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

FORM 10-Q

(Mark One)

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

For the quarterly period ended September 30, 2019

OR

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

For the transition period from to

Commission file number: 001-34705

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)**

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

(Former name, former address and former fiscal year, if changed since last report)

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

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

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

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

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

Large accelerated filer	☒	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 transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act. ☐

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

As of October 31, 2019, there were 58,518,105 shares of the registrant's Common Stock, par value $0.0001 per share, outstanding.

Codexis, Inc.

Quarterly Report on Form 10-Q

For the Quarter Ended September 30, 2019

TABLE OF CONTENTS

PART I. FINANCIAL INFORMATION

Item 1. Financial Statements

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

	September 30, 2019	December 31, 2018
Assets		
Current assets:		
Cash and cash equivalents	$ 92,143	$ 53,039
Accounts receivable, net of allowances of $34 at September 30, 2019 and December 31, 2018	12,327	11,551
Unbilled receivables, current	2,317	1,916
Inventories	397	589
Prepaid expenses and other current assets	1,553	1,068
Contract assets	1,193	35
Total current assets	109,930	68,198
Restricted cash	1,731	1,446
Equity securities	—	588
Right-of-use assets - Operating leases, net	24,542	—
Right-of-use assets - Finance leases, net	321	—
Property and equipment, net	6,241	4,759
Goodwill	3,241	3,241
Other non-current assets	190	1,051
Total assets	$ 146,196	$ 79,283
Liabilities and Stockholders' Equity		
Current liabilities:		
Accounts payable	$ 1,743	$ 3,050
Accrued compensation	4,695	5,272
Other accrued liabilities	6,182	4,855
Current portion of lease obligations - Operating leases	893	—
Current portion of lease obligations - Finance leases	122	—
Deferred revenue	1,288	4,936
Total current liabilities	14,923	18,113
Deferred revenue, net of current portion	1,988	3,352
Long-term lease obligations - Operating leases	25,554	—
Long-term lease obligations - Finance leases	—	61
Lease incentive obligation, net of current portion	—	35
Other long-term liabilities	1,223	1,416
Total liabilities	43,688	22,977
Commitments and Contingencies (Note 11)		
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; 58,386 shares and 54,065 shares issued and outstanding at September 30, 2019 and December 31, 2018, respectively	6	5
Additional paid-in capital	444,276	386,775
Accumulated deficit	(341,774)	(330,474)
Total stockholders' equity	102,508	56,306
Total liabilities and stockholders' equity	$ 146,196	$ 79,283

See accompanying notes to the unaudited condensed consolidated financial statements

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

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2019	**2018**	**2019**	**2018**
Revenues:				
Product revenue	$ 10,351	$ 8,405	$ 24,588	$ 18,291
Research and development revenue	11,555	8,541	25,220	26,235
Total revenues	21,906	16,946	49,808	44,526
Costs and operating expenses:				
Cost of product revenue	5,067	3,791	12,230	10,228
Research and development	8,711	7,917	25,000	22,464
Selling, general and administrative	7,869	7,344	24,180	22,485
Total costs and operating expenses	21,647	19,052	61,410	55,177
Income (loss) from operations	259	(2,106)	(11,602)	(10,651)
Interest income	480	199	929	444
Other expenses, net	(403)	(80)	(615)	(221)
Income (loss) before income taxes	336	(1,987)	(11,288)	(10,428)
Provision for (benefit from) income taxes	(7)	1	12	(11)
Net Income (loss)	$ 343	$ (1,988)	$ (11,300)	$ (10,417)
Net income (loss) per share, basic	$ 0.01	$ (0.04)	$ (0.20)	$ (0.20)
Net income (loss) per share, diluted	$ 0.01	$ (0.04)	$ (0.20)	$ (0.20)
Weighted average common stock shares used in computing net income (loss) per share, basic	58,287	53,597	55,818	51,609
Weighted average common stock shares used in computing net income (loss) per share, diluted	61,412	53,597	55,818	51,609

See accompanying notes to the unaudited condensed consolidated financial statements

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

Three months ended September 30, 2019	Common Stock		Additional paid-in Capital	Accumulated Other Comprehensive Income (Loss)	Accumulated Deficit	Total Stockholders' Equity
	Shares	Amount				
Balance as of July 1, 2019	57,940	$ 6	$ 440,795	$ —	$ (342,117)	$ 98,684
Exercise of stock options	441	—	1,778	—	—	1,778
Release of stock awards	8	—	—	—	—	—
Employee stock-based compensation	—	—	1,732	—	—	1,732
Taxes paid related to net share settlement of equity awards	(3)	—	(51)	—	—	(51)
Issuance of common stock, issuance costs	—	—	(55)	—	—	(55)
Short swing profit settlement	—	—	77	—	—	77
Net Income	—	—	—	—	343	343
Balance as of September 30, 2019	58,386	$ 6	$ 444,276	$ —	$ (341,774)	$ 102,508

Three months ended September 30, 2018	Common Stock		Additional paid-in Capital	Accumulated Other Comprehensive Income (Loss)	Accumulated Deficit	Total Stockholders' Equity
	Shares	Amount				
Balance as of July 1, 2018	53,508	$ 5	$ 380,551	$ —	$ (328,026)	$ 52,530
Exercise of stock options	427	—	2,461	—	—	2,461
Employee stock-based compensation	—	—	1,770	—	—	1,770
Net loss	—	—	—	—	(1,988)	(1,988)
Balance as of September 30, 2018	53,935	$ 5	$ 384,782	$ —	$ (330,014)	$ 54,773

See accompanying notes to the unaudited condensed consolidated financial statements

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

Nine months ended September 30, 2019	Common Stock Shares	Common Stock Amount	Additional paid-in Capital	Accumulated Other Comprehensive Income (Loss)	Accumulated Deficit	Total Stockholders' Equity
Balance as of January 1, 2019	54,065	$ 5	$ 386,775	$ —	$ (330,474)	$ 56,306
Exercise of stock options	970	—	4,621	—	—	4,621
Release of stock awards	449	—	—	—	—	—
Employee stock-based compensation	—	—	5,783	—	—	5,783
Taxes paid related to net share settlement of equity awards	(147)	—	(2,850)	—	—	(2,850)
Issuance of common stock, net of issuance costs of $129	3,049	1	49,870	—	—	49,871
Short swing profit settlement	—	—	77	—	—	77
Net loss	—	—	—	—	(11,300)	(11,300)
Balance as of September 30, 2019	58,386	$ 6	$ 444,276	$ —	$ (341,774)	$ 102,508

Nine months ended September 30, 2018	Common Stock Shares	Common Stock Amount	Additional paid-in Capital	Accumulated Other Comprehensive Income (Loss)	Accumulated Deficit	Total Stockholders' Equity
Balance as of January 1, 2018	48,365	$ 5	$ 340,079	$ (472)	$ (315,065)	$ 24,547
Exercise of stock options	730	—	4,319	—	—	4,319
Release of stock awards	824	—	—	—	—	—
Employee stock-based compensation	—	—	6,183	—	—	6,183
Non-employee stock-based compensation	—	—	24	—	—	24
Taxes paid related to net share settlement of equity awards	(297)	—	(3,140)	—	—	(3,140)
Issuance of common stock, net of issuance costs of $179	4,313	—	37,317	—	—	37,317
Cumulative effect of change in accounting principles [1]	—	—	—	472	(4,532)	(4,060)
Net loss	—	—	—	—	(10,417)	(10,417)
Balance as of September 30, 2018	53,935	$ 5	$ 384,782	$ —	$ (330,014)	$ 54,773

[1] Cumulative effect of change in accounting principles included: Accounting Standards Update 2014-9 (Topic 606), of $4.1 million and Accounting Standards Update 2016-01 (Subtopic 825-10), of $0.5 million.

See accompanying notes to the unaudited condensed consolidated financial statements

Codexis, Inc.
Condensed Consolidated Statements of Cash Flows
(Unaudited, in Thousands)

	Nine Months Ended September 30,	
	2019	**2018**
Operating activities:		
Net loss	$ (11,300)	$ (10,417)
Adjustments to reconcile net loss to net cash used in operating activities:		
Depreciation	1,118	812
Amortization expense - right-of-use assets - operating and finance leases	2,231	—
Gain on disposal of property and equipment	(2)	—
Stock-based compensation	5,783	6,207
Loss on investment in equity securities	526	20
Changes in operating assets and liabilities:		
Accounts receivable, net	(776)	3,556
Unbilled receivables	385	—
Inventories	192	206
Prepaid expenses and other current assets	(485)	(1,188)
Contract assets	(1,158)	(1,868)
Other non-current assets	74	188
Accounts payable	(1,294)	(1,686)
Accrued compensation	(577)	409
Other accrued liabilities	2,687	1,332
Other long-term liabilities	(1,291)	(710)
Deferred revenue	(5,012)	(10,235)
Net cash used in operating activities	(8,899)	(13,374)
Investing activities:		
Purchase of property and equipment	(3,315)	(2,074)
Proceeds from disposal of property and equipment	2	1
Proceeds from the sale of investment securities	62	—
Net cash used in investing activities	(3,251)	(2,073)
Financing activities:		
Proceeds from exercises of stock options	4,621	4,319
Proceeds from issuance of common stock in connection with public offering, net of underwriting discounts and commission	—	37,497
Costs incurred in connection with public offering	—	(180)
Proceeds from issuance of common stock in connection with private placement	50,000	—
Costs incurred in connection with private placement	(129)	—
Payments of lease obligations - Finance leases	(180)	(178)
Recovery of short swing profit	77	—
Taxes paid related to net share settlement of equity awards	(2,850)	(3,140)
Net cash provided by financing activities	51,539	38,318
Net increase in cash, cash equivalents and restricted cash	39,389	22,871
Cash, cash equivalents and restricted cash at the beginning of the period	54,485	32,776
Cash, cash equivalents and restricted cash at the end of the period	$ 93,874	$ 55,647
Supplemental disclosure of cash flow information		
Interest paid	$ 16	$ 61
Income taxes paid	$ 5	$ 5
Purchase of property and equipment recorded in accounts payable and accrued expenses	$ 536	$ 420

The following table provides a reconciliation of cash, cash equivalents and restricted cash reported within the unaudited condensed consolidated balance sheets as of September 30, 2019 and September 30, 2018 to the total of the same such amounts shown above:

	Nine Months Ended September 30,	
	2019	**2018**
Cash and cash equivalents	$ 92,143	$ 54,225
Restricted cash included in non-current assets	1,731	1,422
Total cash, cash equivalents and restricted cash at the end of the period	$ 93,874	$ 55,647

See accompanying notes to the unaudited condensed consolidated financial statements

Note 1. Description of Business

In these notes to the unaudited condensed 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 proteins that deliver value to our clients in a growing set of industries. We view proteins as a vast untapped source of value-creating materials, and we are using our proven technologies, which we have been continuously improving since our inception in 2002, to commercialize an increasing number of novel proteins, both as proprietary Codexis products and in partnership with our customers.

We are a pioneer in the harnessing of computational technologies to drive biology advancements. Since 2002, we have made substantial investments in the development of our CodeEvolver® protein engineering technology platform, the primary source of our competitive advantage. Our technology platform is powered by proprietary, artificial intelligence-based, computational algorithms that rapidly mine our large and continuously growing library of protein variants' performance attributes. These computational outputs enable increasingly reliable predictions for next generation protein variants to be engineered, enabling delivery of targeted performance enhancements in a time-efficient manner. In addition to its computational prowess, our CodeEvolver® protein engineering technology platform integrates additional modular competencies, including robotic high-throughput screening and genomic sequencing, organic chemistry and process development which are all coordinated to create our novel protein innovations.

Our approach to develop commercially viable biocatalytic manufacturing processes begins by conceptually designing the most cost-effective and practical process for a targeted product. We then develop optimized protein catalysts to enable that process design, using our CodeEvolver® protein engineering platform technology. Engineered protein catalyst candidates - many thousands for each protein engineering project - are then rapidly screened and validated in high throughput screening under relevant manufacturing operating conditions. This approach results in an optimized protein catalyst enabling cost-efficient processes that typically are relatively simple to run in conventional manufacturing equipment. This also allows for the efficient technical transfer of our process to our manufacturing partners.

The successful embodiment of our CodeEvolver® protein engineering technology platform in commercial manufacturing processes requires well-integrated expertise in a number of technical disciplines. In addition to those directly involved in practicing our CodeEvolver® protein engineering platform technology, such as molecular biology, enzymology, microbiology, cellular engineering, metabolic engineering, bioinformatics, biochemistry and high throughput analytical chemistry, our process development projects also involve integrated expertise in organic chemistry, chemical process development, chemical engineering, fermentation process development and fermentation engineering. Our integrated, multi-disciplinary approach to biocatalyst and process development is a critical success factor for our company.

We initially commercialized our CodeEvolver® protein engineering technology platform and products in the pharmaceuticals market, which remains our primary business focus. Our customers, which include several large global pharmaceutical companies, use our technology, products and services in their manufacturing processes and process development.

We have also used the technology to develop protein catalysts for use in the fine chemicals market. The fine chemicals market consists of several large market verticals, including food and food ingredients, animal feed, flavors, fragrances and agricultural chemicals.

We have also begun using the CodeEvolver® protein engineering technology platform to develop early stage, novel biotherapeutic product candidates, both for our customers and for our own business, most notably our lead program for the potential treatment of phenylketonuria ("PKU") in humans. PKU is an inherited metabolic disorder in which the enzyme that converts the essential amino acid phenylalanine into tyrosine is deficient. In October 2017, we entered into a Global Development, Option and License Agreement (the "Nestlé Agreement") with Nestec Ltd. ("Nestlé Health Science") to advance CDX-6114, our enzyme biotherapeutic product candidate for the potential treatment of PKU. In February 2019, Nestlé Health Science exercised its option to obtain an exclusive license to develop and commercialize CDX-6114.

In April 2018, we entered into a strategic agreement (the "Porton Agreement") with Porton Pharma Solutions, Ltd. ("Porton") to license key elements of our CodeEvolver® protein engineering technology platform to Porton's global custom intermediate and active pharmaceutical ingredients ("API") development and manufacturing business. This gives us access to a wide variety of small and medium-sized pharmaceutical customers.

We are also using our technology to develop enzymes for customers using next generation sequencing ("NGS") and polymerase chain reaction ("PCR/qPCR") for *in vitro* molecular diagnostic and genomic research applications. Our first enzyme for this application is a DNA ligase which we began marketing to customers in 2018.

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

Below are brief descriptions of our business segments (See Note 13, "Segment, Geographical and Other Revenue Information"):

Performance Enzymes

We initially commercialized our CodeEvolver® protein engineering technology platform and products in the pharmaceuticals market, and to date this continues to be our largest market served. Our customers, which include many large global pharmaceutical companies, use our technology, products and services in their manufacturing processes and process development. We have also used the technology to develop customized enzymes for use in other industrial markets. These markets consist of several large industrial verticals, including food and food ingredients, animal feed, flavors, fragrances, and agricultural chemicals. We also use our technology to develop enzymes for customers using NGS and PCR/qPCR for *in vitro* molecular diagnostic and molecular biology research applications.

Novel Biotherapeutics

We are also targeting new opportunities in the pharmaceutical industry to discover, improve, and/or develop biotherapeutic drug candidates. We believe that our CodeEvolver® protein engineering platform technology can be used to discover 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. Most notable is our lead program for the potential treatment of PKU in humans. PKU is an inherited metabolic disorder in which the enzyme that converts the essential amino acid phenylalanine into tyrosine is deficient. In October 2017, we announced a strategic collaboration with Nestlé Health Science to advance CDX-6114, our own novel orally administrable enzyme therapeutic candidate for the potential treatment of PKU. In July 2018, we announced that we had dosed the first subjects in a first-in-human Phase 1a dose-escalation trial with CDX-6114, which was conducted in Australia. In November 2018, we announced top-line results from the Phase 1a study in healthy volunteers with CDX-6114. In December 2018, Nestlé Health Science became obligated to pay us an additional $1.0 million within 60 days after the achievement of a milestone relating to formulation of CDX-6114. In January 2019, we received notice from the U.S. Food and Drug Administration (the "FDA") that it had completed its review of our investigational new drug application ("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. As a result of the option exercise, we earned a milestone and recognized $3.0 million in revenues in the first quarter of 2019. Upon exercising its option, Nestlé Health Science has 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 third quarter of 2019.

We have also developed a pipeline of other biotherapeutic drug candidates, which are in preclinical development, and in which we expect to continue to make additional investments with the aim of advancing additional product candidates targeting other therapeutic areas.

Recent Financing Activities

In June 2019, we entered into a Securities Purchase Agreement with an affiliate of Casdin Capital, LLC ("Casdin") pursuant to which we issued and sold to Casdin 3,048,780 shares of our common stock at a purchase price of $16.40 per share (the "Private Offering"). After deducting issuance costs of $0.1 million from the Private Offering, our net proceeds were $49.9 million. See Note 10, "Capital Stock" to our unaudited condensed consolidated financial statements for further details.

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

Basis of Presentation and Principles of Consolidation

The accompanying unaudited condensed 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") for interim financial information. Accordingly, they do not include all of the information and notes required by GAAP for complete financial statements. These interim unaudited condensed consolidated financial statements should be read in conjunction with the audited consolidated financial statements and notes thereto contained in our Annual Report on Form 10-K for the year ended December 31, 2018. The condensed consolidated balance sheet at December 31, 2018 has been derived from the audited consolidated financial statements at that date, but does not include all disclosures, including notes, required by GAAP for complete financial statements. The significant accounting policies used in preparation of the unaudited condensed consolidated financial statements for the three and nine months ended September 30, 2019 are consistent with those discussed in Note 2 to the audited consolidated financial statements in the Company's 2018 Annual Report on Form 10-K and are updated below as necessary.

The unaudited condensed consolidated financial statements have been prepared on the same basis as the audited consolidated financial statements and, in the opinion of management, reflect all adjustments of a normal recurring nature considered necessary to present fairly our financial position as of September 30, 2019, results of our operations for the three and nine months ended September 30, 2019 and 2018, changes in stockholders' equity for the three and nine months ended September 30, 2019 and 2018, and cash flows for the nine months ended September 30, 2019 and 2018. The interim results are not necessarily indicative of the results for any future interim period or for the entire year. Accounting Standard Update ("ASU") 2016-02, "Leases (Topic 842)" ("ASC 842) establishes a right-of-use ("ROU") model that requires a lessee to record a right-of-use asset and a lease obligation on the balance sheet for all leases with terms longer than 12 months. See "Recently Adopted Accounting Pronouncements" for details regarding the adoption of ASU 2016-02 effective January 1, 2019.

The unaudited interim condensed consolidated financial statements include the accounts of Codexis, Inc. and its wholly owned subsidiaries in the United States, India and the Netherlands. All significant intercompany balances and transactions have been eliminated in consolidation.

Use of Estimates

The preparation of financial statements in conformity with GAAP requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities, disclosures of contingent liabilities at the date of the unaudited condensed consolidated financial statements, and the reported amounts of revenue and expenses during the reporting period. We regularly assess these estimates which primarily affect revenue recognition, accounts receivable, inventories, the valuation of marketable securities, 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 unaudited condensed consolidated financial statements.

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 chief operating decision maker ("CODM"), or decision making group, in deciding how to allocate resources, and in assessing performance. Our 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 our 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. The Performance Enzymes segment consists of protein catalyst products and services with focus on pharmaceutical, food, molecular diagnostics, and other industrial markets.

Leases

We determine if an arrangement is a lease at inception. Operating leases are included in right-of-use ("ROU") lease assets, current portion of lease obligations, and long-term lease obligations on our balance sheets.

ROU lease assets represent our right to use an underlying asset for the lease term and lease obligations represent our obligation to make lease payments arising from the lease. Operating ROU lease assets and obligations are recognized at the commencement date based on the present value of the future minimum lease payments over the lease term. As our leases do not provide an implicit rate, we use our incremental borrowing rate based on the information available at the commencement date in determining the present value of lease payments. The lease terms may include options to extend or terminate the lease when it is reasonably certain that the option will be exercised. Lease expense is recognized on a straight-line basis over the lease term. We elected to apply the short-term lease measurement and recognition exemption in which ROU assets and lease obligations are not recognized for short-term leases.

Recent Accounting Pronouncements

Recently adopted accounting pronouncements

In February 2016, the FASB issued ASU 2016-02, "Leases (Topic 842)" (“ASC 842”), which is intended to improve financial reporting of leasing transactions by requiring lessees to recognize leases on balance sheets and disclose key information about leasing arrangements. Topic 842 was subsequently amended by ASU No. 2018-01, "Land Easement Practical Expedient for Transition to Topic 842"; ASU 2018-10, "Codification Improvements to ASC 842, Leases"; and ASU 2018-11, "Leases (Topic 842): Targeted Improvements." The new standard establishes a right-of-use ("ROU") model that requires lessees to record a ROU asset and lease obligations on the balance sheet for all leases with terms longer than 12 months. Leases are classified as either finance or operating, with classification affecting the pattern and classification of expense recognition in the condensed consolidated statement of operations. We adopted the new standard on January 1, 2019 using a modified retrospective approach and effective date method. We also elected the "package of practical expedients," which permit us not to reassess under the new standard its prior conclusions about lease identification, lease classification and initial direct costs. We did not elect the use-of-hindsight or the practical expedient pertaining to land easements; the latter is not applicable to us. Upon adoption, for operating leases, we recognized $26.6 million of ROU assets and $27.6 million of lease obligations, which represents the present value of the lease payments discounted using our incremental borrowing rate ("IBR") of 6.6%. For finance leases, we recognized $0.5 million of ROU assets and $0.3 million of lease obligations which represents the present value of the lease payments discounted using weighted-average implicit rate of 5.0%. These amounts were recorded in our unaudited condensed consolidated balance sheet in the first quarter of 2019.

In February 2018, the FASB issued ASU No. 2018-02, “Income Statement - Reporting Comprehensive Income (Topic 220) - Reclassification of Certain Tax Effects from Accumulated Other Comprehensive Income”. This standard allows a reclassification from accumulated other comprehensive income to retained earnings for stranded tax effects resulting from the Tax Cuts and Jobs Act and requires certain disclosures about stranded tax effects and will be effective for us beginning January 1, 2019 and should be applied either in the period of adoption or retrospectively. We adopted ASU 2018-02 in the first quarter of 2019, and the adoption had no impact on our unaudited condensed consolidated financial statements.

In June 2018, the FASB issued ASU 2018-07, "Compensation-Stock Compensation (Topic 718): Improvements to Non-employee Share-Based Payment Accounting," which expands the scope of Topic 718, Compensation—Stock Compensation (which currently only includes share-based payments to employees) to include share-based payments issued to non-employees for goods or services. Consequently, the accounting for share-based payments to non-employees and employees will be substantially aligned. The ASU supersedes Subtopic 505-50, Equity—Equity-Based Payments to Non-Employees. The new standard is effective for fiscal years beginning after December 15, 2018, with early adoption permitted. We adopted ASU 2018-07 in the first quarter of 2019, and the adoption had no impact on our unaudited condensed consolidated financial statements.

In July 2018, the FASB issued ASU 2018-09, "Codification Improvements”, which represent changes to clarify, correct errors in, or make minor improvements to the Codification, eliminating inconsistencies and providing clarifications in current guidance. The amendments in this ASU include those made to: Subtopic 220-10, Income Statement-Reporting Comprehensive Income-Overall; Subtopic 470-50, Debt-Modifications and Extinguishments; Subtopic 480-10, Distinguishing Liabilities from Equity-Overall; Subtopic 718-740, Compensation-Stock Compensation-Income Taxes; Subtopic 805-740, Business Combinations-Income Taxes; Subtopic 815-10, Derivatives and Hedging-Overall; Subtopic 820-10, Fair Value Measurement-Overall; Subtopic 940-405, Financial Services-Brokers and Dealers-Liabilities; and Subtopic 962-325, Plan Accounting-Defined Contribution Pension Plans-Investments-Other. The transition and effective date guidance is based on the facts and circumstances of each amendment. Some of the amendments do not require transition guidance and will be effective upon

issuance. However, many of the amendments do have transition guidance with effective dates for annual periods beginning after December 15, 2018, for public business entities. We adopted subtopics under ASU 2018-09 that are applicable to our company which included subtopics 718-740 and 820-10 in the first quarter of 2019, and the adoption had no impact on our unaudited condensed consolidated financial statements.

Recently issued accounting pronouncements not yet adopted

From time to time, new accounting pronouncements are issued by the FASB or other standards setting bodies that are adopted by us as of the specified effective date. Unless otherwise discussed, we believe that the impact of recently issued standards that are not yet effective will not have a material impact on our unaudited condensed consolidated financial statements upon adoption.

In June 2016, the FASB issued ASU 2016-13, "Financial Instruments - Credit Losses (Topic 326): Measurement of Credit Losses on Financial Instruments," which amends the FASB's guidance on the impairment of financial instruments. The standard adds a new impairment model (known as the "current expected credit loss model") that is based on expected losses rather than incurred losses. ASU 2016-13 is effective for annual reporting periods ending after December 15, 2019, including interim periods within those fiscal years. Early adoption is permitted for fiscal years beginning after December 15, 2018, including interim periods within those fiscal years. We are currently evaluating the impact of adopting ASU 2016-13 on our financial statements and related disclosures.

In January 2017, the FASB issued ASU No. 2017-04, "Intangibles - Goodwill and Other (Topic 350): Simplifying the Test for Goodwill Impairment." The amendments eliminate Step 2 from the goodwill impairment test. The annual, or interim, goodwill impairment test is performed by comparing the fair value of a reporting unit with its carrying amount. An impairment charge should be recognized for the amount by which the carrying amount exceeds the reporting unit’s fair value; however, the loss recognized should not exceed the total amount of goodwill allocated to that reporting unit. In addition, income tax effects from any tax deductible goodwill on the carrying amount of the reporting unit should be considered when measuring the goodwill impairment loss, if applicable. The amendments also eliminate the requirements for any reporting unit with a zero or negative carrying amount to perform a qualitative assessment and, if it fails that qualitative test, to perform Step 2 of the goodwill impairment test. An entity still has the option to perform the qualitative assessment for a reporting unit to determine if the quantitative impairment test is necessary. The new standard is effective for fiscal years beginning after December 15, 2019, with early adoption permitted. We are currently evaluating the impact of adoption of ASU 2017-04 on our financial statements and related disclosures.

In August 2018, the FASB issued ASU 2018-13, "Fair Value Measurement (Topic 820): Disclosure Framework—Changes to the Disclosure Requirements for Fair Value Measurement". The primary focus of ASU 2018-13 is to improve the effectiveness of the disclosure requirements for fair value measurements. The changes affect all companies that are required to include fair value measurement disclosures. In general, the amendments in ASU 2018-13 are effective for all entities for fiscal years and interim periods within those fiscal years, beginning after December 15, 2019. Early adoption is permitted. We are currently evaluating the impact of adoption of ASU 2018-13 on our financial statements and related disclosures.

In November 2018, the FASB issued ASU 2018-18, "Collaborative Arrangements (Topic 808): Clarifying the Interaction Between Topic 808 and Topic 606." ASU 2018-18 provides guidance on how to assess whether certain transactions between collaborative arrangement participants should be accounted for within the revenue recognition standard. The ASU also provides more comparability in the presentation of revenue for certain transactions between collaborative arrangement participants. In general, for public companies, the amendments in this standard are effective for fiscal years beginning after December 15, 2019, and interim periods within those fiscal years. Early adoption is permitted. We are currently evaluating the impact of adoption of ASU 2018-18 on our financial statements.

Note 3. Revenue Recognition

Disaggregation of Revenue

The following table provides information about disaggregated revenue from contracts with customers, 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, Latin America), EMEA (Europe, Middle East, Africa), and APAC (Australia, New Zealand, Southeast Asia, China).

(in thousands)	Three months ended September 30, 2019			Three months ended September 30, 2018		
	Performance Enzymes	Novel Biotherapeutics	Total	Performance Enzymes	Novel Biotherapeutics	Total
Major products and service:						
Product Revenue	$ 10,351	$ —	$ 10,351	$ 8,405	$ —	$ 8,405
Research and development revenue	10,073	1,482	11,555	3,720	4,821	8,541
Total revenues	$ 20,424	$ 1,482	$ 21,906	$ 12,125	$ 4,821	$ 16,946
Primary geographical markets:						
Americas	$ 2,706	$ —	$ 2,706	$ 4,315	$ —	$ 4,315
EMEA	10,723	1,482	12,205	1,453	4,821	6,274
APAC	6,995	—	6,995	6,357	—	6,357
Total revenues	$ 20,424	$ 1,482	$ 21,906	$ 12,125	$ 4,821	$ 16,946

(in thousands)	Nine months ended September 30, 2019			Nine months ended September 30, 2018		
	Performance Enzymes	Novel Biotherapeutics	Total	Performance Enzymes	Novel Biotherapeutics	Total
Major products and service:						
Product Revenue	$ 24,588	$ —	$ 24,588	$ 18,291	$ —	$ 18,291
Research and development revenue	16,512	8,708	25,220	15,728	10,507	26,235
Total revenues	$ 41,100	$ 8,708	$ 49,808	$ 34,019	$ 10,507	$ 44,526
Primary geographical markets:						
Americas	$ 9,620	$ —	$ 9,620	$ 13,968	$ —	$ 13,968
EMEA	15,964	8,708	24,672	4,568	10,507	15,075
APAC	15,516	—	15,516	15,483	—	15,483
Total revenues	$ 41,100	$ 8,708	$ 49,808	$ 34,019	$ 10,507	$ 44,526

Contract Balances

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

	January 1, 2019 balance	Additions	Deductions [1]	September 30, 2019 balance
Contract Assets	$ 35	7,142	(5,984)	$ 1,193
Unbilled receivables, current	$ 1,916	4,189	(3,788)	$ 2,317
Unbilled receivables, non-current [2]	$ 786	—	(786)	$ —
Contract Costs [2]	$ 42	—	(41)	$ 1
Contract Liabilities: Deferred Revenue	$ 8,288	6,486	(11,498)	$ 3,276

[1] The asset or liability balances are presented as a net position per contract and accordingly the deductions column includes the netting effect of presenting each contract on a net position basis as either a net liability or asset.

[2] Included in non-current assets in our unaudited condensed consolidated balance sheets.

We had no asset impairment charges related to contract assets in thethree and nine months ended September 30, 2019.

During the three and nine months ended September 30, 2019, we recognized the following revenues (in thousands):

Revenue recognized in the period from:	Three months ended September 30, 2019	Nine months ended September 30, 2019
Amounts included in contract liabilities at the beginning of the period:		
Performance obligations satisfied	$ 5,092	$ 4,948
Changes in the period:		
Changes in the estimated transaction price allocated to performance obligations satisfied in prior periods	2,641	2,460
Performance obligations satisfied from new activities in the period - contract revenue	14,173	42,400
Total revenue	$ 21,906	$ 49,808

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 period. 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 September 30, 2019.

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)	Remainder of 2019	2020	2021 and Thereafter	Total
Product Revenue	$ —	$ 365	$ 1,623	$ 1,988
Research and development revenue	1,288	—	—	1,288
Total	$ 1,288	$ 365	$ 1,623	$ 3,276

Note 4. Net Income (loss) per Share

Basic net income (loss) per share is computed by dividing the net income (loss) by the weighted-average number of shares of common stock outstanding, less restricted stock awards ("RSAs") subject to forfeiture. Diluted net income (loss) per share is computed by dividing net income (loss) by the weighted average number of shares of common stock outstanding, less RSAs subject to forfeiture, plus all additional common stock shares that would have been outstanding, assuming dilutive potential common stock shares had been issued for other dilutive securities. For periods of net loss, 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.

The following table sets forth the computation of basic and diluted net income (loss) per share during the three and nine months ended September 30, 2019 and 2018 (in thousands, except per share amounts):

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2019	2018	2019	2018
Numerator:				
Net income (loss)	$ 343	$ (1,988)	$ (11,300)	$ (10,417)
Denominator:				
Weighted average common stock shares used in computing net income (loss) per share, basic	58,287	53,597	55,818	51,609
Effect of dilutive shares	3,125	—	—	—
Weighted average common stock shares used in computing net income (loss) per share, diluted	61,412	53,597	55,818	51,609
Net income (loss) per share, basic	$ 0.01	$ (0.04)	$ (0.20)	$ (0.20)
Net income (loss) per share, diluted	$ 0.01	$ (0.04)	$ (0.20)	$ (0.20)

Anti-Dilutive Securities

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

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2019	2018	2019	2018
Shares of common stock issuable pursuant to equity awards outstanding under the Equity Incentive Plan	1,019	7,607	5,623	7,607

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 GlaxoSmithKline ("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 received an upfront fee upon the execution of the agreement in July 2014 and milestone payments in each of the years from 2014 through April 2016. 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. We have the potential to receive additional cumulative 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® protein engineering platform technology.

In September 2019, we received notification from GSK that a milestone relating to the advancement of an enzyme developed by GSK using our CodeEvolver® protein engineering platform technology has been achieved, triggering a $2.0 million milestone payment to Codexis from GSK. We recognized revenue of $2.0 million for the milestone payment for the three and nine months ended September 30, 2019, respectively, compared to zero for the three and nine months ended September 30, 2018, respectively, as research and development revenue.

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.

We received an upfront license fee upon execution of the Merck CodeEvolver® Agreement, and milestone payments in September 2015 and in September 2016, when we completed the transfer of the engineering platform technology. Additionally, we recognized research and development revenues of $1.0 million and $3.0 million for the three and nine months ended September 30, 2019, respectively, compared to $1.1 million and $3.0 million for the three and nine months ended September 30, 2018, 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. These potential API payments are based on the quantity of API developed and manufactured by Merck and will be recognized as usage-based royalties. We recognized zero usage-based royalties in both the three and nine months ended September 30, 2019.

In January 2019, we entered into an amendment to the Merck CodeEvolver® Agreement whereby we installed certain CodeEvolver® protein engineering technology upgrades into Merck's platform license. Pursuant to the agreement, we will maintain those upgrades for a multi-year term. We recognized research and development revenues of $0.1 million and $1.0 million for the three and nine months ended September 30, 2019, respectively, under the amendment.

Merck Sitagliptin Catalyst Supply Agreement

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

Effective as of January 2016, we and Merck amended the Sitagliptin Catalyst Supply Agreement to prospectively provide for variable pricing based on the cumulative volume of sitagliptin catalyst purchased by Merck and to allow Merck to purchase a percentage of its requirements for sitagliptin catalyst from a specified third-party supplier. Merck received a distinct, functional license to manufacture a portion of its demand beginning January 1, 2018, which we recognized as research and development revenue. Under this agreement, we recognized no research and development revenue for the three and nine months ended September 30, 2019, compared to zero and $1.3 million for the three and nine months ended September 30, 2018, respectively.

We have determined that the variable pricing, which provides a discount based on the cumulative volume of sitagliptin catalyst purchased by Merck, provides Merck material rights and we are recognizing product revenues using the alternative method. Under the alternative approach, we estimate the total expected consideration and allocate it proportionately with the expected sales.

The Sitagliptin Catalyst Supply Agreement requires Merck to pay an annual fee for the rights to the sitagliptin technology each year for the term of the Sitagliptin Catalyst Supply Agreement. Amounts of annual license fees are based on contractually agreed prices and are on a declining scale over the term of the contract.

We had a deferred revenue balance from Merck of zero at September 30, 2019 and $3.6 million at December 31, 2018. In addition, pursuant to the terms of the Sitagliptin Catalyst Supply Agreement, we recognized $3.6 million and $11.4 million for the three and nine months ended September 30, 2019, respectively, compared to $3.4 million and $10.7 million for the three and nine months ended September 30, 2018, respectively, in product revenue under this agreement.

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 of $0.8 million in December 2016, which we accordingly 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 provides the customer material rights and we are recognizing revenues using the alternative method. As of September 30, 2019 and December 31, 2018, we had deferred revenue from the supply agreement of $2.0 million.

Research and Development Agreement

In March 2017, we entered into a multi-year research and development services agreement with Tate & Lyle Ingredients Americas LLC ("Tate & Lyle") to develop enzymes for use in the manufacture of Tate & Lyle's zero-calorie TASTEVA® M Stevia sweetener. Under the agreement, we received an upfront payment of $3.0 million, which was recognized ratably over the maximum term of the services period of 21 months. Beginning January 1, 2018, we recognized revenue using a single measure of progress that depicted our performance in transferring the services. During the second quarter of 2018, Tate & Lyle opted to obtain additional development services that we completed by June 30, 2018 and we earned milestone payments upon completion of the services. We recognized revenue of zero and $50 thousand for the three and nine months ended September 30, 2019, respectively, compared to $1.3 million and $7.1 million for the three and nine months ended September 30, 2018, respectively, for research and development services under the research and development agreement.

Global Development, Option and License Agreement and Strategic Collaboration Agreement

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

We received an upfront cash payment of $14.0 million upon the execution of the Nestlé Agreement, a $4.0 million milestone payment after dosing the first subjects in a first-in-human Phase 1a dose-escalation trial with CDX-6114, and a $1.0 million milestone payment upon achievement of a milestone relating to formulation of CDX-6114. The $4.0 million milestone payment that was triggered by the initiation of the trial was received in September 2018 and the $1.0 million milestone payment that was triggered by the achievement of a formulation relating to CDX-6114 was received in February 2019. The upfront payment and the variable consideration relating to the progress payment of $4.0 million and milestone payment of $1.0 million are being recognized over time as the development work is being performed. Revenue is being recognized using a single measure of progress that depicts our performance in transferring control of the services, which is based on the ratio of level of effort incurred to date compared to the total estimated level of effort required to complete all performance obligations under the agreement. We recognized development fees of $0.1 million and $1.8 million for the three and nine months ended September 30, 2019, respectively, compared to $3.7 million and $8.1 million for the three and nine months ended September 30, 2018, respectively, as research and development revenue. We had deferred revenue related to the development fees attributed to the milestone payment and upfront fees of $50 thousand at September 30, 2019 and $1.9 million at December 31, 2018.

In January 2019, we received notice from the 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. The option payment of $3.0 million was recognized in the first quarter of 2019 as research and development fees. Upon exercising its option, Nestlé Health Science has 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 second quarter of 2019. Other potential payments from Nestlé Health Science to us under the Nestlé Agreement 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 middle single digits to low double-digits, of net sales of product.

In addition to the Nestlé Agreement, we and Nestlé Health Science concurrently entered into a Strategic Collaboration Agreement (the "Strategic Collaboration Agreement") pursuant to which we and Nestlé Health Science will collaborate 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. Under the Strategic Collaboration Agreement, we received an upfront payment of $1.2 million in 2017 and an incremental $0.6 million payment in September 2018 for additional services. We recognized research and development fees of $1.4 million and $3.9 million for the three and nine months ended September 30, 2019, respectively, compared to $1.2 million and $2.4 million for the three and nine months ended September 30, 2018, respectively. We had deferred revenue of $25 thousand and $0.8 million at September 30, 2019 and December 31, 2018, respectively.

Strategic Collaboration Agreement

In April 2018, we entered into the Porton Agreement with Porton to license key elements of Codexis' 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 an initial collaboration fee of $0.5 million within 30 days of the effective date and $1.5 million upon the first anniversary of the effective date of the agreement. We completed the technical transfer in the fourth quarter of 2018. Revenue relating to the functional license provided to Porton was recognized at a point in time when control of the license transferred to the customer.

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.

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 Pharma AG ("Novartis"). The Agreement allows Novartis to use Codexis' proprietary CodeEvolver® protein engineering platform technology in the field of human healthcare. Under the Novartis CodeEvolver® Agreement, we will transfer Codexis' proprietary CodeEvolver® protein engineering platform technology to Novartis over approximately 20 months starting with the date on which we commence the technology transfer (the "Technology Transfer Period"). As a part of this technology transfer, our company will provide to Novartis Codexis' proprietary enzymes, proprietary protein engineering protocols and methods, and proprietary software algorithms. In addition, teams of Codexis and Novartis scientists will participate in technology training sessions and collaborative research projects at Codexis' laboratories in Redwood City, California and at a designated Novartis laboratory in Basel, Switzerland. Upon completion of technology transfer, Novartis will have the CodeEvolver® protein engineering platform technology installed at its designated laboratory.

Pursuant to the agreement, we received an upfront payment of $5 million shortly after the effective date of the Novartis CodeEvolver® Agreement. We are entitled to receive an additional $4 million subject to satisfactory completion of the second technology transfer milestone and an additional $5 million upon satisfactory completion of the third technology transfer milestone. In consideration for the continued disclosure and license of improvements to the Codexis technology and materials during a multi-year period that begins on the conclusion of the Technology Transfer Period ("Improvements Term"), Novartis will pay Codexis annual payments which amount to an additional $8 million. Codexis 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 begins 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 usage payments will be based on the total volume of API produced using the CodeEvolver®-developed enzyme. These usage payments can begin in the clinical stage, and will extend throughout the commercial life of each API. Revenue for the combined initial license and technology transfer, which is expected to occur over twenty months, is being recognized using a single measure of progress that depicts our performance in transferring control of the services, which is based on the ratio of level of effort incurred to date compared to the total estimated level of effort required to complete the performance obligation relating to the combined initial license and technology transfer. Revenue allocated to future improvements will be recognized during the Improvement Term. We recognized $3.8 million in revenue for the three and nine months ended September 30, 2019 from the Novartis CodeEvolver® Agreement. As of September 30, 2019, we had deferred revenue of $1.2 million from the Novartis CodeEvolver® Agreement.

Note 6. Cash Equivalents and Marketable Securities

Cash equivalents and marketable securities at September 30, 2019 and at December 31, 2018 consisted of the following (in thousands):

	September 30, 2019			
	Adjusted Cost	Gross Unrealized Gains (3)	Gross Unrealized Losses (3)	Estimated Fair Value
Money market funds (1)	$ 73,450	$ —	$ —	$ 73,450

	December 31, 2018			
	Adjusted Cost	Gross Unrealized Gains[3]	Gross Unrealized Losses[3]	Estimated Fair Value
Money market funds [1]	$ 31,225	$ —	$ —	$ 31,225
Common shares of CO_2 Solutions [2]	563	25	—	588
Total	$ 31,788	$ 25	$ —	$ 31,813

[1] Money market funds are classified in cash and cash equivalents on our unaudited condensed consolidated balance sheets.
[2] Common shares of CO_2 Solutions are classified in equity securities on our unaudited condensed consolidated balance sheets.
[3] As a result of adopting ASU 2016-01, "*Financial Instruments-Overall (Subtopic 825-10): Recognition and Measurement of Financial Assets and Financial Liabilities*", in 2018 and thereafter gross unrealized gains and gross unrealized losses related to our investment in CO_2 Solutions were recognized in other expense, in our unaudited condensed consolidated statements of operations.

As of September 30, 2019, the total cash and cash equivalents balance of $92.1 million was comprised of money market funds of $73.5 million and cash of $18.6 million held with major financial institutions worldwide. As of December 31, 2018, the total cash and cash equivalents balance of $53.0 million was comprised of money market funds of $31.2 million and cash of $21.8 million held with major financial institutions worldwide.

In December 2009, we purchased 10,000,000 common shares of CO_2 Solutions, a company based in Quebec, Canada, whose shares were publicly traded in Canada on the TSX Venture Exchange until September 17, 2019 and are currently listed on NEX board, which is a separate board of TSX Venture Exchange. Our purchase represented approximately 16.6% of CO_2 Solutions' total common shares outstanding at the time of investment and was made in a private placement subject to a four-month statutory resale restriction. This restriction expired on April 15, 2010. Our investment in CO_2 Solutions is recorded at its fair value. See Note 7, "Fair Value Measurements." Through September 30, 2019, we concluded that we did not have the ability to exercise significant influence over CO_2 Solutions' operating and financial policies.

In the quarter ended September 30, 2019, we sold 1.3 million common shares of our investment in CO_2 Solutions and received proceeds of $0.1 million. At September 30, 2019, we reviewed our investment in the common shares of CO_2 Solutions. Concurrent with CO_2 Solutions' announcement to file under the Bankruptcy and Insolvency Act (Canada) and a suspension in trading of its equity securities, there was no observable market pricing available at September 30, 2019. We assessed that the fair value of the investment and concluded to write down the investment to zero. Previously, we had assessed the fair value of the investment using readily quantifiable market data. We recognized a $0.4 million and a $0.5 million loss, respectively in the three and nine months ended September 30, 2019. The loss was included in other expenses, net in the unaudited condensed consolidated statement of operations.

We recognized a loss of $25 thousand and $20 thousand, respectively, in the three and nine months ended September 30, 2018. The loss was included in other expenses, net in the unaudited condensed consolidated statement of operations. On January 1, 2018, we adopted ASU 2016-01. Upon adoption, we reclassified the $0.5 million net unrealized loss on our investment from accumulated other comprehensive loss to our opening accumulated deficit.

Note 7. Fair Value Measurements

The following tables present the financial instruments that were measured at fair value on a recurring basis at September 30, 2019 and December 31, 2018 by level within the fair value hierarchy (in thousands):

	September 30, 2019			
	Level 1	Level 2	Level 3	Total
Money market funds	$ 73,450	$ —	$ —	$ 73,450

	December 31, 2018			
	Level 1	Level 2	Level 3	Total
Money market funds	$ 31,225	$ —	$ —	$ 31,225
Common shares of CO_2 Solutions	588	—	—	588
Total	$ 31,856	$ —	$ —	$ 31,813

We determine the fair value of Level 1 assets using quoted prices in active markets for identical assets. At December 31, 2018, we estimated the fair value of our investment in 10,000,000 common shares of CO_2 Solutions using the market value of common shares as determined by trading on the TSX Venture Exchange, and we classified our investment in CO_2 Solutions within the fair value hierarchy as Level 1 at December 31, 2018 using the quoted prices in an active market to determine their fair value.

In the quarter ended September 30, 2019, we reviewed our investment in the common shares of CO_2 Solutions. Concurrent with CO_2 Solutions' announcement to file under the Bankruptcy and Insolvency Act (Canada) and a suspension in trading of its equity securities, there was no observable market pricing available at September 30, 2019. We assessed the fair value of the investment and concluded to write down the investment to zero. We recognized a $0.4 million and a $0.5 million loss, respectively in the three and nine months ended September 30, 2019 in other expenses, net in the unaudited condensed consolidated statement of operations. For information see Note 6. "Cash Equivalents and Marketable Securities".

Note 8. Balance Sheets Details

Inventories

Inventories consisted of the following (in thousands):

	September 30, 2019	December 31, 2018
Raw materials	$ 7	$ 165
Work-in-process	52	47
Finished goods	338	377
Inventories	$ 397	$ 589

Property and Equipment, net

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

	September 30, 2019	December 31, 2018
Laboratory equipment	$ 23,266	$ 21,328
Leasehold improvements	10,899	10,359
Computer equipment and software	3,806	3,954
Office equipment and furniture	1,461	1,272
Construction in progress	488	939
Property and equipment	39,920	37,852
Less: accumulated depreciation and amortization	(33,679)	(33,093)
Property and equipment, net	$ 6,241	$ 4,759

Goodwill

Goodwill had a carrying value of approximately $3.2 million as of September 30, 2019 and December 31, 2018.

Other Accrued Liabilities

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

	September 30, 2019	December 31, 2018
Accrued purchases	$ 3,894	$ 1,492
Accrued professional and outside service fees	1,833	2,020
Deferred rent	—	343
Lease incentive obligation	—	425
Other	455	575
Total	$ 6,182	$ 4,855

Note 9. Stock-Based Compensation

Equity Incentive Plans

In June 2019, our board of directors (the "Board") and stockholders approved the 2019 Incentive Award Plan (the "2019 Plan"). The 2019 Plan supersedes and replaces 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 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 2019 Plan provides for the grant of stock options, including incentive stock options and non-qualified stock options, stock appreciation rights, restricted stock, restricted stock units, 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 2010 Plan provided for the grant of incentive stock options, non-statutory stock options, restricted stock units ("RSUs"), restricted stock awards ("RSAs"), performance-contingent restricted stock units ("PSUs"), performance based options ("PBOs"), stock appreciation rights, and stock purchase rights to our employees, non-employee directors and consultants.

Stock Options

The option exercise price for incentive stock options is 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 10 years and vest over a four year period 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 one-third 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 approved, solely in respect of non-executive employees, and delegated to our Chief Executive Officer the authority to approve grants of PSUs. The compensation committee of the Board also approved 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 the first quarter of 2019, we awarded PSUs ("2019 PSUs") and PBOs ("2019 PBOs"), each of which commence vesting based upon the achievement of various weighted performance goals, including revenue growth, strategic advancement of biotherapeutics, cash balance and strategic plan development. As of September 30, 2019, we estimated that the 2019 PSUs and 2019 PBOs performance goals would be achieved at 113% of the target level, and recognized expenses accordingly.

In 2018, we awarded PSUs ("2018 PSUs") and PBOs ("2018 PBOs"), each of which commenced vesting based upon the achievement of various weighted performance goals, including core business revenue growth, cash balance, new licensing collaborations, new research and development service revenue arrangements, technology advancement and novel therapeutic enzymes advancement. In the first quarter of 2019, we determined that the 2018 PSUs and 2018 PBOs performance goals had been achieved at 118% of the target level, and recognized expenses accordingly. Accordingly, one-half of the shares underlying the 2018 PSUs and PBOs vested in the first quarter of 2019 and one-half of the shares underlying the 2018 PSUs and PBOs will vest in the first quarter of 2020, in each case subject to the recipient's continued service on each vesting date.

In 2017, we awarded PSUs ("2017 PSUs") and PBOs ("2017 PBOs"), each of which commenced vesting based upon the achievement of various weighted performance goals, including revenue growth, fundraising, service revenue, new platform license revenue, and strategic advancement of biotherapeutics pipeline. In the first quarter of 2018, we determined that the 2017 PSU and PBO performance goals had been achieved at 134.2% of the target level, and recognized expenses accordingly. Accordingly, one-half of the shares underlying the 2017 PSUs and PBOs vested in the first quarter of 2018 and one-half of the shares underlying the 2017 PSUs and PBOs vested in the first quarter of 2019, 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 unaudited condensed consolidated statements of operations as follows (in thousands):

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2019	2018	2019	2018
Research and development	$ 458	$ 552	$ 1,249	$ 1,555
Selling, general and administrative	1,274	1,218	4,534	4,652
Total	$ 1,732	$ 1,770	$ 5,783	$ 6,207

The following table presents total stock-based compensation expense by security type included in the unaudited condensed consolidated statements of operations for the three and nine months ended September 30, 2019 and 2018 (in thousands):

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2019	2018	2019	2018
Stock options	$ 545	$ 472	$ 1,680	$ 1,482
RSUs and RSAs	461	416	1,308	1,293
PSUs	368	407	1,075	1,251
PBOs	358	475	1,720	2,181
Total	$ 1,732	$ 1,770	$ 5,783	$ 6,207

As of September 30, 2019, unrecognized stock-based compensation expense, net of expected forfeitures, was $4.4 million related to unvested employee stock options, $1.8 million related to unvested RSUs and RSAs, $0.8 million related to unvested PSUs, and $1.8 million related to unvested PBOs based on current estimates of the level of achievement. Stock-based compensation expense for these awards will be recognized through the year of 2023.

Note 10. Capital Stock

Exercise of Options

For the nine months ended September 30, 2019 and September 30, 2018, 970,256 and 729,596 shares, respectively, were issued upon option exercises at a weighted-average exercise price of $4.76 and $5.92 per share, respectively, with net cash proceeds of $4.6 million and $4.3 million, respectively.

Private Offering

In June 2019, we entered into a Securities Purchase Agreement with an affiliate of Casdin pursuant to which we issued and sold to Casdin 3,048,780 shares of our common stock ("Shares") at a purchase price of $16.40 per share. After deducting issuance costs of $0.1 million from the Private Offering, our net proceeds were $49.9 million.

In June 2019, we also entered into a Registration Rights Agreement (the “Registration Rights Agreement”) with Casdin. Pursuant to the Registration Rights Agreement, we agreed, subject to certain conditions, to prepare and file a registration statement with the Securities and Exchange Commission (the “SEC”) within 180 days after the closing of the Private Offering, if we are a “well known seasoned issuer” at such time (210 days if we are not then a “well known seasoned issuer”) for purposes of registering the resale of the Shares and any shares of common stock issued as a dividend or other distribution with respect to the Shares. We further agreed, among other things, to indemnify the selling holders under the registration statement from certain losses, claims, damages and liabilities and to pay all fees and expenses (excluding underwriting discounts and selling commissions) incident to the performance of, or compliance with, our obligations under the Registration Rights Agreement.

The Private Offering was exempt from registration pursuant to the exemption for transactions by an issuer not involving any public offering under Section 4(a)(2) the Securities Act, and Regulation D under the Securities Act.

Note 11. Commitments and Contingencies

Operating Leases

Our headquarters are located in Redwood City, California, where we occupy approximately 107,200 square feet of office and laboratory space in four buildings within the same business park of Metropolitan Life Insurance Company ("MetLife"). Our lease (“Lease”) with MetLife includes approximately 28,200 square feet of space located at 200 and 220 Penobscot Drive, Redwood City, California (the “Penobscot Space”), approximately 37,900 square feet of space located at 400 Penobscot Drive, Redwood City, California (the “Building 2 Space”), approximately 11,200 square feet of space located at 501 Chesapeake Drive, Redwood City, California (the “501 Chesapeake Space”), and approximately 29,900 square feet of space located at 101 Saginaw Drive, Redwood City, California (the “Saginaw Space”).

We entered into the initial lease with MetLife for a portion of this space in 2004 and the lease has been amended multiple times since then to adjust space and amend the terms of the Lease. The lease amendment ("Seventh Amendment") in October 2016 waived our existing asset retirement obligation for one of our buildings and extended the lease term to January 2022. The various terms for the spaces under the lease have expiration dates that range from January 2020 through January 2022. Beginning in February 2014, we have subleased certain office and laboratory space to different subtenants with separate options to extend the subleases. These subleases will expire on November 30, 2019 and January 31, 2020.

In February 2019, we entered into the eighth amendment to the Lease ("Eighth Amendment") with MetLife to extend the lease terms for the Penobscot Space, the Building 2 Space and the Chesapeake Space for another 88 months. The lease on the Saginaw Space will expire in January 2020. The lease terms for the Penobscot Space and Building 2 Space have an expiration date of May 2027. The lease term for the 501 Chesapeake Space has an expiration date of May 2029.

We incurred $3.6 million of capital improvement costs related to the facilities leased from MetLife through December 31, 2012. During 2011 and 2012, we requested and received $3.1 million of reimbursements from the landlord for the tenant improvement and HVAC allowances for the completed construction. The reimbursements were recorded once cash was received and are amortized on a straight line basis over the term of the lease as a reduction in rent expense. The remaining lease incentive obligations were zero and $0.5 million at September 30, 2019 and December 31, 2018, respectively. Prior to adoption of ASC 842, lease incentive obligation were reflected as liabilities on the unaudited condensed consolidated balance sheets. Upon adoption of ASC 842, lease incentive obligations were cleared to zero to create our right-of-use assets related to operating lease, reflected on the unaudited condensed consolidated balance sheets. Rent expense for the Redwood City properties is recognized on a straight-line basis over the term of the lease.

We are required to restore certain areas of the Redwood City 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 $0.2 million as of September 30, 2019 and December 31, 2018, respectively, which are included in other liabilities on the unaudited condensed consolidated balance sheets. Accretion expense related to our asset retirement obligations was nominal in the three and nine months ended September 30, 2019 and 2018.

Pursuant to the terms of the amended lease agreement, 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 at a bank in the amount of $1.1 million and $0.7 million as of September 30, 2019 and December 31, 2018, respectively. These deposits are recorded as restricted cash on the unaudited condensed consolidated balance sheets.

Rent expense was $1.1 million and $3.4 million during the three and nine months ended September 30, 2019, respectively, partially offset by sublease income of $0.2 million and $0.7 million, respectively. Rent expense was $0.8 million and $2.4 million during the three and nine months ended September 30, 2018, respectively, partially offset by sublease income of $0.3 million and $0.9 million, respectively.

Finance Leases

In December 2016, we entered into a three-year financing lease agreement with a third-party supplier for the purchase of laboratory equipment that was partially financed through a finance lease of approximately $0.4 million. The lease became effective upon delivery of the equipment, which occurred in February 2017, and the term of the lease is three years from the effective date. This financing agreement was accounted for as a finance lease due to the bargain purchase option at the end of the lease.

In April 2017, we entered into a three-year financing lease agreement with a third-party supplier for the purchase of information technology equipment for approximately $0.3 million. The effective date of the lease was May 19, 2017 and the term of the lease is three years. This financing agreement was accounted for as a finance lease due to the bargain purchase option at the end of the lease.

Adoption of ASC 842

On January 1, 2019, we adopted ASC 842, using a modified retrospective approach and effective date method per adoption of ASU 2018-11. We completed the full analysis by January 2019 and we evaluated the right-of-use (ROU) assets and lease obligations using the incremental borrowing rate (IBR) at December 31, 2018 because the implicit rate is not readily determinable in the lease agreement. Upon adoption of ASC 842, all existing leases were classified as either operating leases or finance leases. All existing leases that were classified as capital leases in accordance with Topic 840 were classified as finance leases. We recorded $26.6 million of ROU assets and $27.6 million of lease obligations for operating leases, and $0.5 million of ROU assets and $0.3 million of lease obligations for finance leases in the balance sheet in the first quarter of 2019.

Practical Expedients, Elections, and Exemptions

We used a practical expedient available under ASC 842-10-65-1(f) that permits us not to reassess whether any expired or existing contracts are or contain leases; not to reassess the lease classification for any expired or existing leases (for example, all existing leases that were classified as operating leases in accordance with ASC 840 will be classified as operating leases, and all existing leases that were classified as capital leases in accordance with ASC 840 will be classified as finance leases); and not to reassess initial direct costs for any existing leases.

On January 1, 2019, we also made an accounting policy election (by class of underlying asset to which the right of use relates) to apply accounting principles to leases that meet ASC 842's definition of a short-term lease (i.e., the short-term lease exemption). We elected not to apply the recognition requirements of Topic 842 and instead we recognize the lease payments as lease cost on a straight-line basis over the lease term. A short-term lease is defined as a lease that, at the commencement date, has a lease term of 12 months or less and does not include an option to purchase the underlying asset that the lessee is reasonably certain to exercise.

The following table shows the reconciliation of right-of-use assets and lease obligations, with balances reflecting the adoption of ASC 842, related to both operating leases and finance leases and gives effect to the modified retrospective adoption and effective date method under the lease guidance on January 1, 2019 (in thousands):

	Operating leases	Finance Leases
Right-of-use assets, balance at December 31, 2018	$ —	$ —
Changes in the period:		
Right-of-use assets created upon adoption of ASC 842	26,617	493
Right-of-use assets, balance at January 1, 2019	$ 26,617	$ 493
Lease obligations, balance at December 31, 2018	$ —	$ —
Changes in the period:		
Lease obligations created upon adoption of ASC 842	27,562	302
Lease obligations, balance at January 1, 2019	$ 27,562	$ 302

Lease related expenses under non-cancellable finance and operating leases and under non-cancellable subleases as follows (in thousands except discount rate and lease term):

	Three months ended September 30, 2019	Nine months ended September 30, 2019
Lease costs		
Finance lease cost:		
Amortization of right-of-use assets	$ 54	$ 163
Interest on lease obligations	2	8
Operating lease cost	1,139	3,417
Sublease income	(262)	(727)
Total lease cost	$ 933	$ 2,861
Other information		
Weighted-average remaining lease term (in years):		
Finance leases		0.5
Operating leases		7.9
Weighted-average discount rate:		
Finance leases		5.0%
Operating leases		6.6%
Cash paid for amounts included in the measurement of lease obligations		
Operating cash flows from operating leases		$ (2,456)
Operating cash flows from finance leases		$ (9)
Financing cash flows from finance leases		$ (180)

As of September 30, 2019, under ASC 842, maturity analysis of annual undiscounted cash flows of the non-cancellable finance and operating leases are as follows (in thousands):

Years ending December 31,	Finance Leases	Operating Leases
2019 (remaining 3 months)	$ 63	$ 824
2020	61	2,816
2021	—	4,197
2022	—	4,285
2023	—	4,589
2024 and thereafter	—	18,220
Total minimum lease payments [1]	$ 124	$ 34,931
Less: imputed interest	(2)	(8,484)
Lease Obligations	$ 122	$ 26,447

[1] Minimum payments have not been reduced by future minimum sublease rentals of $0.3 million to be received under non-cancellable subleases at September 30, 2019.

As of December 31, 2018, under ASC 840, maturity analysis of annual undiscounted cash flows of the non-cancellable capital and operating leases as follows (in thousands):

Years ending December 31,	Capital Leases	Operating Leases
2019	$ 252	$ 3,280
2020	61	712
2021	—	490
2022	—	41
2023	—	—
Total minimum lease payments [1]	313	$ 4,523
Less: amount representing interest	(10)	
Present value of capital lease obligations	303	
Less: current portion	(242)	
Long-term portion of capital leases	$ 61	

[1] Minimum payments have not been reduced by future minimum sublease rentals of $0.9 million to be received under non-cancellable subleases.

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):

Other Commitment Agreement Type	Agreement Date	Future Minimum Payment
Development and manufacturing services agreements	September 2019	$ 1,645
Manufacture and supply agreement with expected future payment date of December 2022	April 2016	1,242
Service agreement for clinical trial	December 2017	80
Total other commitments		$ 2,967

Credit Facility

Effective June 30, 2017, we entered into a credit facility (the "Credit Facility") consisting of term loans ("Term Debt") totaling up to $10.0 million, and advances ("Advances") under a revolving line of credit ("Revolving Line of Credit") totaling up to $5.0 million with an accounts receivable borrowing base of 80% of eligible accounts receivable. At September 30, 2019, we have not drawn from the Credit Facility. In January 2019, we entered into a Fifth Amendment to the Credit Facility to allow for Codexis to obtain a letter of credit of up to $1.1 million to secure its obligations under the Lease with MetLife. In July 2019, we entered into a Sixth Amendment to the Credit Facility to increase permitted indebtedness to $0.7 million for financing insurance premiums in the ordinary course of business. In September 2019, we entered into a Seventh Amendment to the Credit Facility whereby the draw period on the term debt was extended to September 30, 2020. We may draw on the Term Debt at any time prior to September 30, 2020, subject to customary conditions for funding including, among others, that no event of default exists. We may draw on the Revolving Line of Credit at any time prior to the maturity date. On October 1, 2023, any loans for Term Debt mature and the Revolving Line of Credit terminates. Term Debt bears interest through maturity at a variable rate based on the London Interbank Offered Rate plus 3.60%. Advances under the Revolving Line of Credit bear interest at a variable annual rate equal to the greater of (i) 1.00% above the prime rate and (ii) 5.00%.

The Credit Facility allows for interest-only payments on Term Debt through November 1, 2020. Monthly payments of principal and interest on the Term Debt are required following the applicable amortization date. We may elect to prepay in full the Term Debt and Advances under the Revolving Line of Credit at any time.

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 restrictions which require us to comply with certain financial covenants including achieving consolidated product revenues levels at minimum levels as set forth in the Credit Facility unless we maintain certain minimum cash levels with the lender in an amount equal to or greater than six times the sum of the average six-month trailing operating cash flow net outlay plus the average monthly principal due and payable in the immediately succeeding three-month period. The Credit Facility places various restrictions on our transferring collateral, incurring additional indebtedness, engaging in mergers or acquisitions, paying dividends or making other distributions, making investments, creating liens, and selling assets and permitted assets to be held at foreign subsidiaries above specified caps, in each case subject to certain exceptions. 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 Facility and our cash. At September 30, 2019, we were in compliance with the covenants for the Credit Facility.

Legal Proceedings

We are not currently a party to any material pending litigation or other material legal 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 12. Related Party Transactions

AstraZeneca PLC

Pam P. Cheng, a member of our board of directors, joined AstraZeneca PLC as Executive Vice President, Operations and Information Technology in June 2015. We sell biocatalyst products to AstraZeneca PLC and its controlled purchasing agents and contract manufacturers.

We recognized $0.2 million and $0.6 million in revenue in the three and nine months ended September 30, 2019, respectively, compared to de minimis and $0.4 million in the three and nine months ended September 30, 2018, respectively, from transactions with AstraZeneca PLC and its controlled purchasing agents and contract manufacturers. At September 30, 2019 and December 31, 2018, we had zero and $0.2 million of accounts receivable from AstraZeneca, PLC, and its controlled purchasing agents and contract manufacturers, respectively.

Settlement of Short Swing Profit Claim

In August 2019, we recorded approximately $77 thousand related to the short swing profit settlement remitted by a shareholder of our company under Section 16(b) of the Securities Exchange Act of 1934, as amended. We recognized the proceeds as an increase to additional paid-in capital in the accompanying unaudited condensed consolidated balance sheet as of September 30, 2019 and unaudited condensed consolidated statements of stockholders' equity as well as in cash provided by financing activities in the unaudited condensed consolidated statements of cash flows for the quarter ended September 30, 2019.

Note 13. Segment, Geographical and Other Revenue Information

Segment Information

As discussed in Note 2, "Basis of Presentation and Summary of Significant Accounting Policies," beginning in 2018, we identified our biotherapeutics business as a standalone business segment. Our two reportable business segments as of January 1, 2018, consisted of Performance Enzymes and Novel Biotherapeutics.

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.

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.

Performance Enzymes

We initially commercialized our CodeEvolver® protein engineering technology platform and products in the pharmaceuticals market, and to date this continues to be our largest market served. Our customers, which include many large global pharmaceutical companies, use our technology, products and services in their manufacturing processes and process development. We have also used the technology to develop customized enzymes for use in other industrial markets. These markets consist of several large industrial verticals, including food and food ingredients, animal feed, flavors, fragrances, and agricultural chemicals. We also use our technology to develop enzymes for customers using NGS and PCR/qPCR for in vitro molecular diagnostic and molecular biology research applications.

Novel Biotherapeutics

We are also targeting new opportunities in the pharmaceutical industry to discover, improve, and/or develop biotherapeutic drug candidates. We believe that our CodeEvolver® protein engineering platform technology can be used to discover 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. Most notable is our lead program for the potential treatment of PKU in humans. PKU is an inherited metabolic disorder in which the enzyme that converts the essential amino acid phenylalanine into tyrosine is deficient. In October 2017, we announced a strategic collaboration with Nestlé Health Science to advance CDX-6114, our own novel orally administrable enzyme therapeutic candidate for the potential treatment of PKU. In July 2018, we announced that we had dosed the first subjects in a first-in-human Phase 1a dose-escalation trial with CDX-6114, which was conducted in Australia. In November 2018, we announced top-line results from the Phase 1a study in healthy volunteers with CDX-6114. In December 2018, Nestlé Health Science became obligated to pay us an additional $1.0 million within 60 days after the achievement of a milestone relating to formulation of CDX-6114. In January 2019, we received notice from the U.S. Food and Drug Administration (the “FDA”) that it had completed its review of our investigational new drug application (“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 license for the global development and commercialization of CDX-6114 for the management of PKU. The option payment of $3 million was recognized as revenue in the first quarter of 2019 as research and development fees. Upon exercising its option, Nestlé Health Science has 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 second quarter of 2019. For the three and nine months ended September 30, 2019 and 2018, all revenues related to the Novel Biotherapeutics segment were generated from our collaborations with Nestlé Health Science.

We have also developed a pipeline of other biotherapeutic drug candidates, which are in preclinical development, and in which we expect to continue to make additional investments with the aim of advancing additional product candidates targeting other therapeutic areas.

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):

	Three months ended September 30, 2019			Three months ended September 30, 2018		
	Performance Enzymes	Novel Biotherapeutics	Total	Performance Enzymes	Novel Biotherapeutics	Total
Revenues:						
Product revenue	$ 10,351	$ —	$ 10,351	$ 8,405	$ —	$ 8,405
Research and development revenue	10,073	1,482	11,555	3,720	4,821	8,541
Total revenues	20,424	1,482	21,906	12,125	4,821	16,946
Costs and operating expenses:						
Cost of product revenue	5,067	—	5,067	3,791	—	3,791
Research and development[1]	5,313	3,080	8,393	4,758	2,920	7,678
Selling, general and administrative[1]	2,037	690	2,727	1,870	165	2,035
Total segment costs and operating expenses	12,417	3,770	16,187	10,419	3,085	13,504
Income (loss) from operations	$ 8,007	$ (2,288)	$ 5,719	$ 1,706	$ 1,736	$ 3,442
Corporate costs [2]			(4,912)			(5,120)
Depreciation and amortization			(471)			(309)
Income (loss) before income taxes			$ 336			$ (1,987)

[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 and expenses.

	Nine months ended September 30, 2019			Nine months ended September 30, 2018		
	Performance Enzymes	Novel Biotherapeutics	Total	Performance Enzymes	Novel Biotherapeutics	Total
Revenues:						
Product revenue	$ 24,588	$ —	$ 24,588	$ 18,291	$ —	$ 18,291
Research and development revenue	16,512	8,708	25,220	15,728	10,507	26,235
Total revenues	41,100	8,708	49,808	34,019	10,507	44,526
Costs and operating expenses:						
Cost of product revenue	12,230	—	12,230	10,228	—	10,228
Research and development[1]	14,889	9,252	24,141	14,548	7,294	21,842
Selling, general and administrative[1]	6,499	1,768	8,267	5,695	615	6,310
Total segment costs and operating expenses	33,618	11,020	44,638	30,471	7,909	38,380
Income (loss) from operations	$ 7,482	$ (2,312)	$ 5,170	$ 3,548	$ 2,598	$ 6,146
Corporate costs[2]			(15,185)			(15,762)
Depreciation and amortization			(1,273)			(812)
Loss before income taxes			$ (11,288)			$ (10,428)

[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 and expenses.

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

	Three months ended September 30, 2019			Three months ended September 30, 2018		
	Performance Enzymes	Novel Biotherapeutics	Total	Performance Enzymes	Novel Biotherapeutics	Total
Stock-based compensation	$ 736	$ 225	$ 961	$ 354	$ 97	$ 451

	Nine months ended September 30, 2019			Nine months ended September 30, 2018		
	Performance Enzymes	Novel Biotherapeutics	Total	Performance Enzymes	Novel Biotherapeutics	Total
Stock-based compensation	$ 1,973	$ 563	$ 2,536	$ 2,005	$ 243	$ 2,248

Significant Customers

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

	Percentage of Total Revenues for the			
	Three Months Ended September 30,		Nine Months Ended September 30,	
	2019	2018	2019	2018
Customer A	21%	27%	31%	33%
Customer B	*	28%	17%	24%
Customer C	*	10%	*	17%
Customer D	29%	15%	15%	11%

Customers that each contributed 10% or more of our total accounts receivable had the following balances as of the periods presented:

	Percentage of Accounts Receivables as of	
	September 30, 2019	December 31, 2018
Customer A	20%	37%
Customer B	*	17%
Customer D	*	11%
Customer E	14%	*
Customer F	15%	*
Customer G	*	16%
Customer H	16%	*

** Less than 10% of the period presented*

Geographical Information

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

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2019	2018	2019	2018
Revenues				
Americas	$ 2,706	$ 4,315	$ 9,620	$ 13,968
EMEA	12,205	6,274	24,672	15,075
APAC	6,995	6,357	15,516	15,483
Total revenues	$ 21,906	$ 16,946	$ 49,808	$ 44,526

Identifiable long-lived assets by location and goodwill by reporting unit were as follows:

Long-lived assets:	September 30, 2019	December 31, 2018
United States	$ 31,104	$ 4,759

	As of September 30, 2019 and December 31, 2018		
	Performance Enzymes	Novel Biotherapeutics	Total
Goodwill	$ 2,463	$ 778	$ 3,241

ITEM 2. 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 the unaudited condensed consolidated financial statements and the related notes thereto included elsewhere in this Quarterly Report on Form 10-Q and the audited consolidated financial statements and notes thereto and management's discussion and analysis of financial condition and results of operations for the year ended December 31, 2018 included in our Annual Report on Form 10-K for the year ended December 31, 2018, as filed with the SEC on March 1, 2019 (the "Annual Report"). This Quarterly Report on Form 10-Q 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 set forth in Part II, Item 1A of this Quarterly Report on Form 10-Q and Part I, Item 1A of our Annual Report, as incorporated herein and referenced in Part II, Item 1A of this Quarterly Report on Form 10-Q and elsewhere in this report. The forward-looking statements in this Quarterly Report on Form 10-Q represent our views as of the date of this Quarterly Report on Form 10-Q. 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 Quarterly Report on Form 10-Q.

Business Overview

We discover, develop and sell proteins that deliver value to our clients in a growing set of industries. We view proteins as a vast untapped source of value-creating materials, and we are using our proven technologies, which we have been continuously improving since our inception in 2002, to commercialize an increasing number of novel proteins, both as proprietary Codexis products and in partnership with our customers.

We are a pioneer in the harnessing of computational technologies to drive biology advancements. Since 2002, we have made substantial investments in the development of our CodeEvolver® protein engineering technology platform, the primary source of our competitive advantage. Our technology platform is powered by proprietary, artificial intelligence-based, computational algorithms that rapidly mine our large and continuously growing library of protein variants' performance attributes. These computational outputs enable increasingly reliable predictions for next generation protein variants to be engineered, enabling delivery of targeted performance enhancements in a time-efficient manner. In addition to its computational prowess, our CodeEvolver® protein engineering technology platform integrates additional modular competencies, including robotic high-throughput screening and genomic sequencing, organic chemistry and process development which are all coordinated to create our novel protein innovations.

Our approach to developing commercially viable biocatalytic manufacturing processes begins by conceptually designing the most cost-effective and practical process for a targeted product. We then develop optimized protein catalysts to enable that process design using our CodeEvolver® protein engineering platform technology. Engineered protein catalyst candidates - many thousands for each protein engineering project - are then rapidly screened and validated in high throughput screening under relevant manufacturing operating conditions. This approach results in an optimized protein catalyst enabling cost-efficient processes that typically are relatively simple to run in conventional manufacturing equipment. This also allows for the efficient technical transfer of our process to our manufacturing partners.

The successful embodiment of our CodeEvolver® protein engineering technology platform in commercial manufacturing processes requires well-integrated expertise in a number of technical disciplines. In addition to those directly involved in practicing our CodeEvolver® protein engineering platform technology, such as molecular biology, enzymology, microbiology, cellular engineering, metabolic engineering, bioinformatics, biochemistry and high throughput analytical chemistry, our process development projects also involve integrated expertise in organic chemistry, chemical process development, chemical engineering, fermentation process development and fermentation engineering. Our integrated, multi-disciplinary approach to biocatalyst and process development is a critical success factor for our company.

We initially commercialized our CodeEvolver® protein engineering technology platform and products in the pharmaceuticals market, which remains our primary business focus. Our customers, which include several large global

pharmaceutical companies, use our technology, products and services in their manufacturing processes and process development.

We have also used the technology to develop protein catalysts for use in the fine chemicals market. The fine chemicals market consists of several large market verticals, including food and food ingredients, animal feed, flavors, fragrances and agricultural chemicals.

We have also begun using the CodeEvolver® protein engineering technology platform to develop early stage, novel biotherapeutic product candidates, both for our customers and for our own business, most notably our lead program for the potential treatment of phenylketonuria ("PKU") in humans. PKU is an inherited metabolic disorder in which the enzyme that converts the essential amino acid phenylalanine into tyrosine is deficient. In October 2017, we entered into a Global Development, Option and License Agreement (the "Nestlé Agreement") with Nestec Ltd. ("Nestlé Health Science"), to advance CDX-6114, our enzyme biotherapeutic product candidate for the potential treatment of PKU. In February 2019, Nestlé Health Science exercised its option to obtain an exclusive license to develop and commercialize CDX-6114.

In April 2018, we entered into a strategic agreement (the "Porton Agreement") with Porton Pharma Solutions, Ltd. ("Porton") to license key elements of our CodeEvolver® protein engineering technology platform to Porton's global custom intermediate and active pharmaceutical ingredients ("API") development and manufacturing business. This gives us access to a wide variety of small and medium-sized pharmaceutical customers.

We are also using our technology to develop enzymes for customers using next generation sequencing ("NGS") and polymerase chain reaction ("PCR/qPCR") for in vitro molecular diagnostic and genomic research applications. Our first enzyme for this application is a DNA ligase which we began marketing to customers in 2018.

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

Business Segments

We manage our business as two business segments: Performance Enzymes and Novel Biotherapeutics.

Performance Enzymes

We initially commercialized our CodeEvolver® protein engineering technology platform and products in the pharmaceuticals market, and to date this continues to be our largest market served. Our customers, which include many large global pharmaceutical companies, use our technology, products and services in their manufacturing processes and process development. We have also used the technology to develop customized enzymes for use in other industrial markets. These markets consist of several large industrial verticals, including food and food ingredients, animal feed, flavors, fragrances, and agricultural chemicals. We also use our technology to develop enzymes for customers using NGS and PCR/qPCR for in vitro molecular diagnostic and molecular biology research applications.

Novel Biotherapeutics

We are also targeting new opportunities in the pharmaceutical industry to discover, improve, and/or develop biotherapeutic drug candidates. We believe that our CodeEvolver® protein engineering platform technology can be used to discover 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. Most notable is our lead program for the potential treatment of PKU in humans. PKU is an inherited metabolic disorder in which the enzyme that converts the essential amino acid phenylalanine into tyrosine is deficient. In October 2017, we announced a strategic collaboration with Nestlé Health Science to advance CDX-6114, our own novel orally administrable enzyme therapeutic candidate for the potential treatment of PKU. In July 2018, we announced that we had dosed the first subjects in a first-in-human Phase 1a dose-escalation trial with CDX-6114, which was conducted in Australia. In November 2018, we announced top-line results from the Phase 1a study in healthy volunteers with CDX-6114. In December 2018, Nestlé Health Science became obligated to pay us an additional $1.0 million within 60 days after the achievement of a milestone relating to formulation of CDX-6114. In January 2019, we received notice from the U.S. Food and Drug Administration (the "FDA") that it had completed its review of our investigational new drug application ("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. As a result of the option exercise, we earned a milestone and recognized $3.0 million in revenues in the first quarter of 2019. Upon exercising its option, Nestlé Health Science has 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 third quarter of 2019.

We have also developed a pipeline of other biotherapeutic drug candidates, which are in preclinical development, and in which we expect to continue to make additional investments with the aim of advancing additional product candidates targeting other therapeutic areas.

For further description of our business segments, see Note 13, "Segment, Geographical and Other Revenue Information," in the Notes to Unaudited Condensed Consolidated Financial Statements included in this Quarterly Report on Form 10-Q.

Recent Financing Activities

In June 2019, we entered into a Securities Purchase Agreement with an affiliate of Casdin Capital, LLC (“Casdin”) pursuant to which we issued and sold to Casdin 3,048,780 shares of our common stock at a purchase price of$16.40 per share (the “Private Offering”). After deducting issuance costs of$0.1 million from the Private Offering, our net proceeds were $49.9 million. See Note 10, "Capital Stock" to our unaudited condensed consolidated financial statements for further details.

Results of Operations Overview

Revenues increased to $21.9 million for the third quarter of 2019 from $16.9 million in the third quarter of 2018, due to increases in both research and development revenue and product revenue. Product revenue for the third quarter of 2019 increased by $1.9 million to $10.4 million from $8.4 million in the third quarter of 2018 primarily due to higher customer demand for enzymes for both branded and generic products.

Research and development revenue increased by $3.0 million for the third quarter of 2019 to $11.6 million from $8.5 million in the third quarter of 2018, primarily due to revenues from Novartis Pharma AG under the Novartis CodeEvolver® Agreement and a milestone payment from GSK under the GSK CodeEvolver® Agreement partially offset by less revenue due to the prior year completion of services to Tate & Lyle and lower development fees from Nestlé Health Science.

Product gross margins were 51% for the third quarter of 2019, compared to 55% in the same period in 2018, due to less favorable product mix. Our profit margins are affected by many factors including the costs of internal and third-party fixed and variable costs, including materials and supplies, labor, facilities and other overhead costs. Profit margin data are used as a management performance measure to provide additional information regarding our results of operations on a consolidated basis.

Research and development expense increased by $0.8 million, or 10%, to $8.7 million for the third quarter of 2019, compared to the third quarter of 2018, primarily due to an increase in costs associated with higher headcount, higher allocable expenses and increases in lab supplies, which were partially offset by lower outside services.

Selling, general and administrative expense increased by $0.5 million, or 7%, to $7.9 million for the third quarter of 2019, compared to the third quarter of 2018, primarily due to an increase in costs associated with facilities and headcount, which were partially offset by lower outside services and allocable expenses.

Net income for the third quarter of 2019 was $0.3 million, representing a net income of $0.01 per basic and diluted share. This compares to a net loss of $2.0 million, representing a net loss of $0.04 per basic and diluted share for the third quarter of 2018. The increase in net income for the third quarter of 2019 over the same period of the prior year is primarily related to higher research and development services and product revenue partially offset by higher operating expenses.

Cash and cash equivalents increased by $39.1 million to $92.1 million as of September 30, 2019 compared to $53.0 million as of December 31, 2018. Net cash used in operating activities decreased to $8.9 million in the nine months ended September 30, 2019 compared to $13.4 million in the nine months ended September 30, 2018. We believe that based on our current level of operations, our existing cash, and cash equivalents will provide adequate funds for ongoing operations, planned capital expenditures and working capital requirements for at least the next 12 months.

In June 2017, we entered into a loan and security agreement that allows us to borrow up to $10.0 million under a term loan, and up to $5.0 million under a revolving credit facility with 80% of certain eligible accounts receivable as a borrowing base (the "Credit Facility"). Obligations under the Credit Facility are secured by a lien on substantially all of our personal property other than our intellectual property. In January 2019, we entered into a Fifth Amendment to the Credit Facility to allow for Codexis to obtain a letter of credit of up to $1.1 million to secure its obligations under the Lease with MetLife. In July 2019, we entered into a Sixth Amendment to the Credit Facility to increase permitted indebtedness to $0.7 million for financing insurance premiums in the ordinary course of business. In September 2019, we entered into a Seventh Amendment to the Credit Facility whereby the draw period on the term debt was extended to September 30, 2020. We may draw on the Term Debt at any time prior to September 30, 2020, subject to customary conditions for funding including, among others, that no event of default exists. As of September 30, 2019, no amounts were borrowed under the Credit Facility and we were in compliance with the covenants for the Credit Facility. See Note 11, "Commitments and Contingencies," in the Notes to Unaudited Condensed Consolidated Financial Statements included in this Quarterly Report on Form 10-Q.

Below is an overview of our results of operations by business segments:

Performance Enzymes

Revenues increased by $8.3 million, or 68%, to $20.4 million for the three months ended September 30, 2019, compared to the third quarter of 2018, primarily due to revenues fees from Novartis Pharma AG under the Novartis CodeEvolver® Agreement and a milestone payment from GSK under the GSK CodeEvolver® Agreement and an increase in product revenue with higher customer demand for enzymes for both generic and branded products.

Product gross margins were 51% in the three months ended September 30, 2019, compared to 55% in the corresponding period in 2018 due to less favorable product mix.

Research and development expense increased by $0.6 million, or 12%, to $5.3 million for the third quarter of 2019, compared to the third quarter of 2018, primarily due to an increase in costs associated with higher headcount, higher allocable expenses and increases in lab supplies.

Selling, general and administrative expense increased by $0.2 million, or 9% to $2.0 million for the third quarter of 2019, compared to the third quarter of 2018, primarily due to an increase in costs associated with facilities and headcount, which were partially offset by lower outside services and allocable expenses.

Novel Biotherapeutics

Revenues decreased by $3.3 million, or 69%, to $1.5 million for the three months ended September 30, 2019, compared to the third quarter of 2018 primarily due to a decrease in CDX-6114 development service revenues.

Research and development expense increased by $0.2 million, or 5%, to $3.1 million for the third quarter of 2019, compared to the third quarter of 2018, primarily due to an increase in costs associated with higher headcount and lab supplies.

Selling, general and administrative expense increased by $0.5 million, or 318%, to $0.7 million for the third quarter of 2019, compared to the third quarter of 2018, primarily due to an increase in costs associated with headcount, facilities and stock-based compensation.

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 GlaxoSmithKline ("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 received an upfront fee upon the execution of the agreement in July 2014 and milestone payments in each of the years from 2014 through April 2016. 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. We have the potential to receive additional cumulative 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® protein engineering platform technology.

In September 2019, we received notification from GSK that a milestone relating to the advancement of an enzyme developed by GSK using our CodeEvolver® protein engineering platform technology has been achieved, triggering a $2.0 million milestone payment to Codexis from GSK. We recognized revenue of $2.0 million for the milestone payment for the three and nine months ended September 30, 2019, respectively, compared to zero for thethree and nine months ended September 30, 2018, respectively, as research and development revenue.

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.

We received an upfront license fee upon execution of the Merck CodeEvolver® Agreement, and milestone payments in September 2015 and in September 2016, when we completed the transfer of the engineering platform technology. Additionally, we recognized research and development revenues of $1.0 million and $3.0 million for the three and nine months ended September 30, 2019, respectively, compared to $1.1 million and $3.0 million for the three and nine months ended September 30, 2018, 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. These potential API payments are based on the quantity of API developed and manufactured by Merck and will be recognized as usage-based royalties. We recognized zero usage-based royalties in both the three and nine months ended September 30, 2019.

In January 2019, we entered into an amendment to the Merck CodeEvolver® Agreement whereby we installed certain CodeEvolver® protein engineering technology upgrades into Merck’s platform license. Pursuant to the agreement, we will

maintain those upgrades for a multi-year term. We recognized research and development revenues of $0.1 million and $1.0 million for the three and nine months ended September 30, 2019, respectively, under the amendment.

Global Development, Option and License Agreement and Strategic Collaboration Agreement

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

We received an upfront cash payment of $14.0 million upon the execution of the Nestlé Agreement, a $4.0 million milestone payment after dosing the first subjects in a first-in-human Phase 1a dose-escalation trial with CDX-6114, and a $1.0 million milestone payment upon achievement of a milestone relating to formulation of CDX-6114. The $4.0 million milestone payment that was triggered by the initiation of the trial was received in September 2018 and the $1.0 million milestone payment that was triggered by the achievement of a formulation relating to CDX-6114 was received in February 2019. The upfront payment and the variable consideration relating to the progress payment of $4.0 million and milestone payment of $1.0 million are being recognized over time as the development work is being performed. Revenue is being recognized using a single measure of progress that depicts our performance in transferring control of the services, which is based on the ratio of level of effort incurred to date compared to the total estimated level of effort required to complete all performance obligations under the agreement. We recognized development fees of $0.1 million and $1.8 million for the three and nine months ended September 30, 2019, respectively, compared to $3.7 million and $8.1 million for the three and nine months ended September 30, 2018, respectively, as research and development revenue. We had deferred revenue related to the development fees attributed to the milestone payment and upfront fees of $50 thousand at September 30, 2019 and $1.9 million at December 31, 2018.

In January 2019, we received notice from the 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. The option payment of $3.0 million was recognized in the first quarter of 2019 as research and development fees. Upon exercising its option, Nestlé Health Science has 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 second quarter of 2019. Other potential payments from Nestlé Health Science to us under the Nestlé Agreement 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 middle single digits to low double-digits, of net sales of product.

In addition to the Nestlé Agreement, we and Nestlé Health Science concurrently entered into a Strategic Collaboration Agreement (the "Strategic Collaboration Agreement") pursuant to which we and Nestlé Health Science will collaborate 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. Under the Strategic Collaboration Agreement, we received an upfront payment of $1.2 million in 2017 and an incremental $0.6 million payment in September 2018 for additional services. We recognized research and development fees of $1.4 million and $3.9 million for the three and nine months ended September 30, 2019, respectively, compared to $1.2 million and $2.4 million for the three and nine months ended September 30, 2018, respectively. We had deferred revenue of $25 thousand and $0.8 million at September 30, 2019 and December 31, 2018, respectively.

Strategic Collaboration Agreement

In April 2018, we entered into the Porton Agreement with Porton to license key elements of Codexis' 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 an initial collaboration fee of $0.5 million within 30 days of the effective date and $1.5 million upon the first anniversary of the effective date of the agreement. We completed the technical transfer in the fourth quarter of 2018. Revenue relating to the functional license provided to Porton was recognized at a point in time when control of the license transferred to the customer.

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 Pharma AG ("Novartis"). The Agreement allows Novartis to use Codexis' proprietary

CodeEvolver® protein engineering platform technology in the field of human healthcare. Under the Novartis CodeEvolver® Agreement, we will transfer Codexis' proprietary CodeEvolver® protein engineering platform technology to Novartis over approximately 20 months starting with the date on which we commence the technology transfer (the "Technology Transfer Period"). As a part of this technology transfer, our company will provide to Novartis Codexis' proprietary enzymes, proprietary protein engineering protocols and methods, and proprietary software algorithms. In addition, teams of Codexis and Novartis scientists will participate in technology training sessions and collaborative research projects at Codexis' laboratories in Redwood City, California and at a designated Novartis laboratory in Basel, Switzerland. Upon completion of technology transfer, Novartis will have the CodeEvolver® protein engineering platform technology installed at its designated laboratory.

Pursuant to the agreement, we received an upfront payment of $5 million shortly after the effective date of the Novartis CodeEvolver® Agreement. We are entitled to receive an additional $4 million subject to satisfactory completion of the second technology transfer milestone and an additional $5 million upon satisfactory completion of the third technology transfer milestone. In consideration for the continued disclosure and license of improvements to the Codexis technology and materials during a multi-year period that begins on the conclusion of the Technology Transfer Period ("Improvements Term"), Novartis will pay Codexis annual payments which amount to an additional $8 million. Codexis 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 begins 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 usage payments will be based on the total volume of API produced using the CodeEvolver®-developed enzyme. These usage payments can begin in the clinical stage and will extend throughout the commercial life of each API. Revenue for the combined initial license and technology transfer, which is expected to occur over twenty months, is being recognized using a single measure of progress that depicts our performance in transferring control of the services, which is based on the ratio of level of effort incurred to date compared to the total estimated level of effort required to complete the performance obligation relating to the combined initial license and technology transfer. Revenue allocated to future improvements will be recognized during the Improvement Term. We recognized $3.8 million in revenue for the three and nine months ended September 30, 2019 from the Novartis CodeEvolver® Agreement. As of September 30, 2019, we had deferred revenue of $1.2 million from the Novartis CodeEvolver® Agreement.

Results of Operations

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

	Three months ended September 30,		Change		Nine months ended September 30,		Change	
	2019	2018	$	%	2019	2018	$	%
Revenues:								
Product revenue	$ 10,351	$ 8,405	$ 1,946	23%	$ 24,588	$ 18,291	$ 6,297	34 %
Research and development revenue	11,555	8,541	3,014	35%	25,220	26,235	(1,015)	(4)%
Total revenues	21,906	16,946	4,960	29%	49,808	44,526	5,282	12 %
Costs and operating expenses:								
Cost of product revenue	5,067	3,791	1,276	34%	12,230	10,228	2,002	20 %
Research and development	8,711	7,917	794	10%	25,000	22,464	2,536	11 %
Selling, general and administrative	7,869	7,344	525	7%	24,180	22,485	1,695	8 %
Total costs and operating expenses	21,647	19,052	2,595	14%	61,410	55,177	6,233	11 %
Income (loss) from operations	259	(2,106)	2,365	112%	(11,602)	(10,651)	(951)	(9)%
Interest income	480	199	281	141%	929	444	485	109 %
Other expenses, net	(403)	(80)	323	404%	(615)	(221)	394	178 %
Income (loss) before income taxes	336	(1,987)	2,323	117%	(11,288)	(10,428)	(860)	(8)%
Provision for (benefit from) income taxes	(7)	1	(8)	(800)%	12	(11)	23	209 %
Net Income (loss)	$ 343	$ (1,988)	$ 2,331	117%	$ (11,300)	$ (10,417)	$ (883)	(8)%

Revenues

Our revenues are comprised of product revenue and research and development revenue as follows:

- Product revenue consists of sales of protein catalysts, pharmaceutical intermediates, and Codex® Biocatalyst Panels and Kits.
- Research and development revenue includes license, technology access and exclusivity fees, research services fees, milestone payments, royalties, optimization and screening fees.

The following table shows the amounts of our product revenue and research and development revenue from our unaudited condensed consolidated statements of operations for the periods presented (in thousands):

	Three months ended September 30,		Change		Nine months ended September 30,		Change	
(In Thousands)	2019	2018	$	%	2019	2018	$	%
Product revenue	$ 10,351	$ 8,405	$ 1,946	23%	$ 24,588	$ 18,291	$ 6,297	34 %
Research and development revenue	11,555	8,541	3,014	35%	25,220	26,235	(1,015)	(4)%
Total revenues	$ 21,906	$ 16,946	$ 4,960	29%	$ 49,808	$ 44,526	$ 5,282	12%

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 approximately 14 months from the date on which the order is placed. However, a majority of the 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.

Total revenues increased by $5.0 million in the three months ended September 30, 2019 compared to the same period in 2018, primarily due to increases in both research and development revenue and product revenue. Total revenues increased by $5.3 million in the nine months ended September 30, 2019 compared to the same period in 2018, primarily due to an increase in product revenue offset by a decrease in research and development revenue.

Product revenue increased by $1.9 million and $6.3 million in the three and nine months ended September 30, 2019, respectively, compared to the same periods in 2018, primarily due to higher customer demand for enzymes for both branded and generic products.

Research and development revenue increased by $3.0 million in the three months ended September 30, 2019, compared to the same period in 2018, primarily due to recognition of revenue from Novartis Pharma AG under the Novartis CodeEvolver® Agreement and a milestone payment from GSK under the GSK CodeEvolver® Agreement partially offset by less revenue due to the prior year completion of services to Tate & Lyle and lower development fees from Nestlé Health Science.

Research and development revenue decreased by $1.0 million in the nine months ended September 30, 2019 compared to the same period in 2018 primarily due to lower development revenue from Tate & Lyle resulting from the prior year completion of the development work for their sweetener product and lower development fees from Nestlé Health Science due to the completion of development services for CDX-6114 in the current year. The recognition of revenue from the GSK milestone payment and development fees from Novartis Pharma AG partially offset the decrease in research and development revenue.

Cost and Operating Expenses

Our cost and operating expenses are comprised of cost of product revenue, research and development expense, and selling, general and administrative expense. The following table shows the amounts of our cost of product revenue, research and development expense, and selling, general and administrative expense from our unaudited condensed consolidated statements of operations for the periods presented (in thousands):

	Three months ended September 30,		Change		Nine months ended September 30,		Change	
(In Thousands)	**2019**	**2018**	**$**	**%**	**2019**	**2018**	**$**	**%**
Cost of product revenue	$ 5,067	$ 3,791	$ 1,276	34%	$ 12,230	$ 10,228	$ 2,002	20%
Research and development	8,711	7,917	794	10%	25,000	22,464	2,536	11%
Selling, general and administrative	7,869	7,344	525	7%	24,180	22,485	1,695	8%
Total costs and operating expenses	$ 21,647	$ 19,052	$ 2,595	14%	$ 61,410	$ 55,177	$ 6,233	11%

Cost of Product Revenue and Product Gross Margin

Our revenues from product revenue are derived entirely from our Performance Enzymes segment. Revenues from the Novel Biotherapeutics segment are from collaborative research and development activities and not from product revenue.

The following table shows the amounts of our product revenue, cost of product revenue, product gross profit and product gross margin from our unaudited condensed consolidated statements of operations for the periods presented (in thousands):

	Three months ended September 30,		Change		Nine months ended September 30,		Change	
(In Thousands)	**2019**	**2018**	**$**	**%**	**2019**	**2018**	**$**	**%**
Product revenue	$ 10,351	$ 8,405	$ 1,946	23%	$ 24,588	$ 18,291	$ 6,297	34%
Cost of product revenue	5,067	3,791	1,276	34%	12,230	10,228	2,002	20%
Product gross profit	$ 5,284	$ 4,614	$ 670	15%	$ 12,358	$ 8,063	$ 4,295	53%
Product gross margin (%)	51%	55%			50%	44%		

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.

Product gross margins were 51% and 50% in the three and nine months ended September 30, 2019, respectively, compared to 55% and 44% in the corresponding periods in 2018 due to variations in product mix.

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, and depreciation of facilities and laboratory equipment, and (iii) external costs. Research and development expenses are expensed when incurred.

Research and development expenses increased by $0.8 million, or 10%, during the three months ended September 30, 2019 and increased by $2.5 million, or 11%, during the nine months ended September 30, 2019, compared to the same period in 2018, primarily due to an increase in costs associated with higher headcount, higher allocable expenses and increases in lab supplies, which were partially offset by lower outside services and stock compensation expense.

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 costs), marketing costs, building lease costs, and depreciation and amortization expense.

Selling, general and administrative expenses increased by $0.5 million, or 7%, during the three months ended September 30, 2019 and $1.7 million, or 8%, during the nine months ended September 30, 2019, compared to the same period in 2018, primarily due to an increase in costs associated with headcount and higher facility expense, which were partially offset by lower outside services, allocable expenses, and stock compensation expense.

Interest Income and Other Expense

	Three months ended September 30,		Change		Nine months ended September 30,		Change	
(In Thousands)	**2019**	**2018**	**$**	**%**	**2019**	**2018**	**$**	**%**
Interest income	$ 480	$ 199	$ 281	141%	$ 929	$ 444	$ 485	109%
Other expense, net	(403)	(80)	323	404%	(615)	(221)	394	178%
Total other income	$ 77	$ 119	$ (42)	(35)%	$ 314	$ 223	$ 91	41%

Interest Income

Interest income increased by $0.3 million and $0.5 million for the three and nine months ended September 30, 2019, respectively, compared to the same periods in 2018 primarily due to higher interest rates on higher levels of cash and cash equivalents.

Other Expense

Other expense increased by $0.3 million and $0.4 million for the three and nine months ended September 30, 2019, respectively, compared to the same periods in 2018, primarily due to $0.4 million write-down of our investment in CO_2 Solutions partially offset by gains from fluctuations in foreign currency.

Provision for and Benefit from Income Taxes

We recognized an income tax benefit of $7 thousand and income tax provision of $12 thousand for the three and nine months ended September 30, 2019, respectively. We recognized an income tax provision of $1 thousand and income tax benefit of $11 thousand for the three and nine months ended September 30, 2018, respectively. The decrease in income tax expense was due to a decrease in income from our foreign operations. We continue to maintain a full valuation allowance against our net deferred tax assets as we believe that it is more likely than not that the majority of our deferred tax assets will not be realized.

Net Income (loss)

Net income for the third quarter of 2019 was $0.3 million, representing a net income of $0.01 per basic and diluted share. This compares to a net loss of $2.0 million, representing a net loss of $0.04 per basic and diluted share for the third quarter of 2018. The increase in net income for the three months ended September 30, 2019 compared to the same period of the prior year is primarily related to higher research and development services and product revenue, which were partially offset by higher operating expenses.

For the nine months ended September 30, 2019, net loss was $11.3 million, representing a net loss of $0.20 per basic and diluted share. This compares to a net loss of $10.4 million, representing a net loss of $0.20 per basic and diluted share for the nine months ended September 30, 2018. The increase in net loss for the nine months ended September 30, 2019 compared to the same period of the prior year is primarily related to higher operating expenses and the absence of research and development services for the project for Tate & Lyle which was completed in the prior year.

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

Revenue by segment

	Three months ended September 30,						Change			
	2019			2018			Performance Enzymes		Novel Biotherapeutics	
	Performance Enzymes	Novel Biotherapeutics	Total	Performance Enzymes	Novel Biotherapeutics	Total	$	%	$	%
Revenues:										
Product revenue	$ 10,351	$ —	$ 10,351	$ 8,405	$ —	$ 8,405	$ 1,946	23%	$ —	— %
Research and development revenue	10,073	1,482	11,555	3,720	4,821	8,541	6,353	171%	(3,339)	(69)%
Total revenues	$ 20,424	$ 1,482	$ 21,906	$ 12,125	$ 4,821	$ 16,946	$ 8,299	68%	$ (3,339)	(69)%

	Nine Months Ended September 30,						Change			
	2019			2018			Performance Enzymes		Novel Biotherapeutics	
	Performance Enzymes	Novel Biotherapeutics	Total	Performance Enzymes	Novel Biotherapeutics	Total	$	%	$	%
Revenues:										
Product revenue	$ 24,588	$ —	$ 24,588	$ 18,291	$ —	$ 18,291	$ 6,297	34%	$ —	— %
Research and development revenue	16,512	8,708	25,220	15,728	10,507	26,235	784	5%	(1,799)	(17)%
Total revenues	$ 41,100	$ 8,708	$ 49,808	$ 34,019	$ 10,507	$ 44,526	$ 7,081	21%	$ (1,799)	(17)%

Revenues from the Performance Enzymes segment increased by $8.3 million, or 68%, to $20.4 million for the three months ended September 30, 2019, compared to $12.1 million for the three months ended September 30, 2018. Revenues from the Performance Enzymes segment increased by $7.1 million, or 21%, to $41.1 million for the nine months ended September 30, 2019, compared to $34.0 million for the nine months ended September 30, 2018. The increase in revenue is primarily due to $3.8 million of revenues from Novartis Pharma AG under the Novartis CodeEvolver® Agreement, $2.0 million of milestone payment from GSK under the GSK CodeEvolver® Agreement and an increase in product revenue with higher customer demand

for enzymes for both generic and branded products partially offset by the absence of revenue from Tate & Lyle from the prior year period.

Revenues from the Novel Biotherapeutics segment decreased by $3.3 million, or 69%, to $1.5 million for the three months ended September 30, 2019, compared to $4.8 million for the three months ended September 30, 2018. Revenues from the Novel Biotherapeutics segment of $8.7 million decreased by $1.8 million, or 17% for the nine months ended September 30, 2019, compared to $10.5 million for the nine months ended September 30, 2018. The decrease in revenue is primarily due to a decrease in revenue recognition of a functional license granted to Nestlé Health Science for CDX-6114 for the treatment of PKU. Revenues from the Novel Biotherapeutics segment are derived from research and development revenue relating to the development of our CDX-6114 product candidate in collaboration with Nestlé Health Science, as set forth in the Nestlé Agreement.

Cost and Operating Expenses by Segment

	Three months ended September 30,						Change			
	2019			2018			Performance Enzymes		Novel Biotherapeutics	
	Performance Enzymes	Novel Biotherapeutics	Total	Performance Enzymes	Novel Biotherapeutics	Total	$	%	$	%
Cost of product revenue	$ 5,067	$ —	$ 5,067	$ 3,791	$ —	$ 3,791	$ 1,276	34%	$ —	—%
Research and development[1]	5,313	3,080	8,393	4,758	2,920	7,678	555	12%	160	5%
Selling, general and administrative[1]	2,037	690	2,727	1,870	165	2,035	167	9%	525	318%
Total segment costs and operating expenses	$ 12,417	$ 3,770	16,187	$ 10,419	$ 3,085	13,504	$ 1,998	19%	$ 685	22%
Corporate costs			4,989			5,239				
Depreciation and amortization			471			309				
Total costs and operating expenses			$ 21,647			$ 19,052				

[1] Research and development expenses and Selling, general and administrative expenses exclude depreciation and amortization of finance leases.

	Nine months ended September 30,						Change			
	2019			2018			Performance Enzymes		Novel Biotherapeutics	
	Performance Enzymes	Novel Biotherapeutics	Total	Performance Enzymes	Novel Biotherapeutics	Total	$	%	$	%
Cost of product revenue	$ 12,230	$ —	$ 12,230	$ 10,228	$ —	$ 10,228	$ 2,002	20%	$ —	—%
Research and development[1]	14,889	9,252	24,141	14,548	7,294	21,842	341	2%	1,958	27%
Selling, general and administrative[1]	6,499	1,768	8,267	5,695	615	6,310	804	14%	1,153	187%
Total segment costs and operating expenses	$ 33,618	$ 11,020	44,638	$ 30,471	$ 7,909	38,380	$ 3,147	10%	$ 3,111	39%
Corporate costs			15,499			15,985				
Depreciation and amortization			1,273			812				
Total costs and operating expenses			$ 61,410			$ 55,177				

[1] Research and development expenses and Selling, general and administrative expenses exclude depreciation and amortization of finance leases.

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

Research and development expense in the Performance Enzymes segment increased by $0.6 million, or 12%, to $5.3 million in the third quarter of 2019, compared to the third quarter of 2018. Research and development expense in the Performance Enzymes segment increased by $0.3 million, or 2%, to $14.9 million in the nine months ended September 30, 2019, compared to the corresponding period in 2018. The increase was primarily due to an increase in costs associated with higher headcount, higher allocable expenses and increases in lab supplies.

Selling, general and administrative expense in the Performance Enzymes segment increased by $0.2 million, or 9%, to $2.0 million in the third quarter of 2019, compared to the third quarter of 2018. Selling, general and administrative expense in the Performance Enzymes segment increased by $0.8 million, or 14%, to $6.5 million in the nine months ended September 30, 2019, compared to the corresponding period in 2018. The increase was primarily due to an increase in costs associated with facilities and headcount, which were partially offset by lower outside services and allocable expenses.

Research and development expense in the Novel Biotherapeutics segment increased by $0.2 million, or 5%, to $3.1 million in the third quarter of 2019, compared to the third quarter of 2018. Research and development expense in the Novel Biotherapeutics segment increased by $2.0 million, or 27%, to $9.3 million in the nine months ended September 30, 2019, compared to the corresponding period in 2018. The increase was primarily due to an increase in costs associated with higher headcount.

Selling, general and administrative expense in the Novel Biotherapeutics segment increased by $0.5 million, or 318%, to $0.7 million in the third quarter of 2019, compared to the third quarter of 2018. Selling, general and administrative expense in the Novel Biotherapeutics segment increased by $1.2 million, or 187%, to $1.8 million in the nine months ended September 30, 2019, compared to the corresponding period in 2018. The increase was primarily due to an increase in costs associated with headcount, facilities and stock-based compensation.

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

offerings of our common stock. We also have the ability to borrow up to $15.0 million under our Credit Facility. We actively manage our cash usage and investment of liquid cash to ensure the maintenance of sufficient funds to meet our working capital needs. The majority of our cash and cash equivalents are held in U.S. banks, and our foreign subsidiaries maintain a limited amount of cash in their local banks to cover their short-term operating expenses.

The following tables summarize our cash and cash equivalents and working capital as of September 30, 2019 and December 31, 2018, as well as our statements of cash flows for the nine months ended September 30, 2019 and 2018:

(In Thousands)	September 30, 2019	December 31, 2018
Cash and cash equivalents	$ 92,143	$ 53,039
Working capital	$ 95,007	$ 50,085

	Nine months ended September 30,	
(In Thousands)	2019	2018
Net cash used in operating activities	$ (8,899)	$ (13,374)
Net cash used in investing activities	(3,251)	(2,073)
Net cash provided by financing activities	51,539	38,318
Net increase in cash, cash equivalents and restricted cash	$ 39,389	$ 22,871

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 collaborations with new customers. Our cash flows from operations will continue to be affected principally by sales and gross margins from licensing our technology to major pharmaceutical companies, product revenue 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 licensing our technology to major pharmaceutical companies, and our customers for purchases of products and/or collaborative research and development services. Our largest uses of cash from operating activities are for employee-related expenditures, rent payments, inventory purchases to support our product revenue and non-payroll research and development costs.

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. 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 and commercial activities and is uncertain at this time.

We are actively collaborating with new and existing customers in the pharmaceutical and food industries. 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.

As of September 30, 2019, we had cash and cash equivalents of $92.1 million and $15.0 million available to borrow under the Credit Facility. Our liquidity is dependent upon our cash and cash equivalents, cash flows provided by operating activities and the continued availability of borrowings under the Credit Facility. In addition, in June 2019, we sold 3,048,780 shares of common stock at a price per share of $16.40 in the private placement resulting in net proceeds of approximately $49.9 million after deducting related issuance costs. See Part II, Item 2, "Unregistered Sales of Equity Securities and Use of Proceeds" for additional information.

We believe that based on our current level of operations, our existing cash and cash equivalents will provide adequate funds for ongoing operations, planned capital expenditures and working capital requirements for at least the next 12 months.

However, 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 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 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 even if we believe we have sufficient funds for our current or future operating plans. If future financings involve the issuance of equity securities, our

existing stockholders would suffer dilution. If we raise debt financing or enter into additional 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 from Operating Activities

Cash used in operating activities was $8.9 million net for the nine months ended September 30, 2019, which resulted from a net loss of $11.3 million for the nine months ended September 30, 2019 adjusted for non-cash charges for depreciation of $1.1 million, ROU lease asset amortization expense of $2.2 million and stock-based compensation of $5.8 million. Additional cash used by changes in operating assets and liabilities was $6.7 million. Changes in operating assets and liabilities included a decrease of $5.0 million in deferred revenue, a decrease of $1.3 million of accounts payable, and an increase of $1.2 million of contract assets.

Cash used in operating activities was $13.4 million net for the nine months ended September 30, 2018, which resulted from a net loss of $10.4 million for the nine months ended September 30, 2018 adjusted for non-cash charges for depreciation of $0.8 million and stock-based compensation of $6.2 million. Additional cash used by changes in operating assets and liabilities was $10.0 million. Changes in operating assets and liabilities included a decrease of $3.6 million in accounts receivable due mainly to collections from customers, a decrease of $1.7 million of accounts payable, a decrease of $10.2 million in deferred revenue and an increase of $1.9 million of contract assets.

Cash Flows from Investing Activities

Cash used in investing activities was $3.3 million and $2.1 million for the nine months ended September 30, 2019 and 2018, respectively, which was primarily attributable to purchase of property and equipment.

Cash Flows from Financing Activities

Cash provided by financing activities was $51.5 million for the nine months ended September 30, 2019 which represents $49.9 million of net proceeds from a private placement in June 2019 and $4.6 million of proceeds from exercises of stock options offset by $2.9 million for taxes paid related to net share settlement of equity awards.

Cash provided by financing activities was $38.3 million for the nine months ended September 30, 2018 which represents $37.3 million of net proceeds from the public offering in April 2018 and $4.3 million from exercises of stock options, partially offset by other items, primarily $3.1 million for taxes paid related to net share settlement of equity awards.

Contractual Obligations

The following table summarizes our significant contractual obligations at September 30, 2019 (in thousands):

	Payments due by period			
(In Thousands)	**Total**	**Less than 1 year**	**1-3 years**	**>4 years**
Finance lease obligations	$ 124	$ 124	$ —	$ —
Operating leases obligations [1]	34,931	2,618	8,387	23,926
Total	$ 35,055	$ 2,742	$ 8,387	$ 23,926

[1] Represents future minimum lease payments under non-cancellable operating leases in effect as of September 30, 2019 for our facilities in Redwood City, California. The minimum lease payments above do not include common area maintenance charges or real estate taxes. In addition, amounts have not been reduced by future minimum sublease rentals of $0.3 million to be received under non-cancellable subleases.

Other Commitments

We have other commitments related to supply and service arrangements entered into the normal course of business. For additional information about other commitments, see Note 11, "Commitments and Contingencies" in the accompanying notes to the unaudited condensed consolidated financial statements. Future minimum payments reflect amounts those obligations are expected to have on our liquidity and cash flows in future period and include obligations subject to risk of cancellation by us (in thousands):

Other Commitment Agreement Type	Agreement Date	Future Minimum Payment
Development and manufacturing services agreements	September 2019	$ 1,645
Manufacture and supply agreement with expected future payment date of December 2022	April 2016	1,242
Service agreement for clinical trial	December 2017	80
Total other commitments		$ 2,967

On June 30, 2017, we entered into a credit facility consisting of term loans totaling up to$10.0 million, and advances under a revolving line of credit totaling up to $5.0 million with an accounts receivable borrowing base of80% of certain eligible accounts receivable. In January 2019, we entered into a Fifth Amendment to the Credit Facility to allow for Codexis to obtain a letter of credit of up to $1.1 million to secure its obligations under the Lease with MetLife. In July 2019, we entered into a Sixth Amendment to the Credit Facility to increase permitted indebtedness to $0.7 million for financing insurance premiums in the ordinary course of business. In September 2019, we entered into a Seventh Amendment to the Credit Facility whereby the draw period on the term debt was extended to September 30, 2020. We may draw on the Term Debt at any time prior to September 30, 2020, subject to customary conditions for funding including, among others, that no event of default exists. We may draw on the Revolving Line of Credit at any time prior to the maturity date. On October 1, 2023, any loans for Term Debt mature and the Revolving Line of Credit terminates. Term Debt bears interest through maturity at a variable rate based on the London Interbank Offered Rate plus 3.60%. Advances under the Revolving Line of Credit bear interest at a variable annual rate equal to the greater of (i) 1.00% above the prime rate and (ii) 5.00%. No amounts were drawn down under the credit facility as ofSeptember 30, 2019. For additional information about our credit facility, see Note 11, "Commitments and Contingencies" in the accompanying notes to the unaudited condensed consolidated financial statements.

Off-Balance Sheet Arrangements

As of September 30, 2019, we did not have any off-balance sheet arrangements, as defined in Item 303(a)(4) of Regulation S-K as promulgated by the SEC.

Critical Accounting Policies and Estimates

The preparation of financial statements in conformity with generally accepted accounting principles requires management to make judgments, estimates and assumptions in the preparation of our consolidated financial statements and accompanying notes. Actual results could differ from those estimates. There have been no material changes to our critical accounting policies or estimates during the three and nine months ended September 30, 2019 from those discussed in our Annual Report on Form 10-K for the year ended December 31, 2018, filed with the SEC on March 1, 2019, except for our critical accounting policies and estimates on leases as a result of our adoption of ASU 2016-02, "*Leases (Topic 842)"* ("ASC 842"), which is detailed below.

Leases

On January 1, 2019, we adopted the provisions of ASU 2016-02, "Leases (Topic 842) ("ASC 842"), which replaces prior lease guidance ("ASC 840"). This guidance establishes a right-of-use ("ROU") model that requires a lessee to record a ROU asset and lease obligations on the balance sheet for all leases with terms longer than 12 months. Leases are classified as either finance or operating, with classification affecting the pattern and classification of expense recognition in our unaudited condensed consolidated statement of operations. We adopted the new standard on January 1, 2019 using a modified retrospective approach and effective date method.

ITEM 3. QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK

Market Risk Management

Our cash flows and earnings are subject to fluctuations due to changes in foreign currency exchange rates, interest rates and other factors. These market risk exposures are disclosed in Part II, Item 7A of our Annual Report on Form 10-K for the year ended December 31, 2018, filed with the SEC on March 1, 2019.

Interest Rate Sensitivity

As of September 30, 2019, we had unrestricted cash and cash equivalents of $92.1 million. As of September 30, 2019, the effect of a hypothetical 10% decrease in market interest rates would decrease the fair value of our interest income by approximately $0.1 million on an annualized basis.

On June 30, 2017, we entered into a credit facility agreement consisting of term loans totaling up to $10.0 million, and advances under a revolving line of credit totaling up to $5.0 million. Draws on the term debt bear interest at a variable rate based on the London Interbank Offered Rate plus 3.60%. Advances under the revolving line of credit bear interest at a variable annual rate equal to the greater of (i) 1.00% above the prime rate and (ii) 5.00%. Increases in these variable interest rates will increase our future interest expense and decrease our results of operations and cash flows. No amounts were drawn down under the credit facility as of September 30, 2019. 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 September 30, 2019, the effect of a hypothetical 10% change in interest rates would not have any impact on our interest expense.

ITEM 4. CONTROLS AND PROCEDURES

Evaluation of Disclosure Controls and Procedures

We maintain disclosure controls and procedures and internal controls that are designed to provide reasonable assurance that information required to be disclosed in our Exchange Act reports is recorded, processed, summarized, and reported within the time periods specified in the SEC's rules and forms and that such information is accumulated and communicated to our management, including our principal executive officer and our principal financial and accounting officer, as appropriate, to allow timely decisions regarding required disclosure.

Our management, including our principal executive officer and our principal financial and accounting officer, evaluated the effectiveness of our disclosure controls and procedures as defined by Rules 13a-15(e) and 15d-15(e) of the Exchange Act. Based on this review, our principal executive officer and our principal financial and accounting officer concluded that these disclosure controls and procedures were effective as of September 30, 2019 at the reasonable assurance level.

Changes in Internal Control over Financial Reporting

There were no changes in our internal control over financial reporting identified in connection with the evaluation required by paragraph (d) of Exchange Act Rules 13a-15 or 15d-15 that occurred during our last fiscal quarter that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting. We implemented internal controls to ensure we adequately evaluated our lease contracts and properly assessed the impact of ASU 2016-02, "Leases (Topic 842)", to facilitate its adoption on January 1, 2019. There were no significant changes to our internal control over financial reporting due to the adoption of this new standard.

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.

PART II. OTHER INFORMATION

ITEM 1. LEGAL PROCEEDINGS

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

ITEM 1A. RISK FACTORS

We have included in Part I, Item 1A of our Annual Report on Form 10-K for the year ended December 31, 2018, a description of certain risks and uncertainties that could affect our business, future performance or financial condition (the "Risk Factors"). During the three months ended September 30, 2019, there were no material changes from the disclosure provided in the Form 10-K for the year ended December 31, 2018 with respect to the Risk Factors, except as set forth below. Investors should consider the Risk Factors prior to making an investment decision with respect to our stock.

Sales of a substantial number of shares of our common stock in the public market could cause our stock price to fall.

If our existing stockholders sell, or indicate an intention to sell, substantial amounts of our common stock in the public market, the trading price of our common stock could decline. As of September 30, 2019, we had approximately 58.4 million shares of common stock outstanding. Of those shares, approximately 1.9 million were held by current directors, executive officers and other affiliates, or may otherwise be subject to Rule 144 under the Securities Act of 1933, or the Securities Act.

As of September 30, 2019, up to approximately 0.4 million shares of common stock issuable upon vesting of outstanding restricted stock units and performance stock units and up to approximately 5.2 million shares of common stock issuable upon exercise of outstanding options were eligible for sale in the public market to the extent permitted by the provisions of the applicable vesting schedules, and Rule 144 and Rule 701 under the Securities Act. If these additional shares of common stock are issued and sold, or if it is perceived that they will be sold, in the public market, the trading price of our common stock could decline.

As of September 30, 2019, the holder of approximately 3.0 million shares of our outstanding common stock is entitled to rights with respect to the registration of their shares under the Securities Act. Registration of these shares under the Securities Act would result in the shares becoming freely tradable without restriction under the Securities Act, except for shares purchased by affiliates. Any sales of securities by these stockholders could have a material adverse effect on the trading price of our common stock.

ITEM 2. UNREGISTERED SALES OF EQUITY SECURITIES AND USE OF PROCEEDS

Limitations on Dividends and Other Distributions

Effective June 30, 2017, we entered into a credit facility consisting of a term debt note for loans totaling up to $10.0 million, and advances under a revolving line of credit totaling up to $5.0 million. Covenants in the credit facility limit our ability to pay dividends or make other distributions. For additional information see Note 11, "Commitments and Contingencies" in the accompanying notes to the unaudited condensed consolidated financial statements.

ITEM 3. DEFAULTS UPON SENIOR SECURITIES

None.

ITEM 4. MINE SAFETY DISCLOSURES

Not applicable.

ITEM 5. OTHER INFORMATION

Not applicable.

ITEM 6. EXHIBITS

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.
10.1A		Sixth Amendment to Loan and Security Agreement by and between the Company and Western Alliance Bank dated as of July 11, 2019
10.1B		Seventh Amendment to Loan and Security Agreement by and between the Company and Western Alliance Bank dated as of September 30, 2019
10.2	+	Form of Amended and Restated Change in Control Severance Agreement between the Company and certain of its officers
10.3	+	Employment Agreement by and between the Company and Ross Taylor effective as of August 4, 2019
10.4	+	Amendment to Employment Agreement between the Company and John Nicols, effective as of June 28, 2019
23.1		Consent of BDO USA, LLP, independent registered public accounting firm.
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 the Company's Quarterly Report on Form 10-Q for the quarter ended September 30, 2019, formatted in Inline Extensible Business Reporting Language (iXBRL) includes: (i) Unaudited Condensed Consolidated Balance Sheets at September 30, 2019 and December 31, 2018, (ii) Unaudited Condensed Consolidated Statements of Operations for the Three Months and Nine Months Ended September 30, 2019 and 2018, (iii) Unaudited Condensed Consolidated Statements of Stockholders' Equity for the Three Months and Nine Months Ended September 30, 2019 and 2018, (iv) Unaudited Condensed Consolidated Statements of Cash Flows for the Nine Months Ended September 30, 2019 and 2018, and (v) Notes to Unaudited Condensed Consolidated Financial Statements.
101.SCH		XBRL Taxonomy Extension Schema Document
101.CAL		XBRL Taxonomy Extension Calculation Linkbase Document
101.DEF		XBRL Taxonomy Extension Definition Linkbase Document
101.LAB		XBRL Taxonomy Extension Label Linkbase Document
101.PRE		XBRL Taxonomy Extension Presentation Linkbase Document
104		The cover page from the Company’s Quarterly Report on Form 10-Q for the quarter ended September 30, 2019, formatted in Inline XBRL and contained in Exhibit 101.

\+ Indicates a management contract or compensatory plan or arrangement.

SIGNATURES

Pursuant to the requirements 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: November 6, 2019

By: /s/ John J. Nicols

John J. Nicols
President and Chief Executive Officer
(principal executive officer)

Date: November 6, 2019

By: /s/ Ross Taylor

Ross Taylor
Senior Vice President and Chief Financial Officer
(principal financial and accounting officer)

CODEXIS, INC.

CHANGE OF CONTROL SEVERANCE AGREEMENT

This Change of Control Severance Agreement (the "Agreement") is made and entered into by and between _____ (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 six (6) 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 six (6) 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 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 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 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 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: John J. Nicols
Title: President and CEO
Date:

EXECUTIVE

_____
Name:

Date:

Codexis, Inc.
200 Penobscot Drive
Redwood City, CA 94063
Tel: +1 (650) 421-8100
Fax: +1 (650) 421-8102
www.codexis.com

Exhibit 10.3

August 4, 2019

Ross Taylor
Via email: ############@###.##

Dear Ross:

On behalf of Codexis, I am pleased to extend to you this offer of employment as Senior Vice President, Chief Financial Officer reporting to John Nicols, President & CEO. Your position is a full-time position.

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).

Compensation

If you accept this offer and you begin employment with Codexis, you will receive an initial salary of $400,000 per year, payable semi-monthly, which will be subject to all applicable withholdings.

You will also be eligible to participate in the Codexis Executive 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 2019, 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 2019 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 2019 as a percentage of the full year, and you must be an employee of the Company on the date the bonus is paid in order to be eligible for payment. 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.

Stock Options

Subject to approval by the Board, you will be granted an option to purchase 42,285 shares of common stock (the "Option") at an exercise price equal to the fair market value of the shares on the date the option is granted. The Option will be presented to the Board for approval on or as close to your employment start date as possible. The shares subject to the Option will vest one fourth or 25% on the first anniversary of your employment start date and thereafter will vest 1/48th of the shares subject to the Option per month for the following 36 months until the option is 100% vested on the four-year anniversary of your employment start date. Vesting is contingent upon your continued employment through the applicable vesting date. Your Option 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 stock option agreement.

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 is included with the 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. 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, while an employee of Codexis. 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.

Arbitration of Disputes

You agree that, except as described below, any dispute relating to your employment or the termination of your employment with Codexis, including any claims related to any bonus, relocation payments or other compensation, will be finally settled by binding arbitration before a single arbitrator in San Mateo County, California in accordance with the Employment Arbitration Rules and Procedures of the Judicial Arbitration and Mediation Service ("JAMS"). Claims subject to arbitration will include, but will not be limited to, claims under Title VII of the Civil Rights Act of 1964 (as amended) and other civil rights statutes of the United States, the Age Discrimination in Employment Act, the Americans with Disabilities Act, the Family and Medical Leave Act, the Employee Retirement Income Security Act of 1974, the California Fair Employment and Housing Act, the California Labor Code, and any other federal, state or local statute or regulation, and the common law of contract and tort. However, this agreement to arbitrate will not apply to claims (a) for workers' compensation, (b) for unemployment compensation or (c) injunctive relief, pending arbitration, arising out of or related to misappropriation of trade secrets or misuse or improper disclosure of confidential information, unfair competition or breach of any non-competition or non-solicitation agreement between you and Codexis.
You understand that by this agreement, you and Codexis are waiving your respective rights to trial by jury, and that judgment upon any arbitration award may be entered in any court having jurisdiction of the matter. Any controversy or claim subject to arbitration will be waived and forever barred if arbitration is not initiated within one year following the date the controversy or claim first arose, or if statutory rights are involved, within the time limit established by the applicable statute of limitations.

With regard to statutory claims, you and Codexis will have the same remedies available in arbitration as those available had the claim been filed in a court of law, including, where authorized by statute, compensatory and punitive damages, injunctive relief and attorneys' fees. Although Codexis will pay all costs of the JAMS arbitration and the arbitrator, you agree to pay all costs you would otherwise be required to pay were your claims litigated in a court of law, such as costs of your attorney, deposition transcripts and expert witness fees and expenses.

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 me by Monday, August 5, 2019.

Sincerely,

Codexis, Inc.

By: /s/ John Nicols
John Nicols
President & Chief Executive Officer

I understand and agree to the foregoing terms and conditions of employment with Codexis.

/s/ Ross Taylor

August 4, 2019 August 19, 2019
Date / Start Date

ATTACHMENT A

CODEXIS 2010 EMPLOYEE CONFIDENTIAL INFORMATION AND INVENTIONS ASSIGNMENT AGREEMENT

Exhibit 10.4

June 28, 2019

John Nicols
200 Penobscot Drive
Redwood City, CA 94063

Re: Amendment to Employment Agreement

Dear John,

You and Codexis, Inc. (the "Company") are currently parties to an Employment Agreement, dated as of May 28, 2012, as amended on April 21, 2016 and November 16, 2017 (the "Employment Agreement"), which sets forth the terms of your employment with the Company and provides, among other things, that you will be entitled to receive certain severance payments and benefits upon certain qualifying terminations of employment with the Company. Effective as of the date of this amendment (this "Amendment"), you and the Company hereby agree to amend the Employment Agreement as set forth herein.

Section 5(d) of the Employment Agreement is deleted and replaced in its entirety by the following:

"(d) Termination in Contemplation of Change in Control or Within 90 Days Prior to a Change in Control. Notwithstanding anything to the contrary in Section 5(b) or 5(c), in the event Executive is terminated by the Company without Cause or resigns for Good Reason and (i) the event giving rise to such termination or resignation 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 in Control or (ii) such termination or resignation occurs within ninety (90) days prior to a Change in Control, then for all purposes hereunder, including Section 5(b) and 5(c), such termination or resignation shall be deemed to have occurred within the twelve (12) month period immediately following a Change in Control and Executive shall be entitled to the benefits set forth in Section 5(c) with such benefits to be paid, or commence being paid, upon the Date of Termination in the case of a termination or resignation under subclause (i) or the latest of the date the Release becomes effective and irrevocable, the date of the Change in Control or as otherwise provided in Section 13(d) hereof in the case of a termination or resignation under subclause (ii), but otherwise subject to the terms and conditions of Section 5(c)."

All terms and provisions of the Employment Agreement not amended hereby, either expressly or by necessary implication, shall remain in full force and effect. From and after the date of this Amendment, all references to the term "Employment Agreement" in this Amendment or the original Employment Agreement shall include the terms contained in this Amendment.

Please indicate your acceptance of and agreement to the terms and conditions set forth in this Amendment by signing in the space below and returning the executed Amendment to the Company.

Sincerely,

Codexis, Inc.

By: /s/ Richard A. Sabalot

Name: Richard A. Sabalot

Title: Senior Corporate Counsel

Accepted by:

/s/ John Nicols
John Nicols

June 28, 2019
Date

US-DOCS\107373471.1

Exhibit 10.1A

SIXTH AMENDMENT TO LOAN AND SECURITY AGREEMENT

THIS SIXTH AMENDMENT to Loan and Security Agreement (this "**Amendment**") is made effective as of July 11, 2019 (the "**Amendment Date**") and made by and among **WESTERN ALLIANCE BANK**, an Arizona corporation ("**Bank**") and **CODEXIS, INC.**, a Delaware corporation ("**Borrower**").

WHEREAS, Bank and Borrower have entered into that certain Loan and Security Agreement, dated as of June 30, 2017 (as amended, supplemented, restated or otherwise modified from time to time, the "**Loan Agreement**"); and

WHEREAS, Bank and Borrower desire to amend certain provisions of the Loan Agreement as provided herein and subject to the terms and conditions set forth herein;

NOW, THEREFORE, in consideration of the promises, covenants and agreements contained herein, and other good and valuable consideration, the receipt and adequacy of which are hereby acknowledged, Bank and Borrower hereby agree as follows:

1. Capitalized terms used herein but not otherwise defined shall have the respective meanings given to them in the Loan Agreement.

2. Section 1.1 of the Loan Agreement is hereby amended by amending and restating clause (j) of the definition of "Permitted Indebtedness" therein as follows:

   (j) Indebtedness (in the aggregate outstanding amount of not greater than Six Hundred Fifty Thousand Dollars ($650,000) at any given time) consisting of the financing of insurance premiums in the ordinary course of business;

3. Limitation of Amendment.

   a. The amendment set forth above is effective for the purposes set forth herein and shall be limited precisely as written and shall not be deemed to (a) be a consent to any amendment, waiver or modification of any other term or condition of any Loan Document, or (b) otherwise prejudice any right, remedy or obligation which the Bank or Borrower may now have or may have in the future under or in connection with any Loan Document, as amended hereby.

   b. This Amendment shall be construed in connection with and as part of the Loan Documents and all terms, conditions, representations, warranties, covenants and agreements set forth in the Loan Documents, except as herein amended, are hereby ratified and confirmed and shall remain in full force and effect.

4. To induce the Bank to enter into this Amendment, Borrower hereby represents and warrants to the Bank as follows:

   a. Immediately after giving effect to this Amendment (a) the representations and warranties contained in Article 5 of the Loan Agreement are true, accurate and complete in all material respects as of the date hereof (except to the extent such representations and warranties relate to an earlier date, in which case they are true and correct in all material respects as of such date), and (b) no Event of Default has occurred and is continuing;

b. Borrower has the power and due authority to execute and deliver this Amendment and to perform its obligations under the Loan Agreement, as amended by this Amendment;

c. The organizational documents of Borrower delivered to the Bank on the Closing Date, and updated pursuant to subsequent deliveries by the Borrower to the Bank, if any, remain true, accurate and complete and have not been amended, supplemented or restated and are and continue to be in full force and effect;

d. The execution and delivery by Borrower of this Amendment and the performance by Borrower of its obligations under the Loan Agreement, as amended by this Amendment, do not and will not contravene (i) any law or regulation binding on or affecting Borrower, (ii) any contractual restriction with a Person binding on Borrower, (iii) any order, judgment or decree of any court or other governmental or public body or authority, or subdivision thereof, binding on Borrower, or (iv) the organizational documents of Borrower;

e. The execution and delivery by Borrower of this Amendment and the performance by Borrower of its obligations under the Loan Agreement, as amended by this Amendment, do not require any order, consent, approval, license, authorization or validation of, or filing, recording or registration by Borrower with, or exemption by any governmental or public body or authority, or subdivision thereof, binding on Borrower, except as already has been obtained or made; and

f. This Amendment has been duly executed and delivered by Borrower and is the binding obligation of Borrower, enforceable against Borrower in accordance with its terms, except as such enforceability may be limited by bankruptcy, insolvency, reorganization, liquidation, moratorium or other similar laws of general application and by general equitable principles.

5. Except as expressly set forth herein, the Loan Agreement shall continue in full force and effect without alteration or amendment. This Amendment and the Loan Documents represent the entire agreement about this subject matter and supersede prior negotiations or agreements.

6. This Amendment shall be deemed effective as of the Amendment Date upon the due execution and delivery to the Bank of this Amendment by each party hereto.

7. This Amendment may be executed in any number of counterparts, each of which shall be deemed an original, and all of which, taken together, shall constitute one and the same instrument.

8. This Amendment and the rights and obligations of the parties hereto shall be governed by and construed in accordance with the laws of the State of California.

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IN WITNESS WHEREOF, the parties hereto have caused this Sixth Amendment to Loan and Security Agreement to be executed as of the date first set forth above.

BORROWER:

CODEXIS, INC., A DELAWARE CORPORATION

By /s/ Gordon Sangster
Name: Gordon Sangster
Title: CFO

BANK:

WESTERN ALLIANCE BANK, AN ARIZONA CORPORATION

By /s/ Bill Wickline
Name: Bill Wickline
Title: SVP, Director of Portfolio Management

Exhibit 10.1B

SEVENTH AMENDMENT TO LOAN AND SECURITY AGREEMENT

THIS SEVENTH AMENDMENT to Loan and Security Agreement (this "**Amendment**") is made effective as of September 30, 2019 (the "**Amendment Date**") and made by and among **WESTERN ALLIANCE BANK**, an Arizona corporation ("**Bank**") and **CODEXIS, INC.**, a Delaware corporation ("**Borrower**").

WHEREAS, Bank and Borrower have entered into that certain Loan and Security Agreement, dated as of June 30, 2017 (as amended, supplemented, restated or otherwise modified from time to time, the "**Loan Agreement**"); and

WHEREAS, Bank and Borrower desire to amend certain provisions of the Loan Agreement as provided herein and subject to the terms and conditions set forth herein;

NOW, THEREFORE, in consideration of the promises, covenants and agreements contained herein, and other good and valuable consideration, the receipt and adequacy of which are hereby acknowledged, Bank and Borrower hereby agree as follows:

1. Capitalized terms used herein but not otherwise defined shall have the respective meanings given to them in the Loan Agreement.

2. Section 1.1 of the Loan Agreement is hereby amended by adding the following definition thereto in alphabetical order:

   "Seventh Amendment Date" is September 30, 2019.

3. Section 1.1 of the Loan Agreement is hereby further amended by amending and restating the following definitions therein as follows:

   "Amortization Date" is November 1, 2021.

   "Draw Period" is the period commencing on the Closing Date and ending on the earlier of (i) September 30, 2020 and (ii) the occurrence of an Event of Default.

   "Maturity Date" is October 1, 2023.

   "Revolving Facility Termination Fee" is an additional fee payable by Borrower to Bank, upon the election by Borrower to terminate the Revolving Facility, in amount equal to:

   (i) for a termination on or before the first anniversary of the Seventh Amendment Date, three percent (3.00%) of the Revolving Line;

   (ii) a termination after the first anniversary of the Seventh Amendment Date and on or before the second anniversary of the Seventh Amendment Date, two percent (2.00%) of the Revolving Line; and

   (iii) a termination after the second anniversary of the Seventh Amendment Date and on or before the third anniversary of the Seventh Amendment Date, one percent (1.00%) of the Revolving Line.

4. Section 2.6 of the Loan Agreement is hereby further amended by replacing "." at the end of Section 2.6(g) with "; and" and adding the following Section 2.6(h) thereto:

   (h) **Seventh Amendment Fee.** On the Seventh Amendment Date, a fully earned and non-refundable fee in the amount of Twelve Thousand Five Hundred Dollars ($12,500.00).

5. Section 5.16 of the Loan Agreement is hereby amended and restated in its entirety as follows:

5.16 Accounts. All of Borrower's or any Subsidiary's operating, depository or investment accounts maintained or invested with a Person other than Bank are set forth on the Perfection Certificate, provided that such accounts disclosed on the Perfection Certificate are hereby deemed updated with the updated Perfection Certificate delivered to Bank as of the Fourth Amendment Date. On and after (i) the 60th day following the Closing Date and prior to October 1, 2019, at any time that the aggregate balance of Borrower's accounts held with Bank and Bank's Affiliates is less than $15,000,000 for three (3) successive Business Days or less than $14,000,000 on any given day, and (ii) October 1, 2019, at any time that the aggregate balance of Borrower's accounts held with Bank and Bank's Affiliates is less than the sum of (A) $5,000,000 plus (B) the outstanding aggregate principal amount of the Term Loans, for three (3) successive Business Days, none of Borrower's nor any domestic U.S. Subsidiary's operating, depository or investment accounts are maintained or invested with a Person other than Bank. Notwithstanding the foregoing, on and after the 60th day following the Closing Date, neither the Borrower nor any of its domestic Subsidiaries maintains any operating, depository or investment accounts maintained or invested with any Person other than the Bank unless such account (A) is subject to an account control agreement in favor of the Bank in such form and substance as is reasonably acceptable to the Bank, (B) is a deposit account exclusively used for payroll, payroll taxes and other employee wage and benefit payments to or for the benefit of Borrower's or any domestic U.S. Subsidiary's employees and identified to Bank by Borrower as such, or (C) is the Exempt Account (provided that such account and is maintained solely in connection with the Transfers of shares of CO2 Solutions, Inc. held by the Borrower on the Closing Date and any cash balance in such account in excess of Five Hundred Thousand Dollars ($500,000.00) is transferred to another account of Borrower that is maintained in accordance with Section 6.7 within five (5) Business Days).

Furthermore, the aggregate amount of cash and cash equivalent assets held by direct and indirect Foreign Subsidiaries of Borrower in accounts not subject to a control agreement in favor of the Bank (and in such form and substance as is reasonably acceptable to the Bank) does not exceed One Million Two Hundred Thousand Dollars ($1,200,000.00) (of which no more than Four Hundred Thousand Dollars ($400,000.00) may be maintained in accounts other than the accounts for Codexis Laboratories India Pte., Ltd.).

6. Limitation of Amendment.

   a. The amendments set forth above are effective for the purposes set forth herein and shall be limited precisely as written and shall not be deemed to (a) be a consent to any amendment, waiver or modification of any other term or condition of any Loan Document, or (b) otherwise prejudice any right, remedy or obligation which the Bank or Borrower may now have or may have in the future under or in connection with any Loan Document, as amended hereby.

   b. This Amendment shall be construed in connection with and as part of the Loan Documents and all terms, conditions, representations, warranties, covenants and agreements set forth in the Loan Documents, except as herein amended, are hereby ratified and confirmed and shall remain in full force and effect.

7. To induce the Bank to enter into this Amendment, Borrower hereby represents and warrants to the Bank as follows:

   a. Immediately after giving effect to this Amendment (a) the representations and warranties contained in Article 5 of the Loan Agreement are true, accurate and complete in all material respects as of the date hereof (except to the extent such representations and warranties relate to an earlier date, in which case they are true and correct in all material respects as of such date), and (b) no Event of Default has occurred and is continuing;

b. Borrower has the power and due authority to execute and deliver this Amendment and to perform its obligations under the Loan Agreement, as amended by this Amendment;

c. The organizational documents of Borrower delivered to the Bank on the Closing Date, and updated pursuant to subsequent deliveries by the Borrower to the Bank, if any, remain true, accurate and complete and have not been amended, supplemented or restated and are and continue to be in full force and effect;

d. The execution and delivery by Borrower of this Amendment and the performance by Borrower of its obligations under the Loan Agreement, as amended by this Amendment, do not and will not contravene (i) any law or regulation binding on or affecting Borrower, (ii) any contractual restriction with a Person binding on Borrower, (iii) any order, judgment or decree of any court or other governmental or public body or authority, or subdivision thereof, binding on Borrower, or (iv) the organizational documents of Borrower;

e. The execution and delivery by Borrower of this Amendment and the performance by Borrower of its obligations under the Loan Agreement, as amended by this Amendment, do not require any order, consent, approval, license, authorization or validation of, or filing, recording or registration by Borrower with, or exemption by any governmental or public body or authority, or subdivision thereof, binding on Borrower, except as already has been obtained or made; and

f. This Amendment has been duly executed and delivered by Borrower and is the binding obligation of Borrower, enforceable against Borrower in accordance with its terms, except as such enforceability may be limited by bankruptcy, insolvency, reorganization, liquidation, moratorium or other similar laws of general application and by general equitable principles.

8. Except as expressly set forth herein, the Loan Agreement shall continue in full force and effect without alteration or amendment. This Amendment and the Loan Documents represent the entire agreement about this subject matter and supersede prior negotiations or agreements.

9. This Amendment shall be deemed effective as of the Amendment Date upon the due execution and delivery to the Bank of this Amendment by each party hereto [and the payment by Borrower to the Bank of fee due under Section 2.6(g) of the Loan Agreement as amended hereby].

10. This Amendment may be executed in any number of counterparts, each of which shall be deemed an original, and all of which, taken together, shall constitute one and the same instrument.

11. This Amendment and the rights and obligations of the parties hereto shall be governed by and construed in accordance with the laws of the State of California.

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IN WITNESS WHEREOF, the parties hereto have caused this Seventh Amendment to Loan and Security Agreement to be executed as of the date first set forth above.

BORROWER:

CODEXIS, INC., A DELAWARE CORPORATION

By /s/ Ross Taylor
Name: Ross Taylor
Title: Senior Vice President and CEO

BANK:

WESTERN ALLIANCE BANK, AN ARIZONA CORPORATION

By /s/ Lindsay Fouty
Name: Lindsay Fouty
Title: VP, Portfolio Management

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 Statement on Form S-3 (No. 333-228693) of Codexis, Inc. of our reports dated March 1, 2019, relating to the consolidated financial statements, and the effectiveness of Codexis, Inc.'s internal control over financial reporting, which appear in the Company's Annual Report on Form 10-K for the year ended December 31, 2018 filed with the SEC on March 1, 2019.

We also consent to the reference to us under the caption "Experts" in the Prospectus constituting a part of the Registration Statement.

/s/ BDO USA, LLP

San Jose, California
November 6, 2019

Exhibit 31.1

CERTIFICATION

I, John J. Nicols, certify that:

1. I have reviewed this Quarterly Report on Form 10-Q 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: November 6, 2019

/s/ John J. Nicols

John J. Nicols

President and Chief Executive Officer
(principal executive officer)

Exhibit 31.2

CERTIFICATION

I, Ross Taylor, certify that:

1. I have reviewed this Quarterly Report on Form 10-Q 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: November 6, 2019

/s/ Ross Taylor

Ross Taylor
Senior Vice President and Chief Financial Officer
(principal financial and accounting 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 Quarterly Report of Codexis, Inc. (the "Company") on Form 10-Q for the fiscal quarter ended September 30, 2019, as filed with the Securities and Exchange Commission (the "Report"), John J. Nicols, President and Chief Executive Officer of the Company and Ross Taylor, Senior Vice President and 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: November 6, 2019

/s/ John J. Nicols

John J. Nicols

President and Chief Executive Officer
(principal executive officer)

/s/ Ross Taylor

Ross Taylor
Senior Vice President and Chief Financial Officer
(principal financial and accounting officer)