unsuccessful Party or Parties. However, the arbitral tribunal may apportion such costs between the Parties if it determines that apportionment is reasonable, taking into account the circumstances of the case.

(d) The arbitration award shall be final and binding on the Parties, and the parties undertake to carry out any award without delay. Judgment upon the award may be entered by any court having jurisdiction of the award or having jurisdiction over the relevant party or its assets.

(e) The parties agree that the IBA Rules on the Taking of Evidence in International Arbitration shall apply to the arbitration. The Parties agree not to bring any 28 USC § 1782 application before the U.S. courts in aid of any arbitration commenced or anticipated under this provision, and undertake not to use in the arbitration proceedings any documents obtained pursuant to such an application. The Parties agree that the arbitration shall be kept confidential.

(f) The existence of the arbitration, any non-public information provided in the arbitration, and any submissions, orders or awards made in the arbitration (together, the "Confidential Information") shall not be disclosed to any non-party except the tribunal, the AAA, the Parties, their counsel, experts, witnesses, accountants and auditors, insurers and reinsurers, and any other person necessary to the conduct of the arbitration. Notwithstanding the foregoing, a Party may disclose Confidential Information to the extent that disclosure may be required to fulfil a legal duty, protect or pursue a legal right, or enforce or challenge an award in bona fide legal proceedings. This confidentiality provision survives termination of the Agreement and of any arbitration brought pursuant to the Agreement.

(g) Nothing in this Agreement shall be deemed as preventing a Party from seeking injunctive relief (or any other provisional remedy) from any court having jurisdiction over the Parties and the subject matter of the dispute as necessary to protect that Party's name, Confidential Information, trade secrets, know-how, or any other proprietary rights.

13.5 Force Majeure. Codexis shall establish a written business continuity plan and Business Continuity Management system that aims to assure supply of Codexis Enzyme to Pfizer and its Affiliates in the event of a business interruption, including any disruption resulting from a force majeure event, to the extent commercially reasonable. Except for the payment of money, neither Party shall be held responsible for any delay or failure in performance hereunder caused by strikes, embargoes, unexpected government requirements, civil or military authorities, acts of God, flood, earthquake, or by the public enemy or other causes reasonably beyond such Party's control and without such Party's fault or negligence; provided, that the affected Party notifies the unaffected Party as soon as reasonably possible and resumes performance hereunder as soon as reasonably possible following cessation of such force majeure event; provided, further, that no such delay or failure in performance shall continue for more than three (3) months. In the event that a delay or failure in performance by a Party under this Section 13.5 continues longer than three (3) months, the other Party may terminate this Agreement in accordance with the terms and conditions of Section 11.3.

13.6 Independent Contractors. The Parties are independent contractors. Nothing in this Agreement is intended or will be deemed to constitute a partnership, agency or employer-employee relationship between the Parties. Neither Party will incur any debts or make any commitments for the other Party.

13.7 Assignment. Except as expressly provided herein, neither this Agreement nor any interest hereunder will be assignable, nor any other obligation delegable, by a Party without the prior written consent of the other Party, which consent will not be unreasonably withheld or delayed. This Agreement shall be binding upon successors and permitted assigns of the Parties. Any assignment not in accordance with this Section 13.7 shall be null and void. Any permitted assignment or transfer of this Agreement shall not release the assigning or transferring Party from its obligations under this Agreement.

13.8 Notices. Any notice, report, communication, or consent required or permitted by this Agreement shall be in writing and shall be sent (a) by prepaid registered or certified mail, return receipt requested; (b) by overnight express delivery service by a nationally recognized courier; (c) via confirmed facsimile, followed within five (5) days by a copy delivered in accordance with this Section 13.8; or (d) via e-mail or pdf, with delivery receipt and read receipt requested, addressed to the other Party at the address shown below or at such other address as such Party gives notice hereunder. Such notice will be deemed to have been given when delivered or, if delivery is not accomplished by some fault of the addressee, when tendered.

If to Pfizer:

Pfizer Ireland Pharmaceuticals
Operations Support Group
Ringaskiddy Co Cork
Ireland
Attn: Company Secretary

and, with a copy (which shall not constitute notice) to:

Pfizer Inc.
235 East 42nd Street
New York, NY 10017
Attn: General Counsel
LegalNotice@Pfizer.com

If to Codexis:

Codexis, Inc.

Codexis, Inc.

200 Penobscot Drive

Redwood City, California 94063

USA

Attn: President

ceo@codexis.com

With a copy to:

Codexis, Inc.

Codexis, Inc.

200 Penobscot Drive

Redwood City, California 94063

USA

Attn: General Counsel

gc@codexis.com

13.9 Severability. If any provision of this Agreement is found by a court to be void, invalid, or unenforceable, such provision shall be reformed to comply with Applicable Law or stricken if not so conformable, so as not to affect the validity or enforceability of this Agreement; provided, that no such reformation or striking shall be effective if the result materially changes the economic benefit of this Agreement to either Party. If any provision of this Agreement becomes or is declared by a court of competent jurisdiction to be void, invalid, or unenforceable, and reformation or striking of such provision would materially change the economic benefit of this Agreement to either Party, the Parties shall modify such provision in accordance with Section 13.10 to obtain a legal, valid, and enforceable provision and provide an economic benefit to the Parties that most nearly effects the Parties' intent on entering into this Agreement.

13.10 Press Release. Upon execution of this Agreement, the Parties shall issue the mutually agreed upon joint press release set forth in **Exhibit 13.10**. Any disclosure that is required by Applicable Law (including the Securities Act of 1933, as amended, and the Securities Exchange Act of 1934, as amended), or the rules of a securities exchange or the Securities and Exchange Commission or the securities regulations of any state or other jurisdiction, may be made by Codexis or Pfizer; *provided* that any such required disclosure will not contain any confidential information of, respectively, Pfizer or Codexis and, if disclosure of such information is required by Applicable Law or such rules or regulations, the Parties will comply with Section 8.4, and will use reasonable efforts to minimize such disclosure and obtain confidential treatment for any such information that is disclosed to a governmental agency, including the identities of the parties or the other party, as applicable. Codexis may publicly disclose any information that has previously been disclosed in accordance with this Section 13.10 without any requirement to receive Pfizer's approval thereof or to provide Pfizer with an opportunity to review such disclosure.

13.11 Modifications; Waivers. This Agreement may not be altered, amended, supplemented, or modified in any way except by a writing signed by each Party. The

failure of a Party to enforce any rights or provisions of this Agreement shall not be construed to be a waiver of such rights or provisions, or a waiver by such Party to thereafter enforce such rights or provisions or any other rights or provisions hereunder.

13.12 No Third Party Beneficiaries. This Agreement is neither expressly nor impliedly made for the benefit of any party other than those executing it, save as expressly stated herein in regard to Pfizer Affiliates and Pfizer Designees.

13.13 Interpretation.

(a) Captions and Headings. The captions and headings of clauses contained in this Agreement preceding the text of the articles, sections, subsections, and paragraphs hereof are inserted solely for convenience and ease of reference only and shall not constitute any part of this Agreement, or have any effect on its interpretation or construction.

(b) Singular and Plural. All references in this Agreement to the singular shall include the plural where applicable, and all references to gender shall include both genders and the neuter.

(c) Articles, Sections, and Subsections. Unless otherwise specified, references in this Agreement to any article shall include all sections, subsections, and paragraphs in such article; references in this Agreement to any section shall include all subsections and paragraphs in such section; and references in this Agreement to any subsection shall include all paragraphs in such subsection.

(d) Days. All references to days in this Agreement shall mean calendar days, unless otherwise specified.

(e) Ambiguities. The Parties jointly drafted this Agreement. Ambiguities and uncertainties in this Agreement, if any, shall not be interpreted against either Party, irrespective of which Party may be deemed to have caused the ambiguity or uncertainty to exist.

13.14 Counterparts. This Agreement may be executed in two or more counterparts, each of which shall be deemed an original and all of which together shall constitute one and the same instrument. Counterparts may be delivered, electronic mail (including pdf or any electronic signature complying with the U.S. Federal ESIGN Act of 2000, e.g., www.docusign.com) or other transmission method and any counterpart so delivered shall be deemed to have been duly and validly delivered and be valid and effective for all purposes.

13.15 Entire Agreement. The Parties acknowledge that this Agreement, including, for clarity, the preamble, recitals and exhibits attached hereto, sets forth the entire agreement and understanding of the Parties as to the subject matter hereof, and supersedes all prior and contemporaneous discussions, agreements, and writings with respect hereto with respect to the subject matter hereof. No trade customs, courses of dealing or courses of performance by the Parties shall be relevant to modify, supplement, or explain any term(s) used in this Agreement. Each Party agrees and acknowledges that it has not relied on any information, data, or forecasts provided by the other Party, or discussions with the other Party, in the negotiation and execution of this Agreement.

[*Signature page follows*]

IN WITNESS WHEREOF, Pfizer and Codexis have executed this Agreement by their respective duly authorized representatives on the dates identified below but the Agreement shall become effective on the Effective Date.

PFIZER IRELAND PHARMACEUTICALS	**CODEXIS, INC.**
By: /s/Paul Duffy	By: /s/John Nicols
Name: Paul Duffy	Name: John Nicols
Title: Director	Title: President & CEO
Date: July 13, 2022	Date: July 13, 2022

Exhibit 1.36

Licensed Patents

Intentionally omitted pursuant to Regulation S-K, Item 601(a)(5)

Exhibit 1.43

Pfizer Designees

Intentionally omitted pursuant to Regulation S-K, Item 601(a)(5)

Exhibit 2.5(a)

Existing Orders

Intentionally omitted pursuant to Regulation S-K, Item 601(a)(5)

Exhibit 2.5(b)

Existing Non-Cancelable Orders

Intentionally omitted pursuant to Regulation S-K, Item 601(a)(5)

Exhibit 2.5(c)

Existing Cancelable Orders

Intentionally omitted pursuant to Regulation S-K, Item 601(a)(5)

Exhibit 2.6

Specifications

Intentionally omitted pursuant to Regulation S-K, Item 601(a)(5)

Exhibit 3.1

Pricing for Codexis Enzyme

Intentionally omitted pursuant to Regulation S-K, Item 601(a)(5)

Exhibit 9.1(e)

Pfizer International Anti-Bribery and Anti-Corruption Principles

Pfizer has a longstanding corporate policy that prohibits colleagues or anyone else acting on our behalf from providing any payment or benefit to any person or entity in order to improperly influence a government official or to gain an unfair business advantage. Pfizer is committed to performing with integrity and acting ethically and legally in accordance with all applicable laws and regulations, including, but not limited to, anti-bribery and anti-corruption laws. We expect the same commitment from the consultants, agents and representatives or other companies and individuals acting on our behalf ("Business Associates"), as well as those acting on behalf of Business Associates, in connection with work for Pfizer.

Bribery of Government Officials

Most countries have laws that forbid making, offering or promising any payment or anything of value (directly or indirectly) to a government official when the payment is intended to influence an official act or decision to award or retain business. Under Pfizer's policies, "government official" is broadly interpreted and includes: (i) any elected or appointed government official (e.g., a member of a ministry of health); (ii) any employee or person acting for or on behalf of a government official, agency, or enterprise performing a governmental function; (iii) any political party, candidate for public office, officer, employee, or person acting for or on behalf of a political party or candidate for public office; or (iv) an employee or person acting for or on behalf of a public international organization (e.g. the United Nations). "Government" is meant to include all levels and subdivisions of government (i.e. local, regional, or national and administrative, legislative, or executive). Because this definition of "government official" is so broad, it is likely that Business Associates will interact with a government official in the ordinary course of their business on behalf of Pfizer. For example, doctors employed by government-owned hospitals would be considered "government officials" under Pfizer's policies.

The U.S. Foreign Corrupt Practices Act of 1977 (the "FCPA") prohibits making, promising, or authorizing the making of a payment or providing anything of value to a non-U.S. government official to improperly or corruptly induce that official to make any governmental act or decision to assist a company in obtaining or retaining business, or to otherwise obtain an improper advantage. The FCPA also prohibits a company or person from using another company or individual to engage in any of the foregoing activities. As a U.S. company, Pfizer must comply with the FCPA and could be held liable as a result of acts committed anywhere in the world by a Business Associate.

Anti-Bribery and Anti-Corruption Principles Governing Interactions with Governments and Government Officials

Business Associates must communicate and abide by the following principles with regard to their interactions with governments and government officials:

- Business Associates, and those acting on their behalf in connection with work for Pfizer, may not directly or indirectly make, promise, or authorize the making of a corrupt payment or provide anything of value to any government official to induce that government official to make any governmental act or decision to help Pfizer obtain or retain business. Business Associates, and those acting on their behalf in connection with work for Pfizer, may never make a payment to or offer a government official any items or benefit, regardless of value, as an improper

inducement for such government official to approve, reimburse, prescribe, or purchase a Pfizer product, to influence the outcome of a clinical trial, or otherwise improperly to benefit Pfizer's business activities

.

- Business Associates, and those acting on their behalf in connection with work for Pfizer, need to understand whether local laws, regulations, or operating procedures (including requirements imposed by government entities such as government-owned hospitals or research institutions) impose any limits, restrictions, or disclosure requirements on compensation, financial support, donations, or gifts that may be provided to government officials. Business Associates and those acting on their behalf in connection with work for Pfizer, must take into account and comply with any applicable restrictions in conducting their Pfizer-related activities. If a Business Associate is uncertain as to the meaning or applicability of any identified limits, restrictions, or disclosure requirements with respect to interactions with government officials, that Business Associate should consult with his or her primary Pfizer contact before undertaking their activities.

- Business Associates and those acting on their behalf in connection with work for Pfizer are not permitted to offer facilitation payments. A "facilitation payment" is a nominal, unofficial payment to a government official for the purpose of securing or expediting the performance of a routine, non-discretionary governmental action. Examples of facilitation payments include payments to expedite the processing of licences, permits or visas for which all paperwork is in order. In the event that a Business Associate, or someone acting on their behalf in connection with work for Pfizer, receives or becomes aware of a request or demand for a facilitation payment or bribe in connection with work for Pfizer, the Business Associate shall report such request or demand promptly to his or her primary Pfizer contact before taking any further action.

Commercial Bribery

Bribery and corruption can also occur in non-government, business to business relationships. Most countries have laws which prohibit offering, promising, giving, requesting, receiving, accepting, or agreeing to accept money or anything of value in exchange for an improper business advantage. Examples of prohibited conduct could include, but are not limited to, the provision of inappropriate gifts or hospitality, kickbacks, or investment opportunities offered to improperly induce the purchase of goods or services. Pfizer colleagues are not permitted to offer, give, solicit or accept bribes, and we accept our Business Associates, and those acting on their behalf in connection with work for Pfizer, to abide by the same principles.

Anti-Bribery and Anti-Corruption Principles Governing Interactions with Private Parties and Pfizer Colleagues

Business Associates must communicate and abide by the following principles with regard to their interactions with private parties and Pfizer colleagues:

- Business Associates, and those acting on their behalf in connection with work for Pfizer, may not directly or indirectly make, promise, or authorize the making of a corrupt payment or provide anything of value to any person to induce that person to provide an unlawful business advantage for Pfizer.
- Business Associates and those acting on their behalf in connection with work for Pfizer, may not directly or indirectly, solicit, agree to accept or receive a payment or anything of value as an improper inducement in connection with their business activities performed for Pfizer.
- Pfizer colleagues are not permitted to receive gifts, services, perks, entertainment or other items of more than token or nominal value from Business Associates, and those acting on their behalf in connection with work for Pfizer. Moreover, gifts of nominal value are only permitted if they are received in an infrequent basis and only at the appropriate occasions.

Reporting Suspected or Actual Violations

Business Associates, and those acting on their behalf in connection with work for Pfizer, are expected to raise concerns related to potential violations of these International Anti-Bribery and Anti-Corruption Principles or the law. Such reports can be made to a Business Associate's primary point of contact at Pfizer, or if an Associate prefers, to Pfizer's Compliance Group by e-mail at [***] or by phone at [***].

Exhibit 13.10

Press Release

Codexis Announces Agreement with Pfizer to Supply Enzyme

for the Manufacture of PAXLOVID™ (nirmatrelvir tablets; ritonavir tablets)

REDWOOD CITY, Calif., July [XX], 202– Codexis, Inc. (NASDAQ: CDXS), a leading enzyme engineering company enabling the promise of synthetic biology, today announced that the Company has entered into an agreement with Pfizer for the supply of a proprietary high-performance enzyme used to manufacture a critical intermediate for nirmatrelvir, an active pharmaceutical ingredient (API) in PAXLOVID™, Pfizer's antiviral therapeutic, which is currently authorized for emergency use by the U.S. Food and Drug Administration ("FDA") for the treatment of mild-to-moderate COVID-19 in people at high risk of progression to severe illness and authorized or approved by other regulatory authorities across the globe.

"Pfizer has played a critical role in the response to the global COVID-19 pandemic, including through their rapid development of PAXLOVID™, and I am incredibly proud that Codexis' engineered enzyme is enabling a sustainable manufacturing route for their nirmatrelvir API." said John Nicols, President and CEO of Codexis. "This agreement demonstrates the agility of Codexis' commercial supply chain and manufacturing capabilities to very rapidly generate unprecedented enzyme quantities. We look forward to our continued support of Pfizer's manufacturing of PAXLOVID™ for COVID-19 patients."

"Codexis has been an extremely valuable partner throughout the scale-up of the nirmatrelvir process, and we are pleased to extend our partnership through this multi-year agreement." said Pamela Siwik, Vice President, Launch Excellence, Pfizer Global Supply. "Their unique enzyme is an important element in the manufacture of PAXLOVID and plays a role in supporting our efforts to ensure rapid availability of this COVID-19 oral treatment to people around the world."

For important information related to the terms of the enzyme supply agreement and its impact on Codexis' outlook, see Codexis' Current Report on Form 8-K filed with the SEC on July [XX], 2022.

About Codexis

Codexis is a leading enzyme engineering company leveraging its proprietary CodeEvolver® platform to discover and develop novel, high performance enzymes and novel biotherapeutics. Codexis enzymes have applications in the sustainable manufacturing of pharmaceuticals, food, and industrial products; in the creation of the next generation of life science tools; and as gene therapy and biologic therapeutics. The Company's unique performance enzymes drive improvements such as: reduced energy usage, waste generation and capital requirements; higher yields; higher fidelity diagnostics; and more efficacious therapeutics. Codexis enzymes enable the promise of synthetic biology to improve the health of people and the planet. For more information, visit www.codexis.com.

Forward-Looking Statements

To the extent that statements contained in this press release are not descriptions of historical facts regarding Codexis, they are forward-looking statements reflecting the current beliefs and expectations of management made pursuant to the safe harbor provisions of the Private Securities Litigation Reform Act of 1995, including Codexis' expectations regarding the supply of its proprietary high performance enzyme to Pfizer and Codexis' ability to continue to support the manufacture of Pfizer's treatment for COVID-19 patients. You should not place undue

reliance on these forward-looking statements because they involve known and unknown risks, uncertainties and other factors that are, in some cases, beyond Codexis' control and that could materially affect actual results. Additional information about factors that could materially affect actual results can be found in Codexis' Annual Report on Form 10-K filed with the Securities and Exchange Commission ("SEC") on February 28, 2022 and in Codexis' Quarterly Report on Form 10-Q filed with the SEC on May 9, 2022, including under the caption "Risk Factors," and in Codexis' other periodic reports filed with the SEC. Codexis expressly disclaims any intent or obligation to update these forward-looking statements, except as required by law.

Investor Relations Contact:
Argot Partners
Brendan Strong/Carrie McKim
(212) 600-1902
Codexis@argotpartners.com

AMENDMENT NO. 1 TO ENZYME SUPPLY AGREEMENT

This Amendment No. 1 to Enzyme Supply Agreement (this " **Amendment No. 1**") is made as of December 19, 2022 (the "**Amendment No. 1 Effective Date**"), between Codexis, Inc., a Delaware corporation having its principal offices at 200 Penobscot Drive, Redwood City, California 94063 ("**Codexis**") and Pfizer Ireland Pharmaceuticals, an Irish corporation, with its principal place of business at Operations Support Group, Ringaskiddy, Cork, Ireland, and its Affiliates ("**Pfizer**"). Codexis and Pfizer may each be referred to herein individually as a "**Party**" or collectively, as the "**Parties**."

RECITALS

WHEREAS, Pfizer and Codexis are parties to that certain Enzyme Supply Agreement dated as of October 30, 2021 (" **Enzyme Supply Agreement**");

WHEREAS, Pfizer and Codexis desire to amend the Enzyme Supply Agreement in the manner specified in this Amendment No. 1.

NOW THEREFORE, in consideration of the promises and undertakings set forth herein, the Parties agree as follows:

1. All defined terms shall, unless defined or modified herein, have the meaning set forth in the Enzyme Supply Agreement.

2. As of the Amendment No. 1 Effective Date, Section 2.5(d)(ii)(b) of the Enzyme Supply Agreement shall read as follows:

    (b) 100% of any fees invoiced by Codexis to Pfizer during the period January 1, 2022 through December 31, 2023 under mutually acceptable, executed, written definitive collaborative development(s)/licensing agreement(s) (not including this Agreement) executed by Codexis and Pfizer from the Effective Date through January 31, 2023. For clarity, such agreements may include standalone purchase orders.

3. All other terms and conditions of the Agreement remain unchanged.

IN WITNESS WHEREOF, a duly authorized representative of each Party has executed this Amendment No. 1 as of the dates identified below, but this Amendment No. 1 shall become effective on the Amendment No. 1 Effective Date.

Codexis, Inc.	**Pfizer Ireland Pharmaceuticals**
/Ke /Kevin Norrett/	/Paul Duffy/
Name: Kevin Norrett Title: Chief Operating Date: December 29, 2022	Name: Paul Duffy Title: Director Date: January 3, 2023

AMENDMENT NO. 2 TO ENZYME SUPPLY AGREEMENT

This Amendment No. 2 to Enzyme Supply Agreement (this "**Amendment**") is made as of February 1, 2023 (the "**Amendment Effective Date**"), between Codexis, Inc., a Delaware corporation having its principal offices at 200 Penobscot Drive, Redwood City, California 94063 ("**Codexis**") and Pfizer Ireland Pharmaceuticals, an Ireland corporation, with its principal place of business at Operations Support Group, Ringaskiddy, Cork, Ireland, and its Affiliates ("**Pfizer**"). Codexis and Pfizer may each be referred to herein individually as a "**Party**" or collectively, as the "**Parties**."

RECITALS

WHEREAS, Pfizer and Codexis are parties to that certain Enzyme Supply Agreement dated as of October 30, 2021 (as amended, the "**Agreement**"); and

WHEREAS, Pfizer and Codexis desire to amend the Agreement in the manner specified in this Amendment;

NOW THEREFORE, in consideration of the promises and undertakings set forth herein, the Agreement is hereby amended as follows:

1. All defined terms shall, unless defined or modified herein, have the meaning set forth in the Agreement.

2. Section 2.5(d)(ii)(b) of the Agreement is deleted in its entirety and replaced with the following:

    "(b) 100% of any fees invoiced by Codexis to Pfizer during the period January 1, 2022 through December 31, 2023 under mutually acceptable, executed, written definitive collaborative development/licensing agreement(s) (not including this Agreement) executed by Codexis and Pfizer from the Effective Date through March 31, 2023. For clarity, such agreements may include standalone purchase orders."

3. Section 2.5(d)(iii) of the Agreement is deleted in its entirety and replaced with the following:

    "(iii) A total of 50% of any portion of the Retainer Fee which has not been credited after the issuance of credits pursuant to Section 2.5(d)(ii) is creditable against 80% of the Adjusted Enzyme Price of any New Order(s) (as defined in Section 2.5(e)) placed by Pfizer or its Affiliates and accepted by Codexis with a scheduled ship date (as reflected on the New Order) between January 1, 2024 and December 31, 2024."

4. All other terms and conditions of the Agreement remain unchanged.

IN WITNESS WHEREOF, a duly authorized representative of each Party has executed this Amendment as of the dates identified below, but this Amendment shall become effective on the Amendment Effective Date.

Codexis, Inc.	**Pfizer Ireland Pharmaceuticals**
Name:	Name:
Title:	Title:
Date:	Date:

Codexis, Inc.
200 Penobscot Drive
Redwood City, CA 94063
Tel: +1 (650) 421-8100
Fax: +1 (650) 421-8102
www.codexis.com

October 5, 2022 Margaret Fitzgerald Dear Margaret,

On behalf of Codexis, Inc. ("Codexis" or the "Company"), I am pleased to extend to you this offer of employment as Chief Legal and Compliance Officer reporting to Stephen Dilly, President and CEO. Your position is a full-time and exempt from overtime pay under the Fair Labor Standards Act.

Your employment is subject to proof of your legal right to work in the United States, and to your completing the United States Citizenship and Immigration Service Employment Eligibility Verification Form I-9. Your employment is also subject to successful completion of your professional references, background and drug screening, as well as the execution of your Employee Confidential Information and Inventions Assignment Agreement (Attachment A) (your "Confidentiality Agreement").

Compensation

If you accept this offer and you begin employment with Codexis, you will receive an initial salary of USD$445,000 per year, payable semi-monthly, which will be subject to all applicable withholdings.

You will also be eligible to participate in the Codexis Employee Incentive Compensation Plan (the " Incentive Plan"). Your Incentive Plan target will be 40% of your Codexis base salary earnings. If Codexis meets all of its corporate goals for 2022, and you also perform well against your individual and group goals, to be established with your supervisor, you can expect to receive an Incentive Plan payout at or near this target after our Board of Directors (the "Board") approval of our 2022 year-end financial statements. Based on the Company's performance and your individual and group's goal performance, your actual bonus may be more or less than this target, and under certain circumstances there may be no payout. Any Incentive Plan payout you receive will be based on your service during 2022 as a percentage of the full year; and no bonus will be paid unless you begin employment on or before October 1, 2022. Any payout will be subject to all applicable withholdings. Please also note that the Incentive Plan does not constitute a contract of employment or alter the "at will" status of your employment. In addition, Codexis reserves the right to modify or terminate the Incentive Plan at any time and for any reason without your consent.

Sign-On Bonus

You will also receive a sign-on bonus of USD$200,000.00 which will be subject to all applicable withholdings. The sign-on bonus will be paid out in two equal installments. The first within your first 30 days of employment. The second to be paid in time with the annual Codexis 2022 bonus payout; typically, within the first Quarter of 2023. Notwithstanding the foregoing, the sign-on bonus will not be considered earned to any extent on the date of payment and instead will only be earned if you remain employed by Codexis through the first anniversary of your employment start date. If within one year of your employment start date (i) you resign your employment with Codexis or (ii) your employment is terminated by Codexis for cause, you hereby agree to repay the net amount of your sign-on bonus within 30 days of the termination of your employment.

Equity

We are pleased to inform you that we will recommend to the Board or a committee appointed by the Board that you be granted an award (the "Award") of performance stock units ("PSUs") with an approximate value of US$500,000.00 as determined in accordance with Codexis' policy, as may be amended from time to time. The actual number of PSUs that will be distributed to you upon vesting is contingent upon the satisfaction by the company of pre-determined performance criteria for the measurement period, which for this grant will be the calendar year 2022. You may not receive any PSUs if the minimum performance criteria are not met. If the minimum performance criteria are met, the PSUs will vest in two, equal installments beginning within the first calendar quarter following the measurement period and until the PSUs are 100% vested one-year following the first installment vesting date. Your PSU grant will be subject to the terms of the Codexis, Inc. 2019 Equity Incentive Award Plan and will be conditioned on your acceptance of an appropriate PSU agreement.

Subject to approval by the Board or a committee appointed by the Board, you will be granted an option (the "Option") to purchase Common Stock having a value of US$1,000,000.00, as determined in accordance with Codexis' policy, as may be amended from time to time. The Option will have an exercise price per share equal to the closing trading price of a share of Common Stock on the date the Option is granted (or if the grant date is not a trading day, the immediately preceding trading day). Options are generally granted on or around the 5th day of the month following the month employees commence employment. The Option will vest and become exercisable as to one fourth or 25% of the shares initially subject to the Option on the first anniversary of the date of grant and thereafter will vest and become exercisable as to 1/48th of the shares initially subject to the Option per month for the following 36 months until the option is 100% vested on the four-year anniversary of the date of grant. Vesting is contingent upon your continued employment through the applicable vesting date. Your Option will be subject to the terms of the Plan and a stock option agreement to be entered into between you and the Company.

Please note that the Company can grant the Award and Option to you only if and as long as it is permitted
and feasible under the laws of the United States of America or any laws of a country in which you reside or to which laws you may be subject. If local laws make the grant of Award or Option illegal or impractical, the Company will let you know as soon as possible.

Change of Control Severance Agreement

In connection with the commencement of your employment with Codexis, you will have the opportunity to enter into a Change of Control Severance Agreement. A copy of the Change of Control Severance Agreement (Attachment B) will be sent to you under separate cover for your review and signature.

Employee Benefits

As a full-time employee, you will be eligible for the Codexis employee benefit plans, which currently include medical, dental, vision, long-term disability, and life insurance, as well as a 401(k) plan and flexible time off that allows full-time employees to accrue 20 days of flexible time off each year of employment. For employees working greater than or equal to 20 hours and less than 40 hours per week flexible time off is prorated. Codexis reserves the right to modify or terminate any of these plans at any time and for any reason.

Other Terms and Conditions of Employment

Your employment with Codexis is at will. "Employment at will" means that you are free to resign from your employment at any time, for any reason or no reason at all, with or without cause and with or without notice. Similarly, Codexis may terminate your employment at any time for any legal reason, with or without cause and with or without notice. It also means that your job duties, title and responsibility and reporting level, work schedule, compensation and benefits, as well as Codexis' personnel policies and procedures, may be changed with prospective effect, with or without notice, at any time in the sole discretion of Codexis. By accepting this offer of employment, you agree that your employment is at will, and acknowledge that no one, other than the President and CEO of Codexis, has the authority to promise you, either orally or in writing, anything to the contrary. Any such agreement must be in writing and signed by both you and the President to be effective.

Employment with any other entity or for yourself in competition with Codexis, or any direct or indirect subsidiary of Codexis, is not permitted. If you want to take an outside job, please discuss the opportunity with your manager and the Human Resources Department in advance so that a determination can be made if any actual or potential conflict of interest exists.

During the course of your employment you may create, develop or have access to confidential information belonging to Codexis, including technical, research, financial, business, commercial, personnel or operational information, and/or ideas, trade secrets, know-how, procedures, strategies or plans. You agree that as a condition of your employment with Codexis, you will sign and comply with the Codexis Employee Confidential Information and Inventions Assignment Agreement, a copy of which is attached to this letter as Attachment A.

The terms described in this letter supersede and replace all prior agreements, understandings, and promises between Codexis and you concerning the terms and conditions of your employment with Codexis.

We hope that your association with Codexis will be mutually successful and rewarding, and we look forward to welcoming you aboard. Please indicate your acceptance of this offer by initialing each page and signing this letter below and **returning the letter to Karen Armijo by October 8, 2022.**

Sincerely, Codexis, Inc.

By: /s/ Stephen Dilly
Stephen Dilly, Ph.D.
President & CEO

I understand and agree to the foregoing terms and conditions of employment with Codexis.

/s/ Margaret Fitzgerald
10/5/2022 | 1:39 PM PDT

10/31/2022
Date / Start Date

ATTACHMENT A

CODEXIS 2010 EMPLOYEE CONFIDENTIAL INFORMATION AND INVENTIONS ASSIGNMENT AGREEMENT

CODEXIS, INC.

EMPLOYEE CONFIDENTIAL INFORMATION AND INVENTIONS ASSIGNMENT AGREEMENT

The following confirms an agreement (the "Agreement") between Codexis, Inc., its subsidiaries, affiliates, successors or assigns (together the "Company") and me (**Margaret Fitzgerald**). As a condition of my employment, and in consideration of my employment with the Company and my receipt of the compensation now and hereafter paid to me by Company, I agree to the following effective as of my first day of employment with the Company:

1. **At-Will Employment.** This Agreement is not an employment contract for any particular term. I have a right to resign and Company has the right to terminate my employment at will, at any time, for any or no reason, with or without cause and without notice. In addition, this Agreement does not purport to set forth all of the terms and conditions of my employment, and, as an employee of Company, I have obligations to Company which are not set forth in this Agreement. However, the terms of this Agreement govern over any inconsistent terms and can only be changed by a subsequent written agreement signed by both parties.

2. Confidential Information.

(a) **Company Information.** I agree at all times during the term of my employment and thereafter, to hold in strictest confidence, and not to use, except for the benefit of the Company, or to disclose to any person, firm or corporation (in writing, verbally, or via email or any other medium) without written advance authorization of the Board of Directors of the Company, any Confidential Information of the Company. I will not use any Confidential Information except in the performance of my authorized duties as an employee of Company. I understand that "Confidential Information" includes, without limitation, any tangible or intangible proprietary information, technical data, trade secrets or know-how, including, but not limited to, research ideas, concepts, tangible and biological materials (including, but not limited to, cell lines, plasmids, vectors and DNA) and data; product plans, products, and services; customer lists and customers (including, but not limited to, customers of the Company on whom I called or with whom I became acquainted during my term of my employment); business markets, software, development, discoveries, inventions, processes, formulas, technology, designs, drawings, engineering, hardware configuration information, marketing, business plans, corporate strategy plans, financial data; or other business information made, generated or developed by me in the course of my employment with Company, or disclosed to me by Company either directly or indirectly in any form, including, without limitation, in writing, orally, electronically, or by drawings or observation of materials, parts, equipment, or research experiments. Confidential Information also includes confidential information provided to Company by any third party, which is indicated by such third party to be confidential. I further understand that Confidential Information does not include any of the foregoing items which has become publicly known and made generally available through no wrongful act of mine.

(b) **Third Party Information.** I agree that I will not, during my employment with the Company, improperly use or disclose any proprietary information or trade secrets of any former or concurrent employer or other person or entity, and that I will not bring onto the premises of the Company any unpublished document or proprietary information belonging to any such employer, person or entity unless consented to in writing and in advance by such employer, person or entity.

(c) **Third Party Information Received by the Company.** I recognize that the Company has received and in the future will likely receive from third parties their confidential or proprietary information subject to a duty on the Company's part to maintain the confidentiality of such information and to use it only for certain limited purposes. I agree to hold all such confidential or proprietary information in the strictest confidence and not to disclose it to any person, firm or corporation or to use it except as necessary in carrying out my work for the Company consistent with the Company's agreement with such third party.

(d) **Defend Trade Secrets Act**. 18 U.S.C. § 1833(b) states:

"An individual shall not be held criminally or civilly liable under any Federal or State trade secret law for the disclosure of a trade secret that—(A) is made—(i) in confidence to a Federal, State, or local government official, either directly or indirectly, or to an attorney; and (ii) solely for the purpose of reporting or investigating a suspected violation of law; or (B) is made in a complaint or other document filed in a lawsuit or other proceeding, if such filing is made under seal."

Accordingly, I have the right to disclose in confidence trade secrets to Federal, State, and local government officials, or to an attorney, for the sole purpose of reporting or investigating a suspected violation of law. I also have the right to disclose trade secrets in a document filed in a lawsuit or other proceeding, but only if the filing is made under seal and protectable from public disclosure. Nothing in this Certification is intended to conflict with 18 U.S.C. § 1833(b) or create liability for disclosures of trade secrets that are expressly allowed by 18 U.S.C. § 1833(b).

3. Inventions.

(a) **Inventions Retained and Licensed.** I have attached hereto, as **Exhibit A**, a list describing all inventions, original works of authorship, developments, improvements, and trade secrets (if any) which were made by me prior to my employment with the Company (collectively referred to as "Prior Inventions"), which belong to me, which relate to the Company's proposed business, products or research and development, and which are not assigned to the Company hereunder; if no such list is attached to or contained in **Exhibit A**, I represent that there are no such Prior Inventions. If in the course of my employment with the Company, I incorporate into a Company product, process or machine a Prior Invention owned by me or in which I have an interest, the Company is hereby granted and shall have a nonexclusive, fully sublicensable, royalty-free, irrevocable, perpetual, worldwide license to make, have made, modify, use, have used, sell, have sold and import such Prior Invention as part of or in connection with such product, process or machine.

(b) **Assignment of Inventions.** I agree that I will promptly make full written disclosure to the Company, will hold in trust for the sole right and benefit of the Company. I hereby assign to the Company, or its designee, all my right, title, and interest in and to any and all inventions, original works of authorship, developments, concepts, improvements or trade secrets, whether or not patentable or registrable under copyright or similar laws, which I may solely or jointly conceive or develop or reduce to practice, or cause to be conceived or developed or reduced to practice, during the period of time I am in the employ of the Company (collectively referred to as "Inventions"), excepting only any invention (if any) which qualifies fully under the provisions of California Labor Code Section 2870 as provided in Section 3 (f) below. I further acknowledge that all original works of authorship which are made by me (solely or jointly with others) within the scope of and during the period of my employment with the Company and which are protectable by copyright are "works made for hire", as that term is defined in the United States Copyright Act.

(c) **Inventions Assigned to the United States.** I agree to assign to the United States government all my right, title, and interest in and to any and all Inventions hereunder, whenever such full title is required to be in the United States by a contract between the Company and the United States or any of its agencies.

(d) **Maintenance of Records.** I agree to keep and maintain adequate and current written records of any and all Inventions hereunder, including any made by me solely or jointly with others during the term of my employment with the Company. The records will be in the form of notes, sketches, drawings, and any other format that may be specified by the Company. The records will be available to and remain the sole property of the Company at all times.

(e) **Patent and Copyright Registrations.** I agree to assist the Company, or its designee, at the Company's expense, in every proper way to secure the Company's rights in the Inventions and any copyrights, patents, mask work rights or other intellectual property rights relating thereto in any and all countries, including the disclosure to the Company of all pertinent information and data with respect thereto, the execution of all applications, specifications, oaths, assignments and all other instruments which the Company shall deem necessary in order to apply for and obtain such rights and in order to assign and convey to the Company, its successors, assigns and nominees the sole and exclusive rights, title and interest in and to such Inventions, and any copyrights, patents, mask work rights or other intellectual property rights relating thereto. I further agree that my obligation to execute or cause to be executed, when it is in my power to do so, any such instrument or papers shall continue after the termination of this Agreement. If the Company is unable because of my mental or physical incapacity or for any other reason to secure my signature to apply for or to pursue any application for any United States or foreign patents or copyright registrations covering Inventions or original works of authorship assigned to the Company as above, then I hereby irrevocably designate and appoint the Company and its duly authorized officers and agents as my agent and attorney in fact, to act for and in my behalf and stead to execute and file any such applications and to do all other lawfully permitted acts to further the prosecution and issuance of letters patent or copyright registrations thereon with the same legal force and effect as if executed by me.

(f) **Exception to Assignments.** I understand that the provisions of this Agreement requiring assignment of Inventions to the Company do not apply to any invention which qualifies fully under the provisions of California Labor Code Section 2870 (attached hereto as **Exhibit B**). I will advise the Company promptly in writing of any invention that I believe meet the criteria in California Labor Code Section 2870 and are not disclosed on **Exhibit A**.

4. **Conflicting Employment.** I agree that, during the term of my employment with the Company, I will not engage in any other employment, occupation, consulting or other business activity directly related to the business in which the Company is now involved or becomes involved during the term of my employment, nor will I engage in any other conduct or activities that conflict with my obligations to the Company or is not in the best interests of the Company.

5. **Returning Company Property.** I agree that, prior to or at the time of leaving the employ of the Company, I will deliver to the Company (and will not keep in my possession, recreate or deliver to anyone else) any and all Confidential Information in my possession, as well as all equipment, devices, records, data, notes, reports, proposals, lists, correspondence, specifications, drawings, blueprints, sketches, biological and other tangible materials (including, but not limited, to cell lines, plasmids, vectors and DNA), other documents or tangible property of the Company (or property of third parties that is lawfully in the possession or control of the Company), or reproductions of any aforementioned items including any and all of the aforementioned items

developed by me pursuant to my employment with the Company or otherwise property of the Company, its successors or assigns. In the event of the termination of my employment, I agree to sign and deliver the "Termination Certification" attached hereto as **Exhibit C**.

6. **Notification of New Employer.** In the event that I leave the employ of the Company, I hereby grant consent to notification by the Company to my new employer about my rights and obligations under this Agreement.

7. **Solicitation of Employees and Customers.** I acknowledge and agree that for a period of twenty- four (24) months or to the maximum extent permitted by law immediately following the termination of my relationship with the Company for any reason, whether voluntarily or involuntarily, I shall not either directly or indirectly without the prior written consent of the Company:

(a) solicit, induce, recruit or encourage any of the Company's employees to leave their employment, either for myself or for any other person or entity; or

(b) use Confidential Information of the Company to solicit the business of any customer of the Company, where I had contact with such customer during the period of my employment with the Company, and which business is competitive with any significant part of the business conducted by the Company or any subsidiary or affiliate thereof at the time of termination of my employment or as contemplated to be conducted by the Company at such time.

In connection with the foregoing, I acknowledge and agree that the identity, appropriate knowledge of personnel, research and/or product requirements, volume and frequency of orders, and price sensitivity of customers of the Company are not publicly available information and constitute valuable trade secrets of the Company.

8. **Photography Consent, Waiver, And Release.** Upon execution of this Agreement, I agree to sign the Photography Consent, Waiver and Release attached as **Exhibit D** hereto.

9. **Conflict of Interest Guidelines.** I agree to diligently adhere to the Conflict of Interest Guidelines attached as **Exhibit E** hereto.

10. **Representations.** I agree to execute any proper oath or verify any proper document required to carry out the terms of this Agreement. I represent that my performance of all the terms of this Agreement will not breach any agreement to keep in confidence proprietary information acquired by me in confidence or in trust prior to my employment by the Company. I have not entered into, and I agree I will not enter into, any oral or written agreement in conflict herewith.

11. **Equitable Remedies.** I agree that it would be impossible or inadequate to measure and calculate the Company's damages from any breach of the covenants set forth in this Agreement. Accordingly, I agree that if I breach any provision of this Agreement, the Company will have available, in addition to any other right or remedy available, the right to obtain an injunction from a court of competent jurisdiction restraining such breach or threatened breach and to specific performance of any such provision of this Agreement.

12. **Non-Disparagement.** I agree that, during employment with Company and thereafter, I will not make comments, whether oral or in writing, that tend to disparage or injure the Company, its officers, directors, agents, employees, technology, businesses, products or services. Nothing in this Agreement will be construed to preclude me from complying with the terms of a validly issued subpoena.

13. General Provisions.

(a) **Governing Law; Consent to Personal Jurisdiction.** This Agreement will be governed by the laws of the State of California exclusively, as such laws apply to contracts between California residents performed entirely within California. I hereby expressly consent to the personal jurisdiction of the state and federal courts located in San Mateo County, California for any lawsuit filed there against me by the Company arising from or relating to this Agreement.

(b) **Entire Agreement.** This Agreement sets forth the entire agreement and understanding between the Company and me relating to the subject matter herein and merges all prior and contemporaneous discussions between us, including any previous confidentiality agreements that I may have entered into with the Company. No modification of or amendment to this Agreement, nor any waiver of any rights under this Agreement, will be effective unless in writing signed by both parties. Any subsequent change or changes in my duties, salary or compensation will not affect the validity or scope of this Agreement.

(c) **Severability.** If one or more of the provisions in this Agreement are deemed void by law, then the remaining provisions will continue in full force and effect.

(d) **Successors and Assigns.** This Agreement will be binding upon my heirs, executors, administrators and other legal representatives and will be for the benefit of the Company, its successors, and assigns.

(e) **Survival.** The rights and obligations of the parties to this Agreement will survive termination of my employment with Company.

(f) **Counterparts.** This Agreement may be executed in any number of counterparts, each of which shall be deemed to be an original and all of which together shall be deemed to be one and the same instrument.

[SIGNATURE PAGE FOLLOWS}

I HAVE READ THIS AGREEMENT CAREFULLY AND I UNDERSTAND AND ACCEPT THE OBLIGATIONS WHICH IT IMPOSES UPON ME WITHOUT RESERVATION. NO PROMISES OR REPRESENTATIONS HAVE BEEN MADE TO ME TO INDUCE ME TO SIGN THIS AGREEMENT. I SIGN THIS AGREEMENT VOLUNTARILY AND FREELY, IN DUPLICATE, WITH THE UNDERSTANDING THAT ONE COUNTERPART WILL BE RETAINED BY COMPANY AND THE OTHER COUNTERPART WILL BE RETAINED BY ME.

Date: 10/5/2022 | 1:39 PM PDT

/s/ Margaret Fitzgerald
Signature

Margaret Fitzgerald
Printed

CODEXIS, INC.

By: __

Title: __

Date: __

EXHIBIT A

LIST OF PRIOR INVENTIONS (INCLUDING ORIGINAL WORKS OF AUTHORSHIP)

Title	Date	Identifying Number Or Brief Description

EXHIBIT B

CALIFORNIA LABOR CODE SECTION 2870 EMPLOYMENT AGREEMENTS; ASSIGNMENT OF RIGHTS

"(a) Any provision in an employment agreement which provides that an employee shall assign, or offer to assign, any of his or her rights in an invention to his or her employer shall not apply to an invention that developed entirely on his or her own time without using the employer's equipment, supplies, facilities, or trade secret information except for those inventions that either:

(1) Relate at the time of conception or reduction to practice of the invention to the employer's business, or actual or demonstrably anticipated research or development of the employer.

(2) Result from any work performed by the employee for the employer.

(b) To the extent a provision in the employment agreement purports to require an employee to assign an invention otherwise excluded from being required to be assigned under subdivision (a), the provision is against the public policy of this state and is unenforceable."

EXHIBIT C

CODEXIS, INC. TERMINATION CERTIFICATION

This is to certify that I do not have in my possession, nor have I failed to return, any devices, records, data, notes, reports, proposals, lists, correspondence, specifications, drawings, blueprints, sketches, materials, equipment, other documents or property, or reproductions of any aforementioned items belonging to Codexis, Inc., its subsidiaries, affiliates, successors or assigns, except where authorized in writing.

I further certify that I have complied with all the terms of the Codexis, Inc. Employee Confidential Information and Inventions Assignment Agreement signed by me, including the reporting of any inventions and original works of authorship (as defined therein), conceived or made by me (solely or jointly with others) covered by that agreement.

I further agree that, in compliance with the Employee Confidential Information and Inventions Assignment Agreement, I will preserve as confidential all trade secrets, confidential knowledge, data or other proprietary information relating to products, processes, know-how, designs, formulas, developmental or experimental work, computer programs, data bases, other original works of authorship, customer lists, business plans, financial information or other subject matter pertaining to any business of Codexis, Inc. or any of its employees, clients, consultants, or licensees.

The Federal **Defend Trade Secrets Act** . 18 U.S.C. § 1833(b) states:

"An individual shall not be held criminally or civilly liable under any Federal or State trade secret law for the disclosure of a trade secret that—(A) is made—(i) in confidence to a Federal, State, or local government official, either directly or indirectly, or to an attorney; and (ii) solely for the purpose of reporting or investigating a suspected violation of law; or (B) is made in a complaint or other document filed in a lawsuit or other proceeding, if such filing is made under seal."

Accordingly, I have the right to disclose in confidence trade secrets to Federal, State, and local government officials, or to an attorney, for the sole purpose of reporting or investigating a suspected violation of law. I also have the right to disclose trade secrets in a document filed in a lawsuit or other proceeding, but only if the filing is made under seal and protectable from public disclosure. Nothing in this Certification is intended to conflict with 18 U.S.C. § 1833(b) or create liability for disclosures of trade secrets that are expressly allowed by 18 U.S.C. § 1833(b).

I further agree that in compliance with the Employee Confidential Information and Inventions Assignment Agreement, for twenty-four (24) months from this date: (a) I will not use confidential information to solicit, induce, recruit or encourage any of the Company's employees to leave their employment, either for myself or for any other person or entity; and (b) I will not use confidential information to solicit the business of any customer of the Company, which business is competitive with any significant part of the business conducted by the Company or any subsidiary or affiliate thereof at the time of termination of my employment or as contemplated to be conducted by the Company at such time.

Date: __

_____

(Employee's Signature)

_____

(Type/Print Employee's Name)

[TO BE SIGNED UPON TERMINATION OF EMPLOYMENT]

EXHIBIT D

CODEXIS, INC.
PHOTOGRAPHY CONSENT, WAIVER, AND RELEASE

For good and valuable consideration, I hereby consent and give permission to Codexis, Inc. ("Codexis") or its agent, to photograph, image and/or videotape me, my property, and/or myself as included with others (such photographs, images, and/or videotapes, "Photographs"). I understand that any such Photographs, and all rights associated with them, will belong solely and exclusively to Codexis and Codexis shall have the irrevocable and absolute right to copyright, duplicate, reproduce, alter, display, distribute, and/or publish them in any manner, for any purpose, and in any form including, but not limited to, print, electronic, video, and/or Internet without notifying me.

I voluntarily waive any and all rights I may now or hereafter have with respect to any such Photographs, including any compensation, ownership, copyright, and privacy rights and any right to inspect or approve such Photographs and/or copy, print or other materials that may be used in connection with them, whether now or in the future, whether that use is known or unknown to me. I hereby waive any right to inspect or approve of any finished Photographs whether printed or electronic, that may be used now or in the future, whether that use is known or unknown to me, and I forever waive any right to royalties or other compensation arising from or related to the use of the Photographs. I hereby release and discharge, and agree to hold harmless, Codexis, its officers, agents and employees, and all persons acting under its permission or authority, from any claims, losses, damages or liability arising from or related to such Photographs and/or their use under any circumstances.

This consent, waiver, and release will be binding upon the heirs, executors, administrators and other legal representatives of myself, and will be for the benefit of Codexis, its successors and assigns.

I HAVE READ AND FULLY UNDERSTAND THE CONTENTS OF THIS CONSENT, WAIVER, AND RELEASE FORM, AND I SIGN IT FREELY AND VOLUNTARILY.

Name: Margaret Fitzgerald

/s/ Margaret Fitzgerald
Signature

Date: 10/5/2022 | 1:39 PM PDT

EXHIBIT E

CONFLICT OF INTEREST GUIDELINES

It is the policy of Codexis, Inc., to conduct its affairs in strict compliance with this letter and spirit of the law and to adhere to the highest principles of business ethics. Accordingly, all officers, employees and independent contractors must avoid activities that are in conflict, or give the appearance of being in conflict, with these principles and with the interests of the company. The following are potentially compromising situations that must be avoided. Any exceptions must be reported to the Chief Executive Officer and written approval for continuation must be obtained.

1. Revealing confidential information to outsiders or misusing confidential information. Unauthorized divulging of information is a violation of this policy whether or not for personal gain and whether or not harm to the company is intended. (The Employee Confidential Information and Inventions Assignment Agreement elaborates on this principle and is a binding agreement.)

2. Accepting or offering substantial gifts, excessive entertainment, favors or payments which may be deemed to constitute undue influence or otherwise be improper or embarrassing to Codexis, Inc.

3. Participating in civic or professional organizations that might involve divulging confidential information of the company.

4. Initiating or approving personnel actions affecting reward or punishment of employees or applicants where there is a family relationship or is or appears to be a personal or social involvement.

5. Initiating or approving any form of harassment of employees based upon their age, sex, race, ethnicity, national origin, or on any other protected basis.

6. Investing or holding outside directorship in suppliers, customers, or competing companies, including financial speculations, where such investment or directorship might influence in any manner a decision or course of action of the company.

7. Borrowing from or lending to employees, customers or suppliers.

8. Acquiring any business opportunity of interest to Codexis, Inc.

9. Improperly using or disclosing to the company any proprietary information or trade secrets of any former or concurrent employer or other person or entity with whom obligations of confidentiality exist.

10. Unlawfully discussing prices, costs, customers, sales or markets with competing companies or their employees.

11. Making any unlawful agreement with distributors with respect to prices.

12. Improperly using or authorizing the use of any inventions that are the subject of patent claims of any other person or entity.

13. Engaging in any conduct that is not in Codexis, Inc.’s best interest.

Each officer, employee and independent contractor must take every necessary action to ensure compliance with these guidelines and to bring problem areas to the attention of higher management for review. Violations of this conflict of interest policy may result in discharge without warning.

CODEXIS, INC.

CHANGE OF CONTROL SEVERANCE AGREEMENT

This Change of Control Severance Agreement (the "Agreement") is made and entered into by and between Margaret Fitzgerald (the "Executive") and Codexis, Inc., a Delaware corporation (the "Company"), effective as of the latest date set forth by the signatures of the parties hereto below (the "Effective Date").

R E C I T A L S

A. It is expected that the Company from time to time will consider the possibility of an acquisition by another company or other change of control. The Board of Directors of the Company (the "Board") recognizes that such consideration as well as the possibility of an involuntary termination or reduction in responsibility can be a distraction to Executive and can cause Executive to consider alternative employment opportunities. The Board has determined that it is in the best interests of the Company and its stockholders to assure that the Company will have the continued dedication and objectivity of Executive, notwithstanding the possibility, threat or occurrence of such an event.

B. The Board believes that it is in the best interests of the Company and its stockholders to provide Executive with an incentive to continue Executive's employment and to motivate Executive to maximize the value of the Company upon a Change of Control (as defined below) for the benefit of its stockholders.

C. The Board believes that it is imperative to provide Executive with severance benefits upon certain terminations of Executive's service to the Company that provide Executive with enhanced financial security and provides incentive and encouragement to Executive to remain with the Company notwithstanding the possibility of such an event.

D. Certain capitalized terms used in the Agreement are defined in Section 9 below. The parties hereto agree as follows:

1. Term of Agreement. This Agreement shall become effective as of the Effective Date and terminate upon the date that all obligations of the parties hereto with respect to this Agreement have been satisfied.

2. At-Will Employment. The Company and Executive acknowledge that Executive's employment is and shall continue to be "at-will," as defined under applicable law. If Executive's employment terminates for any reason, Executive shall not be entitled to any payments, benefits, damages, awards or compensation other than as provided by this Agreement.

3. Covered Termination Outside a Change of Control Period. Except as otherwise provided under Section 6, if Executive experiences a Covered Termination other than during a Change of Control Period, and if Executive, within sixty (60) days following the date of the Covered Termination, provides the Company with an executed Release of Claims (as defined below) which is not revoked within the applicable revocation period, if any, then in addition to any accrued but

unpaid salary, bonus, vacation and expense reimbursement payable in accordance with applicable law, the Company shall provide Executive with the following:

(a) Severance. Executive shall receive a lump sum cash payment in an amount equal to twelve (12) months of Executive's base salary at the rate in effect immediately prior to Executive's termination of employment (without giving effect to any reduction in base salary that gives rise to a Voluntary Termination for Good Reason), less applicable withholdings. This severance payment shall be made to Executive in substantially equal installments in accordance with the Company's normal payroll procedures with the first such installment to be made on the first payroll date following the date the Release of Claims becomes effective and irrevocable, provided, that if the Covered Termination occurs after November 1 of any year, the first such installment shall be made on the first payroll date of the subsequent year and, provided further, that, in each case, the first installment shall include any installment payments that would have been made had such installments commenced on the first payroll date after the Covered Termination.

(b) Continued Healthcare. If Executive elects to receive continued healthcare coverage pursuant to the provisions of the Consolidated Omnibus Budget Reconciliation Act of 1985, as amended ("COBRA"), the Company shall directly pay, or reimburse Executive for, the premium for Executive, Executive's covered dependents and Executive's spouse or domestic partner from the date of Executive's Covered Termination through the earlier of (i) the twelve (12) month anniversary of the date of Executive's Covered Termination and (ii) the date Executive, Executive's covered dependents, if any, and Executive's spouse or domestic partner, if any, become eligible for healthcare coverage under another employer's plan(s), *provided*, *however*, that if (1) any plan pursuant to which such benefits are provided is not, or ceases prior to the expiration of the continuation coverage period to be, exempt from the application of Section 409A under Treasury Regulation Section 1.409A-1(a)(5), (2) the Company is otherwise unable to continue to cover Executive or Executive's dependents under its group health plans, or (3) the Company cannot provide the benefit without violating applicable law (including, without limitation, Section 2716 of the Public Health Service Act), then, in any such case, an amount equal to each remaining Company subsidy shall thereafter be paid to Executive in substantially equal monthly installments over the remaining period the Company would otherwise directly pay or reimburse Executive. After the Company ceases to pay premiums pursuant to the preceding sentence, Executive may, if eligible, elect to continue healthcare coverage at Executive's expense in accordance with the provisions of COBRA.

4. Covered Termination Within a Change of Control Period. If Executive experiences a Covered Termination during a Change of Control Period, and if Executive, within sixty (60) days following the date of the Covered Termination, provides the Company with an executed Release of Claims (as defined below) which is not revoked within the applicable revocation period, if any, then in addition to any accrued but unpaid salary, bonus, vacation and expense reimbursement payable in accordance with applicable law, the Company shall provide Executive with the following:

(a) Severance. Executive shall receive a lump sum cash payment in an amount equal to the sum of eighteen (18) months of Executive's base salary at the rate in effect immediately prior to Executive's termination of employment (without giving effect to any reduction in base salary subsequent to a Change of Control that gives rise to a Voluntary Termination for Good

Reason), less applicable withholdings. This severance payment shall be made to Executive within sixty (60) days following the date of the Covered Termination.

(b) Equity Awards. Each outstanding equity award, including, without limitation, stock options, restricted stock, and restricted stock units, held by Executive shall automatically become vested and, if applicable, exercisable and any restrictions thereon shall immediately lapse, in each case, with respect to one hundred percent (100%) of the then unvested shares subject to such equity award. Notwithstanding the foregoing, any outstanding performance stock units or performance stock options held by Executive shall automatically become vested with respect to: (i) in the event of a Change of Control that occurs prior to the applicable Measurement Date, such number of shares of Company common stock corresponding to the target performance level for any applicable performance goals; or (ii) in the event of a Change of Control that occurs on or after the Measurement Date, such number of shares of Company common stock corresponding to the Company's actual achievement of any applicable performance goals.

(c) Continued Healthcare. If Executive elects to receive continued healthcare coverage pursuant to the provisions of COBRA, the Company shall directly pay, or reimburse Executive for, the premium for Executive, Executive's covered dependents and Executive's spouse or domestic partner from the date of Executive's Covered Termination through the earlier of (i) the eighteen (18) month anniversary of the date of Executive's Covered Termination and (ii) the date Executive, Executive's covered dependents, if any, and Executive's spouse or domestic partner, if any, become eligible for healthcare coverage under another employer's plan(s), *provided*, *however*, that if (1) any plan pursuant to which such benefits are provided is not, or ceases prior to the expiration of the continuation coverage period to be, exempt from the application of Section 409A of the Code, under Treasury Regulation Section 1.409A-1(a)(5), (2) the Company is otherwise unable to continue to cover Executive or Executive's dependents under its group health plans, or (3) the Company cannot provide the benefit without violating applicable law (including, without limitation, Section 2716 of the Public Health Service Act), then, in any such case, an amount equal to each remaining Company subsidy shall thereafter be paid to Executive in substantially equal monthly installments over the remaining period the Company would otherwise directly pay or reimburse Executive. After the Company ceases to pay premiums pursuant to the preceding sentence, Executive may, if eligible, elect to continue healthcare coverage at Executive's expense in accordance with the provisions of COBRA.

5. Death or Disability. If Executive terminates employment with the Company due to death or Disability and such termination constitutes a "separation from service" within the meaning of Section 409A of Code and the Department of Treasury regulations and other guidance promulgated thereunder (a "Separation from Service"), then in addition to any accrued but unpaid salary, bonus, vacation and expense reimbursement payable in accordance with applicable law, the Company shall provide Executive with the following:

(a) Pro-Rata Vesting of Equity Awards. Each outstanding equity award, including, without limitation, stock options, restricted stock and restricted stock units, held by Executive shall automatically become vested and, if applicable, exercisable and any restrictions thereon shall immediately lapse, in each case, with respect to that number of shares of Company common stock that would otherwise vest on the next vesting date for such equity award, assuming Executive's continued service through such date, pro-rated to the date of Executive's termination due to death or Disability. For purposes of determining the number of shares subject to any outstanding performance stock units or performance stock options that would otherwise vest on the

next vesting date pursuant to the foregoing sentence, the applicable performance goals shall be deemed achieved: (i) in the event of a termination due to death or Disability that occurs prior to the applicable Measurement Date, at the target performance level; or (ii) in the event of a termination due to death or Disability that occurs on or after the Measurement Date, based on the Company's actual achievement.

(b) Continued Healthcare. If Executive, or any beneficiary of Executive, elects to receive continued healthcare coverage pursuant to the provisions of COBRA, the Company shall directly pay, or reimburse Executive, or such beneficiary, for, the premium for Executive,
Executive's covered dependents and Executive's spouse or domestic partner from the date of
Executive's termination due to death or Disability through the earlier of (i) the twelve (12) month anniversary of the date of Executive's termination of employment and (ii) the date Executive,
Executive's covered dependents, if any, and Executive's spouse or domestic partner, if any, become eligible for healthcare coverage under another employer's plan(s), *provided*, *however*, that if (1) any plan pursuant to which such benefits are provided is not, or ceases prior to the expiration of the continuation coverage period to be, exempt from the application of Section 409A of the Code, under Treasury Regulation Section 1.409A-1(a)(5), (2) the Company is otherwise unable to continue to cover Executive or Executive's dependents under its group health plans, or (3) the Company cannot provide the benefit without violating applicable law (including, without limitation, Section 2716 of the Public Health Service Act), then, in any such case, an amount equal to each remaining Company subsidy shall thereafter be paid to Executive in substantially equal monthly installments over the remaining period the Company would otherwise directly pay or reimburse Executive. After the Company ceases to pay premiums pursuant to the preceding sentence, Executive, or any beneficiary of Executive, may, if eligible, elect to continue healthcare coverage at his or her expense in accordance with the provisions of COBRA.

6. Termination in Connection with a Change of Control. Notwithstanding anything in this Agreement to the contrary, in the event Executive experiences a Covered Termination and the Involuntary Termination without Cause underlying the Covered Termination, or the event upon which a Voluntary Termination for Good Reason underlying the Covered Termination is based, occurs at the direction of a person or entity that has entered into an agreement with the Company that contemplates a transaction that, if consummated, would constitute a Change of Control, then for all purposes hereunder, including, without limitation, Sections 4 and 7, such Covered Termination shall be deemed to have occurred during a Change of Control Period and, in lieu of the benefits provided under Section 3, Executive shall be entitled to the benefits set forth in Section 4 with such benefits to be paid, or commence being paid, upon the Covered Termination, but otherwise subject to the terms and conditions of Section 4.

7. Termination for Cause; Voluntary Resignation. If Executive's service with the Company is terminated by the Company for Cause or by Executive for any or no reason other than due to death, Disability or as a Covered Termination, then Executive shall only be entitled to any accrued but unpaid salary, bonus, vacation and expense reimbursement in accordance with applicable law.

8. Limitation on Payments. In the event that the severance and other benefits provided for in this Agreement or otherwise payable to Executive (i) constitute "parachute payments" within the meaning of Section 280G of the Code and (ii) but for this Section 8, would be subject to the excise tax imposed by Section 4999 of the Code, then Executive's severance benefits under this Agreement shall be payable either

(a) in full, or

(b) as to such lesser amount which would result in no portion of such severance benefits being subject to excise tax under Section 4999 of the Code, whichever of the foregoing amounts, taking into account the applicable federal, state and local income taxes and the excise tax imposed by Section 4999 of the Code, results in the receipt by Executive on an after-tax basis, of the greatest amount of severance benefits under this Agreement, notwithstanding that all or some portion of such severance benefits may be taxable under Section 4999 of the Code. The specific benefits that shall be reduced, if any, and the order of such reduction shall be determined by the Executive in his or her sole discretion. Unless the Company and Executive otherwise agree in writing, any determination required under this Section 8 shall be made in writing by the Company's independent public accountants (the "Accountants"), whose determination shall be conclusive and binding upon Executive and the Company for all purposes. For purposes of making the calculations required by this Section 8, the Accountants may make reasonable assumptions and approximations concerning applicable taxes and may rely on reasonable, good faith interpretations concerning the application of Sections 280G and 4999 of the Code. The Company and Executive shall furnish to the Accountants such information and documents as the Accountants may reasonably request in order to make a determination under this Section. The Company shall bear all costs the Accountants may reasonably incur in connection with any calculations contemplated by this Section 8.

9. Definition of Terms. The following terms referred to in this Agreement shall have the following meanings:

(a) Change of Control. "Change of Control" shall mean (i) a dissolution or liquidation of the Company; (ii) a sale of all or substantially all the assets of the Company; (iii) a merger or consolidation in which the Company is not the surviving corporation and in which beneficial ownership of securities of the Company representing at least fifty percent (50%) of the combined voting power entitled to vote in the election of directors has changed; (iv) a reverse merger in which the Company is the surviving corporation but the shares of the common stock of the Company outstanding immediately before the merger are converted by virtue of the merger into other property, whether in the form of securities, cash or otherwise, and in which beneficial ownership of securities of the Company representing at least fifty percent (50%) of the combined voting power entitled to vote in the election of directors has changed; (v) an acquisition by any person, entity or group within the meaning of Section 13(d) or 14(d) of the Securities and Exchange Act of 1934, as amended (the "Exchange Act"), or any comparable successor provisions (excluding any employee benefit plan, or related trust, sponsored or maintained by the Company or subsidiary of the Company or other entity controlled by the Company) of the beneficial ownership (within the meaning of Rule 13d-3 promulgated under the Exchange Act, or comparable successor rule) of securities of the Company representing at least fifty percent (50%) of the combined voting power entitled to vote in the election of directors; or, (vi) in the event that the individuals who are members of the Incumbent Board cease for any reason to constitute at least fifty percent (50%) of the Board. Notwithstanding the foregoing, a Change of Control shall not include any transaction effected primarily for the purpose of financing the Company with cash (as determined by the Board acting in good faith and without regard to whether such transaction is effectuated by a merger, equity
financing or otherwise) or the initial public offering of the Company's common stock. Further notwithstanding the foregoing, if a Change of Control would give rise to a payment or settlement event that constitutes "nonqualified deferred compensation," the transaction or event constituting the

Change of Control must also constitute a "change in control event" (as defined in Treasury Regulation §1.409A-3(i)(5)) in order to give rise to the payment or settlement event, to the extent required by Section 409A.

(b) Change of Control Period. "Change of Control Period" shall mean the period commencing ninety (90) days prior to a Change of Control and ending on the first anniversary of the Change of Control.

(c) Covered Termination. "Covered Termination" shall mean an Involuntary Termination without Cause or a Voluntary Termination for Good Reason that constitutes the Executive's Separation from Service.

(d) Disability. "Disability" shall mean that Executive has been unable to perform Executive's Company duties as the result of Executive's incapacity due to physical or mental illness, and such inability, at least one hundred eighty (180) days after its commencement, is determined to be total and permanent by a physician selected by the Company or its insurers and acceptable to Executive or Executive's legal representative (such agreement as to acceptability not to be unreasonably withheld). Termination resulting from Disability may only be effected after at least thirty (30) days' written notice by the Company of its intention to terminate Executive's employment. In the event that Executive resumes the performance of substantially all of Executive's duties hereunder before the termination of Executive's employment becomes effective, the notice of intent to terminate shall automatically be deemed to have been revoked.

(e) Incumbent Board. "Incumbent Board" shall mean the individuals who, as of the Effective Date, are members of the Board. If the election, or nomination for election by the Company's stockholders, of any new director is approved by a vote of at least fifty percent (50%) of the Incumbent Board, such new director shall be considered as a member of the Incumbent Board.

(f) Involuntary Termination without Cause. "Involuntary Termination without Cause" shall mean the termination of Executive's employment by the Company other than a termination following (i) the willful and continued failure to substantially perform the Executive's duties with the Company (other than as a result of physical or mental disability) after a written demand for substantial performance is delivered to the Executive by the Company, which demand specifically identifies the manner in which the Company believes that the Executive has not substantially performed the Executive's duties and that has not been cured within fifteen (15) days following receipt by the Executive of the written demand; (ii) commission of a felony (other than a traffic-related offense) that in the written determination of the Company is likely to cause or has caused material injury to the Company's business; (iii) dishonesty with respect to a significant matter relating to the Company's business; or (iv) material breach of any agreement by and between the Executive and the Company, which material breach has not been cured within fifteen (15) days following receipt by the Executive of written notice from the Company identifying such material breach.

(g) Release of Claims. "Release of Claims" shall mean a general release of all claims against the Company and its affiliates in a form reasonably acceptable to the Company.

(h) Voluntary Termination for Good Reason. "Voluntary Termination for Good Reason" shall mean Executive's voluntarily resignation after the occurrence of any of the following without Executive's written consent: (i) a material diminution in Executive's base compensation; (ii) a material diminution in Executive's authority, duties or responsibilities; (iii) a material change of at least thirty-five (35) miles in the geographic location at which Executive must perform Executive's services; or (iv) a material breach of this Agreement by the Company. Notwithstanding the foregoing, a resignation shall not constitute a "Voluntary Termination for Good Reason" unless the condition giving rise to such resignation continues more than thirty (30) days following Executive's written notice of the condition within ninety (90) days of the first occurrence of such condition and Executive's termination occurs within one hundred eighty (180) days following the first occurrence of such condition.

(h) Measurement Date. "Measurement Date," with respect to an award of performance stock units or performance stock options, shall mean the date the Compensation Committee of the Board of Directors determines the achievement of the applicable performance goals for the applicable performance period.

10. Successors.

(a) Company's Successors. Any successor to the Company (whether direct or indirect and whether by purchase, merger, consolidation, liquidation or otherwise) to all or substan- tially all of the Company's business and/or assets shall assume the obligations under this Agreement and agree expressly to perform the obligations under this Agreement in the same manner and to the same extent as the Company would be required to perform such obligations in the absence of a succession. For all purposes under this Agreement, the term "Company" shall include any successor to the Company's business and/or assets which executes and delivers the assumption agreement described in this Section 10(a) or which becomes bound by the terms of this Agreement by operation of law.

(b) Executive's Successors. The terms of this Agreement and all rights of Executive hereunder shall inure to the benefit of, and be enforceable by, Executive's personal or legal representatives, executors, administrators, successors, heirs, distributees, devisees and legatees.

11. Notices. Notices and all other communications contemplated by this Agreement shall be in writing and shall be deemed to have been duly given when personally delivered or one day following mailing via Federal Express or similar overnight courier service. In the case of Executive, mailed notices shall be addressed to Executive at Executive's home address that the Company has on file for Executive. In the case of the Company, mailed notices shall be addressed to its corporate headquarters, and all notices shall be directed to the attention of its Secretary.

12. Confidentiality; Non-Solicitation.

(a) Confidentiality. While Executive is employed by the Company, and thereafter while Executive receives severance benefits hereunder, Executive shall not directly or indirectly disclose or make available to any person, firm, corporation, association or other entity for any reason or purpose whatsoever, any Confidential Information (as defined below). Upon termination of Executive's employment with the Company, all Confidential Information in Executive's possession

that is in written or other tangible form (together with all copies or duplicates thereof, including computer files) shall be returned to the Company and shall not be retained by Executive or furnished to any third party, in any form except as provided herein; *provided, however*, that Executive shall not be obligated to treat as confidential, or return to the Company copies of any Confidential Information that (i) was publicly known at the time of disclosure to Executive, (ii) becomes publicly known or available thereafter other than by any means in violation of this Agreement or any other duty owed to the Company by any person or entity, or (iii) is lawfully disclosed to Executive by a third party. For purposes of this Agreement, the term "Confidential Information" shall mean information disclosed to Executive or known by Executive as a consequence of or through his or her relationship with the Company, about the customers, employees, business methods, public relations methods, organization, procedures or finances, including, without limitation, information of or relating to customer lists, of the Company and its affiliates. In addition, Executive shall continue to be subject to the Confidential Information, Secrecy, and Invention Agreement entered into between Executive and the Company (the "Confidential Information Agreement").

(b) Non-Solicitation. In addition to each Executive's obligations under the Confidential Information Agreement, Executive shall not for a period of one (1) year following
Executive's termination of employment for any reason, either on Executive's own account or jointly with or as a manager, agent, officer, employee, consultant, partner, joint venturer, owner or stockholder or otherwise on behalf of any other person, firm or corporation, directly or indirectly solicit or attempt to solicit away from the Company any of its officers or employees or offer employ- ment to any person who is an officer or employee of the Company; *provided, however*, that a general advertisement to which an employee of the Company responds shall in no event be deemed to result in a breach of this Section 12(b). Executive also agrees not to harass or disparage the Company or its employees, clients, directors or agents or divert or attempt to divert any actual or potential business of the company.

(c) Survival of Provisions. The provisions of this Section 12 shall survive the
termination or expiration of the applicable Executive's employment with the Company and shall be fully enforceable thereafter. If it is determined by a court of competent jurisdiction in any state that any restriction in this Section 12 is excessive in duration or scope or is unreasonable or unenforceable under the laws of that state, it is the intention of the parties that such restriction may be modified or amended by the court to render it enforceable to the maximum extent permitted by the law of that state.

13. Dispute Resolution.

(a) To ensure the timely and economical resolution of disputes that arise in connection with this Agreement, Executive and the Company agree that any and all disputes, claims, or causes of action arising from or relating to the enforcement, breach, performance or interpretation of this Agreement, Executive's employment, or the termination of Executive's employment, shall be resolved to the fullest extent permitted by law by final, binding and confidential arbitration, by a single arbitrator, in San Mateo County, California, conducted by Judicial Arbitration and Mediation Services, Inc. ("JAMS") under the applicable JAMS employment rules. **By agreeing to this arbitration procedure, both Executive and the Company waive the right to resolve any such dispute through a trial by jury or judge or administrative proceeding**. The arbitrator shall: (i) have the authority to compel adequate discovery for the resolution of the dispute and to award such

relief as would otherwise be permitted by law; and (ii) issue a written arbitration decision, to include the arbitrator's essential findings and conclusions and a statement of the award. The arbitrator shall be authorized to award any or all remedies that Executive or the Company would be entitled to seek in a court of law. The Company shall pay all JAMS' arbitration fees in excess of the amount of court fees that would be required if the dispute were decided in a court of law. Nothing in this Agreement is intended to prevent either Executive or the Company from obtaining injunctive relief in court to prevent irreparable harm pending the conclusion of any such arbitration. Notwithstanding the foregoing, Executive and the Company each have the right to resolve any issue or dispute over intellectual property rights by Court action instead of arbitration.

14. Miscellaneous Provisions.

(a) Section 409A. Notwithstanding any provision to the contrary in this Agreement, if Executive is deemed by the Company at the time of Executive's Separation from Service to be a "specified employee" for purposes of Section 409A(a)(2)(B)(i) of the Code, to the extent delayed commencement of any portion of the benefits to which Executive is entitled under this Agreement is required in order to avoid a prohibited distribution under Section 409A(a)(2)(B)(i) of the Code, such portion of Executive's benefits shall not be provided to Executive prior to the earlier of (i) the expiration of the six-month period measured from the date of the Executive's Covered Termination or termination of employment due to Disability or (ii) the date of Executive's death. Upon the first business day following the expiration of the applicable Code Section 409A(a)(2)(B)(i) period, all payments deferred pursuant to this Section 14(a) shall be paid in a lump sum to Executive, and any remaining payments due under the Agreement shall be paid as otherwise provided herein.

(b) Waiver. No provision of this Agreement shall be modified, waived or dis- charged unless the modification, waiver or discharge is agreed to in writing and signed by Executive and by an authorized officer of the Company (other than Executive). No waiver by either party of any breach of, or of compliance with, any condition or provision of this Agreement by the other party shall be considered a waiver of any other condition or provision or of the same condition or provision at another time.

(c) Whole Agreement. This Agreement and the Confidential Information Agreement represent the entire understanding of the parties hereto with respect to the subject matter hereof and supersede all prior arrangements and understandings regarding same.

(d) Choice of Law. The validity, interpretation, construction and performance of this Agreement shall be governed by the laws of the State of California.

(e) Severability. The invalidity or unenforceability of any provision or provisions of this Agreement shall not affect the validity or enforceability of any other provision hereof, which shall remain in full force and effect.

(f) Counterparts. This Agreement may be executed in counterparts, each of which shall be deemed an original, but all of which together will constitute one and the same instru- ment.[Signature page follows]

IN WITNESS WHEREOF, each of the parties has executed this Agreement, in the case of the Company by its duly authorized officer, as of the day and year set forth below.

CODEXIS, INC.

By: /s/ Stephen Dilly
Name: Stephen Dilly
Title: President and CEO
Date:

EXECUTIVE
/s/ Margaret Fitzgerald
Margaret Fitzgerald
Date: 10/10/2022 | 11:53 AM PDT

Codexis, Inc.
200 Penobscot Drive Redwood City, CA
94063 Tel: +1 (650) 421-8100
Fax: +1 (650) 421-8102
www.codexis.com

December 27, 2022

Sri Ryali

Dear Sri,

On behalf of Codexis, Inc. ("Codexis" or the "Company"), I am pleased to extend to you this offer of employment as Chief Financial Officer reporting to Stephen Dilly, President and Chief Executive Officer. Your position is a full-time and exempt from overtime pay under the Fair Labor Standards Act.

Your employment is subject to proof of your legal right to work in the United States, and to your completing the United States Citizenship and Immigration Service Employment Eligibility Verification Form I-9. Your employment is also subject to successful completion of your professional references, background and drug screening, as well as the execution of your Employee Confidential Information and Inventions Assignment Agreement (Attachment A) (your "Confidentiality Agreement").

You will not, during your employment by the Company, be employed by or otherwise engaged in any other business activity requiring any of your time, except that, with the prior written approval of the Company's Board of Directors (the "Board") or the Company's Chief Executive Officer, you may serve as a member of the board of directors of up to one organization that is not a competitor of the Company, provided that such service does not individually or in the aggregate interfere with the performance of your duties to the Company, violate the Company's standards of conduct then in effect, or raise a conflict under the Company's conflict of interest policies. In the event of any conflict between this paragraph and your Confidentiality Agreement, this paragraph shall control.

Compensation

If you accept this offer and you begin employment with Codexis, you will receive an initial salary of USD$450,000 per year, payable semi-monthly, which will be subject to all applicable withholdings.

You will also be eligible to be paid a one-time sign-on bonus in the amount of USD$100,000 (the " Sign-On Bonus"), which will be paid to you on the first payroll date following your commencement of employment with the Company, subject to all applicable withholdings. [Notwithstanding the foregoing, your Sign-On Bonus will not be earned when paid and, instead, will only be earned if you remain continuously employed with the Company through the first anniversary of your commencement of employment with the Company. In the event your employment with the Company terminates prior to the first anniversary of your commencement of employment with the Company for any reason, then you agree to repay to the Company the full amount of the Sign-On Bonus.]

You will also be eligible to participate in the Codexis Employee Incentive Compensation Plan (the " Incentive Plan"). Your Incentive Plan target will be 50% of your Codexis base salary earnings. If Codexis meets all of its corporate goals for 2023, and you also perform well against your individual and group goals, to be established with your supervisor, you can expect to receive an Incentive Plan payout at or near this target after our Board of Directors (the "Board") approval of our 2023 year-end financial statements. Based on the Company's performance and your individual and group's goal performance, your actual bonus may be more or less than this target, and under certain circumstances there may be no payout. Any Incentive Plan payout you receive will be based on your service during 2023 as a percentage of the full year. Any payout will be subject to all applicable withholdings. Please also note that the Incentive Plan does not constitute a contract of employment or alter the "at will" status of your employment.

In addition, Codexis reserves the right to modify or terminate the Incentive Plan at any time and for any reason without your consent.

Equity

As an inducement for you to join the Company, we are pleased to inform you that we will recommend to the Board or a committee appointed by the Board that you be granted an award (the "Award") of performance stock units ("PSUs") with an approximate value of US$666,667.00 as determined in accordance with Codexis' policy, as may be amended from time to time. The actual number of shares of Company common stock ("Common Stock") that will be issued to you upon vesting of the PSUs is contingent upon the satisfaction by the company of pre-determined performance criteria for the measurement period, which for this grant will be the calendar year 2023. You may not receive any PSUs if the minimum performance criteria are not met. If the minimum performance criteria are met, the PSUs will vest in two, equal installments beginning within the first calendar quarter following the measurement period and until the PSUs are 100% vested one-year following the first installment vesting date. Your PSU grant will be subject to the terms of the Codexis, Inc. 2022 Employment Inducement Award Plan (the "Plan") and will be conditioned on your acceptance of an appropriate PSU agreement.

In addition, as an additional inducement for you to join the Company, subject to approval by the Board or a committee appointed by the Board, you will be granted an option (the "Option") to purchase Common Stock having a value of US$1,333,333.00, as determined in accordance with Codexis' policy, as may be amended from time to time. The Option will have an exercise price per share equal to the closing trading price of a share of Common Stock on the date the Option is granted (or if the grant date is not a trading day, the immediately preceding trading day). Options are generally granted on or around the 5th day of the month following the month employees commence employment. The Option will vest and become exercisable as to one fourth or 25% of the shares initially subject to the Option on the first anniversary of the date of grant and thereafter will vest and become exercisable as to 1/48th of the shares initially subject to the Option per month for the following 36 months until the option is 100% vested on the four-year anniversary of the date of grant. Vesting is contingent upon your continued employment through the applicable vesting date. Your Option will be subject to the terms of the Plan and a stock option agreement to be entered into between you and the Company.

Please note that the Company can grant the Award and Option to you only if and as long as it is permitted and feasible under the laws of the United States of America or any laws of a country in which you reside or to which laws you may be subject. If local laws make the grant of Award or Option illegal or impractical, the Company will let you know as soon as possible.

Change of Control Severance Agreement

In connection with the commencement of your employment with Codexis, you will have the opportunity to enter into a Change of Control Severance Agreement. A copy of the Change of Control Severance Agreement (Attachment B) is included with this offer letter for your review and signature.

Employee Benefits

As a full-time employee, you will be eligible for the Codexis employee benefit plans, which currently include medical, dental, vision, long-term disability, and life insurance, as well as a 401(k) plan and flexible time off that allows full-time employees to accrue 20 days of flexible time off each year of employment. For employees working

greater than or equal to 20 hours and less than 40 hours per week flexible time off is prorated. Codexis reserves the right to modify or terminate any of these plans at any time and for any reason.

Other Terms and Conditions of Employment

Your employment with Codexis is at will. "Employment at will" means that you are free to resign from your employment at any time, for any reason or no reason at all, with or without cause and with or without notice. Similarly, Codexis may terminate your employment at any time for any legal reason, with or without cause and with or without notice. It also means that your job duties, title and responsibility and reporting level, work schedule, compensation and benefits, as well as Codexis' personnel policies and procedures, may be changed with prospective effect, with or without notice, at any time in the sole discretion of Codexis. By accepting this offer of employment, you agree that your employment is at will, and acknowledge that no one, other than the President and CEO of Codexis, has the authority to promise you, either orally or in writing, anything to the contrary. Any such agreement must be in writing and signed by both you and the President to be effective.

Employment with any other entity or for yourself in competition with Codexis, or any direct or indirect subsidiary of Codexis, is not permitted. If you want to take an outside job, please discuss the opportunity with your manager and the Human Resources Department in advance so that a determination can be made if any actual or potential conflict of interest exists.

During the course of your employment you may create, develop or have access to confidential information belonging to Codexis, including technical, research, financial, business, commercial, personnel or operational information, and/or ideas, trade secrets, know-how, procedures, strategies or plans. You agree that as a condition of your employment with Codexis, you will sign and comply with the Codexis Employee Confidential Information and Inventions Assignment Agreement, a copy of which is attached to this letter as Attachment A.

The terms described in this letter supersede and replace all prior agreements, understandings, and promises between Codexis and you concerning the terms and conditions of your employment with Codexis.

We hope that your association with Codexis will be mutually successful and rewarding, and we look forward to welcoming you aboard. Please indicate your acceptance of this offer by initialing each page and signing this letter below and **returning the letter to Karen Armijo by January 3, 2023.**

Sincerely, Codexis, Inc.

By: /s/Stephen Dilly
Stephen Dilly, Ph.D
President & CEO

I understand and agree to the foregoing terms and conditions of employment with Codexis.

/s/ Sri Ryali

12/30/2022 1/17/2023
Date / Start Date

ATTACHMENT A

CODEXIS 2010 EMPLOYEE CONFIDENTIAL INFORMATION AND INVENTIONS ASSIGNMENT AGREEMENT

CODEXIS, INC.

EMPLOYEE CONFIDENTIAL INFORMATION AND INVENTIONS ASSIGNMENT AGREEMENT

The following confirms an agreement (the "Agreement") between Codexis, Inc., its subsidiaries, affiliates, successors or assigns (together the "Company") and me (**Sri Ryali**). As a condition of my employment, and in consideration of my employment with the Company and my receipt of the compensation now and hereafter paid to me by Company, I agree to the following effective as of my first day of employment with the Company:

1. **At-Will Employment.** This Agreement is not an employment contract for any particular term. I have a right to resign and Company has the right to terminate my employment at will, at any time, for any or no reason, with or without cause and without notice. In addition, this Agreement does not purport to set forth all of the terms and conditions of my employment, and, as an employee of Company, I have obligations to Company which are not set forth in this Agreement. However, the terms of this Agreement govern over any inconsistent terms and can only be changed by a subsequent written agreement signed by both parties.

2. Confidential Information.

(a) **Company Information.** I agree at all times during the term of my employment and thereafter, to hold in strictest confidence, and not to use, except for the benefit of the Company, or to disclose to any person, firm or corporation (in writing, verbally, or via email or any other medium) without written advance authorization of the Board of Directors of the Company, any Confidential Information of the Company. I will not use any Confidential Information except in the performance of my authorized duties as an employee of Company. I understand that "Confidential Information" includes, without limitation, any tangible or intangible proprietary information, technical data, trade secrets or know-how, including, but not limited to, research ideas, concepts, tangible and biological materials (including, but not limited to, cell lines, plasmids, vectors and DNA) and data; product plans, products, and services; customer lists and customers (including, but not limited to, customers of the Company on whom I called or with whom I became acquainted during my term of my employment); business markets, software, development, discoveries, inventions, processes, formulas, technology, designs, drawings, engineering, hardware configuration information, marketing, business plans, corporate strategy plans, financial data; or other business information made, generated or developed by me in the course of my employment with Company, or disclosed to me by Company either directly or indirectly in any form, including, without limitation, in writing, orally, electronically, or by drawings or observation of materials, parts, equipment, or research experiments. Confidential Information also includes confidential information provided to Company by any third party, which is indicated by such third party to be confidential. I further understand that Confidential Information does not include any of the foregoing items which has become publicly known and made generally available through no wrongful act of mine.

(b) **Third Party Information.** I agree that I will not, during my employment with the Company, improperly use or disclose any proprietary information or trade secrets of any former or concurrent employer or other person or entity, and that I will not bring onto the premises of the Company any unpublished document or proprietary information belonging to any such employer, person or entity unless consented to in writing and in advance by such employer, person or entity.

(c) **Third Party Information Received by the Company.** I recognize that the Company has received and in the future will likely receive from third parties their confidential or proprietary information

subject to a duty on the Company's part to maintain the confidentiality of such information and to use it only for certain limited purposes. I agree to hold all such confidential or proprietary information in the strictest confidence and not to disclose it to any person, firm or corporation or to use it except as necessary in carrying out my work for the Company consistent with the Company's agreement with such third party.

(d) **Defend Trade Secrets Act**. 18 U.S.C. § 1833(b) states:

"An individual shall not be held criminally or civilly liable under any Federal or State trade secret law for the disclosure of a trade secret that—(A) is made—(i) in confidence to a Federal, State, or local government official, either directly or indirectly, or to an attorney; and (ii) solely for the purpose of reporting or investigating a suspected violation of law; or (B) is made in a complaint or other document filed in a lawsuit or other proceeding, if such filing is made under seal."

Accordingly, I have the right to disclose in confidence trade secrets to Federal, State, and local government officials, or to an attorney, for the sole purpose of reporting or investigating a suspected violation of law. I also have the right to disclose trade secrets in a document filed in a lawsuit or other proceeding, but only if the filing is made under seal and protectable from public disclosure. Nothing in this Certification is intended to conflict with 18 U.S.C. § 1833(b) or create liability for disclosures of trade secrets that are expressly allowed by 18 U.S.C. § 1833(b).

3. Inventions.

(a) **Inventions Retained and Licensed.** I have attached hereto, as **Exhibit A**, a list describing all inventions, original works of authorship, developments, improvements, and trade secrets (if any) which were made by me prior to my employment with the Company (collectively referred to as "Prior Inventions"), which belong to me, which relate to the Company's proposed business, products or research and development, and which are not assigned to the Company hereunder; if no such list is attached to or contained in **Exhibit A**, I represent that there are no such Prior Inventions. If in the course of my employment with the Company, I incorporate into a Company product, process or machine a Prior Invention owned by me or in which I have an interest, the Company is hereby granted and shall have a nonexclusive, fully sublicensable, royalty-free, irrevocable, perpetual, worldwide license to make, have made, modify, use, have used, sell, have sold and import such Prior Invention as part of or in connection with such product, process or machine.

(b) **Assignment of Inventions.** I agree that I will promptly make full written disclosure to the Company, will hold in trust for the sole right and benefit of the Company. I hereby assign to the Company, or its designee, all my right, title, and interest in and to any and all inventions, original works of authorship, developments, concepts, improvements or trade secrets, whether or not patentable or registrable under copyright or similar laws, which I may solely or jointly conceive or develop or reduce to practice, or cause to be conceived or developed or reduced to practice, during the period of time I am in the employ of the Company (collectively referred to as "Inventions"), excepting only any invention (if any) which qualifies fully under the provisions of California Labor Code Section 2870 as provided in Section 3 (f) below. I further acknowledge that all original works of authorship which are made by me (solely or jointly with others) within the scope of and during the period of my employment with the Company and which are protectable by copyright are "works made for hire", as that term is defined in the United States Copyright Act.

(c) **Inventions Assigned to the United States.** I agree to assign to the United States government all my right, title, and interest in and to any and all Inventions hereunder, whenever such full title is

required to be in the United States by a contract between the Company and the United States or any of its agencies.

(d) **Maintenance of Records.** I agree to keep and maintain adequate and current written records of any and all Inventions hereunder, including any made by me solely or jointly with others during the term of my employment with the Company. The records will be in the form of notes, sketches, drawings, and any other format that may be specified by the Company. The records will be available to and remain the sole property of the Company at all times.

(e) **Patent and Copyright Registrations.** I agree to assist the Company, or its designee, at the Company's expense, in every proper way to secure the Company's rights in the Inventions and any copyrights, patents, mask work rights or other intellectual property rights relating thereto in any and all countries, including the disclosure to the Company of all pertinent information and data with respect thereto, the execution of all applications, specifications, oaths, assignments and all other instruments which the Company shall deem necessary in order to apply for and obtain such rights and in order to assign and convey to the Company, its successors, assigns and nominees the sole and exclusive rights, title and interest in and to such Inventions, and any copyrights, patents, mask work rights or other intellectual property rights relating thereto. I further agree that my obligation to execute or cause to be executed, when it is in my power to do so, any such instrument or papers shall continue after the termination of this Agreement. If the Company is unable because of my mental or physical incapacity or for any other reason to secure my signature to apply for or to pursue any application for any United States or foreign patents or copyright registrations covering Inventions or original works of authorship assigned to the Company as above, then I hereby irrevocably designate and appoint the Company and its duly authorized officers and agents as my agent and attorney in fact, to act for and in my behalf and stead to execute and file any such applications and to do all other lawfully permitted acts to further the prosecution and issuance of letters patent or copyright registrations thereon with the same legal force and effect as if executed by me.

(f) **Exception to Assignments.** I understand that the provisions of this Agreement requiring assignment of Inventions to the Company do not apply to any invention which qualifies fully under the provisions of California Labor Code Section 2870 (attached hereto as **Exhibit B**). I will advise the Company promptly in writing of any invention that I believe meet the criteria in California Labor Code Section 2870 and are not disclosed on **Exhibit A**.

4. **Conflicting Employment.** I agree that, during the term of my employment with the Company, I will not engage in any other employment, occupation, consulting or other business activity directly related to the business in which the Company is now involved or becomes involved during the term of my employment, nor will I engage in any other conduct or activities that conflict with my obligations to the Company or is not in the best interests of the Company.

5. **Returning Company Property.** I agree that, prior to or at the time of leaving the employ of the Company, I will deliver to the Company (and will not keep in my possession, recreate or deliver to anyone else) any and all Confidential Information in my possession, as well as all equipment, devices, records, data, notes, reports, proposals, lists, correspondence, specifications, drawings, blueprints, sketches, biological and other tangible materials (including, but not limited, to cell lines, plasmids, vectors and DNA), other documents or tangible property of the Company (or property of third parties that is lawfully in the possession or control of the Company), or reproductions of any aforementioned items including any and all of the aforementioned items developed by me pursuant to my employment with the Company or otherwise property of the Company, its

successors or assigns. In the event of the termination of my employment, I agree to sign and deliver the "Termination Certification" attached hereto as **Exhibit C**.

6. **Notification of New Employer.** In the event that I leave the employ of the Company, I hereby grant consent to notification by the Company to my new employer about my rights and obligations under this Agreement.

7. **Solicitation of Employees and Customers.** I acknowledge and agree that for a period of twenty- four (24) months or to the maximum extent permitted by law immediately following the termination of my relationship with the Company for any reason, whether voluntarily or involuntarily, I shall not either directly or indirectly without the prior written consent of the Company:

(a) solicit, induce, recruit or encourage any of the Company's employees to leave their employment, either for myself or for any other person or entity; or

(b) use Confidential Information of the Company to solicit the business of any customer of the Company, where I had contact with such customer during the period of my employment with the Company, and which business is competitive with any significant part of the business conducted by the Company or any subsidiary or affiliate thereof at the time of termination of my employment or as contemplated to be conducted by the Company at such time.

In connection with the foregoing, I acknowledge and agree that the identity, appropriate knowledge of personnel, research and/or product requirements, volume and frequency of orders, and price sensitivity of customers of the Company are not publicly available information and constitute valuable trade secrets of the Company.

8. **Photography Consent, Waiver, And Release.** Upon execution of this Agreement, I agree to sign the Photography Consent, Waiver and Release attached as **Exhibit D** hereto.

9. **Conflict of Interest Guidelines.** I agree to diligently adhere to the Conflict of Interest Guidelines attached as **Exhibit E** hereto.

10. **Representations.** I agree to execute any proper oath or verify any proper document required to carry out the terms of this Agreement. I represent that my performance of all the terms of this Agreement will not breach any agreement to keep in confidence proprietary information acquired by me in confidence or in trust prior to my employment by the Company. I have not entered into, and I agree I will not enter into, any oral or written agreement in conflict herewith.

11. **Equitable Remedies.** I agree that it would be impossible or inadequate to measure and calculate the Company's damages from any breach of the covenants set forth in this Agreement. Accordingly, I agree that if I breach any provision of this Agreement, the Company will have available, in addition to any other right or remedy available, the right to obtain an injunction from a court of competent jurisdiction restraining such breach or threatened breach and to specific performance of any such provision of this Agreement.

12. **Non-Disparagement.** I agree that, during employment with Company and thereafter, I will not make comments, whether oral or in writing, that tend to disparage or injure the Company, its officers, directors, agents, employees, technology, businesses, products or services. Nothing in this Agreement will be construed to preclude me from complying with the terms of a validly issued subpoena.

13. **General Provisions.**

(a) **Governing Law; Consent to Personal Jurisdiction.** This Agreement will be governed by the laws of the State of California exclusively, as such laws apply to contracts between California residents performed entirely within California. I hereby expressly consent to the personal jurisdiction of the state and federal courts located in San Mateo County, California for any lawsuit filed there against me by the Company arising from or relating to this Agreement.

(b) **Entire Agreement.** This Agreement sets forth the entire agreement and understanding between the Company and me relating to the subject matter herein and merges all prior and contemporaneous discussions between us, including any previous confidentiality agreements that I may have entered into with the Company. No modification of or amendment to this Agreement, nor any waiver of any rights under this Agreement, will be effective unless in writing signed by both parties. Any subsequent change or changes in my duties, salary or compensation will not affect the validity or scope of this Agreement.

(c) **Severability.** If one or more of the provisions in this Agreement are deemed void by law, then the remaining provisions will continue in full force and effect.

(d) **Successors and Assigns.** This Agreement will be binding upon my heirs, executors, administrators and other legal representatives and will be for the benefit of the Company, its successors, and assigns.

(e) **Survival.** The rights and obligations of the parties to this Agreement will survive termination of my employment with Company.

(f) **Counterparts.** This Agreement may be executed in any number of counterparts, each of which shall be deemed to be an original and all of which together shall be deemed to be one and the same instrument.

[SIGNATURE PAGE FOLLOWS]

I HAVE READ THIS AGREEMENT CAREFULLY AND I UNDERSTAND AND ACCEPT THE OBLIGATIONS WHICH IT IMPOSES UPON ME WITHOUT RESERVATION. NO PROMISES OR REPRESENTATIONS HAVE BEEN MADE TO ME TO INDUCE ME TO SIGN THIS AGREEMENT. I SIGN THIS AGREEMENT VOLUNTARILY AND FREELY, IN DUPLICATE, WITH THE UNDERSTANDING THAT ONE COUNTERPART WILL BE RETAINED BY COMPANY AND THE OTHER COUNTERPART WILL BE RETAINED BY ME.

Date: 12/30/2022

/s/ Sriram Ryali
Signature

Sriram Ryali
Printed

CODEXIS, INC.

By: __

Title: __

Date: __

EXHIBIT A

LIST OF PRIOR INVENTIONS (INCLUDING ORIGINAL WORKS OF AUTHORSHIP)

Title	Date	Identifying Number Or Brief Description

EXHIBIT B

CALIFORNIA LABOR CODE SECTION 2870 EMPLOYMENT AGREEMENTS; ASSIGNMENT OF RIGHTS

"(a) Any provision in an employment agreement which provides that an employee shall assign, or offer to assign, any of his or her rights in an invention to his or her employer shall not apply to an invention that developed entirely on his or her own time without using the employer's equipment, supplies, facilities, or trade secret information except for those inventions that either:

(1) Relate at the time of conception or reduction to practice of the invention to the employer's business, or actual or demonstrably anticipated research or development of the employer.

(2) Result from any work performed by the employee for the employer.

(b) To the extent a provision in the employment agreement purports to require an employee to assign an invention otherwise excluded from being required to be assigned under subdivision (a), the provision is against the public policy of this state and is unenforceable."

EXHIBIT C

CODEXIS, INC. TERMINATION CERTIFICATION

This is to certify that I do not have in my possession, nor have I failed to return, any devices, records, data, notes, reports, proposals, lists, correspondence, specifications, drawings, blueprints, sketches, materials, equipment, other documents or property, or reproductions of any aforementioned items belonging to Codexis, Inc., its subsidiaries, affiliates, successors or assigns, except where authorized in writing.

I further certify that I have complied with all the terms of the Codexis, Inc. Employee Confidential Information and Inventions Assignment Agreement signed by me, including the reporting of any inventions and original works of authorship (as defined therein), conceived or made by me (solely or jointly with others) covered by that agreement.

I further agree that, in compliance with the Employee Confidential Information and Inventions Assignment Agreement, I will preserve as confidential all trade secrets, confidential knowledge, data or other proprietary information relating to products, processes, know-how, designs, formulas, developmental or experimental work, computer programs, data bases, other original works of authorship, customer lists, business plans, financial information or other subject matter pertaining to any business of Codexis, Inc. or any of its employees, clients, consultants, or licensees.

The Federal **Defend Trade Secrets Act** . 18 U.S.C. § 1833(b) states:

"An individual shall not be held criminally or civilly liable under any Federal or State trade secret law for the disclosure of a trade secret that—(A) is made—(i) in confidence to a Federal, State, or local government official, either directly or indirectly, or to an attorney; and (ii) solely for the purpose of reporting or investigating a suspected violation of law; or (B) is made in a complaint or other document filed in a lawsuit or other proceeding, if such filing is made under seal."

Accordingly, I have the right to disclose in confidence trade secrets to Federal, State, and local government officials, or to an attorney, for the sole purpose of reporting or investigating a suspected violation of law. I also have the right to disclose trade secrets in a document filed in a lawsuit or other proceeding, but only if the filing is made under seal and protectable from public disclosure. Nothing in this Certification is intended to conflict with 18 U.S.C. § 1833(b) or create liability for disclosures of trade secrets that are expressly allowed by 18 U.S.C. § 1833(b).

I further agree that in compliance with the Employee Confidential Information and Inventions Assignment Agreement, for twenty-four (24) months from this date: (a) I will not use confidential information to solicit, induce, recruit or encourage any of the Company's employees to leave their employment, either for myself or for any other person or entity; and (b) I will not use confidential information to solicit the business of any customer of the Company, which business is competitive with any

significant part of the business conducted by the Company or any subsidiary or affiliate thereof at the time of termination of my employment or as contemplated to be conducted by the Company at such time.

Date: ___

_____

(Employee's Signature)

_____

(Type/Print Employee's Name)

[TO BE SIGNED UPON TERMINATION OF EMPLOYMENT]

EXHIBIT D

CODEXIS, INC.
PHOTOGRAPHY CONSENT, WAIVER, AND RELEASE

For good and valuable consideration, I hereby consent and give permission to Codexis, Inc. ("Codexis") or its agent, to photograph, image and/or videotape me, my property, and/or myself as included with others (such photographs, images, and/or videotapes, "Photographs"). I understand that any such Photographs, and all rights associated with them, will belong solely and exclusively to Codexis and Codexis shall have the irrevocable and absolute right to copyright, duplicate, reproduce, alter, display, distribute, and/or publish them in any manner, for any purpose, and in any form including, but not limited to, print, electronic, video, and/or Internet without notifying me.

I voluntarily waive any and all rights I may now or hereafter have with respect to any such Photographs, including any compensation, ownership, copyright, and privacy rights and any right to inspect or approve such Photographs and/or copy, print or other materials that may be used in connection with them, whether now or in the future, whether that use is known or unknown to me. I hereby waive any right to inspect or approve of any finished Photographs whether printed or electronic, that may be used now or in the future, whether that use is known or unknown to me, and I forever waive any right to royalties or other compensation arising from or related to the use of the Photographs. I hereby release and discharge, and agree to hold harmless, Codexis, its officers, agents and employees, and all persons acting under its permission or authority, from any claims, losses, damages or liability arising from or related to such Photographs and/or their use under any circumstances.

This consent, waiver, and release will be binding upon the heirs, executors, administrators and other legal representatives of myself, and will be for the benefit of Codexis, its successors and assigns.

I HAVE READ AND FULLY UNDERSTAND THE CONTENTS OF THIS CONSENT, WAIVER, AND RELEASE FORM, AND I SIGN IT FREELY AND VOLUNTARILY.

Name: Sriram Ryali

/s/ Sriram Ryali
Signature
Date: 10/30/2022

EXHIBIT E

CONFLICT OF INTEREST GUIDELINES

It is the policy of Codexis, Inc., to conduct its affairs in strict compliance with this letter and spirit of the law and to adhere to the highest principles of business ethics. Accordingly, all officers, employees and independent contractors must avoid activities that are in conflict, or give the appearance of being in conflict, with these principles and with the interests of the company. The following are potentially compromising situations that must be avoided. Any exceptions must be reported to the Chief Executive Officer and written approval for continuation must be obtained.

1. Revealing confidential information to outsiders or misusing confidential information. Unauthorized divulging of information is a violation of this policy whether or not for personal gain and whether or not harm to the company is intended. (The Employee Confidential Information and Inventions Assignment Agreement elaborates on this principle and is a binding agreement.)

2. Accepting or offering substantial gifts, excessive entertainment, favors or payments which may be deemed to constitute undue influence or otherwise be improper or embarrassing to Codexis, Inc.

3. Participating in civic or professional organizations that might involve divulging confidential information of the company.

4. Initiating or approving personnel actions affecting reward or punishment of employees or applicants where there is a family relationship or is or appears to be a personal or social involvement.

5. Initiating or approving any form of harassment of employees based upon their age, sex, race, ethnicity, national origin, or on any other protected basis.

6. Investing or holding outside directorship in suppliers, customers, or competing companies, including financial speculations, where such investment or directorship might influence in any manner a decision or course of action of the company.

7. Borrowing from or lending to employees, customers or suppliers.

8. Acquiring any business opportunity of interest to Codexis, Inc.

9. Improperly using or disclosing to the company any proprietary information or trade secrets of any former or concurrent employer or other person or entity with whom obligations of confidentiality exist.

10. Unlawfully discussing prices, costs, customers, sales or markets with competing companies or their employees.

11. Making any unlawful agreement with distributors with respect to prices.

12. Improperly using or authorizing the use of any inventions that are the subject of patent claims of any other person or entity.

13. Engaging in any conduct that is not in Codexis, Inc.'s best interest.

Each officer, employee and independent contractor must take every necessary action to ensure compliance with these guidelines and to bring problem areas to the attention of higher management for review. Violations of this conflict of interest policy may result in discharge without warning.

CODEXIS, INC.

CHANGE OF CONTROL SEVERANCE AGREEMENT

This Change of Control Severance Agreement (the "Agreement") is made and entered into by and between Sri Ryali (the "Executive") and Codexis, Inc., a Delaware corporation (the "Company"), effective as of the latest date set forth by the signatures of the parties hereto below (the "Effective Date").

R E C I T A L S

A. It is expected that the Company from time to time will consider the possibility of an acquisition by another company or other change of control. The Board of Directors of the Company (the "Board") recognizes that such consideration as well as the possibility of an involuntary termination or reduction in responsibility can be a distraction to Executive and can cause Executive to consider alternative employment opportunities. The Board has determined that it is in the best interests of the Company and its stockholders to assure that the Company will have the continued dedication and objectivity of Executive, notwithstanding the possibility, threat or occurrence of such an event.

B. The Board believes that it is in the best interests of the Company and its stockholders to provide Executive with an incentive to continue Executive's employment and to motivate Executive to maximize the value of the Company upon a Change of Control (as defined below) for the benefit of its stockholders.

C. The Board believes that it is imperative to provide Executive with severance benefits upon certain terminations of Executive's service to the Company that provide Executive with enhanced financial security and provides incentive and encouragement to Executive to remain with the Company notwithstanding the possibility of such an event.

D. Certain capitalized terms used in the Agreement are defined in Section 9 below. The parties hereto agree as follows:

1. Term of Agreement. This Agreement shall become effective as of the Effective Date and terminate upon the date that all obligations of the parties hereto with respect to this Agreement have been satisfied.

2. At-Will Employment. The Company and Executive acknowledge that Executive's employment is and shall continue to be "at-will," as defined under applicable law. If Executive's employment terminates for any reason, Executive shall not be entitled to any payments, benefits, damages, awards or compensation other than as provided by this Agreement.

3. Covered Termination Outside a Change of Control Period. Except as otherwise provided under Section 6, if Executive experiences a Covered Termination other than during a Change of Control Period, and if Executive, within sixty (60) days following the date of the Covered Termination, provides the Company with an executed Release of Claims (as defined below) which is not revoked within the applicable revocation period, if any, then in addition to any accrued but

unpaid salary, bonus, vacation and expense reimbursement payable in accordance with applicable law, the Company shall provide Executive with the following:

(a) Severance. Executive shall receive a lump sum cash payment in an amount equal to twelve (12) months of Executive's base salary at the rate in effect immediately prior to Executive's termination of employment (without giving effect to any reduction in base salary that gives rise to a Voluntary Termination for Good Reason), less applicable withholdings. This severance payment shall be made to Executive in substantially equal installments in accordance with the Company's normal payroll procedures with the first such installment to be made on the first payroll date following the date the Release of Claims becomes effective and irrevocable, provided, that if the Covered Termination occurs after November 1 of any year, the first such installment shall be made on the first payroll date of the subsequent year and, provided further, that, in each case, the first installment shall include any installment payments that would have been made had such installments commenced on the first payroll date after the Covered Termination.

(b) Continued Healthcare. If Executive elects to receive continued healthcare coverage pursuant to the provisions of the Consolidated Omnibus Budget Reconciliation Act of 1985, as amended ("COBRA"), the Company shall directly pay, or reimburse Executive for, the premium for Executive, Executive's covered dependents and Executive's spouse or domestic partner from the date of Executive's Covered Termination through the earlier of (i) the twelve (12) month anniversary of the date of Executive's Covered Termination and (ii) the date Executive, Executive's covered dependents, if any, and Executive's spouse or domestic partner, if any, become eligible for healthcare coverage under another employer's plan(s), *provided*, *however*, that if (1) any plan pursuant to which such benefits are provided is not, or ceases prior to the expiration of the continuation coverage period to be, exempt from the application of Section 409A under Treasury Regulation Section 1.409A-1(a)(5), (2) the Company is otherwise unable to continue to cover Executive or Executive's dependents under its group health plans, or (3) the Company cannot provide the benefit without violating applicable law (including, without limitation, Section 2716 of the Public Health Service Act), then, in any such case, an amount equal to each remaining Company subsidy shall thereafter be paid to Executive in substantially equal monthly installments over the remaining period the Company would otherwise directly pay or reimburse Executive. After the Company ceases to pay premiums pursuant to the preceding sentence, Executive may, if eligible, elect to continue healthcare coverage at Executive's expense in accordance with the provisions of COBRA.

4. Covered Termination Within a Change of Control Period. If Executive experiences a Covered Termination during a Change of Control Period, and if Executive, within sixty (60) days following the date of the Covered Termination, provides the Company with an executed Release of Claims (as defined below) which is not revoked within the applicable revocation period, if any, then in addition to any accrued but unpaid salary, bonus, vacation and expense reimbursement payable in accordance with applicable law, the Company shall provide Executive with the following:

(a) Severance. Executive shall receive a lump sum cash payment in an amount equal to the sum of eighteen (18) months of Executive's base salary at the rate in effect immediately prior to Executive's termination of employment (without giving effect to any reduction in base salary subsequent to a Change of Control that gives rise to a Voluntary Termination for Good

Reason), less applicable withholdings. This severance payment shall be made to Executive within sixty (60) days following the date of the Covered Termination.

(b) Equity Awards. Each outstanding equity award, including, without limitation, stock options, restricted stock, and restricted stock units, held by Executive shall automatically become vested and, if applicable, exercisable and any restrictions thereon shall immediately lapse, in each case, with respect to one hundred percent (100%) of the then unvested shares subject to such equity award. Notwithstanding the foregoing, any outstanding performance stock units or performance stock options held by Executive shall automatically become vested with respect to: (i) in the event of a Change of Control that occurs prior to the applicable Measurement Date, such number of shares of Company common stock corresponding to the target performance level for any applicable performance goals; or (ii) in the event of a Change of Control that occurs on or after the Measurement Date, such number of shares of Company common stock corresponding to the Company's actual achievement of any applicable performance goals.

(c) Continued Healthcare. If Executive elects to receive continued healthcare coverage pursuant to the provisions of COBRA, the Company shall directly pay, or reimburse Executive for, the premium for Executive, Executive's covered dependents and Executive's spouse or domestic partner from the date of Executive's Covered Termination through the earlier of (i) the eighteen (18) month anniversary of the date of Executive's Covered Termination and (ii) the date Executive, Executive's covered dependents, if any, and Executive's spouse or domestic partner, if any, become eligible for healthcare coverage under another employer's plan(s), *provided*, *however*, that if (1) any plan pursuant to which such benefits are provided is not, or ceases prior to the expiration of the continuation coverage period to be, exempt from the application of Section 409A of the Code, under Treasury Regulation Section 1.409A-1(a)(5), (2) the Company is otherwise unable to continue to cover Executive or Executive's dependents under its group health plans, or (3) the Company cannot provide the benefit without violating applicable law (including, without limitation, Section 2716 of the Public Health Service Act), then, in any such case, an amount equal to each remaining Company subsidy shall thereafter be paid to Executive in substantially equal monthly installments over the remaining period the Company would otherwise directly pay or reimburse Executive. After the Company ceases to pay premiums pursuant to the preceding sentence, Executive may, if eligible, elect to continue healthcare coverage at Executive's expense in accordance with the provisions of COBRA.

5. Death or Disability. If Executive terminates employment with the Company due to death or Disability and such termination constitutes a "separation from service" within the meaning of Section 409A of Code and the Department of Treasury regulations and other guidance promulgated thereunder (a "Separation from Service"), then in addition to any accrued but unpaid salary, bonus, vacation and expense reimbursement payable in accordance with applicable law, the Company shall provide Executive with the following:

(a) Pro-Rata Vesting of Equity Awards. Each outstanding equity award, including, without limitation, stock options, restricted stock and restricted stock units, held by Executive shall automatically become vested and, if applicable, exercisable and any restrictions thereon shall immediately lapse, in each case, with respect to that number of shares of Company common stock that would otherwise vest on the next vesting date for such equity award, assuming Executive's continued service through such date, pro-rated to the date of Executive's termination due to death or Disability. For purposes of determining the number of shares subject to any outstanding performance stock units or performance stock options that would otherwise vest on the

next vesting date pursuant to the foregoing sentence, the applicable performance goals shall be deemed achieved: (i) in the event of a termination due to death or Disability that occurs prior to the applicable Measurement Date, at the target performance level; or (ii) in the event of a termination due to death or Disability that occurs on or after the Measurement Date, based on the Company's actual achievement.

(b) Continued Healthcare. If Executive, or any beneficiary of Executive, elects to receive continued healthcare coverage pursuant to the provisions of COBRA, the Company shall directly pay, or reimburse Executive, or such beneficiary, for, the premium for Executive,
Executive's covered dependents and Executive's spouse or domestic partner from the date of
Executive's termination due to death or Disability through the earlier of (i) the twelve (12) month anniversary of the date of Executive's termination of employment and (ii) the date Executive,
Executive's covered dependents, if any, and Executive's spouse or domestic partner, if any, become eligible for healthcare coverage under another employer's plan(s), *provided*, *however*, that if (1) any plan pursuant to which such benefits are provided is not, or ceases prior to the expiration of the continuation coverage period to be, exempt from the application of Section 409A of the Code, under Treasury Regulation Section 1.409A-1(a)(5), (2) the Company is otherwise unable to continue to cover Executive or Executive's dependents under its group health plans, or (3) the Company cannot provide the benefit without violating applicable law (including, without limitation, Section 2716 of the Public Health Service Act), then, in any such case, an amount equal to each remaining Company subsidy shall thereafter be paid to Executive in substantially equal monthly installments over the remaining period the Company would otherwise directly pay or reimburse Executive. After the Company ceases to pay premiums pursuant to the preceding sentence, Executive, or any beneficiary of Executive, may, if eligible, elect to continue healthcare coverage at his or her expense in accordance with the provisions of COBRA.

6. Termination in Connection With a Change of Control. Notwithstanding anything in this Agreement to the contrary, in the event Executive experiences a Covered Termination and the Involuntary Termination without Cause underlying the Covered Termination, or the event upon which a Voluntary Termination for Good Reason underlying the Covered Termination is based, occurs at the direction of a person or entity that has entered into an agreement with the Company that contemplates a transaction that, if consummated, would constitute a Change of Control, then for all purposes hereunder, including, without limitation, Sections 4 and 7, such Covered Termination shall be deemed to have occurred during a Change of Control Period and, in lieu of the benefits provided under Section 3, Executive shall be entitled to the benefits set forth in Section 4 with such benefits to be paid, or commence being paid, upon the Covered Termination, but otherwise subject to the terms and conditions of Section 4.

7. Termination for Cause; Voluntary Resignation. If Executive's service with the Company is terminated by the Company for Cause or by Executive for any or no reason other than due to death, Disability or as a Covered Termination, then Executive shall only be entitled to any accrued but unpaid salary, bonus, vacation and expense reimbursement in accordance with applicable law.

8. Limitation on Payments. In the event that the severance and other benefits provided for in this Agreement or otherwise payable to Executive (i) constitute "parachute payments" within the meaning of Section 280G of the Code and (ii) but for this Section 8, would be subject to the excise tax imposed by Section 4999 of the Code, then Executive's severance benefits under this Agreement shall be payable either

(a) in full, or

(b) as to such lesser amount which would result in no portion of such severance benefits being subject to excise tax under Section 4999 of the Code, whichever of the foregoing amounts, taking into account the applicable federal, state and local income taxes and the excise tax imposed by Section 4999 of the Code, results in the receipt by Executive on an after-tax basis, of the greatest amount of severance benefits under this Agreement, notwithstanding that all or some portion of such severance benefits may be taxable under Section 4999 of the Code. The specific benefits that shall be reduced, if any, and the order of such reduction shall be determined by the Executive in his or her sole discretion. Unless the Company and Executive otherwise agree in writing, any determination required under this Section 8 shall be made in writing by the Company's independent public accountants (the "Accountants"), whose determination shall be conclusive and binding upon Executive and the Company for all purposes. For purposes of making the calculations required by this Section 8, the Accountants may make reasonable assumptions and approximations concerning applicable taxes and may rely on reasonable, good faith interpretations concerning the application of Sections 280G and 4999 of the Code. The Company and Executive shall furnish to the Accountants such information and documents as the Accountants may reasonably request in order to make a determination under this Section. The Company shall bear all costs the Accountants may reasonably incur in connection with any calculations contemplated by this Section 8.

9. Definition of Terms. The following terms referred to in this Agreement shall have the following meanings:

(a) Change of Control. "Change of Control" shall mean (i) a dissolution or liquidation of the Company; (ii) a sale of all or substantially all the assets of the Company; (iii) a merger or consolidation in which the Company is not the surviving corporation and in which beneficial ownership of securities of the Company representing at least fifty percent (50%) of the combined voting power entitled to vote in the election of directors has changed; (iv) a reverse merger in which the Company is the surviving corporation but the shares of the common stock of the Company outstanding immediately before the merger are converted by virtue of the merger into other property, whether in the form of securities, cash or otherwise, and in which beneficial ownership of securities of the Company representing at least fifty percent (50%) of the combined voting power entitled to vote in the election of directors has changed; (v) an acquisition by any person, entity or group within the meaning of Section 13(d) or 14(d) of the Securities and Exchange Act of 1934, as amended (the "Exchange Act"), or any comparable successor provisions (excluding any employee benefit plan, or related trust, sponsored or maintained by the Company or subsidiary of the Company or other entity controlled by the Company) of the beneficial ownership (within the meaning of Rule 13d-3 promulgated under the Exchange Act, or comparable successor rule) of securities of the Company representing at least fifty percent (50%) of the combined voting power entitled to vote in the election of directors; or, (vi) in the event that the individuals who are members of the Incumbent Board cease for any reason to constitute at least fifty percent (50%) of the Board. Notwithstanding the foregoing, a Change of Control shall not include any transaction effected primarily for the purpose of financing the Company with cash (as determined by the Board acting in good faith and without regard to whether such transaction is effectuated by a merger, equity financing or otherwise) or the initial public offering of the Company's common stock. Further notwithstanding the foregoing, if a Change of Control would give rise to a payment or settlement event that constitutes "nonqualified deferred compensation," the transaction or event constituting the

Change of Control must also constitute a "change in control event" (as defined in Treasury Regulation §1.409A-3(i)(5)) in order to give rise to the payment or settlement event, to the extent required by Section 409A.

(b) Change of Control Period. "Change of Control Period" shall mean the period commencing ninety (90) days prior to a Change of Control and ending on the first anniversary of the Change of Control.

(c) Covered Termination. "Covered Termination" shall mean an Involuntary Termination without Cause or a Voluntary Termination for Good Reason that constitutes the Executive's Separation from Service.

(d) Disability. "Disability" shall mean that Executive has been unable to perform Executive's Company duties as the result of Executive's incapacity due to physical or mental illness, and such inability, at least one hundred eighty (180) days after its commencement, is determined to be total and permanent by a physician selected by the Company or its insurers and acceptable to Executive or Executive's legal representative (such agreement as to acceptability not to be unreasonably withheld). Termination resulting from Disability may only be effected after at least thirty (30) days' written notice by the Company of its intention to terminate Executive's employment. In the event that Executive resumes the performance of substantially all of Executive's duties hereunder before the termination of Executive's employment becomes effective, the notice of intent to terminate shall automatically be deemed to have been revoked.

(e) Incumbent Board. "Incumbent Board" shall mean the individuals who, as of the Effective Date, are members of the Board. If the election, or nomination for election by the Company's stockholders, of any new director is approved by a vote of at least fifty percent (50%) of the Incumbent Board, such new director shall be considered as a member of the Incumbent Board.

(f) Involuntary Termination without Cause. "Involuntary Termination without Cause" shall mean the termination of Executive's employment by the Company other than a termination following (i) the willful and continued failure to substantially perform the Executive's duties with the Company (other than as a result of physical or mental disability) after a written demand for substantial performance is delivered to the Executive by the Company, which demand specifically identifies the manner in which the Company believes that the Executive has not substantially performed the Executive's duties and that has not been cured within fifteen (15) days following receipt by the Executive of the written demand; (ii) commission of a felony (other than a traffic-related offense) that in the written determination of the Company is likely to cause or has caused material injury to the Company's business; (iii) dishonesty with respect to a significant matter relating to the Company's business; or (iv) material breach of any agreement by and between the Executive and the Company, which material breach has not been cured within fifteen (15) days following receipt by the Executive of written notice from the Company identifying such material breach.

(g) Release of Claims. "Release of Claims" shall mean a general release of all claims against the Company and its affiliates in a form reasonably acceptable to the Company.

(h) Voluntary Termination for Good Reason. "Voluntary Termination for Good Reason" shall mean Executive's voluntarily resignation after the occurrence of any of the following without Executive's written consent: (i) a material diminution in Executive's base compensation; (ii) a material diminution in Executive's authority, duties or responsibilities; (iii) a material change of at least thirty-five (35) miles in the geographic location at which Executive must perform Executive's services; or (iv) a material breach of this Agreement by the Company. Notwithstanding the foregoing, a resignation shall not constitute a "Voluntary Termination for Good Reason" unless the condition giving rise to such resignation continues more than thirty (30) days following Executive's written notice of the condition within ninety (90) days of the first occurrence of such condition and Executive's termination occurs within one hundred eighty (180) days following the first occurrence of such condition.

(h) Measurement Date. "Measurement Date," with respect to an award of performance stock units or performance stock options, shall mean the date the Compensation Committee of the Board of Directors determines the achievement of the applicable performance goals for the applicable performance period.

10. Successors.

(a) Company's Successors. Any successor to the Company (whether direct or indirect and whether by purchase, merger, consolidation, liquidation or otherwise) to all or substantially all of the Company's business and/or assets shall assume the obligations under this Agreement and agree expressly to perform the obligations under this Agreement in the same manner and to the same extent as the Company would be required to perform such obligations in the absence of a succession. For all purposes under this Agreement, the term "Company" shall include any successor to the Company's business and/or assets which executes and delivers the assumption agreement described in this Section 10(a) or which becomes bound by the terms of this Agreement by operation of law.

(b) Executive's Successors. The terms of this Agreement and all rights of Executive hereunder shall inure to the benefit of, and be enforceable by, Executive's personal or legal representatives, executors, administrators, successors, heirs, distributees, devisees and legatees.

11. Notices. Notices and all other communications contemplated by this Agreement shall be in writing and shall be deemed to have been duly given when personally delivered or one day following mailing via Federal Express or similar overnight courier service. In the case of Executive, mailed notices shall be addressed to Executive at Executive's home address that the Company has on file for Executive. In the case of the Company, mailed notices shall be addressed to its corporate headquarters, and all notices shall be directed to the attention of its Secretary.

12. Confidentiality; Non-Solicitation.

(a) Confidentiality. While Executive is employed by the Company, and thereafter while Executive receives severance benefits hereunder, Executive shall not directly or indirectly disclose or make available to any person, firm, corporation, association or other entity for any reason or purpose whatsoever, any Confidential Information (as defined below). Upon termination of Executive's employment with the Company, all Confidential Information in Executive's possession

that is in written or other tangible form (together with all copies or duplicates thereof, including computer files) shall be returned to the Company and shall not be retained by Executive or furnished to any third party, in any form except as provided herein; *provided, however*, that Executive shall not be obligated to treat as confidential, or return to the Company copies of any Confidential Information that (i) was publicly known at the time of disclosure to Executive, (ii) becomes publicly known or available thereafter other than by any means in violation of this Agreement or any other duty owed to the Company by any person or entity, or (iii) is lawfully disclosed to Executive by a third party. For purposes of this Agreement, the term "Confidential Information" shall mean information disclosed to Executive or known by Executive as a consequence of or through his or her relationship with the Company, about the customers, employees, business methods, public relations methods, organization, procedures or finances, including, without limitation, information of or relating to customer lists, of the Company and its affiliates. In addition, Executive shall continue to be subject to the Confidential Information, Secrecy, and Invention Agreement entered into between Executive and the Company (the "Confidential Information Agreement").

(b) Non-Solicitation. In addition to each Executive's obligations under the Confidential Information Agreement, Executive shall not for a period of one (1) year following
Executive's termination of employment for any reason, either on Executive's own account or jointly with or as a manager, agent, officer, employee, consultant, partner, joint venturer, owner or stockholder or otherwise on behalf of any other person, firm or corporation, directly or indirectly solicit or attempt to solicit away from the Company any of its officers or employees or offer employment to any person who is an officer or employee of the Company; *provided, however*, that a general advertisement to which an employee of the Company responds shall in no event be deemed to result in a breach of this Section 12(b). Executive also agrees not to harass or disparage the Company or its employees, clients, directors or agents or divert or attempt to divert any actual or potential business of the company.

(c) Survival of Provisions. The provisions of this Section 12 shall survive the
termination or expiration of the applicable Executive's employment with the Company and shall be fully enforceable thereafter. If it is determined by a court of competent jurisdiction in any state that any restriction in this Section 12 is excessive in duration or scope or is unreasonable or unenforceable under the laws of that state, it is the intention of the parties that such restriction may be modified or amended by the court to render it enforceable to the maximum extent permitted by the law of that state.

13. Dispute Resolution.

(a) To ensure the timely and economical resolution of disputes that arise in connection with this Agreement, Executive and the Company agree that any and all disputes, claims, or causes of action arising from or relating to the enforcement, breach, performance or interpretation of this Agreement, Executive's employment, or the termination of Executive's employment, shall be resolved to the fullest extent permitted by law by final, binding and confidential arbitration, by a single arbitrator, in San Mateo County, California, conducted by Judicial Arbitration and Mediation Services, Inc. ("JAMS") under the applicable JAMS employment rules. **By agreeing to this arbitration procedure, both Executive and the Company waive the right to resolve any such dispute through a trial by jury or judge or administrative proceeding**. The arbitrator shall: (i) have the authority to compel adequate discovery for the resolution of the dispute and to award such

relief as would otherwise be permitted by law; and (ii) issue a written arbitration decision, to include the arbitrator's essential findings and conclusions and a statement of the award. The arbitrator shall be authorized to award any or all remedies that Executive or the Company would be entitled to seek in a court of law. The Company shall pay all JAMS' arbitration fees in excess of the amount of court fees that would be required if the dispute were decided in a court of law. Nothing in this Agreement is intended to prevent either Executive or the Company from obtaining injunctive relief in court to prevent irreparable harm pending the conclusion of any such arbitration. Notwithstanding the foregoing, Executive and the Company each have the right to resolve any issue or dispute over intellectual property rights by Court action instead of arbitration.

14. Miscellaneous Provisions.

(a) Section 409A. Notwithstanding any provision to the contrary in this Agreement, if Executive is deemed by the Company at the time of Executive's Separation from Service to be a "specified employee" for purposes of Section 409A(a)(2)(B)(i) of the Code, to the extent delayed commencement of any portion of the benefits to which Executive is entitled under this Agreement is required in order to avoid a prohibited distribution under Section 409A(a)(2)(B)(i) of the Code, such portion of Executive's benefits shall not be provided to Executive prior to the earlier of (i) the expiration of the six-month period measured from the date of the Executive's Covered Termination or termination of employment due to Disability or (ii) the date of Executive's death. Upon the first business day following the expiration of the applicable Code Section 409A(a)(2)(B)(i) period, all payments deferred pursuant to this Section 14(a) shall be paid in a lump sum to Executive, and any remaining payments due under the Agreement shall be paid as otherwise provided herein.

(b) Waiver. No provision of this Agreement shall be modified, waived or discharged unless the modification, waiver or discharge is agreed to in writing and signed by Executive and by an authorized officer of the Company (other than Executive). No waiver by either party of any breach of, or of compliance with, any condition or provision of this Agreement by the other party shall be considered a waiver of any other condition or provision or of the same condition or provision at another time.

(c) Whole Agreement. This Agreement and the Confidential Information Agreement represent the entire understanding of the parties hereto with respect to the subject matter hereof and supersede all prior arrangements and understandings regarding same.

(d) Choice of Law. The validity, interpretation, construction and performance of this Agreement shall be governed by the laws of the State of California.

(e) Severability. The invalidity or unenforceability of any provision or provisions of this Agreement shall not affect the validity or enforceability of any other provision hereof, which shall remain in full force and effect.

(f) Counterparts. This Agreement may be executed in counterparts, each of which shall be deemed an original, but all of which together will constitute one and the same instrument.

[Signature page follows]

IN WITNESS WHEREOF, each of the parties has executed this Agreement, in the case of the Company by its duly authorized officer, as of the day and year set forth below.

CODEXIS, INC.

By:
Name: Stephen Dilly
Title: President and CEO
Date:

EXECUTIVE
/s/ Sri Ryali
Sri Ryali
Date: 12/30/2022

Exhibit 23.1

Consent of Independent Registered Public Accounting Firm

Codexis, Inc.
Redwood City, California

We hereby consent to the incorporation by reference in the Registration Statements on Form S-3 (No. 333-255926) and Form S-8 (Nos. 333-167752, 333-172166, 333-179903, 333-187711, 333-194524, 333-202596, 333-210022, 333-216587, 333-223693, 333-224885, 333-230037, 333-232262 and 333-269163) of Codexis, Inc. of our reports dated February 27, 2023, relating to the consolidated financial statements, and the effectiveness of Codexis, Inc.'s internal control over financial reporting, which appear in this Annual Report on Form 10-K.

/s/ BDO USA, LLP
San Jose, California

February 27, 2023

Exhibit 31.1

CERTIFICATION

I, Stephen Dilly, certify that:

1. I have reviewed this Annual Report on Form 10-K of Codexis, Inc.;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
4. The registrant's other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:
   (a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
   (b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
   (c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
   (d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and
5. The registrant's other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):
   (a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and
   (b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: February 27, 2023

/s/Stephen Dilly

Stephen Dilly
President and Chief Executive Officer

Exhibit 31.2

CERTIFICATION

I, Sriram Ryali, certify that:

1. I have reviewed this Annual Report on Form 10-K of Codexis, Inc.;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
4. The registrant's other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:
   (a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
   (b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
   (c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
   (d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and
5. The registrant's other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):
   (a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and
   (b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: February 27, 2023

/s/Sriram Ryali

Sriram Ryali

Chief Financial Officer

Exhibit 32.1

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

In connection with the Annual Report of Codexis, Inc. (the "Company") on Form 10-K for the fiscal year ended December 31, 2022, as filed with the Securities and Exchange Commission (the "Report"), Stephen Dilly, President and Chief Executive Officer of the Company and Sriram Ryali, Chief Financial Officer of the Company, respectively, do each hereby certify, pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that:

- The Report fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934; and
- The information in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

Date: February 27, 2023

/s/Stephen Dilly
Stephen Dilly
President and Chief Executive Officer

/s/Sriram Ryali
Sriram Ryali
Chief Financial Officer