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 June 30, 2022

or

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

For the transition period from to

Commission file 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)**

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

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 August 2, 2022, there were 65,494,096 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 June 30, 2022

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Item 1. Financial Statements

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

	June 30, 2022	December 31, 2021
Assets		
Current assets:		
Cash and cash equivalents	$ 90,113	$ 116,797
Restricted cash, current	546	579
Financial assets:		
Accounts receivable	29,200	24,953
Contract assets	11,287	4,557
Unbilled receivables	8,543	8,558
Total financial assets	49,030	38,068
Less: allowances	(109)	(416)
Total financial assets, net	48,921	37,652
Inventories	1,718	1,160
Prepaid expenses and other current assets	3,985	5,700
Total current assets	145,283	161,888
Restricted cash	1,520	1,519
Investment in non-marketable equity securities ($12,713 and $12,713 with a related party)	19,302	14,002
Right-of-use assets - Operating leases, net	41,706	44,095
Right-of-use assets - Finance leases, net	—	17
Property and equipment, net	23,694	21,345
Goodwill	3,241	3,241
Other non-current assets	224	276
Total assets	$ 234,970	$ 246,383
Liabilities and Stockholders' Equity		
Current liabilities:		
Accounts payable	$ 2,015	$ 2,995
Accrued compensation	7,732	11,119
Other accrued liabilities	12,934	12,578
Current portion of lease obligations - Operating leases	5,103	4,093
Deferred revenue ($0 and $245 to a related party)	2,230	2,586
Total current liabilities	30,014	33,371
Deferred revenue, net of current portion	3,151	3,749
Long-term lease obligations - Operating leases	41,006	43,561
Other long-term liabilities	1,340	1,311
Total liabilities	75,511	81,992
Commitments and Contingencies (Note 10)		
Stockholders' equity:		
Preferred stock, $0.0001 par value per share; 5,000 shares authorized, none issued and outstanding	—	—
Common stock, $0.0001 par value per share; 100,000 shares authorized; 65,494 shares and 65,109 shares issued and outstanding at June 30, 2022 and December 31, 2021, respectively	6	6
Additional paid-in capital	558,147	552,083
Accumulated deficit	(398,694)	(387,698)
Total stockholders' equity	159,459	164,391
Total liabilities and stockholders' equity	$ 234,970	$ 246,383

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 June 30,		Six Months Ended June 30,	
	2022	2021	2022	2021
Revenues:				
Product revenue ($143, $0, $143 and $0 from a related party)	$ 34,645	$ 14,717	$ 65,335	$ 24,943
Research and development revenue ($0, $344, $245 and $476 from a related party)	3,761	10,736	8,411	18,542
Total revenues	38,406	25,453	73,746	43,485
Costs and operating expenses:				
Cost of product revenue	11,270	4,318	19,791	8,536
Research and development	19,089	12,826	38,590	24,397
Selling, general and administrative	10,656	12,795	26,360	24,193
Total costs and operating expenses	41,015	29,939	84,741	57,126
Loss from operations	(2,609)	(4,486)	(10,995)	(13,641)
Interest income	140	206	182	382
Other income (expense), net	(63)	23	(66)	(63)
Loss before income taxes	(2,532)	(4,257)	(10,879)	(13,322)
Provision for income taxes	108	8	117	11
Net loss	$ (2,640)	$ (4,265)	$ (10,996)	$ (13,333)
Net loss per share, basic and diluted	$ (0.04)	$ (0.07)	$ (0.17)	$ (0.21)
Weighted average common stock shares used in computing net loss per share, basic and diluted	65,288	64,434	65,193	64,363

See accompanying notes to the unaudited condensed consolidated financial statements.

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

Three Months Ended June 30, 2022	Common Stock Shares	Common Stock Amount	Additional Paid-in Capital	Accumulated Deficit	Total Stockholders' Equity
Balance as of April 1, 2022	65,304	$ 6	$ 554,683	$ (396,054)	$ 158,635
Exercise of stock options	97	—	251	—	251
Release of stock awards	95	—	—	—	—
Employee stock-based compensation	—	—	3,174	—	3,174
Non-employee stock-based compensation	—	—	57	—	57
Taxes paid related to net share settlement of equity awards	(2)	—	(18)	—	(18)
Net loss	—	—	—	(2,640)	(2,640)
Balance as of June 30, 2022	65,494	$ 6	$ 558,147	$ (398,694)	$ 159,459

Three Months Ended June 30, 2021	Common Stock Shares	Common Stock Amount	Additional Paid-in Capital	Accumulated Deficit	Total Stockholders' Equity
Balance as of April 1, 2021	64,488	$ 6	$ 539,220	$ (375,487)	$ 163,739
Exercise of stock options	95	—	455	—	455
Release of stock awards	42	—	—	—	—
Employee stock-based compensation	—	—	2,779	—	2,779
Non-employee stock-based compensation	—	—	65	—	65
Taxes paid related to net share settlement of equity awards	(2)	—	—	—	—
Net loss	—	—	—	(4,265)	(4,265)
Balance as of June 30, 2021	64,623	$ 6	$ 542,519	$ (379,752)	$ 162,773

See accompanying notes to the unaudited condensed consolidated financial statements.

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

Six Months Ended June 30, 2022	Common Stock Shares	Common Stock Amount	Additional Paid-in Capital	Accumulated Deficit	Total Stockholders' Equity
Balance as of January 1, 2022	65,109	$ 6	$ 552,083	$ (387,698)	$ 164,391
Exercise of stock options	175	—	432	—	432
Release of stock awards	285	—	—	—	—
Employee stock-based compensation	—	—	6,951	—	6,951
Non-employee stock-based compensation	—	—	118	—	118
Taxes paid related to net share settlement of equity awards	(75)	—	(1,437)	—	(1,437)
Net loss	—	—	—	(10,996)	(10,996)
Balance as of June 30, 2022	65,494	$ 6	$ 558,147	$ (398,694)	$ 159,459

Six Months Ended June 30, 2021	Common Stock Shares	Common Stock Amount	Additional Paid-in Capital	Accumulated Deficit	Total Stockholders' Equity
Balance as of January 1, 2021	64,283	$ 6	$ 536,516	$ (366,419)	$ 170,103
Exercise of stock options	213	—	1,678	—	1,678
Release of stock awards	181	—		—	—
Employee stock-based compensation	—	—	5,405	—	5,405
Non-employee stock-based compensation	—	—	126	—	126
Taxes paid related to net share settlement of equity awards	(54)	—	(1,206)	—	(1,206)
Net loss	—	—	—	(13,333)	(13,333)
Balance as of June 30, 2021	64,623	$ 6	$ 542,519	$ (379,752)	$ 162,773

See accompanying notes to the unaudited condensed consolidated financial statements.

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

	Six Months Ended June 30,	
	2022	**2021**
Operating activities:		
Net loss	$ (10,996)	$ (13,333)
Adjustments to reconcile net loss to net cash used in operating activities:		
Depreciation	2,556	1,375
Amortization expense - right-of-use assets - operating and finance leases	2,406	1,309
Stock-based compensation	7,069	5,531
Provision (recovery) for credit losses	(307)	—
Equity securities earned from research and development activities from a related party	(245)	(477)
Other non-cash items	(27)	(318)
Changes in operating assets and liabilities:		
Financial assets	(10,962)	(7,521)
Inventories	(558)	(113)
Prepaid expenses and other assets	1,811	(170)
Accounts payable	(958)	436
Accrued compensation and other accrued liabilities	81	(404)
Other long-term liabilities	(2,527)	(1,314)
Deferred revenue	(710)	264
Net cash used in operating activities	(13,367)	(14,735)
Investing activities:		
Purchase of property and equipment	(7,030)	(4,344)
Proceeds from sale of property and equipment	28	29
Investment in non-marketable securities	(5,300)	(630)
Net cash used in investing activities	(12,302)	(4,945)
Financing activities:		
Proceeds from exercises of stock options	432	1,679
Costs incurred in connection with equity financing	(42)	—
Taxes paid related to net share settlement of equity awards	(1,437)	(1,206)
Net cash provided by (used in) financing activities	(1,047)	473
Net decrease in cash, cash equivalents and restricted cash	(26,716)	(19,207)
Cash, cash equivalents and restricted cash at the beginning of the period	118,895	150,817
Cash, cash equivalents and restricted cash at the end of the period	$ 92,179	$ 131,610
Supplemental disclosure of cash flow information:		
Interest paid	$ 12	$ 3
Supplemental non-cash investing and financing activities:		
Capital expenditures incurred but not yet paid	$ 409	$ 338

The following table provides a reconciliation of cash, cash equivalents and restricted cash reported within the unaudited condensed consolidated balance sheets as of June 30, 2022 and 2021 to the total of the same such amounts shown above in the unaudited condensed consolidated statements of cash flows:

	June 30,	
	2022	**2021**
Cash and cash equivalents	$ 90,113	$ 129,506
Restricted cash, current and non-current	2,066	2,104
Total cash, cash equivalents and restricted cash	$ 92,179	$ 131,610

See accompanying notes to the unaudited condensed consolidated financial statements.

Codexis Inc.

Notes to Condensed Consolidated Financial Statements

(Unaudited)

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

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

Business Update Regarding COVID-19

We are subject to risks and uncertainties as a result of the current COVID-19 pandemic. The COVID-19 pandemic has presented a substantial public health and economic challenge around the world and is affecting our employees, communities and business operations, as well as the U.S. economy and other economies worldwide. The full extent to which the COVID-19 pandemic will directly or indirectly impact our business, results of operations and financial condition will depend on future developments that are highly uncertain and may not be accurately predicted, including the duration and severity of the pandemic, the prevalence of more contagious and or virulent variants, and the extent and severity of the impact on our customers, new information that may emerge concerning COVID-19, the actions taken to contain it or treat its impact and the economic impact on local, regional, national and international markets.

To date, we and our collaboration partners have been able to continue to supply our enzymes to our customers worldwide. However, we are dependent on our manufacturing and logistics partners and consequently, disruptions in operations of our partners and customers may affect our ability to supply enzymes to our customers. Furthermore, our ability to provide future R&D services may continue to be impacted as a result of governmental orders ("Orders") and any disruptions in operations of our customers with whom we collaborate. We believe that these disruptions have had a minimal impact on revenue for the three and six months ended June 30, 2022. The extent to which the pandemic may impact our business operations and operating results will continue to remain highly dependent on future developments, which are uncertain and cannot be predicted with confidence. Should these disruptions escalate in the future, they may negatively and materially impact our business. results of operations and financial condition.

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 but does not include all 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, 2021. The condensed consolidated balance sheet at December 31, 2021 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 six months ended June 30, 2022 and 2021, are consistent with those discussed in Note 2 to the audited consolidated financial statements in the Company’s 2021 Annual Report on Form 10-K and are updated below as necessary. There have been no significant changes in our significant accounting policies or critical accounting estimates since December 31, 2021.

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 June 30, 2022, results of our operations for the three and six months ended June 30, 2022 and 2021, changes in stockholders' equity for the three and six months ended June 30, 2022 and 2021, and cash flows for the six months ended June 30, 2022 and 2021. The interim results are not necessarily indicative of the results for any future interim period or for the entire year.

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

Use of Estimates

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

Accounting Pronouncements

Recently adopted accounting pronouncements

In May 2021, FASB issued ASU No. 2021-04,*Earnings Per Share (Topic 260), Debt—Modifications and Extinguishments (Subtopic 470-50), Compensation—Stock Compensation (Topic 718), and Derivatives and Hedging—Contracts in Entity's Own Equity (Subtopic 815-40), Issuer's Accounting for Certain Modifications or Exchanges of Freestanding Equity-Classified Written Call Options, a consensus of the Emerging Issues Task Force*. The standard establishes a principles-based framework in accounting for modifications of freestanding equity-classified written call options on the basis of the economic substance of the underlying transaction. The standard also requires incremental financial statement disclosures. The standard affects entities that present earnings per share in accordance with the guidance in Topic 260, Earnings Per Share. We adopted the standard on January 1, 2022 on a prospective basis. The adoption of this standard had no impact on our Unaudited Condensed Consolidated Financial Statements and related disclosures.

In August 2020, FASB issued ASU No 2020-06*Debt—Debt with Conversion and Other Options (Subtopic 470-20) and Derivatives and Hedging— Contracts in Entity's Own Equity (Subtopic 815-40) No. 2020-06 August 2020 Accounting for Convertible Instruments and Contracts in an Entity's Own Equity*, to reduce the complexity and to simplify the accounting for convertible debt instruments and convertible preferred stock, and the derivatives scope exception for contracts in an entity's own equity. In addition, the guidance on calculating diluted earnings per share has been simplified and made more internally consistent. We adopted the standard on January 1, 2022 on a modified retrospective basis. The adoption of this standard had no impact on our Unaudited Condensed Consolidated Financial Statements and related disclosures.

In March 2020, the FASB issued ASU 2020-04, Reference Rate Reform (Topic 848*: Facilitation of the Effects of Reference Rate Reform on Financial Reporting*. The standard provides optional expedients and exceptions for applying GAAP to contracts, hedging relationships, and other transactions in which the reference LIBOR or another reference rate are expected to be discontinued as a result of the Reference Rate Reform. We adopted the standard on January 1, 2022 on a prospective basis. The adoption of this standard had no significant impact on our Unaudited Condensed Consolidated Financial Statements and related disclosures.

Recently issued accounting pronouncements not yet adopted

There have been no other recent accounting pronouncements or changes in accounting pronouncements during the three and six months ended June 30, 2022, that are of significance or potential significance to us.

Note 3. Revenue Recognition

Disaggregation of Revenue

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

Segment information is as follows (in thousands):

	Three Months Ended June 30, 2022			Three Months Ended June 30, 2021		
	Performance Enzymes	Novel Biotherapeutics	Total	Performance Enzymes	Novel Biotherapeutics	Total
Major products and service:						
Product revenue	$ 34,645	$ —	$ 34,645	$ 14,717	$ —	$ 14,717
Research and development revenue	1,885	1,876	3,761	6,868	3,868	10,736
Total revenues	$ 36,530	$ 1,876	$ 38,406	$ 21,585	$ 3,868	$ 25,453
Primary geographical markets:						
Americas	$ 2,307	$ 1,307	$ 3,614	$ 3,703	$ 2,141	$ 5,844
EMEA	4,121	569	4,690	4,442	1,727	6,169
APAC	30,102	—	30,102	13,440	—	13,440
Total revenues	$ 36,530	$ 1,876	$ 38,406	$ 21,585	$ 3,868	$ 25,453

	Six Months Ended June 30, 2022			Six Months Ended June 30, 2021		
	Performance Enzymes	Novel Biotherapeutics	Total	Performance Enzymes	Novel Biotherapeutics	Total
Major products and service:						
Product revenue	$ 65,335	$ —	$ 65,335	$ 24,943	$ —	$ 24,943
Research and development revenue	4,294	4,117	8,411	10,872	7,670	18,542
Total revenues	$ 69,629	$ 4,117	$ 73,746	$ 35,815	$ 7,670	$ 43,485
Primary geographical markets:						
Americas	$ 4,861	$ 2,486	$ 7,347	$ 6,574	$ 4,199	$ 10,773
EMEA	7,186	1,631	8,817	8,979	3,471	12,450
APAC	57,582	—	57,582	20,262	—	20,262
Total revenues	$ 69,629	$ 4,117	$ 73,746	$ 35,815	$ 7,670	$ 43,485

Contract Balances

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

	June 30, 2022	December 31, 2021
Contract assets	$ 11,287	$ 4,557
Unbilled receivables	$ 8,543	$ 8,558
Contract costs	$ 36	$ 56
Contract liabilities: deferred revenue	$ 5,381	$ 6,335

We had no asset impairment charges related to financial assets in the three and six months ended June 30, 2022 and 2021.

The increase in contract assets was primarily due to increases in product revenue from contracts subject to over time revenue recognition. The nominal decrease in unbilled receivables was primarily due to the timing of billings. The decrease in deferred revenue was primarily due to timing of recognition of revenue.

We recognized the following revenues (in thousands):

	Three Months Ended June 30,		Six Months Ended June 30,	
Revenue recognized in the period for:	2022	2021	2022	2021
Amounts included in contract liabilities at the beginning of the period:				
Performance obligations satisfied	$ 441	$ 1,239	$ 1,413	$ 1,391
Changes in the period:				
Changes in the estimated transaction price allocated to performance obligations satisfied in prior periods	(298)	4,306	(29)	4,336
Performance obligations satisfied from new activities in the period - contract revenue	38,263	19,908	72,362	37,758
Total revenues	$ 38,406	$ 25,453	$ 73,746	$ 43,485

Performance Obligations

The following table includes estimated revenue expected to be recognized in the future related to performance obligations that are unsatisfied or partially unsatisfied at the end of the reporting periods. The estimated revenue does not include contracts with original durations of one year or less, amounts of variable consideration attributable to royalties, or contract renewals that are unexercised as of June 30, 2022.

The balances in the table below are partially based on judgments involved in estimating future orders from customers subject to the exercise of material rights pursuant to respective contracts as of June 30, 2022 (in thousands):

	Remainder of 2022	2023	2024	2025 and Thereafter	Total
Product revenue	$ 5	$ 67	$ 100	$ 2,876	$ 3,048
Research and development revenue	1,019	1,292	15	7	2,333
Total revenues	$ 1,024	$ 1,359	$ 115	$ 2,883	$ 5,381

Note 4. Net Loss per Share

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

Anti-Dilutive Securities

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

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

	Three Months Ended June 30,		Six Months Ended June 30,	
	2022	2021	2022	2021
Shares issuable under the Equity Incentive Plan	5,792	5,366	5,792	5,366

Note 5. Investments in Non-Marketable Securities

Non-Marketable Debt Securities

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

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

In November 2020, we purchased convertible subordinated notes issued by Arzeda Corp. ("Arzeda"), an early-stage computational protein design company, for $1.0 million and the investment was classified as available-for-sale non-marketable interest-bearing debt securities. In July 2021, we converted the non-marketable debt security with a carrying value of $1.3 million into 207,070 shares of Series B-2 preferred stock of Arzeda Corp. During the three and six months ended June 30, 2021 we recognized $0.2 million and $0.3 million, respectively, in interest income from interest earned on our investment in this debt security.

There were no investments in non-marketable debt securities as of June 30, 2022 and December 31, 2021.

Non-Marketable Equity Securities

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

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

There was no remeasurement event for our investments in non-marketable equity securities that occurred during the three and six months ended June 30, 2022 and 2021. We recognized no realized gains or losses during the three and six months ended June 30, 2022 and 2021.

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

	June 30, 2022	December 31, 2021
Molecular Assemblies, Inc. ("MAI")	$ 12,713	$ 12,713
seqWell	5,000	—
Arzeda	1,289	1,289
Other investments in non-marketable equity securities	300	—
Total non-marketable equity securities	$ 19,302	$ 14,002

Note 6. Fair Value Measurements

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

	June 30, 2022			
	Level 1	Level 2	Level 3	Total
Money market funds	$ 67,218	$ —	$ —	$ 67,218

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

During the three and six months ended June 30, 2022 and 2021, we didnot recognize any significant credit losses nor other-than-temporary impairment losses on non-marketable securities.

Note 7. Balance Sheets Details

Cash Equivalents

Cash equivalents as of June 30, 2022 and December 31, 2021, consisted of the following (in thousands):

	June 30, 2022		December 31, 2021	
	Adjusted Cost	Estimated Fair Value	Adjusted Cost	Estimated Fair Value
Money market funds [1]	$ 67,218	$ 67,218	$ 86,095	$ 86,095

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

As of June 30, 2022, the total cash and cash equivalents balance of $90.1 million consisted of money market funds of $67.2 million and cash of $22.9 million held with major financial institutions. As of December 31, 2021, the total cash and cash equivalents balance of $116.8 million consisted of money market funds of $86.1 million and cash of $30.7 million held with major financial institutions.

Inventories

Inventories consisted of the following (in thousands):

	June 30, 2022	December 31, 2021
Raw materials	$ 49	$ 49
Work-in-process	73	65
Finished goods	1,596	1,046
Inventories	$ 1,718	$ 1,160

Inventories are recorded net of reserves of $1.4 million as of June 30, 2022 and December 31, 2021.

Property and Equipment, net

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

	June 30, 2022	December 31, 2021
Laboratory equipment	$ 38,378	$ 33,101
Leasehold improvements	16,609	16,117
Computer equipment and software	3,836	3,481
Office equipment and furniture	1,320	1,297
Construction in progress	1,670	3,231
Property and equipment	61,813	57,227
Less: accumulated depreciation and amortization	(38,119)	(35,882)
Property and equipment, net	$ 23,694	$ 21,345

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

	Three Months Ended June 30,		Six Months Ended June 30,	
	2022	2021	2022	2021
Depreciation expense	$ 1,341	$ 716	$ 2,556	$ 1,375

Goodwill

Goodwill had a carrying value of $3.2 million as of June 30, 2022 and December 31, 2021.

Other Accrued Liabilities

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

	June 30, 2022	December 31, 2021
Accrued purchases	$ 8,292	$ 6,755
Accrued professional and outside service fees	4,113	5,147
Other	529	676
Total	$ 12,934	$ 12,578

Note 8. Stock-based Compensation

Equity Incentive Plans

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

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

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

The 2010 Plan provided for the grant of incentive stock options, non-statutory stock options, RSUs, RSAs, PSUs, PBOs, stock appreciation rights, and stock purchase rights to our employees, non-employee directors and consultants.

Stock Options

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

Restricted Stock Units ("RSUs")

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

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

The compensation committee of the Board approved, solely in respect of non-executive employees, delegated to our Chief Executive Officer the authority to approve grants of PSUs. The compensation committee of the Board also 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 2022, we awarded PSUs ("2022 PSUs") and PBOs ("2022 PBOs"), each of which commence vesting based upon the achievement of various weighted performance goals, including total revenues, research and development revenue, product revenue (excluding sales of CDX-616 to Pfizer for its use in the manufacture of a critical intermediate for nirmatrelvir, an active pharmaceutical ingredient (API) in its PAXLOVID™ product), operating expenses excluding cost of product revenue, strategic performance enzyme deliverables, strategic biotherapeutics deliverables, organization and infrastructure upgrades, corporate developments, and significant events that can be publicly announced, subject to the recipient's continued service. As of June 30, 2022, we estimated that the 2022 PSUs and 2022 PBOs performance goals would be achieved at 92% and 46% of the target level, respectively, and recognized stock-based compensation expenses accordingly.

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

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

Stock-Based Compensation Expense

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

	Three Months Ended June 30,		Six Months Ended June 30,	
	2022	2021	2022	2021
Research and development	$ 959	$ 597	$ 1,895	$ 1,074
Selling, general and administrative	2,272	2,247	5,174	4,457
Total	$ 3,231	$ 2,844	$ 7,069	$ 5,531

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

	Three Months Ended June 30,		Six Months Ended June 30,	
	2022	2021	2022	2021
Stock options	$ 794	$ 682	$ 1,600	$ 1,347
RSUs and RSAs	1,333	690	2,495	1,232
PSUs	442	573	1,314	1,043
PBOs	662	899	1,660	1,909
Total	$ 3,231	$ 2,844	$ 7,069	$ 5,531

As of June 30, 2022, unrecognized stock-based compensation expense, net of expected forfeitures, was $5.8 million related to unvested stock options, $8.4 million related to unvested RSUs and RSAs, $1.8 million related to unvested PSUs, and $3.5 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 2026.

Note 9. Capital Stock

Exercise of Options

For the six months ended June 30, 2022 and June 30, 2021, we issued 174,600 and 212,631 shares, respectively, upon option exercises at a weighted-average exercise price of $2.47 and $8.03 per share, respectively, with net cash proceeds of $0.4 million and $1.7 million, respectively.

Equity Distribution Agreement

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

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

During the three and six months ended June 30, 2022,no shares of our common stock were issued pursuant to the EDA. As of June 30, 2022, $50.0 million worth of shares remained available for sale under the EDA.

Note 10. Commitments and Contingencies

Operating Leases

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

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

Pursuant to the terms of the RWC Lease, we exercised our right to deliver a letter of credit in lieu of a security deposit. The letter of credit is collateralized by deposit balances held by the bank in the amount of $1.1 million as of June 30, 2022 and December 31, 2021, and are recorded as non-current restricted cash on the unaudited condensed consolidated balance sheets.

In January 2021, we entered into a lease agreement with ARE-San Francisco No. 63, LLC (“ARE”) to lease a portion of a facility consisted of approximately 36,593 rentable square feet in San Carlos, California to serve as additional office and research and development laboratory space (the “San Carlos Space”). The terms include an initial annualized base rent of $2.5 million, subject to scheduled 3% annual rent increases, an annualized additional allowance payment of $0.4 million, plus certain operating expenses. The lease has a 10-year term from the lease commencement date of November 30, 2021 with one option to extend the term for an additional period of 5 years. We have provided ARE with a $0.5 million security deposit in the form of a letter of credit and we commenced occupancy of the San Carlos Space in December 2021. We have the right to sublease the facility, subject to landlord consent.

We entered into a short-term office lease in San Carlos, California during the second quarter of 2021 and this lease expired in April 2022. Our remaining future commitment pursuant to this lease is nil as of June 30, 2022.

We are required to restore certain areas of the Redwood City and San Carlos facilities that we are renting to their original form. We are expensing the asset retirement obligation over the terms of the respective leases. We review the estimated obligation each reporting period and make adjustments if our estimates change. We recorded asset retirement obligations of 0.5 million and $0.4 million as of June 30, 2022 and December 31, 2021, 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 six months ended June 30, 2022 and 2021.

Lease and other information

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

	Three Months Ended June 30,		Six Months Ended June 30,	
	2022	2021	2022	2021
Finance lease costs	$ —	$ 27	$ 18	$ 53
Operating lease cost	1,829	1,033	3,660	2,065
Short-term lease costs [1]	10	10	40	10
Total lease cost [2]	$ 1,839	$ 1,070	$ 3,718	$ 2,128

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

Other information:	Operating Leases
Weighted-average remaining lease term (in years)	7.5 years
Weighted-average discount rate	5.4 %

	Six Months Ended June 30,	
Cash paid:	2022	2021
Operating cash flows from operating leases	$ 2,817	$ 2,093

As of June 30, 2022, our maturity analysis of annual undiscounted cash flows of the non-cancellable operating leases are as follows (in thousands):

Years ending December 31,	Operating Leases
2022 (remaining 6 months)	$ 3,688
2023	7,568
2024	7,783
2025	8,004
2026	8,232
2027 and thereafter	20,706
Total minimum lease payments	55,981
Less: imputed interest	9,872
Lease obligations	$ 46,109

Reconciliation of operating lease liabilities as shown within the unaudited condensed consolidated balance sheets	
Current portion of lease obligations - Operating leases	$ 5,103
Long-term lease obligations - Operating leases	41,006
Total operating lease liabilities	$ 46,109

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	Various	$ 3,970
Facility maintenance agreement	January 2022	1,450
Total other commitments		$ 5,420

Credit Facility

In June 30, 2017, we entered into a credit facility (the “Credit Facility”) with Western Alliance Bank consisting of term loans (“Term Debt”) up to $10.0 million, and advances (“Advances”) under a revolving line of credit ("Revolving Line of Credit") up to $5.0 million with an accounts receivable borrowing base of 80% of eligible accounts receivable. The right to take draws on the Term Debt expired on December 31, 2021. On October 1, 2024, loans drawn, if any, under the Revolving Line of Credit terminate. Advances made under the Revolving Line of Credit bear interest at a variable annual rate equal to the greater of (i) 4.25% or (ii) the sum of (A) the prime rate plus (B) 1.00%. As of June 30, 2022 and December 31, 2021, we have not drawn from the Credit Facility.

Our obligations under the Credit Facility are secured by a lien on substantially all of our personal property other than our intellectual property. The Credit Facility includes a number of customary covenants and restrictive financial covenants including meeting minimum product revenue levels and maintaining certain minimum cash levels with the lender. The Credit Facility's financial covenants restrict the ability of the Company to transfer collateral, incur additional indebtedness, engage in mergers or acquisitions, pay dividends or make other distributions, make investments, create liens, sell assets, or sell certain assets held at foreign subsidiaries. A failure to comply with these covenants could permit the lender to exercise remedies against us and the collateral securing the Credit Facility, including foreclosure of our properties securing the Credit Facilities and our cash. As of June 30, 2022, we were in compliance with the covenants for the Credit Facility.

Legal Proceedings

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

In April 2022, we reached a settlement resolving a non-material dispute involving the Company's trademark. The terms of the settlement are not material to the business or the results of operations of the Company.

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 11. Related Party Transactions

Molecular Assemblies, Inc.

In June 2020, we entered into a Stock Purchase Agreement with MAI pursuant to which we purchased 1,587,050 shares of MAI's Series A preferred stock for $1.0 million. In connection with the transaction, John Nicols, our President and Chief Executive Officer, also joined MAI's board of directors. Concurrently with our initial equity investment, we entered into a Master Collaboration and Research Agreement with MAI (the "MAI Agreement"), pursuant to which we are leveraging our CodeEvolver® protein engineering platform technology to improve the DNA polymerase enzymes that are critical for enzymatic DNA synthesis. Under the MAI Agreement, we are performing services utilizing our CodeEvolver® protein engineering platform technology to improve DNA polymerase enzymes in exchange for compensation in the form of additional shares of MAI's Series A preferred stock. We completed the R&D service with MAI pursuant to the MAI Agreement during the first quarter of 2022. In December 2021, we received the primary milestone payment pursuant to the MAI Agreement of $1.0 million in the form of an additional 1,587,049 shares of Series B preferred stock. In addition to our initial equity investment and the shares we have received under the MAI Agreement, in April 2021, we purchased an additional 1,000,000 shares of MAI's Series A preferred stock for $0.6 million and in September 2021, we purchased 9,198,423 shares of MAI's Series B preferred stock for $7.0 million.

We recognized nil and $0.2 million in research and development revenue from transactions with MAI in the three and six months ended June 30, 2022, respectively, and we recognized $0.3 million and $0.5 million in research and development service transactions with MAI in the three and six months ended June 30, 2021, respectively. We received nil shares of MAI's Series A and B preferred stock from research and development services we provided to MAI in the three and six months ended June 30, 2022, and we received 714,171 and 1,428,342 shares of MAI's Series A and B preferred stock from research and development services we provided to MAI in the three and six months ended June 30, 2021, respectively. As of June 30, 2022 we have 16,705,320 shares of MAI's Series A and B preferred stock that we have earned or purchased since executing the Stock Purchase Agreement with MAI.

During the second quarter of 2022, we sold certain enzyme products to MAI pursuant to the purchase order we received from MAI during the quarter. We recognized $0.1 million in product revenue from transactions with MAI in the three and six months ended June 30, 2022, respectively.

The carrying value of our investment in MAI Series A and B preferred stock was $12.7 million as of June 30, 2022 and December 31, 2021. We had nil and $0.2 million in deferred revenue from MAI as of June 30, 2022 and December 31, 2021 respectively. Payment for the services rendered was received in the form of additional shares of MAI's Series A and Series B preferred stock.

On August 2, 2022, we announced that we had executed a Commercial License and Enzyme Supply Agreement with MAI ("MAI Supply Agreement") that will enable MAI to utilize an evolved terminal deoxynucleotidyl transferase (TdT) enzyme in MAI's Fully Enzymatic Synthesis™ (or FES™) technology.

Note 12. Segment, Geographical and Other Revenue Information

Segment Information

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

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

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. All of our long lived assets are located in the United States.

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

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

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

	Three Months Ended June 30, 2022			Three Months Ended June 30, 2021		
	Performance Enzymes	Novel Biotherapeutics	Total	Performance Enzymes	Novel Biotherapeutics	Total
Revenues:						
Product revenue	$ 34,645	$ —	$ 34,645	$ 14,717	$ —	$ 14,717
Research and development revenue	1,885	1,876	3,761	6,868	3,868	10,736
Total revenues	36,530	1,876	38,406	21,585	3,868	25,453
Costs and operating expenses:						
Cost of product revenue	11,270	—	11,270	4,318	—	4,318
Research and development[(1)]	6,929	11,078	18,007	5,057	7,194	12,251
Selling, general and administrative[(1)]	3,876	680	4,556	3,170	620	3,790
Total segment costs and operating expenses	22,075	11,758	33,833	12,545	7,814	20,359
Income (loss) from operations	$ 14,455	$ (9,882)	4,573	$ 9,040	$ (3,946)	5,094
Corporate costs [(2)]			(5,789)			(8,610)
Unallocated depreciation and amortization			(1,316)			(741)
Loss before income taxes			$ (2,532)			$ (4,257)

	Six Months Ended June 30, 2022			Six Months Ended June 30, 2021		
	Performance Enzymes	Novel Biotherapeutics	Total	Performance Enzymes	Novel Biotherapeutics	Total
Revenues:						
Product revenue	$ 65,335	$ —	$ 65,335	$ 24,943	$ —	$ 24,943
Research and development revenue	4,294	4,117	8,411	10,872	7,670	18,542
Total revenues	69,629	4,117	73,746	35,815	7,670	43,485
Costs and operating expenses:						
Cost of product revenue	19,791	—	19,791	8,536	—	8,536
Research and development[1]	13,051	23,424	36,475	11,502	11,799	23,301
Selling, general and administrative[1]	7,416	1,400	8,816	5,988	1,221	7,209
Total segment costs and operating expenses	40,258	24,824	65,082	26,026	13,020	39,046
Income (loss) from operations	$ 29,371	$ (20,707)	8,664	$ 9,789	$ (5,350)	4,439
Corporate costs [2]			(16,994)			(16,335)
Unallocated depreciation and amortization			(2,549)			(1,426)
Loss before income taxes			$ (10,879)			$ (13,322)

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

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

	Three Months Ended June 30,							
	2022				2021			
	Performance Enzymes	Novel Biotherapeutics	Corporate cost	Total	Performance Enzymes	Novel Biotherapeutics	Corporate cost	Total
Stock-based compensation	$ 1,283	$ 358	$ 1,590	$ 3,231	$ 1,115	$ 257	$ 1,472	$ 2,844

	Six Months Ended June 30,							
	2022				2021			
	Performance Enzymes	Novel Biotherapeutics	Corporate cost	Total	Performance Enzymes	Novel Biotherapeutics	Corporate cost	Total
Stock-based compensation	$ 2,770	$ 768	$ 3,531	$ 7,069	$ 2,109	$ 495	$ 2,927	$ 5,531

Significant Customers

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

	Percentage of Total Revenues for the			
	Three Months Ended June 30,		Six Months Ended June 30,	
	2022	2021	2022	2021
Customer A	62 %	15 %	62 %	10 %
Customer B	*	12 %	*	13 %
Customer C	*	12 %	*	*
Customer D	*	*	*	17 %
Customer E	*	*	*	10 %

** Percentage was less than 10%*

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

	Percentage of Accounts Receivables as of	
	June 30, 2022	December 31, 2021
Customer A	67 %	62 %

Geographical Information

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

	Three Months Ended June 30,		Six Months Ended June 30,	
	2022	2021	2022	2021
Revenues				
Americas	$ 3,614	$ 5,844	$ 7,347	$ 10,773
EMEA	4,690	6,169	8,817	12,450
APAC	30,102	13,440	57,582	20,262
Total revenues	$ 38,406	$ 25,453	$ 73,746	$ 43,485

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

	June 30, 2022	December 31, 2021
United States	$ 65,400	$ 65,457

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

	As of June 30, 2022 and December 31, 2021		
	Performance Enzymes	Novel Biotherapeutics	Total
Goodwill	$ 2,463	$ 778	$ 3,241

Note 13. Allowance for Credit Losses

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

	Three and Six Months Ended June 30,	
	2022	2021
Balance at beginning of period	$ 416	$ 74
Provision for credit losses	—	—
Write-offs	(257)	—
Adjustment to the existing allowance	(50)	—
Balance at end of period	$ 109	$ 74

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

	June 30, 2022					
	Current	31-60 Days	61-90 Days	91 Days and over	Total over 31 Days	Total balance
Accounts receivable	$ 26,883	$ 2,175	$ 28	$ 114	$ 2,317	$ 29,200

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

Note 14. Subsequent Events

On July 14, 2022, the Company entered into an Enzyme Supply Agreement, effective as of October 30, 2021, with Pfizer Inc. (the "Pfizer Supply Agreement"), covering the manufacture, sale and purchase of the Company's proprietary enzyme product, CDX-616, for use by Pfizer in the manufacture of nirmatrelvir, an API in its PAXLOVID™ (nirmatrelvir tablets; ritonavir tablets) antiviral therapeutic, which is currently authorized for emergency use by the FDA for the treatment of mild to moderate COVID-19.

In addition to defining terms under which Pfizer has and will continue to purchase quantities of CDX-616 from the Company, Pfizer will, pursuant to the terms of the Pfizer Supply Agreement, pay Codexis a retainer fee of $25.9 million which we received in August 2022, which is being paid in lieu of certain existing orders for delivery of the CDX-616 enzyme product in early 2023, which have been cancelled. The retainer fee is creditable against future orders of CDX-616 used to manufacture PAXLOVID™ and for fees associated with any new development and licensing agreements with Pfizer entered into prior to December 31, 2022.

On July 18, 2022, Codexis' Board of Directors appointed Dr. Stephen Dilly, a current Board member, as the Company's new president and chief executive officer, effective August 9, 2022. Dr. Dilly succeeds John Nicols, our current president and chief executive officer, who notified the Board of his intention to retire from these roles effective August 8, 2022. In connection with the appointment of Dr. Dilly as president and chief executive officer, the Board reconstituted its Audit Committee and appointed Byron Dorgan, Chair of the Board, as a member of the Audit Committee to fill the seat previously held by Dr. Dilly.

On July 18, 2022, the Company and Mr. Nicols entered into a Transition and Separation Agreement, pursuant to which Mr. Nicols will continue to serve as the Company's president and chief executive officer through August 8, 2022, at which time he will retire from the Company and will be employed thereafter as a strategic advisor through August 7, 2024, unless Mr. Nicols' employment terminate sooner in accordance with the Transition and Separation Agreement. The Transition and Separation Agreement provides for Mr. Nicols to continue to serve as a member of the Board through the 2023 annual meeting of the Company's stockholders.

On August 2, 2022, we announced that we had executed a Commercial License and Enzyme Supply Agreement with MAI ("MAI Supply Agreement") that will enable MAI to utilize an evolved terminal deoxynucleotidyl transferase (TdT) enzyme in MAI's Fully Enzymatic Synthesis™ (or FES™) technology.

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, 2021 included in our Annual Report on Form 10-K for the year ended December 31, 2021, as filed with the SEC on February 28, 2022 (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 discussed in Part II, Item 1A: "Risk Factors" of this Quarterly Report on Form 10-Q and Part I, Item 1A: "Risk Factors" of our Annual Report, as incorporated herein and referenced in Part II, Item 1A: "Risk Factors" 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 enzymes and other proteins that deliver value to our clients in a growing set of industries. We view proteins as a vast, largely untapped source of value-creating products, 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 enzymes, both as proprietary Codexis products and in partnership with our customers.

We are a pioneer in harnessing 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 the structural and performance attributes of our large and continuously growing library of protein variants. These computational outputs enable increasingly reliable predictions for next generation protein variants to be engineered, enabling time- and cost-efficient delivery of the targeted performance enhancements. 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 bioprocess development which are all coordinated to rapidly innovate novel, fit-for-purpose products.

The core historical application of the technology has been in developing commercially viable biocatalytic manufacturing processes for more sustainable production of complex chemicals. It begins by conceptually designing the most cost-effective and practical process for a targeted product. We then develop optimized biocatalysts to enable the designed process, using our CodeEvolver® platform. Engineered biocatalyst candidates, numbering many thousands for each project, are then rapidly screened and validated using high throughput methods under process-relevant operating conditions. This approach results in an optimized biocatalyst that enables cost-efficient processes that are relatively simple to run in conventional manufacturing equipment allowing for efficient technical transfer of our processes to our manufacturing partners. This also allows for efficient technical transfer of our processes to our manufacturing partners.

We initially commercialized our CodeEvolver® protein engineering technology platform and products in the manufacture of small molecule pharmaceuticals, which remains a primary business focus. Our customers, which include many large, global pharmaceutical companies, use our technology, products and services in their process development and in manufacturing. Additionally, we have licensed our proprietary CodeEvolver® protein engineering technology platform to global pharmaceutical companies enabling them to use this technology, in house, to engineer enzymes for their own businesses. 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 (Codexis' third such agreement with large pharmaceutical companies) allows Novartis to use our proprietary CodeEvolver® protein engineering platform technology in the field of human healthcare.

As evidence of our strategy to extend our technology beyond pharmaceutical manufacturing, we have also used the technology to develop biocatalysts and enzyme products for use in a broader set of industrial markets, including several large verticals, such as food, feed, consumer care and fine chemicals. In addition, we are using our technology to develop enzymes for various life science related applications, such as next generation sequencing ("NGS"), and polymerase chain reaction ("PCR/qPCR") for in vitro molecular diagnostics and genomic research applications. In December 2019, we entered into a license agreement to provide Roche Sequencing Solutions, Inc. with our first enzyme for this target market: the Company's EvoT4™ DNA ligase. In June 2020, we also entered into the MAI Agreement pursuant to which we are leveraging our CodeEvolver® platform technology to improve the DNA polymerase enzymes that are critical for enzymatic DNA synthesis.

We have been using the CodeEvolver® protein engineering technology platform to develop early stage, novel biotherapeutic product candidates, both in partnership with customers and for our own proprietary Codexis drug candidates. Our first program was 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 License Agreement") with Societé des Produits Nestlé S.A., formerly known as 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. Also in October 2017, we entered into a strategic collaboration agreement with Nestle Health Science ("Nestlé SCA") pursuant to which we and Nestlé Health Science are collaborating to leverage the CodeEvolver® platform technology to develop other novel enzymes for Nestlé Health Science's established Consumer Care and Medical Nutrition business areas. In March 2020, we entered into a Strategic Collaboration and License Agreement ("Takeda Agreement") with Shire Human Genetic Therapies, Inc., a wholly-owned subsidiary of Takeda Pharmaceutical Company Limited ("Takeda") for the research and development of novel gene therapies for certain disease indications, including the treatment of lysosomal storage disorders and a blood factor deficiency.

BUSINESS SEGMENTS

We manage our business as two business segments: Performance Enzymes and Novel Biotherapeutics. See Note 12, "Segment, Geographical and Other Revenue Information" in the Notes to Unaudited Condensed Consolidated Financial Statements included in this Quarterly Report on Form 10-Q.

Performance Enzymes

We initially commercialized our CodeEvolver® protein engineering technology platform and products in the manufacture of small molecule pharmaceuticals 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, feed, consumer care, and fine chemicals. We also use our technology in the life sciences markets to develop enzymes for customers using NGS and PCR/qPCR for in vitro molecular diagnostic and molecular biology research applications, as well DNA/RNA synthesis and health monitoring 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.

BUSINESS UPDATE REGARDING COVID-19

We are subject to risks and uncertainties as a result of the current COVID-19 pandemic. The COVID-19 pandemic has presented a substantial public health and economic challenge around the world and is affecting our employees, communities and business operations, as well as the U.S. economy and other economies worldwide. The full extent to which the COVID-19 pandemic will directly or indirectly impact our business, results of operations and financial condition will depend on future developments that are highly uncertain and may not be accurately predicted, including the duration and severity of the pandemic, the prevalence of more contagious and or virulent variants, and the extent and severity of the impact on our customers, new information that may emerge concerning COVID-19, the actions taken to contain it or treat its impact and the economic impact on local, regional, national and international markets.

To date, we and our collaboration partners have been able to continue to supply our enzymes to our customers worldwide, however, there can be no guarantee this will continue. Furthermore, our ability to provide future R&D services will continue to be impacted as a result of governmental orders and any disruptions in operations of our customers with whom we collaborate. We believe that these disruptions have had minimal impact on our revenue for the three and six months ended June 30, 2022. The extent to which the pandemic may impact our business operations and operating results will continue to remain highly dependent on future developments, which are uncertain and cannot be predicted with confidence. Should these disruptions escalate in the future, they may negatively and materially impact our business. results of operations and financial condition.

As a result of the COVID-19 pandemic we have received purchase orders from Pfizer for large quantities of our proprietary enzyme product, CDX-616, for use by Pfizer in the manufacture of a critical intermediate for its proprietary API, nirmatrelvir, used by Pfizer in combination with the API ritonavir, as its PAXLOVID™ (nirmatrelvir tablets; ritonavir tablets) product for the treatment of COVID-19 infections in humans. These purchase orders have had substantial impact on our revenue for the three and six months ended June 30, 2022 and for the year ended December 31, 2021. See below under "Recent Developments."

Our future results of operations and liquidity could be adversely impacted by delays in payments of outstanding receivable amounts beyond normal payment terms, supply chain disruptions and uncertain demand, and the impact of any initiatives or programs that we may undertake to address financial and operations challenges faced by our customers. The near-and-long term impact of COVID-19 to our financial condition, liquidity, or results of operations remains uncertain. Although some of the Orders that were enacted to control the spread of COVID-19 have been scaled back and the vaccine rollout has expanded, surges in the spread of COVID-19 due to the emergence of new more contagious or virulent variants or the ineffectiveness of the vaccines against such strains, may result in the reimplementation of certain Orders, which could adversely impact our business. The extent to which the COVID-19 pandemic may materially impact our financial condition, liquidity, or results of operations in the future is uncertain.

Recent Developments

In July 2022, we entered into an Enzyme Supply Agreement, effective as of October 30, 2021, with Pfizer Inc. (the "Pfizer Supply Agreement"), covering the manufacture, sale and purchase of CDX-616 for use by Pfizer in the manufacture of nirmatrelvir. In addition to defining terms under which Pfizer has and will continue to purchase quantities of CDX-616 from us, Pfizer will, pursuant to the terms of the Pfizer Supply Agreement, pay Codexis a retainer fee of $25.9 million which we received in August 2022, which is being paid in lieu of certain existing orders for delivery of the CDX-616 enzyme product in early 2023, which have been cancelled. The retainer fee is creditable against future orders of CDX-616 used to manufacture PAXLOVID™ and for fees associated with any new development and licensing agreements with Pfizer entered into prior to December 31, 2022. We anticipate recognizing a nominal portion of the retainer fee as revenue in 2022, and recognizing the remainder as revenue in 2023 and 2024.

Results of Operations Overview

Revenues were $38.4 million in the second quarter of 2022, a 51% increase from $25.5 million in the second quarter of 2021.

Product revenue, which consists primarily of sales of biocatalysts, pharmaceutical intermediates, and Codex® biocatalyst panels and kits, was $34.6 million in the second quarter of 2022, an increase of 135% from $14.7 million in the second quarter of 2021. The increase in product revenue was primarily due to revenue from Pfizer related to the purchase of our CDX-616 enzyme products, but partially offset by lower revenue from the sales of other enzyme products used in the manufacture of branded pharmaceutical products. We expect the sale of CDX-616 enzyme products to Pfizer under the Pfizer Supply Agreement to remain a significant component of our product revenue in 2022.

Research and development revenues, which include license, technology access and exclusivity fees, research service fees, milestone payments, royalties, and optimization and screening fees, totaled $3.8 million in the second quarter of 2022, a 65% decrease compared with $10.7 million in the second quarter of 2021. The decrease in research and development revenue was primarily due to lower research and development fees from Takeda under the Takeda Agreement and lower research and development fees from other existing collaboration agreements being recognized in the second quarter of 2022 as compared to the same period in the prior year.

Our products' profitability is affected by many factors including the average profit margin on the products we sell. 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 is used as a management performance measure to provide additional information regarding our results of operations on a consolidated basis. Product gross margins were 67% in the second quarter of 2022, compared to 71% in the second quarter of 2021, due to a less favorable product mix, variation in prices per volume sold and higher shipping costs.

Research and development expenses were $19.1 million in the second quarter of 2022, an increase of 49% from $12.8 million in the second quarter of 2021. The increase was primarily due to increases in costs associated with higher headcount, higher facilities cost and lab supplies, increase in outside services costs related to Chemistry, Manufacturing and Controls ("CMC") and regulatory expenses, higher stock-based compensation and higher depreciation expense and other outside services. We expect research and development expenses for the rest of the year to be higher than the comparative prior year periods mainly due to increases in headcount, higher allocation of facilities cost due to the additional research and development laboratory space in which we commenced occupancy in December 2021, and other external costs as we continue our efforts on advancing our internal and collaborative programs.

Selling, general and administrative expenses were $10.7 million in the second quarter of 2022, a decrease of 17%, compared to $12.8 million in the second quarter of 2021. The decrease was primarily due to decrease in legal fees due to settlement of a trademark dispute in April 2022 and lower allocable expenses, partially offset by an increase in costs associated with a higher headcount and higher outside and temporary services.

Net loss was $2.6 million, or a net loss of $0.04 per basic and diluted share in the second quarter of 2022 compared to a net loss of $4.3 million, or a net loss of $0.07 per basic and diluted share for the second quarter of 2021. The decrease in net loss is primarily related to an increase in product revenue, partially offset by higher operating expenses and lower research and development revenues.

Cash and cash equivalents decreased to $90.1 million as of June 30, 2022 compared to $116.8 million as of December 31, 2021. In addition,net cash used in operations was $13.4 million in the six months ended June 30, 2022 compared to $14.7 million in the six months ended June 30, 2021. We believe that our existing cash and cash equivale›s, combined with our future expectations for product revenues, research and development revenues, and expense management will provide adequate funds for ongoing operations, planned capital expenditures and working capital requirements through the end of 2024.

In June 2017, we entered into a loan and security agreement with Western Alliance Bank 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. Draws on the term debt are subject to customary conditions for funding. Our ability to take draws on the term debt expired on December 31, 2021. As of June 30, 2022, no amounts were borrowed under the Credit Facility and we were in compliance with the covenants for the Credit Facility. See Note 10, "Commitments and Contingencies" in the Notes to Unaudited Condensed Consolidated Financial Statements included in this Quarterly Report on Form 10-Q.

Merck Sitagliptin Catalyst Supply Agreement

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

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

We recognized revenue of $0.7 million and $2.4 million for the three and six months ended June 30, 2022, respectively, compared to $2.2 million and $5.5 million for the three and six months ended June 30, 2021, respectively, in product revenue under this agreement. Revenues recognized by us under the Sitagliptin Catalyst Supply Agreement comprised 2% and 3% of our total revenues for the three and six months ended June 30, 2022, respectively, compared to 9% and 13% for the three and six months ended June 30, 2021, respectively.

As of June 30, 2022, we recorded revenue of $1.0 million from sitagliptin enzyme sales that were recognized over time based on the progress of the manufacturing process. These products will be shipped within the six month period following the end of the second quarter of 2022.

Global Development, Option and License Agreement and Strategic Collaboration Agreement

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

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

In October 2017, we entered into the Nestlé SCA pursuant to which we and Nestlé Health Science are collaborating to leverage the CodeEvolver® protein engineering technology platform to develop novel enzymes for Nestlé Health Science's established Consumer Care and Medical Nutrition business areas. The term of the Nestlé SCA has been extended through December 2022.

In January 2020, we entered into a development agreement with Nestlé Health Science pursuant to which we and Nestlé Health Science are collaborating to advance a lead candidate discovered through our Nestlé SCA, CDX-7108, targeting Exocrine Pancreatic Insufficiency, into preclinical and early clinical studies. We, together with Nestlé Health Science, are continuing to advance CDX-7108 and initiated a Phase 1 clinical trial with the first subject being dosed in the fourth quarter of 2021.

Under the Nestlé SCA and the development agreement, we recognized $0.6 million and $1.6 million in research and development fees for the three and six months ended June 30, 2022, respectively, compared to $1.7 million and $3.5 million for the three and six months ended June 30, 2021, respectively.

Platform Technology Transfer and License Agreement

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

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

We recognized $0.3 million and $0.5 million in research and development revenue for the three and six months ended June 30, 2022, respectively, compared to $0.3 million and $1.1 million for the three and six months ended June 30, 2021, respectively.

Strategic Collaboration and License Agreement

In March 2020, we entered into the Takeda Agreement with Shire Human Genetic Therapies, Inc., a wholly-owned subsidiary of Takeda Pharmaceutical Co. Ltd. ("Takeda"), under which we are collaborating to research and develop protein sequences for use in gene therapy products for certain diseases in accordance with each applicable program plan.

On execution of the Takeda Agreement, we received an upfront non-refundable cash payment of $8.5 million and we initiated activities under three program plans for Fabry Disease, Pompe Disease, and an undisclosed blood factor deficiency, respectively (the "Initial Programs"). In May 2021, Takeda elected to exercise its option to initiate an additional program for a certain undisclosed rare genetic disorder; as a result we received the option exercise fee during the third quarter of 2021. Pursuant to the Takeda Agreement, we are eligible to receive other payments that include (i) reimbursement of research and development fees and preclinical development milestones for the three initial programs of $10.5 million, in aggregate, and $5.9 million for the fourth program, (ii) clinical development and commercialization-based milestones, per target gene, of up to $100.0 million and (iii) tiered royalty payments based on net sales of applicable products at percentages ranging from the mid-single digits to low single-digits.

Revenue recognized relating to the functional licenses provided to Takeda was recognized at a point in time when the control of the license transferred to the customer. We recognized research and development revenue related to the Takeda Agreement of $1.3 million and $2.5 million for the three and six months ended June 30, 2022, respectively, compared to $2.1 million and $4.2 million for the three and six months ended June 30, 2021, respectively.

Pfizer, Inc. purchase orders

We recognized product revenue of $23.8 million and $45.1 million for the three and six months ended June 30, 2022, respectively, compared to $3.9 million and $4.3 million for the three and six months ended June 30, 2021, respectively, from the sale of quantities of CDX-616 enzyme products to Pfizer. Revenues recognized by us from sales of CDX-616 enzyme products to Pfizer comprised 62% and 61% of our total revenues for the three and six months ended June 30, 2022, respectively, and 15% and 10% for the three and six months ended June 30, 2021, respectively. As of June 30, 2022, we recorded revenue and contract assets of $9.7 million from the sale of this enzyme product that were recognized over time based on the progress of the manufacturing process. These products will be shipped within the three month period following the end of the second quarter of 2022.

See Note 14, "Subsequent Events" in the Notes to Unaudited Condensed Consolidated Financial Statements and above under "Recent Developments" for additional information with regard to the Pfizer Supply Agreement.

RESULTS OF OPERATIONS

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

	Three Months Ended June 30,		Change		Six Months Ended June 30,		Change	
	2022	2021	$	%	2022	2021	$	%
Revenues:								
Product revenue	$ 34,645	$ 14,717	$ 19,928	135 %	$ 65,335	$ 24,943	$ 40,392	162 %
Research and development revenue	3,761	10,736	(6,975)	(65) %	8,411	18,542	(10,131)	(55) %
Total revenues	38,406	25,453	12,953	51 %	73,746	43,485	30,261	70 %
Costs and operating expenses:								
Cost of product revenue	11,270	4,318	6,952	161 %	19,791	8,536	11,255	132 %
Research and development	19,089	12,826	6,263	49 %	38,590	24,397	14,193	58 %
Selling, general and administrative	10,656	12,795	(2,139)	(17) %	26,360	24,193	2,167	9 %
Total costs and operating expenses	41,015	29,939	11,076	37 %	84,741	57,126	27,615	48 %
Loss from operations	(2,609)	(4,486)	1,877	(42) %	(10,995)	(13,641)	2,646	(19) %
Interest income	140	206	(66)	(32) %	182	382	(200)	(52) %
Other income (expense), net	(63)	23	(86)	(374) %	(66)	(63)	(3)	5 %
Loss before income taxes	(2,532)	(4,257)	1,725	(41) %	(10,879)	(13,322)	2,443	(18) %
Provision for income taxes	108	8	100	1,250 %	117	11	106	964 %
Net loss	$ (2,640)	$ (4,265)	$ 1,625	(38) %	$ (10,996)	$ (13,333)	$ 2,337	(18) %

Revenues

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

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

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

	Three Months Ended June 30,		Change		Six Months Ended June 30,		Change	
	2022	2021	$	%	2022	2021	$	%
Product revenue	$ 34,645	$ 14,717	$ 19,928	135 %	$ 65,335	$ 24,943	$ 40,392	162 %
Research and development revenue	3,761	10,736	(6,975)	(65) %	8,411	18,542	(10,131)	(55) %
Total revenues	$ 38,406	$ 25,453	$ 12,953	51 %	$ 73,746	$ 43,485	$ 30,261	70 %

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

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

Total revenues increased by $13.0 million and $30.3 million in the three and six months ended June 30, 2022, respectively, compared to the same periods in 2021, primarily due to higher product revenue but partially offset by lower research and development revenue.

Product revenue, increased by $19.9 million and $40.4 million in the three and six months ended June 30, 2022, respectively, compared to the same periods in 2021, primarily due to $23.8 million and $45.1 million in revenue from Pfizer related to the purchase of our CDX-616 enzyme products, but partially offset by lower revenue volume from sales of other enzyme products used in the manufacture of branded pharmaceutical products.

Research and development revenue decreased by $7.0 million and $10.1 million in the three and six months ended June 30, 2022, respectively, compared to the same periods in 2021, primarily due to lower research and development fees from Takeda under the Takeda Agreement and lower research and development fees from other existing collaboration agreements being recognized in 2022 as compared to the same periods in the prior year.

Cost and Operating Expenses

Our cost and operating expenses consist 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, except percentages):

	Three Months Ended June 30,		Change		Six Months Ended June 30,		Change	
	2022	2021	$	%	2022	2021	$	%
Cost of product revenue	$ 11,270	$ 4,318	$ 6,952	161 %	$ 19,791	$ 8,536	$ 11,255	132 %
Research and development	19,089	12,826	6,263	49 %	38,590	24,397	14,193	58 %
Selling, general and administrative	10,656	12,795	(2,139)	(17) %	26,360	24,193	2,167	9 %
Total costs and operating expenses	$ 41,015	$ 29,939	$ 11,076	37 %	$ 84,741	$ 57,126	$ 27,615	48 %

Cost of Product Revenue and Product Gross Margin

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

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

	Three Months Ended June 30,		Change		Six Months Ended June 30,		Change	
	2022	2021	$	%	2022	2021	$	%
Product revenue	$ 34,645	$ 14,717	$ 19,928	135 %	$ 65,335	$ 24,943	$ 40,392	162 %
Cost of product revenue [1]	11,270	4,318	6,952	161 %	19,791	8,536	11,255	132 %
Product gross profit	$ 23,375	$ 10,399	$ 12,976	125 %	$ 45,544	$ 16,407	$ 29,137	178 %
Product gross margin (%) [2]	67 %	71 %			70 %	66 %		

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

Cost of product revenue increased by $7.0 million in the three months ended June 30, 2022 and by $11.3 million in the six months ended June 30, 2022 compared to the same periods in 2021. The increase was primarily due to a higher volume of product sales and variations in product mix. Product gross margins were 67% and 70% in the three and six months ended June 30, 2022, respectively, compared to 71% and 66% in the corresponding periods in 2021 due to variations in product mix, variation in prices per volume sold and higher shipping costs.

Research and Development Expenses

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

Research and development expenses increased by $6.3 million, or 49%, during the three months ended June 30, 2022, and by $14.2 million, or 58%, in the six months ended June 30, 2022, compared to the same periods in 2021. The increase in research and development expenses was primarily due to increases in costs associated with higher headcount, higher facilities cost and lab supplies, increase in outside services related to CMC and regulatory expenses, higher stock-based compensation and higher depreciation expense and other outside services.

Selling, General and Administrative Expenses

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

Selling, general and administrative expenses decreased by $2.1 million, or 17%, in the three months ended June 30, 2022, compared to the same period in 2021, primarily due to decrease in legal fees due to settlement of a trademark dispute in April 2022 and lower allocable expenses, partially offset by an increase in costs associated with a higher headcount and higher outside and temporary services. The increase of $2.2 million, or 9%, in the six months ended June 30, 2022 compared to the same period in 2021, was primarily due to increase in costs associated with a higher headcount, higher stock-based compensation costs and higher outside and temporary services, partially offset by decrease in legal fees due to settlement of the trademark dispute in April 2022 and lower allocable expenses.

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

	Three Months Ended June 30,		Change		Six Months Ended June 30,		Change	
	2022	2021	$	%	2022	2021	$	%
Interest income	$ 140	$ 206	$ (66)	(32) %	$ 182	$ 382	$ (200)	(52) %
Other income (expense), net	(63)	23	(86)	(374) %	(66)	(63)	(3)	5 %
Total other income	$ 77	$ 229	$ (152)	(66) %	$ 116	$ 319	$ (203)	(64) %

Interest Income

Interest income decreased by $0.1 million and $0.2 million in the three and six months ended June 30, 2022, respectively, compared to the same periods in 2021, primarily due to earned interest income and amortization of debt discount on non-marketable debt security in the prior year and reduction in interest income from lower average interest rates on declining average cash balances.

Other Income (Expense), net

Other income (expense), net, decreased by $86 thousand and $3 thousand in the three and six months ended June 30, 2022, respectively, compared to the same periods in 2021, primarily due to interest expense charges recognized on the amortization of an embedded bifurcated derivative of a share-settled redemption feature on non-marketable securities in the prior year.

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

	Three Months Ended June 30,		Change		Six Months Ended June 30,		Change	
	2022	2021	$	%	2022	2021	$	%
Provision for income taxes	$ 108	$ 8	$ 100	1,250 %	$ 117	$ 11	$ 106	964 %

The provision for income taxes for the three and six months ended June 30, 2022 and 2021 were primarily due to the income tax withholding imposed by foreign taxing authorities on income earned in certain countries outside of the united States and remitted to the United States and the accrual of interest and penalties on historic uncertain tax positions.

Net Loss

Net loss for the three months ended June 30, 2022 was $2.6 million, or a net loss per basic and diluted share of $0.04. This compared to a net loss of $4.3 million, or a net loss per basic and diluted share of $0.07 for the three months ended June 30, 2021. Net loss for the six months ended June 30, 2022 was $11.0 million, or a net loss per basic and diluted share of $0.17. This compared to a net loss of $13.3 million, or a net loss per basic and diluted share of $0.21 for the six months ended June 30, 2021. The decrease in net loss for both the three and six months ended June 30, 2022 was primarily related to an increase in product revenues with higher margins, partially offset by higher operating expenses and lower research and development revenues.

RESULTS OF OPERATIONS BY SEGMENT (in thousands, except percentages):

Revenues by segment

	Three Months Ended June 30,						Change			
	2022			2021			Performance Enzymes		Novel Biotherapeutics	
	Performance Enzymes	Novel Biotherapeutics	Total	Performance Enzymes	Novel Biotherapeutics	Total	$	%	$	%
Revenues:										
Product revenue	$ 34,645	$ —	$ 34,645	$ 14,717	$ —	$ 14,717	$ 19,928	135 %	$ —	— %
Research and development revenue	1,885	1,876	3,761	6,868	3,868	10,736	(4,983)	(73) %	(1,992)	(51) %
Total revenues	$ 36,530	$ 1,876	$ 38,406	$ 21,585	$ 3,868	$ 25,453	$ 14,945	69 %	$ (1,992)	(51) %

	Six Months Ended June 30,						Change			
	2022			2021			Performance Enzymes		Novel Biotherapeutics	
	Performance Enzymes	Novel Biotherapeutics	Total	Performance Enzymes	Novel Biotherapeutics	Total	$	%	$	%
Revenues:										
Product revenue	$ 65,335	$ —	$ 65,335	$ 24,943	$ —	$ 24,943	$ 40,392	162 %	$ —	— %
Research and development revenue	4,294	4,117	8,411	10,872	7,670	18,542	(6,578)	(61)%	(3,553)	(46) %
Total revenues	$ 69,629	$ 4,117	$ 73,746	$ 35,815	$ 7,670	$ 43,485	$ 33,814	94 %	$ (3,553)	(46) %

Revenues from the Performance Enzymes segment increased by $14.9 million, or 69%, for the three months ended June 30, 2022 and by $33.8 million, or 94%, for the six months ended June 30, 2022 compared to the same periods in 2021. The increase in product revenue of $19.9 million, or 135%, in the three months ended June 30, 2022, and of $40.4 million, or 162%, in the six months ended June 30, 2022, compared to the same periods in 2021, was primarily due to higher revenue from Pfizer but partially offset by lower revenue from the sales of other enzyme products used in the manufacture of branded pharmaceuticals products. The decrease in research and development revenue of $5.0 million, or 73%, for the three months ended June 30, 2022 and of $6.6 million, or 61%, in the six months ended June 30, 2022, compared to the same periods in 2021 was primarily due to lower revenues from Novartis under the Novartis CodeEvolver® Agreement as we completed the technology transfer to Novartis during the third quarter of 2021 and lower research and development fees from other existing collaboration agreements compared to the same period in the prior year.

Revenues from the Novel Biotherapeutics segment decreased by $2.0 million, or 51%, for the three months ended June 30, 2022 and by $3.6 million, or 46%, for the six months ended June 30, 2022 compared to the same periods in 2021, primarily due to lower research and development fees from Takeda under the Takeda Agreement and lower research and development revenue from Nestlé Health Science recognized this year compared to the prior year.

Costs and operating expenses by segment

	Three Months Ended June 30,						Change			
	2022			2021			Performance Enzymes		Novel Biotherapeutics	
	Performance Enzymes	Novel Biotherapeutics	Total	Performance Enzymes	Novel Biotherapeutics	Total	$	%	$	%
Cost of product revenue	$ 11,270	$ —	$ 11,270	$ 4,318	$ —	$ 4,318	$ 6,952	161 %	$ —	— %
Research and development [1]	6,929	11,078	18,007	5,057	7,194	12,251	1,872	37 %	3,884	54 %
Selling, general and administrative [1]	3,876	680	4,556	3,170	620	3,790	706	22 %	60	10 %
Total segment costs and operating expenses	$ 22,075	$ 11,758	33,833	$ 12,545	$ 7,814	20,359	$ 9,530	76 %	$ 3,944	50 %
Corporate costs [2]			5,866			8,839				
Unallocated depreciation and amortization			1,316			741				
Total costs and operating expenses			$ 41,015			$ 29,939				

	Six Months Ended June 30,						Change			
	2022			2021			Performance Enzymes		Novel Biotherapeutics	
	Performance Enzymes	Novel Biotherapeutics	Total	Performance Enzymes	Novel Biotherapeutics	Total	$	%	$	%
Cost of product revenue	$ 19,791	$ —	$ 19,791	$ 8,536	$ —	$ 8,536	$ 11,255	132 %	$ —	— %
Research and development [1]	13,051	23,424	36,475	11,502	11,799	23,301	1,549	13 %	11,625	99 %
Selling, general and administrative [1]	7,416	1,400	8,816	5,988	1,221	7,209	1,428	24 %	179	15 %
Total segment costs and operating expenses	$ 40,258	$ 24,824	65,082	$ 26,026	$ 13,020	39,046	$ 14,232	55 %	$ 11,804	91 %
Corporate costs [2]			17,110			16,654				
Unallocated depreciation and amortization			2,549			1,426				
Total costs and operating expenses			$ 84,741			$ 57,126				

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

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

Research and development expense in the Performance Enzymes segment increased by $1.9 million, or 37%, in the three months ended June 30, 2022 and by $1.5 million, or 13% in the six months ended June 30, 2022, as compared to the same periods in 2021. The increase was primarily due to an increase in costs associated with outside services, lab supplies and higher headcount, partially offset by lower allocable expenses.

Selling, general and administrative expense in the Performance Enzymes segment increased by $0.7 million, or 22%, in the three months ended June 30, 2022, and increased by $1.4 million, or 24%, in the six months ended June 30, 2022, as compared to the same periods in 2021, primarily due to an increase in costs associated with higher headcount and higher outside services expenses, partially offset by lower allocable expenses.

Research and development expense in the Novel Biotherapeutics segment increased by $3.9 million, or 54%, in the three months ended June 30, 2022 and by $11.6 million, or 99% in the six months ended June 30, 2022, as compared to the same periods in 2021. The increase was primarily due to higher costs associated with higher headcount, higher facilities cost and lab supplies, increase in outside services related to CMC and regulatory expenses and higher allocable expenses.

Selling, general and administrative expense in the Novel Biotherapeutics segment remained unchanged for thethree and six months ended June 30, 2022 as compared to the same periods in 2021.

LIQUIDITY AND CAPITAL RESOURCES

Liquidity is the measurement of our ability to meet working capital needs and to fund capital expenditures. We have historically funded our operations primarily through cash generated from operations, stock option exercises and public and private offerings of our common stock. We also have the ability to borrow up to $5.0 million under our Credit Facility. We actively manage our cash usage and investment of liquid cash to ensure the maintenance of sufficient funds to meet our working capital needs. Our cash and cash equivalents are held in U.S. banks.

The following summarizes our cash and cash equivalents balance and working capital as of June 30, 2022 and December 31, 2021 (in thousands):

	June 30, 2022	December 31, 2021
Cash and cash equivalents	$ 90,113	$ 116,797
Working capital	$ 115,269	$ 128,517

Sources of Capital

In addition to our existing cash and cash equivalents, 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 activities and is uncertain at this time. Under the Merck CodeEvolver® Agreement, we are eligible to receive payments of up to $15.0 million for each commercial API that is manufactured by Merck using one or more novel enzymes developed by Merck using the CodeEvolve® technology. In addition, under the GSK CodeEvolver® Agreement, depending upon GSK's successful application of the licensed technology, we have the potential to receive additional contingent payments that range from $5.8 million to $38.5 million per project.

In May 2019, we entered into the Platform Technology Transfer and License Agreement with Novartis. The Novartis CodeEvolver® Agreement allows Novartis to use Codexis' proprietary CodeEvolver® protein engineering platform technology in the field of human healthcare. Pursuant to the agreement, we received an upfront payment of shortly after the effective date and we also received milestone payments upon completion of the second technology milestone transfer in 2020 and the third technology milestone in 2021. In consideration for the continued disclosure and license of improvements to the technology and materials during a multi-year period that began on the conclusion of the Technology Transfer Period ("Improvements Term"), Novartis will pay an additional $8.0 million in aggregate over four years.

In October 2017, we entered into the Nestlé License Agreement with Nestlé Health Science. Pursuant to the Nestlé License Agreement, Nestlé Health Science paid us an upfront cash payment and milestone payments after dosing the first subjects in a first-in-human Phase 1a dose-escalation trial with CDX-6114 and achievement of a formulation relating to CDX-6114. We are also eligible to receive payments from Nestlé Health Science under the Nestlé License Agreement that include (i) development and approval milestones of up to $85.0 million, (ii) sales-based milestones of up to $250.0 million in the aggregate, which aggregate amount is achievable if net sales exceed $1.0 billion in a single year, and (iii) tiered royalties, at percentages ranging from the mid-single digits to low double-digits, of net sales of product.

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.

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

Equity Distribution Agreement

In May 2021, we entered into an Equity DistributionAgreement ("EDA") with Piper Sandler & Co ("PSC"), under which PSC, as our exclusive agent, at our discretion and at such times that we may determine from time to time, may sell over a three-year period from the execution of the EDA up to a maximum of $50.0 million of shares of our common stock. During the six months ended June 30, 2022, no shares of our common stock were issued pursuant to the EDA and as of June 30, 2022, $50.0 million worth of shares remained available for sale under the EDA. Sales of our common stock under this arrangement could be subject to business, economic or competitive uncertainties and contingencies, many of which may be beyond our control, and which could cause actual results from the sale of our common stock to differ materially from expectations.

Credit Facility

In June 30, 2017, we entered into the Credit Facility with Western Alliance Bank consisting of term loans up to $10.0 million, and advances under a revolving credit facility of up to $5.0 million with an accounts receivable borrowing base of 80% of eligible accounts receivable. Our right to take draws on the term debt expired on December 31, 2021. On October 1, 2024, loans drawn, if any, under the Revolving Line of Credit terminate.

The Credit Facility requires us to maintain compliance with certain financial covenants including attainment of certain lender-approved projections or maintenance of certain minimum cash levels. Restrictive covenants in the Credit Facility restrict the payment of dividends or other distributions. As of June 30, 2022, no amounts were borrowed under the Credit Facility and we were in compliance with the covenants for the Credit Facility. For additional information about our contractual obligations, see Note 10, "Commitments and Contingencies" in the Notes to Unaudited Condensed Consolidated Financial Statements included in this Quarterly Report on Form 10-Q.

We believe that our existing cash and cash equivalents, combined with our future expectations for product revenues, research and development revenue, and expense management will provide adequate funds for ongoing operations, planned capital expenditures and working capital requirements through the end of 2024. We have based this estimate on assumptions that may prove to be wrong, and we could utilize our capital resources sooner than we expect.

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

Cash Flows

The following is a summary of cash flows for six months ended June 30, 2022 and 2021 (in thousands):

	Six Months Ended June 30,	
	2022	**2021**
Net cash used in operating activities	$ (13,367)	$ (14,735)
Net cash used in investing activities	(12,302)	(4,945)
Net cash provided by (used in) financing activities	(1,047)	473
Net decrease in cash, cash equivalents and restricted cash	$ (26,716)	$ (19,207)

Cash Flows from Operating Activities

Cash used in operating activities for the six months ended June 30, 2022 of $13.4 million consisted of net loss adjusted for certain non-cash items and changes in operating assets and liabilities.

The $1.4 million decrease in net cash used in operations for the six months ended June 30, 2022 as compared to the same period in 2021, was primarily due to the increases in cash received from revenue, partially offset by the net effect of increases in cash paid for cost of revenues and operating expenses and changes in operating assets and liabilities.

Cash Flows from Investing Activities

Cash used in investing activities for the six months ended June 30, 2022 was primarily attributable to $5.3 million for additional new equity investments in privately held companies and $7.0 million for purchases of property and equipment during the period.

The $7.4 million increase in net cash used in investing activities for the six months ended June 30, 2022 as compared to the same period in 2021, was primarily due to higher cash utilized for additional investments in equity securities and purchases of property and equipment.

Cash Flows from Financing Activities

Cash used in financing activities for the six months ended June 30, 2022 included $1.4 million for taxes paid related to net share settlement of equity awards offset by $0.4 million of proceeds from exercises of stock options.

The $1.5 million increase in net cash used in financing activities for the six months ended June 30, 2022 as compared to the same period in 2021 was primarily due to higher cash paid on taxes related to net share settlement of equity awards and lower proceeds from exercises of stock options.

CRITICAL ACCOUNTING POLICIES AND ESTIMATES

The of preparation 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 six months ended June 30, 2022 from those discussed in our Annual Report on Form 10-K for the year ended December 31, 2021, filed with the SEC on February 28, 2022.

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, 2021, filed with the SEC on February 28, 2022.

Interest Rate Sensitivity

Our unrestricted cash and cash equivalents total $90.1 million at June 30, 2022. We primarily invest these amounts in money market funds which are held for working capital purposes. We do not enter into investments for trading or speculative purposes. As of June 30, 2022, the effect of a hypothetical 10% decrease in market interest rates would have a $0.1 million impact on a potential loss in future interest income and cash flows.

In June 2017, we entered into a Credit Facility with Western Alliance Bank consisting of term loans up to $10.0 million, and advances under a revolving line of credit up to $5.0 million. Term loans made under the Term Debt bear interest at variable rate through maturity at the greater of (i) 3.75% or (ii) the sum of (A) Index Rate (prime rate published in the Money Rates section of the Western Edition of The Wall Street Journal plus (B) 0.50%. Advances made under the Revolving Line of Credit bear interest at a variable annual rate equal to the greater of (i) 4.25% or (ii) the sum of (A) the prime rate plus (B) 1.00%. Increases in these variable interest rates will increase our future interest expense and decrease our results of operations and cash flows. Our right to take draws on the long term debt expired on December 31, 2021 and no amounts were drawn under the Credit Facility as of June 30, 2022. 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 June 30, 2022, the effect of a hypothetical 10% change in interest rates would not have any impact on our interest expense.

Foreign Currency Risk

Our results of operations and cash flows are subject to fluctuations due to changes in foreign currency exchange rates. In periods when the USD declines in value as compared to the foreign currencies in which we incur expenses, our foreign-currency based expenses increase when translated into United States dollars. Although substantially all of our sales are denominated in United States dollars, future fluctuations in the value of the USD may affect the price competitiveness of our products outside the United States. Our most significant foreign currency exposure is due to non-functional currency denominated monetary assets, primarily currencies denominated in other than their functional currency. These non-functional currency denominated monetary assets are subject to re-measurement which may create fluctuations in other expense, net, a component in our consolidated statement of operations and in the fair value of the assets in the consolidated balance sheets. As of June 30, 2022, the effect of a hypothetical 10% unfavorable change in exchange rates on currencies denominated in other than their functional currency would result in a potential loss in future earnings in our consolidated statement of operations and a reduction in the fair value of the assets of approximately $44 thousand.

Investment in Non-Marketable Equity Securities

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

ITEM 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 evaluation, our principal executive officer and our principal financial and accounting officer have concluded that, because a material weakness in our internal control over financial reporting existed as of March 31, 2022 and had not been remediated as of June 30, 2022, these disclosure controls and procedures were not effective as of June 30, 2022.

Management concluded that, as of March 31, 2022, a material weakness in internal control over financial reporting exists related to management's controls over the revenue recognition process in the three months ended March 31, 2022. Specifically, our controls addressing the completeness and accuracy of reports used to calculate product revenue from arrangements subject to over time revenue recognition did not operate at the proper level of precision to identify material errors. The control deficiency resulted in a material misstatement of revenue related accounts in the three months ended March 31, 2022, which management corrected before the financial statements for the three months ended March 31, 2022 were issued. This material weakness has not been remediated as of June 30, 2022.

Management's Plan to Remediate Material Weakness

We have begun the process of implementing a detailed plan for the remediation of the material weakness identified in the first quarter of 2022, including enhancing management's review controls over revenue and the level of detail and precision applied when reviewing the completeness and accuracy of reports used to determine product revenue for arrangements subject to over time revenue recognition. Although we have begun implementing the enhancements described above, the material weakness will not be considered remediated until the applicable controls operate for a sufficient period of time and management has concluded, through testing, that these controls are operating effectively. Until this material weakness is remediated, we plan to continue to perform additional analyses and other procedures to ensure that our consolidated financial statements are prepared in accordance with GAAP.

Changes in Internal Control over Financial Reporting

Other than as described above, 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. There were no significant changes to our internal control over financial reporting due to the adoption of new standards.

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, 2021, a description of certain risks and uncertainties that could affect our business, future performance or financial condition (the "Risk Factors"). Other than in respect of the additional risk factor included below, during the three months ended June 30, 2022, there were no material changes from the disclosure provided in the Form 10-K for the year ended December 31, 2021 with respect to the Risk Factors. Investors should consider the Risk Factors prior to making an investment decision with respect to our stock.

We have identified a material weakness in our internal control over accounting related to our product revenue recognition process and such weakness led to a conclusion that our internal control over financial reporting and disclosure controls and procedures were not effective as of March 31, 2022. This material weakness has not been remediated as of June 30, 2022. Our inability to remediate the material weakness, our discovery of any additional weaknesses, and/or our inability to achieve and maintain effective disclosure controls and procedures and internal control over financial reporting could adversely affect our results of operations and our stock price.

Section 404 of the Sarbanes-Oxley Act of 2002 requires that companies evaluate and report on the effectiveness of their internal control over financial reporting. In addition, we regularly engage our independent registered public accounting firm to report on its evaluation of those controls. As disclosed in more detail under Part I, Item 4, "Controls and Procedures" above, we have identified a material weakness in our internal control as of March 31, 2022 related to management's controls over the revenue recognition process. Specifically, our controls addressing the completeness and accuracy of reports used to calculate product revenue from arrangements subject to over time revenue recognition did not operate at the proper level of precision to identify the errors. This material weakness has not been remediated as of June 30, 2022. Due to the material weakness in our internal control over financial reporting, we have concluded that our disclosure controls and procedures were not effective as of June 30, 2022.

Failure to have effective internal control over financial reporting and disclosure controls and procedures could impair our ability to produce accurate financial statements on a timely basis and could lead to a restatement of our financial statements. If, as a result of the ineffectiveness of our internal control over financial reporting and disclosure controls and procedures, we cannot provide reliable financial statements, our business decision processes may be adversely affected, our business and results of operations could be harmed and investors could lose confidence in our reported financial information. In addition, in some circumstances, failure to maintain effective internal control over financial reporting could result in investigations or sanctions by regulatory authorities.

Our management is taking steps to remediate the material weakness, including enhancing management's review controls over revenue and the level of detail and precision applied when reviewing the completeness and accuracy of reports used to determine product revenue for arrangements subject to over time revenue recognition. Although we have begun implementing the enhancements described above, the material weakness will not be considered remediated until the applicable controls operate for a sufficient period of time and management has concluded, through testing, that these controls are operating effectively. Additional details regarding the remediation efforts are disclosed under Part I, Item 4, "Controls and Procedures" above. In addition, we may in the future identify additional internal control deficiencies that could rise to the level of a material weakness or uncover other errors in financial reporting. During the course of our evaluation of this material weakness, we may identify areas requiring improvement and may be required to design additional enhanced processes and controls to address issues identified through this review. In addition, there can be no assurance that such remediation efforts will be successful, that our internal control over financial reporting will be effective as a result of these efforts or that any such future deficiencies identified may not be material weaknesses that would be required to be reported in future periods. In addition, we cannot assure you that our independent registered public accounting firm will be able to attest that such internal controls are effective when they are required to do so.

If we fail to remediate the material weakness and maintain effective internal control over financial reporting or disclosure controls and procedures, we may not be able to rely on the integrity of our financial results, which could result in inaccurate or late reporting of our financial results, as well as delays or the inability to meet our reporting obligations or to comply with SEC rules and regulations. Any of these could result in delisting actions by the Nasdaq Stock Market, investigation and sanctions by regulatory authorities, stockholder investigations and lawsuits, and could adversely affect our business and the trading price of our common stock.

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

None.

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.
10.1	*	Platform Technology Transfer, Collaboration and License Agreement by and between the Company and GlaxoSmithKline Intellectual Property Limited, effective as of July 10, 2014.
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 June 30, 2022, formatted in Inline Extensible Business Reporting Language ("iXBRL") includes: (i) Unaudited Condensed Consolidated Balance Sheets at June 30, 2022 and December 31, 2021 (ii) Unaudited Condensed Consolidated Statements of Operations for the Three and Six Months Ended June 30, 2022 and 2021, (iii) Unaudited Condensed Consolidated Statements of Stockholders' Equity for the Three and Six Months Ended June 30, 2022 and 2021, (iv) Unaudited Condensed Consolidated Statements of Cash Flows for the Six Months Ended June 30, 2022 and 2021 and (v) Notes to Unaudited Condensed Consolidated Financial Statements.
101.SCH		Inline XBRL Taxonomy Extension Schema Document
101.CAL		Inline XBRL Taxonomy Extension Calculation Linkbase Document
101.DEF		Inline XBRL Taxonomy Extension Definition Linkbase Document
101.LAB		Inline XBRL Taxonomy Extension Label Linkbase Document
101.PRE		Inline XBRL Taxonomy Extension Presentation Linkbase Document
104		The cover page from the Company’s Quarterly Report on Form 10-Q for the quarter ended June 30, 2022, formatted in Inline XBRL and contained in Exhibit 101.

* Portions of the exhibit, marked by brackets, have been omitted because the omitted information is (i) not material and (ii) would be competitively harmful if publicly disclosed.

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: August 5, 2022

By: /s/ John J. Nicols

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

Date: August 5, 2022

By: /s/ Ross Taylor

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

CONFIDENTIAL
Certain information in this document, marked by brackets, has been omitted because it is both (i) not material and (ii) is the type that the registrant treats as private or confidential.

PLATFORM TECHNOLOGY TRANSFER, COLLABORATION AND LICENSE AGREEMENT

BY AND BETWEEN

CODEXIS, INC.

AND

GLAXOSMITHKLINE INTELLECTUAL PROPERTY DEVELOPMENT LIMITED

EFFECTIVE AS OF

10 July 2014

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Exhibits

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PLATFORM TECHNOLOGY TRANSFER, COLLABORATION AND LICENSE AGREEMENT

This Platform Technology Transfer, Collaboration and License Agreement (together with any exhibits attached hereto, this "**Agreement**") is made and entered into as of 10 July 2014 (the "**Effective Date**"), by and between Codexis, Inc., a Delaware corporation, having a place of business at 200 Penobscot Drive, Redwood City, California 94063, United States of America, ("**Codexis**") and **GlaxoSmithKline Intellectual Property Development Limited**, an English company headquartered at 980 Great West Road, Brentford, Middlesex, TW8 9GS, United Kingdom ("**GSK**"). Codexis and GSK are sometimes referred to herein individually as a "**Party**" and collectively as the "**Parties**."

RECITALS

Whereas, GSK possesses expertise in bioprocess development and scale up, including commercial scale manufacture, as well as certain expertise in biocatalyst development;

Whereas, Codexis possesses expertise in the engineering and optimization of biocatalysts for use in pharmaceutical compound synthesis and manufacture;

Whereas, GSK seeks to collaborate with Codexis on certain biocatalysis projects in order to develop biocatalytic approaches to synthesize compounds of interest to GSK and to practice the Platform Technology under the licenses granted by Codexis and in connection with a technology transfer from Codexis; and

Whereas, Codexis desires to grant to GSK such license and perform such technology transfer, on the terms and conditions set forth herein.

AGREEMENT

Now, Therefore, in consideration of the foregoing premises and the mutual promises, covenants and conditions contained in this Agreement, the Parties agree as follows:

1. DEFINITIONS.The terms in this Agreement with initial letters capitalized, whether used in the singular or the plural, shall have the meaning set forth below.

1.1 "Affiliate" means any Person that directly or indirectly is controlled by, controls or is under common control with a Party to this Agreement. For the purposes of this definition, the term "control" (including, with correlative meanings, the terms "controlled by" and "under common control with") as used with respect to a Person means (a) in the case of a corporate entity, direct or indirect ownership of voting securities entitled to cast more than fifty percent (50%) of the votes in the election of directors, (b) in the case of a non-corporate entity, direct or indirect ownership of more than fifty percent (50%) of the equity interests with the power to direct the management and policies of such entity, or (c) any other arrangement

whereby a Person controls or has the right to control the board of directors or equivalent governing body or management of a corporation or other entity; *provided* that, if local Applicable Law restricts foreign ownership, control shall be established by direct or indirect ownership of the maximum ownership percentage that may, under such local Applicable Law, be owned by foreign interests.

1.2 "Alliance Manager" has the meaning assigned to such term in Section 2.1.2.

1.3 "Applicable Law" means all applicable laws, statutes, rules, regulations, ordinances and other pronouncements having the effect of law of any federal, national, multinational, state, provincial, county, city or other political subdivision, government or Regulatory Authority.

1.4 "Arising Codexis Enzyme Technology" means: (a) the amino acid sequence and structure of any Project Enzyme developed under a Project during the TT Term (and, if GSK exercises the Option, during the Improvements TT Term) and (b) structure-activity data that describes the structure-activity relationship and other characteristics of any Project Enzyme(s) noted in (a), and in each of (a) and (b), which data and information are Controlled by Codexis during the TT Term (and, if GSK exercises the Option, during the Improvements TT Term).

1.5 "Arising Codexis Enzyme Technology IP" means Intellectual Property which has arisen directly from the Arising Codexis Enzyme Technology.

1.6 "Arising Codexis Process Technology" means methods of using Project Enzymes in compound synthesis, developed under a Project during the TT Term (and, if GSK exercises the Option, during the Improvements TT Term) and which methods are Controlled by Codexis during the TT Term (and, if GSK exercises the Option, during the Improvements TT Term); *provided* that *Arising Codexis Process Technology* shall exclude technology that is generally applicable to chemical process development and to the synthesis and scale up of small molecule compounds and that does not specifically require the use or performance of such Project Enzyme.

1.7 "Arising Codexis Process Technology IP" means Intellectual Property which has arisen directly from the Arising Codexis Process Technology.

1.8 "Arising GSK Enzyme Technology" means: (a) the amino acid sequence and structure of any Project Enzyme researched under a Project during the TT Term and (b) structure-activity data that describes the structure-activity relationship and other characteristics of any Project Enzyme(s) noted in (a) and, in each of (a) and (b), which data and information are Controlled by GSK during the TT Term.

1.9

"Arising GSK Enzyme Technology IP" means Intellectual Property which has arisen directly from the Arising GSK Enzyme Technology.

1.10 "Arising GSK Process Technology" means methods of using Project Enzymes developed under a Project during the TT Term; *provided* that *Arising GSK Process Technology* shall exclude technology that is generally applicable to chemical process development and to the synthesis and scale up of small molecule compounds and that does not specifically require the use or performance of such Project Enzyme, which methods are Controlled by GSK during the TT Term.

1.11 "Arising GSK Process Technology IP" means Intellectual Property which has arisen directly from the Arising GSK Process Technology.

1.12 "Background IP" means any and all Intellectual Property which is Controlled by a Party and (a) exists as of the Effective Date and/or (b) arises independently of the other Party during the Term.

1.13 "Business Day" means a day other than Saturday, Sunday or any day on which commercial banks located in New York, New York are authorized or obligated by Applicable Law to close.

1.14 "Calendar Quarter" means the period beginning on the Effective Date and ending on the last day of the calendar quarter in which the Effective Date falls and, thereafter, each successive period of three (3) consecutive calendar months ending on March 31, June 30, September 30 or December 31.

1.15 "Calendar Year" means the period beginning on the Effective Date and ending on December 31st of the calendar year in which the Effective Date falls, and thereafter, each successive period of twelve (12) consecutive calendar months commencing on January 1 and ending on December 31.

1.16 "Change of Control" means, with respect to a Party, any one of the following events: (a) any entity or two or more entities acting in concert shall have acquired beneficial ownership, directly or indirectly, of more than fifty percent (50%) of the total voting power of the stock then outstanding of the Party normally entitled to vote in elections of directors; (b) the Party consolidates with or merges into another entity, or any entity consolidates with or merges into the Party, in either event pursuant to a transaction in which more than fifty percent (50%) of the total voting power of the stock outstanding of the surviving entity normally entitled to vote in elections of directors is not held by the parties holding at least fifty percent (50%) of such total voting power of the Party preceding such consolidation or merger; or (c) the Party conveys, transfers or leases all or substantially all of its assets to a another entity that is not an Affiliate of the Party (such entity or entities in each of (a), (b) and (c), the "**Acquiring Entity**").

1.17

"Clinical Proof of Concept" means the initial demonstration of clinical efficacy of an Enzyme Product in a patient population demonstrated through the conduct of a Phase 1b Clinical Trial or a Phase 2a Clinical Trial.

1.18 "Codexis Core Patents" means the Patents set forth on Exhibit 1.18.

1.19 "Codexis Core Technology" means those (i) tools, processes and methods Controlled by Codexis; and (ii) generally applicable tools, processes and methods which Codexis has the ability to transfer to or license to GSK, in each of (i) and (ii) above: (a) used to identify, select, optimise, isolate, modify, engineer, research, develop, make, have made and/or import enzymes, Covered Enzymes and Enzymes, through the recombination and/or rearrangement and/or mutation of genetic material for the creation of genetic diversity, using any methods, including but not limited to Codexis Software, in silico, in vitro, and/or in vivo technologies, (b) screening techniques, methodologies and/or processes of using the resulting genes and/or proteins to identify and assess their potential utility, (c) gene expression methods applicable in high throughput screening, (d) techniques for cultivation of microorganisms, (e) techniques for producing, harvesting, and/or purifying proteins, and (f) Codexis Software, in each of (a) – (f) above, as described in Exhibit 1.19.

1.20 "Codexis Core Technology Improvements" means any improvement or advance to the Codexis Core Technology practiced by Codexis or any Affiliate of Codexis which are licensed to GSK under Section 3.2, that is generated by either Party, or both Parties, or on behalf of either Party or both Parties, or by Codexis with a Third Party, during the TT Term and is Controlled by Codexis, excluding any improvement or advance to the Codexis Core Technology which arises from GSK's Background IP.

1.21 "Codexis Core Technology Improvements IP" means any and all Intellectual Property which is generated by or on behalf of either Party or any Affiliate of the Parties or jointly between the Parties or any Affiliate of the Parties which Covers the Codexis Core Technology Improvements.

1.22 "Codexis Documentation" means any documentation disclosed by Codexis to GSK pursuant to Article 2 (including with respect to Codexis Core Technology Improvements or the Platform Technology), including all Codexis Methods, the Technology Transfer Plan, and documentation related to the Codexis Software and the documentation described in the Technology Transfer Plan and any and all copies thereof, in whole or in part.

1.23 "Codexis Enzymes" means any Covered Enzyme which is Controlled by Codexis and transferred to GSK pursuant to the Technology Transfer Plan. For clarity, *Codexis Enzymes* does not include GSK Initial Enzymes and GSK Selected Enzymes.

1.24 "Codexis Enzyme Patents" means the Patents set forth on Exhibit 1.24.

1.25

"Codexis Exclusive Field" means, the use, research or development (whether in vitro or in vivo), or commercialization of any Enzyme or Enzyme fusion protein (except where the use of any Enzyme or Enzyme fusion protein which is used by GSK solely: (i) as a research reagent or a research tool, or (ii) to synthesize any GSK Compound), that: (a) effects a chemical transformation in humans, (b) facilitates, assists or enables the action, dispersion, absorption or bioavailability of a molecule, biologic agent, drug product, therapeutic agent, or other compound (other than such Enzyme or Enzyme fusion protein) in humans, or (c) transports a molecule, biologic agent, drug product, therapeutic agent, or any other compound (other than such Enzyme or Enzyme fusion protein) in humans, in each of cases (a) through (c) for any purpose, including without limitation the use of Enzymes for medicinal or therapeutic purposes, such as the treatment of lysosomal storage diseases, removal of toxic metabolites and by-products resulting from defects in metabolism, metabolite depletion therapy (e.g., for the treatment of cancer), permeabilization of tissue for improved uptake of a molecule, biologic agent, drug product, therapeutic agent, or any other compound into cells (e.g., hyaluronidase type application, [***], etc.), as well as combinations of the above; *provided* that the *Codexis Exclusive Field* [***].

1.26 "Codexis Initial Enzyme(s)" means any Codexis Enzyme or any Enzyme derived from a Codexis Enzyme or a Codexis Library which is designated as an Initial Enzyme pursuant to a Project.

1.27 "Codexis Initial Enzyme IP" means any and all Intellectual Property which Codexis Controls during the Term and which Covers any Codexis Initial Enzymes.

1.28 "Codexis Library" means any collection, set or sub-set of expression vectors containing genes Controlled by Codexis that encode for Covered Enzymes, Enzymes or enzymes, transferred to GSK under the Technology Transfer Plan, for the propagation of additional enzyme stock.

1.29 "Codexis Materials" means those materials disclosed or transferred to GSK by Codexis for the practice of the Platform Technology, including (a) the Codexis Libraries and Codexis Enzymes, and (b) the Codexis Core Technology Improvements to which GSK is entitled pursuant to Section 2.2.9.

1.30 "Codexis Mayflower Patents" means the Patents set forth on Exhibit 1.30.

1.31 "Codexis Methods" means (a) as of the Effective Date, the methods and protocols listed in Appendix IV of the Technology Transfer Plan, and (b) after the Effective Date, the methods and protocols disclosed by Codexis and drafted by Codexis, documenting all

material methods relating to the Codexis Core Technology in sufficient detail to enable a scientist with reasonable skills and experience in the field of protein engineering or protein biochemistry to practice the Platform Technology. The *Codexis Methods* shall include the most current and complete procedures used by Codexis as of the date on which they are disclosed to GSK with respect to the procedures described therein.

1.32 "Codexis Senior Management" means, as of the Effective Date, [***].

1.33 "Codexis Software" means [***], and all other software disclosed under the Technology Transfer Plan, as amended from time to time, together with all software Controlled by Codexis and disclosed by Codexis under this Agreement, including all versions and improvements practiced by Codexis during the TT Term.

1.34 "Codexis Team" has the meaning assigned to it in Section 2.2.5(b).

1.35 "Collaborative Project" means any collaborative enzyme evolution project in the GSK Exclusive Field agreed by the JSC as such prior to the commencement of such collaborative enzyme evolution project, using the Platform Technology where both Codexis and GSK perform the research plan to identify a GSK Selected Enzyme.

1.36 "Commercially Reasonable Efforts" means, with respect to a Party's obligations under this Agreement, efforts consistent with the efforts and resources normally used by a similarly situated pharmaceutical, biotechnology or technology company in the exercise of its reasonable business discretion relating to the development or commercialization of a product with similar product characteristics that is of similar market potential at a similar stage of development or commercialization, taking into account issues of efficacy, safety, patent and regulatory exclusivity, product profile, anticipated or approved labeling, present and future market potential, competitive market conditions, the proprietary position of the compound or product, the regulatory structure involved, and other technical, legal, scientific, medical or commercial factors, and the profitability of the product, including in light of pricing and reimbursement issues.

1.37 "Completion of Wave 1" means achievement of all the "Wave 1 Milestone Success Criteria" as defined under the Technology Transfer Plan.

1.38 Completion of Wave 2" means achievement of all the "Wave 2 Milestone Success Criteria" as defined under the Technology Transfer Plan.

1.39 Completion of Wave 3" means achievement of all the "Wave 3 Milestone Success Criteria" as defined under the Technology Transfer Plan.

1.40 "Confidential Information" means all trade secrets, processes, formulae, Know-How, improvements, inventions, chemical or biological materials, chemical structures, techniques, marketing plans, strategies, customer lists, suppliers, or other information that has been created, discovered, or developed by a Party, or has otherwise become known to a Party, or to which rights have been assigned or licensed to a Party, as well as any other information and materials that are deemed confidential or proprietary to or by a Party (including all information and materials of a Party's customers and any other Third Party and their consultants), in each case that are disclosed by such Party to the other Party, regardless of whether any of the foregoing are marked "confidential" or "proprietary" or communicated to the other Party by the disclosing Party in oral, written, graphic or electronic form.

1.41 "Controlled" or "Controls" means, when used in reference to an item or to Intellectual Property rights, the legal authority or right of a Party (or any of its Affiliates) (whether by ownership, assignment or by license, other than pursuant to this Agreement) to grant the right to use such item or a license or sublicense of such Intellectual Property rights to the other Party, or to otherwise disclose proprietary or trade secret information to such other Party, without violating any Applicable Law, breaching the terms of any agreement with any Third Party, or misappropriating the proprietary or trade secret information or other Know-How of a Third Party.

1.42 "Cover" or "Covers" means a particular item or method claimed in any Intellectual Property that, but for a license under or ownership right in such Intellectual Property, the use, making, having made, offering for sale, sale, importation, or other exploitation of such item would infringe or misappropriate such Intellectual Property (assuming, in the case of pending Patent applications, that such pending Patent applications were issued Patents).

1.43 "Covered Enzyme" means any immature or mature peptide or protein, including derivatives, with enzymatic or biocatalytic activity Covered by the Licensed IP pursuant to this Agreement.

1.44 "Dollar" or "$" means the lawful currency of the United States.

1.45 "Embargo Period" means the period beginning on the Effective Date and continuing until and ending on the five (5) year anniversary of the Effective Date.

1.46 "Enzyme" means any immature or mature peptide or protein, including derivatives, with enzymatic or biocatalytic activity derived from the use of the Platform Technology pursuant to this Agreement.

1.47 "Enzyme Product" means any of: (a) Licensed Enzyme Therapeutic Product, (b) Licensed Diagnostic Product, (c) Licensed Accessory Product, (d) Licensed Prophylactic Product, or (e) Licensed Other Therapeutic Product.

1.48

"FDA" means the U.S. Food and Drug Administration, or any successor agency thereto.

1.49 "Field" means (a) the manufacture and commercialization of compounds, molecules and products (including, but not limited to, Licensed Products) for the treatment of any human disease or medically treatable human condition; (b) the prophylaxis, diagnosis, or treatment of any human disease or medically treatable human condition; and (c) the research and development of compounds, molecules and products (including, but not limited to, Licensed Products) for the treatment of any human disease or medically treatable human condition.

1.50 "Final Round of Enzyme Evolution" means that final one (1) Round of Enzyme Evolution in the series of successive Rounds of Enzyme Evolution in which the GSK Selected Enzyme was identified.

1.51 "First Commercial Sale" means the first sale of a Licensed Product in a given country or other regulatory jurisdiction in the Territory by or on behalf of GSK, its Affiliates or sublicensees to a Third Party, after receipt of Regulatory Approval (including pricing approval, to the extent required for sale of Licensed Products in a given country or regulatory jurisdiction, and the completion of any necessary labeling negotiations that may be required after Regulatory Approval and such pricing approval) for Licensed Products in such country or regulatory jurisdiction. *First Commercial Sale* shall specifically exclude sales or transfers for clinical study purposes or compassionate use, named-patient, indigent patient or similar uses, if such uses do not result in monetary compensation to GSK above the cost of goods.

1.52 "First Production Run" means the use of a Licensed Collaborative Project GSK Selected Enzyme or a Licensed GSK Sole Project GSK Selected Enzyme in the synthesis of a GSK Compound (a) for use in clinical trials or (b) for commercial sales.

1.53 "FTE" means the equivalent of the work performed after the Effective Date of one (1) Codexis scientist or one (1) GSK scientist, full time for one (1) year. In no event will one (1) person count for more than one (1) FTE in any Calendar Year.

1.54 "Fully Burdened Cost" means [***]. For the avoidance of doubt, the calculation of "Fully Burdened Cost" shall exclude for all purposes the cost of any and all materials supplied by GSK. [***].

1.55 "Generic Version" means, with respect to a Pharmaceutical Product, a product meeting all of the following criteria: (a) such product contains the same active pharmaceutical ingredient(s) in the same dosage form and the same formulation as is contained in such Pharmaceutical Product, and (b) such product is A/B Rated with respect to such Pharmaceutical Product. For the purposes of this definition, **"A/B Rated"** means, inside the United States, "therapeutically equivalent" as evaluated by the FDA, applying the definition of "therapeutically equivalent" set forth in the preface to the then-current edition of the FDA publication "Approved Drug Products With Therapeutic Equivalence Evaluations" and, outside the United States, such equivalent determination by the applicable Regulatory Authorities as is necessary to permit pharmacists or other individuals authorized to dispense pharmaceuticals under Applicable Law to substitute one product for another product in the absence of specific instruction from a physician or other authorized prescriber under Applicable Law.

1.56 "Good Clinical Practices" or "GCP" means the then-current international ethical and scientific quality standards for designing, conducting, recording and reporting trials that involve the participation of human subjects. In the United States, GCP shall be based on Good Clinical Practices established through FDA guidance (including ICH E6) and, outside the United States, GCP shall be based on ICH E6.

1.57 "Good Laboratory Practices" or "GLP" means the then-current Good Laboratory Practice (or similar standards) for the performance of laboratory activities for pharmaceutical products as are required by applicable Regulatory Authorities or Applicable Law. In the United States, Good Laboratory Practices are established through FDA regulations (including 21 C.F.R. Part 58), FDA guidance, FDA current review and inspection standards and current industry standards.

1.58 "Good Manufacturing Practices" or "GMP" means the then-current Good Manufacturing Practices for the manufacture of products as are required by applicable Regulatory Authorities or Applicable Law. In the United States, GMP shall be as defined under the rules and regulations of the FDA, as the same may be amended from time to time.

1.59 "GSK Compound" means any compound which is Controlled by GSK or its Affiliates [***], in any form including, but not limited to the final active pharmaceutical ingredient (i.e., an API) form (but excluding, for clarity, any Enzyme).

1.60 "GSK Exclusive Field" means the development and/or use of any Enzyme for the synthesis of any GSK Compound, within the Field.

1.61 "GSK Existing Pharmaceutical Product" means any GSK product containing a GSK Compound which has obtained Regulatory Approval and where the first such GSK product sold in a Major Market Country did not include the use of a GSK Selected Enzyme within the route of synthesis of the GSK Compound included within the product.

1.62

"GSK Initial Enzyme(s)" means any enzyme (which for clarity is not an "*Enzyme*") that is provided by GSK and which is designated as an Initial Enzyme pursuant to a Project excluding, for clarity, Enzymes derived from a Codexis Enzyme or a Codexis Library.

1.63 "GSK Project Library" means any collection, set or sub-set of Enzymes and/or expression vectors containing genes that encode for Enzymes derived from a Project.

1.64 "GSK Selected Enzyme" means an Enzyme derived from an Initial Enzyme and has been selected by GSK from a Project for use pursuant to this Agreement to synthesize any GSK Compound.

1.65 "GSK Sole Project" means any Enzyme evolution project that was initiated using a GSK Initial Enzyme or a Codexis Initial Enzyme, conducted in the GSK Exclusive Field by GSK or any Affiliate of GSK, whether or not in collaboration with any Third Party permitted under this Agreement, using the Platform Technology which may involve limited Codexis' participation (which, for clarity, would not constitute such level of participation that the JSC would otherwise deem such participation as constituting a Collaborative Project).

1.66 "GSK Team" shall have the meaning assigned to it in Section 2.2.5(a).

1.67 "IFRS" means the International Financial Reporting Standards.

1.68 "Improvements TT Term" means the period beginning on the expiration of the TT Term and continuing until and ending on the earlier of (a) the Improvements TT Term Expiration Date, (b) the date on which GSK fails to timely pay an Annual Option Fee in accordance with Section 7.2 or (c) the early termination of this Agreement by Codexis in accordance with Sections 11.2 or 11.4.

1.69 "Improvements TT Term Expiration Date" means, if GSK exercises the Option under Section 3.5.2 and timely pays the First Annual Option Fee and each Annual Option Fee set forth in Section 7.2, the three (3) year anniversary of the TT Term Expiration Date or a later date if the Improvements TT Term is extended in accordance with Section 3.5.4.

1.70 "Initial Enzyme" means any GSK Initial Enzyme or Codexis Initial Enzyme contributed to a Project which is selected to undergo Initial Enzyme Optimisation.

1.71 "Initial Enzyme Optimisation" means the process of optimising Initial Enzymes for desired characteristics directly using the Platform Technology in any Project.

1.72 "Initial Technology Transfer Inventory" means all of the items set out in Appendix I of the Technology Transfer Plan.

1.73 "Initial Training" has the meaning assigned to such term in Section 2.2.6.

1.74

"In-License Agreements" means the agreements set forth in Exhibit 1.74 in the versions sent by Codexis to GSK in an e-mail(s) dated July 7, 2014.

1.75 "In-Licensed IP" means the In-Licensed Patents and any In-Licensed Know-How.

1.76 "In-Licensed Know-How" means all Know-How of Third Parties Controlled by Codexis as of the Effective Date and licensed to Codexis pursuant to the In-License Agreements, in each case that Covers the Codexis Documentation, the Codexis Materials, the Codexis Software or the practice of the Platform Technology.

1.77 "In-Licensed Patents" means all Patents of Third Parties Controlled by Codexis as of the Effective Date and licensed or sub-licensed to Codexis pursuant to the In-License Agreements, in each case, that Cover the Codexis Documentation, the Codexis Materials, the Codexis Software or the practice of the Platform Technology, set forth on Exhibit 1.77.

1.78 "Intellectual Property" means Patents, Know-How, copyrights and software, including all applications for registration for the foregoing and all other similar proprietary rights as may exist anywhere in the world.

1.79 "Invention" means any discovery, invention, contribution, method, finding, or improvement, whether or not patentable, and all related Know-How.

1.80 "Invoice" means any invoice submitted to GSK by Codexis under this Agreement, produced in accordance with GSK's processing requirements, as set forth in Exhibit 1.80.

1.81 "Know-How" means non-public materials and technical information, including techniques, methods, processes, technology, recipes, designs, equipment configurations and uses, biological samples, compounds and cell lines, and biological, chemical, pharmacological, toxicological, clinical, assay and related trade secrets, and manufacturing data, preclinical and clinical data, the specifications of ingredients, the manufacturing processes, formulation, specifications, sourcing information, quality control and testing procedures, and related know-how and trade secrets.

1.82 "Licensed Additional Codexis IP" means Licensed Additional Codexis Know-How and Licensed Additional Codexis Patents.

1.83 "Licensed Accessory Product" means [***].

1.84 "Licensed Additional Codexis Know-How" means any and all Know-How which (a) Codexis or any Codexis Affiliate comes to Control during the TT Term (and, if GSK exercises the Option, during the Improvements TT Term) and (b) which Covers (i) the Platform Technology, (ii) Arising Codexis Enzyme Technology, (iii) Arising Codexis Process Technology, (iv) any Codexis Core Technology Improvements, (v) the Codexis Documentation and (vi) Codexis Materials.

1.85 "Licensed Additional Codexis Patents" means any and all Patents which (a) Codexis or any Affiliate comes to Control during the TT Term (and, if GSK exercises the Option, during the Improvements TT Term) and (b) which Covers (i) the Platform Technology, (ii) Arising Codexis Enzyme Technology, (iii) Arising Codexis Process Technology, or (iv) any Codexis Core Technology Improvements.

1.86 "Licensed Collaborative Project GSK Selected Enzyme" means any GSK Selected Enzyme arising from a Collaborative Project.

1.87 "Licensed Diagnostic Product" means [***].

1.88 "Licensed Enzyme Therapeutic Product" means [***].

1.89 "Licensed GSK Sole Project GSK Selected Enzyme" means any GSK Selected Enzyme arising from a GSK Sole Project.

1.90 "Licensed IP" means (a) the Licensed Patents, (b) the In-Licensed Patents, (c) the Licensed Know-How, (d) the In-Licensed Know-How, (e) the Licensed Additional Codexis Know-How, and (f) the Licensed Additional Codexis Patents.

1.91 "Licensed Know-How" means any Know-How Controlled by Codexis as of the Effective Date which is disclosed or provided to GSK hereunder in accordance with Section 2.2.3, including the Codexis Documentation, Codexis Materials and Codexis Software but only to the extent existing as of the Effective Date.

1.92 "Licensed Other Therapeutic Product" means [***].

1.93 "Licensed Patents" means (a) the Codexis Core Patents and (b) the Codexis Enzyme Patents.

1.94 **"Licensed Product"** means an Enzyme Product and/or a Pharmaceutical Product.

1.95 **"Licensed Prophylactic Product"** means [***].

1.96 **"Losses"** means any claim, threatened claim, suit, proceeding, liability, loss, damage, expense (including reasonable legal expenses, costs of litigation, and attorneys' fees) or judgment, whether for money or equitable relief, of any kind.

1.97 **"Major Market Country"** means [***].

1.98 **"Net Sales"** means gross invoiced sales of the Licensed Product to Third Parties, in each quarter less the following deductions from such gross amounts which are actually incurred, allowed, paid, accrued or specifically allocated to the extent that such amounts are deducted from gross invoiced sales amounts as reported in financial statements in accordance with the International Financial Reporting Standards ("IFRS"), applied on a consistent basis:

1.1.1 credits or allowances actually granted for damaged Licensed Product, returns or rejections of Licensed Product, price adjustments, and billing errors;

1.1.2 governmental and other rebates (or equivalents thereof) to national, state/provincial, local and other governments, their agencies and purchasers, and reimbursers, or to trade customers;

1.1.3 normal and customary trade, cash and quantity discounts, allowances, and credits actually allowed or paid;

1.1.4 commissions allowed or paid to Third Party distributors, brokers or agents other than sales personnel, sales representatives and sales agents;

1.1.5 transportation costs, including insurance, for outbound freight related to delivery of Licensed Product to the extent included in the gross amount invoiced;

1.1.6 sales taxes, value added taxes, and other taxes directly linked to the sales of Licensed Product to the extent included in the gross amount invoiced; and

1.1.7 any other items actually deducted from gross invoiced sales amounts as reported in financial statements in accordance with the IFRS, applied on a consistent basis.

For purposes of this definition, the Licensed Product shall be considered "sold" and "deductions" allowed when recorded as invoiced in financial statements prepared in accordance with IFRS.

1.99 "On-Site Training" has the meaning assigned to such term in Section 2.2.7.

1.100 "Patent(s)" means (a) patents and patent applications anywhere in the world, (b) all divisionals, continuations, continuations in-part thereof or any other patent application claiming priority, or entitled to claim priority, directly or indirectly to (i) any such patents or patent applications, or (ii) any patent or patent application from which such patents or patent applications claim, or is entitled to claim, direct or indirect priority, and (c) all patents issuing on any of the foregoing anywhere in the world, together with all registrations, reissues, re-examinations, patents of addition, renewals, substitutions, validations, and re-validations, supplemental protection certificates or extensions of any of the foregoing anywhere in the world, and (d) all provisional and any other priority patent applications filed worldwide.

1.101 "Person" means any individual, firm, corporation, partnership, limited liability company, trust, business trust, joint venture, governmental authority, association or other entity.

1.102 "Pharmaceutical Product" means any product containing a GSK Compound that includes a GSK Selected Enzyme within its route of synthesis, and which has been formulated into such product.

1.103 "Phase 1b Clinical Trial" means a pilot human clinical trial usually conducted in patients diagnosed with the disease, or condition for which the study drug is intended, who demonstrate some biomarker, surrogate, or possible clinical outcome.

1.104 "Phase 2a Clinical Trial" means a human clinical trial, the principal purpose of which is a determination of efficacy and safety, in the target population, at the intended clinical dose or doses, to confirm the optimal manner of use.

1.105 "Platform Technology" means (a) the Codexis Core Technology, (b) the Codexis Enzymes and (c) the Codexis Libraries which are provided to GSK by Codexis under this Agreement in such a state and condition and in the detail which are necessary to enable a scientist with reasonable skills and experience in the field of protein engineering or protein biochemistry to use, identify, select, optimise, isolate, modify, engineer, research, develop, make, have made and/or import any Enzyme, in each of (a), (b) and (c), that (i) is described in, and embodies the subject matter of, the Codexis Documentation, and (ii) uses the Codexis Materials and the Codexis Software.

1.106 "Project" means any GSK Sole Project or Collaborative Project.

1.107 "Project Enzyme" means any Enzyme derived from an Initial Enzyme arising from a Round of Enzyme Evolution.

1.108 "Prosecution" means the preparation, drafting, filing, prosecution (including any interferences, reissue proceedings, reexaminations, inter partes reviews, post-grant reviews, oppositions and Patent office appeals) and maintenance of Patents in the Territory. When used as a verb, "Prosecute" means to engage in Prosecution.

1.109 "Regulatory Approval(s)" means, with respect to any Licensed Product in any jurisdiction, all approvals from any Regulatory Authority necessary for the commercial manufacture, marketing and sale of any product containing such Licensed Product in such jurisdiction in accordance with Applicable Law, including without limitation, receipt of pricing and reimbursement approvals, where required.

1.110 "Regulatory Authority" means any national or supranational governmental authority, including without limitation the FDA, that has responsibility in countries in the Territory over the development and/or commercialization of any Licensed Product, as applicable.

1.111 "Regulatory Filings" means any and all regulatory applications, filings, approvals and associated correspondence required to develop any Licensed Product in each country or jurisdiction in the Territory.

1.112 "Restricted Enzyme" means any immature or mature peptide or protein with enzymatic or biocatalytic activity, or any vector that encodes for any such peptide or protein, listed in Exhibit 1.112, which list as of the Effective Date will be provided in accordance with Section 3.7.1. During the Term, Exhibit 1.112 may be revised in accordance with Section 3.7.1.

1.113 "Round(s) of Enzyme Evolution" means round of Initial Enzyme Optimisation conducted during a Project resulting in Project Enzymes comprising a GSK Project Library.

1.114 "Royalty Term" means, on a country-by-country and Enzyme Product-by-Enzyme Product basis, the period commencing as of the date of First Commercial Sale of such Enzyme Product in such country and ending upon [***]: (a) [***] years after the date of First Commercial Sale of such Enzyme Product in such country, and (b) the date of expiration of the last to expire Valid Claim of the last to expire Patent that claims the composition of matter or method of use of the Enzyme Product that would be infringed by the manufacture, use or sale of such Enzyme Product in such country, but for the licenses granted to GSK under this Agreement.

1.115 "Scientific Lead" shall have the meaning assigned to it in Section 2.1.1.

1.116 "Technology Transfer" means (a) the transfer of the Codexis Documentation, Codexis Software and Codexis Materials and (b) the training with respect to the Platform Technology, in each case to be conducted in accordance with the Technology Transfer Plan and Article 2.

1.117 "Technology Transfer Plan" means that plan for the Technology Transfer as mutually agreed between the Parties and set forth in Exhibit 1.117 as of the Effective Date and as may be amended by the Parties during the TT Term in accordance with Section 2.2.4, itemising each Party's responsibilities and obligations, the activities to be performed by each Party, and a timeline for performance of such activities, in connection with the Technology Transfer from Codexis to GSK to fully implement the Platform Technology within GSK.

1.118 "Territory" means worldwide.

1.119 "Third Party" means any Person other than GSK and Affiliates of GSK, and Codexis and Affiliates of Codexis.

1.120 "TT Term" means the period beginning on the Effective Date and ending on the earlier of (a) the date on which Codexis receives notification from GSK, in accordance with Section 7.3, of Completion of Wave 3, (b) the third (3rd) anniversary of the Effective Date, or (c) the date GSK initiates the first GSK Sole Project that is not a Technology Transfer Project and for which GSK will provide prompt notification to Codexis of such initiation date.

1.121 "TT Term Expiration Date" means the earlier of (a) the date on which Codexis receives notification from GSK, in accordance with Section 7.3, of Completion of Wave 3, (b) the third (3rd) anniversary of the Effective Date, or (c) the date GSK initiates the first GSK Sole Project that is not a Technology Transfer Project and for which GSK will provide prompt notification to Codexis of such initiation date.

1.122 "Upfront Payment" shall have the meaning assigned to it in Section 7.1.

1.123 "United States" or "U.S." means the United States of America and all its territories and possessions.

1.124 "Valid Claim" means either (a) a claim of an issued and unexpired Patent which has not been held permanently revoked, unenforceable or invalid by a decision of a court or other governmental agency of competent jurisdiction, unappealable or unappealed within the time allowed for appeal and that is not admitted to be invalid or unenforceable through reissue, disclaimer or otherwise (i.e., only to the extent the subject matter is disclaimed or is sought to be deleted or amended through reissue), or (b) a claim of a pending Patent application that has not been abandoned, finally rejected or expired without the possibility of appeal or refiling.

1.125 "Wave" means each phase of the Technology Transfer noted as *Wave 1*, *Wave 2* and *Wave 3* of the Technology Transfer Plan in force as of the Effective Date, and from time-to-time during the TT Term.

1.126 Additional Definitions. Each of the following terms has the meaning set forth in the corresponding section of this Agreement indicated below:

Definition:	Section:
AAA	12.3
A/B Rated	1.55
Acquiring Entity	1.16
Agreement	Preamble
Annual Option Fee	7.2
Bankruptcy Code	11.3
Breaching Party	11.2
Challenging Party	11.4
Codexis	Preamble
Codexis Indemnitees	10.1
Codexis Patents	6.5.2
Covered Patent Claim	3.1.3
Cure Period	11.2
Disclosing Party	9.1
Dispute	12.1
Effective Date	Preamble
Exclusive Option	3.5.1
First Annual Option Fee	7.2
Force Majeure	13.4
GSK	Preamble
GSK Indemnitees	10.2
GSK Patents	6.5.3
Indemnification Claim	10.3
Indemnitee	10.3
Indemnitor	10.3
Infringement Action	6.6.1
Joint Steering Committee or JSC	5.1.1
Lactosan	3.4.6
Material	2.5
Material Transfer Record Form	2.5
Non-Breaching Party	11.2
Non-Exclusive Option	3.5.1
Non-Solicitation Period	13.1
Option	3.5.1
Option Period	3.5.2
Parties	Preamble
Party	Preamble
Patent Challenge	11.4

Patent Claim	3.1.3
Patent Committee	5.2.1
Patent Committee Embargo License Period	3.1.4(a)
Potentially Restricted Enzyme	3.7.1
Project Team	5.1.3
Receiving Party	9.1
Royalties	7.9
Technology Transfer	1.116
Technology Transfer Project	2.3
Technology Transfer Project Activities	2.3
Technology Transfer Project Plan	2.3
Term	11.1
Termination Audit Right	11.5.3
Terminated Country	11.5.2
Transferor	2.5
Transferee	2.5

2. TECHNOLOGY TRANSFER AND PROJECTS

1.127 Management of Technology Transfer; Projects; Alliance.

1.1.1 Scientific Lead. Each Party shall designate in writing within fifteen (15) days after the Effective Date, a "**Scientific Lead**" with all necessary scientific skill and expertise to fulfil such role in accordance with this Article 2, to be the primary contact for such Party responsible for managing day-to-day communications between the Parties with respect to the technical aspects of the Technology Transfer and other scientific and technical activities set forth in this Agreement, including responsibility for scheduling teleconferences and coordinating meetings and technical support as required hereunder. Each Party may respectively appoint a substitute Scientific Lead to represent it under this Section 2.1.1.

1.1.2 Alliance Manager. Each Party shall designate in writing within fifteen (15) days after the Effective Date, an "**Alliance Manager**" with all necessary business skill and expertise as necessary to be the primary contact for such Party as regards all business development and/or contract-related communications between the Parties for all matters in connection with this Agreement, outside of the purview of the technical matters for which the Scientific Leads are responsible. The Alliance Managers shall be responsible for initially

addressing any finance, legal and business issues that may arise. Each Party may respectively appoint a substitute Alliance Manager to represent it under this Section 2.1.2.

1.1.3 Limitations. The Scientific Leads and the Alliance Managers shall not have the authority to amend, modify or waive compliance with this Agreement, through meeting minutes, e-mails or otherwise.

1.128 Technology Transfer.

1.1.1 Codexis Methods. Except for the protocols listed under the heading "Protocols to be Generated in the Context of Training during Technology Transfer" in Appendix IV of the Technology Transfer Plan, Codexis shall provide the Codexis Methods within thirty (30) days after the Effective Date.

1.1.2 Codexis Technology Transfer. Codexis shall transfer to GSK the Initial Technology Transfer Inventory and: (a) the Codexis Materials, (b) the Codexis Documentation, and (c) the Codexis Software, each in accordance with the Technology Transfer Plan. The Parties shall perform the Technology Transfer during the TT Term pursuant to the timelines under the Technology Transfer Plan.

1.1.3 Technology Transfer Plan. Upon the Effective Date the Parties shall commence the Technology Transfer in sequential order of Waves as described in, and in accordance with, the Technology Transfer Plan. Each Party shall perform the activities assigned to such Party under the Technology Transfer Plan at the sites identified in Section 2.2.6 and 2.2.7 and shall perform all such activities in compliance with Applicable Law. Notwithstanding anything to the contrary, subject to any updates to the Technology Transfer Plan pursuant to Section 2.2.4, Codexis shall not be obligated to transfer to GSK any information and/or materials not described in the Technology Transfer Plan.

1.1.4 Updates to Technology Transfer Plan. In the event that errors and/or omissions in the Technology Transfer Plan are discovered by GSK and/or Codexis during the TT Term and the Parties mutually agree to update the Technology Transfer Plan pursuant to any reasonable scientific rationale agreed between the Parties to enable GSK to practice the Platform Technology, the Parties shall then update the Technology Transfer Plan accordingly.

1.1.5 Technology Transfer Teams. In order to effect Section 2.2:

(a) GSK shall identify a Technology Transfer team of personnel and in such numbers as it may so determine (the "**GSK Team"**) to participate in each Wave of the Technology Transfer. GSK shall change any member(s) of the GSK Team in its sole discretion at any time. The GSK Team shall have all reasonable skills and experience in the field of protein engineering to perform the Technology Transfer.

(b)

Codexis shall identify a Technology Transfer team to lead the GSK Team in each Wave of the Technology Transfer, including the Initial Training and the On-Site Training [***] (the "**Codexis Team**") as detailed in the Technical Transfer Plan. Codexis, in its sole discretion, may change any member(s) of the Codexis Team at any time. Each member of the Codexis Team shall have all necessary scientific experience and expertise to perform the Technology Transfer.

1.1.4 Initial Training at Codexis' Facility. After the Effective Date, the GSK Team will participate in Wave 2 of Technology Transfer at Codexis' facility in Redwood City, California, which training shall be completed as outlined in the Technology Transfer Plan (the "**Initial Training**"). GSK shall bear its own costs and expenses of participating in such Initial Training.

1.1.5 On-Site Training at GSK's Upper Merion West Campus Facility. On an agreed-upon date, promptly following Completion of Wave 1 the Codexis Team and the GSK Team will participate in Wave 2 Technology Transfer activities at a GSK facility in Upper Merion West Campus facility (or any other GSK facility nominated by GSK in the greater Philadelphia region). Codexis shall bear its own costs and expenses of providing such training (the "**On-Site Training**"). The On-Site Training shall be conducted by the Codexis Team in accordance with the Technology Transfer Plan. The On-Site Training shall include training on all items identified in the Technology Transfer Plan as required at the On-Site Training.

1.1.6 Acceptance by GSK of the Initial Technology Transfer Inventory; Completion of Technology Transfer. The Initial Technology Transfer Inventory to be transferred in accordance with the Technology Transfer Plan shall be deemed to have been accepted by GSK [***] (the "**Initial Technology Transfer Inventory Acceptance Criteria**"). In the event that any item in the Initial Technology Transfer Inventory fails to meet the Initial Technology Transfer Inventory Acceptance Criteria, GSK shall notify Codexis in writing [***]. In the event that any item of the Initial Technology Transfer Inventory fails to meet the Initial Technology Transfer Inventory Acceptance Criteria and GSK so notifies Codexis of such, Codexis shall promptly provide replacements for any item of the Initial Technology Transfer Inventory which shall meet the Initial Technology Transfer Inventory Acceptance Criteria. The Technology Transfer will have been completed when each item of the Initial Technology Transfer Inventory and each step in the Technology Transfer Plan has been successfully completed[***].

1.1.7 Codexis Core Technology Improvements, Arising Codexis Enzyme Technology and Arising Codexis Process Technology During the TT Term.

(c) Initial Disclosure. Within [***] days after the end of the Calendar Quarters ending June 30 and December 31:

(i) during the TT Term and, if GSK exercises the Option, during the Improvements TT Term, Codexis' Alliance Manager shall disclose to GSK's Alliance Manager [***] Codexis Core Technology Improvements by or on behalf of Codexis, or any Affiliate of Codexis and [***] corresponding Licensed Additional Codexis IP during the applicable half year period, if any; and

(ii) during the TT Term, Codexis' Alliance Manager shall disclose to GSK's Alliance Manager [***] Arising Codexis Enzyme Technology and/or Arising Codexis Process Technology by or on behalf of Codexis, or any Affiliate of Codexis and [***] corresponding Licensed Additional Codexis IP during the applicable half year period, if any.

(d) Subsequent Disclosure. If the GSK Alliance Manager requests further information regarding Codexis Core Technology Improvements, Arising Codexis Enzyme Technology and/or Arising Codexis Process Technology by or on behalf of Codexis, or any Affiliate of Codexis, and [***] corresponding Licensed Additional IP during the TT Term and, if GSK exercises the Option, during the Improvements TT Term, and corresponding Licensed Additional Codexis IP disclosed to GSK in accordance with Section 2.2.9(a), GSK shall, within [***] days after receipt of the initial disclosure of Codexis Core Technology Improvements by Codexis pursuant to Section 2.2.9(a) request the disclosure of such further information Controlled by Codexis, and with respect to Section 2.2.9(a), in sufficient detail as reasonably necessary for GSK to make a decision as to whether to exercise its rights pursuant to Section 3.5.2 to obtain a license to such Codexis Core Technology Improvements and corresponding Licensed Additional Codexis IP. All information, documents and other materials disclosed by Codexis to GSK pursuant to this Section 2.2.9 shall constitute the Confidential Information of Codexis.

(e) Disclosure of Codexis Core Technology Improvements During the TT Term and, if GSK exercises the Option, during the Improvements TT Term. During the TT Term and, if GSK exercises the Option, during the Improvements TT Term, GSK shall have [***] days after the disclosure of such further information relating to the Codexis Core Technology Improvements and corresponding Licensed Additional Codexis IP pursuant to Section 2.2.9(b) to request in writing that Codexis disclose such Codexis Core Technology Improvement(s) and [***] corresponding Licensed Additional Codexis IP to GSK. If GSK makes such request during such period, Codexis shall disclose such Codexis Core Technology and Licensed Additional Codexis IP to GSK as promptly as possible, and in any event no later than within [***] days and such Codexis Core Technology and Licensed Additional Codexis IP shall be deemed licensed to GSK under Section 3.2.1.

(f) Role of Scientific Lead. For one (1) Calendar Year following the end of the TT Term, and during the Improvements TT Term, if GSK exercises the Option, Codexis shall make its Scientific Lead reasonably available to provide telephonic or web-based advisory technical support and assistance to GSK in GSK's practice of the Platform Technology pursuant to the licenses granted pursuant to Section 3.5.3.

1.1.1 Arising GSK Enzyme Technology and Arising GSK Process Technology During the TT Term.

(g) Initial Disclosure. Within [***] days after the end of the Calendar Quarters ending June 30 and December 31, during the TT Term, GSK shall disclose to Codexis' Alliance Manager [***] Arising GSK Enzyme Technology and Arising GSK Process Technology, if any.

(h) Subsequent Disclosure. If the Codexis Alliance Manager requests further information regarding Arising GSK Enzyme Technology and/or Arising GSK Process Technology, Codexis shall, within [***] days after receipt of the initial disclosure of such Arising GSK Enzyme Technology and/or such Arising GSK Process Technology by GSK pursuant to Section 2.2.10(a) request the disclosure of such further information Controlled by GSK.

1.1 Technology Transfer Projects. During the TT Term, the Parties shall conduct at least four (4) Projects as set forth in the Technology Transfer Plan (each, a "**Technology Transfer Project**") pursuant to the terms of written project plans (each, a "**Technology Transfer Project Plan**") agreed upon and approved by the JSC at appropriate times during the TT Term in light of the schedule set forth in the Technology Transfer Plan. The Parties acknowledge and agree that Technology Transfer Projects [***] (as described in the Technology Transfer Plan) shall be [***], and Technology Transfer Projects [***] (as described in the Technology Transfer Plan) shall be [***]. Subject to Article 7, each Party shall be solely responsible for all costs and expenses arising from activities performed by such Party pursuant to the Technology Transfer Project Plans ("**Technology Transfer Project Activities**"). Each such Technology Transfer Project shall be deemed completed upon satisfaction of the criteria for such project as set forth in the Technology Transfer Plan.

1.2 New Projects . Upon reasonable request by GSK during the TT Term, the JSC shall meet to discuss in good faith one or more additional Collaborative Projects to be conducted by the Parties under this Agreement. If the JSC agrees that any such Collaborative Project shall be performed by the Parties, the Parties shall prepare in good faith a written research plan for such Collaborative Project and submit such written research plan to the JSC for approval. If the JSC approves such Collaborative Project, the written research plan will automatically be made a part of this Agreement.

1.3 Transfers of Materials. In the event that the Parties mutually agree that a transfer of any biopharmaceutical, biological, chemical or other material ("**Material(s)**") from GSK or Codexis (the "**Transferor**") to Codexis or GSK (as applicable) (the "**Transferee**") is necessary or desirable to facilitate the Parties' collaborative activities pursuant to this Agreement, except where Codexis Materials are transferred by Codexis to GSK pursuant to the Technology Transfer Plan (which in all cases shall be itemised and recorded in writing, such written records to be sent to GSK for confirmation of receipt of all such items), the Parties shall document such transfer using the material transfer record form set out in Exhibit 2.5 (the "**Material Transfer Record Form**") and the Transferor shall effect such transfer in accordance with the following provisions:

1.1.1 the Transferor shall complete and submit to the Transferee for counter-signature, the Material Transfer Record Form prior to the transfer of the Material.

1.1.2 both Parties warrant that they have the full right and authority to transfer the Materials to the Transferee for use within the contemplated research program.

1.1.3 the Material and related information provided by Transferor will remain the property of Transferor or remain under the control of Transferor and will be kept securely by Transferee and will not be provided by Transferee, without the prior written consent of Transferor, to any Third Party.

1.1.4 the Transferee shall only use the Material for the purpose of the performing the applicable work as laid out under any applicable Project or in connection with the Platform Technology, in each case in accordance with Applicable Law.

1.1.5 the Transferee acknowledges that the Material is experimental in nature and provided "AS IS."

1.1.6 the Transferee shall use the Material at its own risk and in accordance with Applicable Law and any safety instructions provided by the Transferor.

1.1.7 all right title and interest in Materials transferred in accordance with this Section 2.5 shall remain vested in the Transferor and the Transferee shall gain no right, title or interest of any sort, other than as may be granted to the Transferee pursuant to the rights and licenses in this Agreement, in such Material.

1.1 Project Reporting. At each JSC meeting or as otherwise agreed between the Parties (but in no event less than once per Calendar Quarter), each Party will provide the JSC with presentations regarding the Technology Transfer Project Activities performed by it, including a summary of results relating to each Technology Transfer Project.

1.2 Post- Project Enzyme Supply.

1.1.8 Request, Audit and Supply Terms. Subject to the limitations in Section 2.7.2, GSK, during the Term, may request that Codexis supply to GSK any Enzyme for use in any Project. Prior to obtaining supply of any Enzyme from Codexis, GSK shall have the right to perform a quality and technical audit of Codexis' manufacturing facility to determine such facility's suitability for manufacture of the Enzyme and compliance with Applicable Law, including without limitation, whether such facility (a) holds necessary permits and licenses; and (b) maintains such Good Laboratory Practices and/or Good Manufacturing Practices, in each case as may be applicable to the Enzyme to be obtained from Codexis. If GSK elects to proceed with obtaining supply from Codexis after satisfactory completion of the audit, the Parties shall negotiate in good faith to agree to mutually acceptable commercial supply and quality terms, defining the roles and responsibilities related to Codexis' manufacture and delivery of the Enzyme to GSK. [***].

1.1.9 Limitations. GSK may only request the use of [***], and Codexis will have no obligation under Section 2.7.1 to supply Enzyme to GSK [***].

1.4 Regulatory Responsibilities and Costs. As between the Parties, GSK shall prepare, file, maintain and own all Regulatory Filings and related submissions with respect to all Licensed Products and shall bear the cost of such preparation, filing, maintenance and ownership. GSK shall be responsible for all safety reporting obligations globally with respect to all Licensed Products and shall maintain the global safety database for all Licensed Products. GSK shall be solely responsible for communicating with the FDA and/or any other Regulatory Authority in any country or jurisdiction regarding all Licensed Products.

1.5 Commercialization Responsibilities and Costs. GSK shall be solely responsible for all commercialization activities relating to Licensed Products, at GSK's sole cost and expense, and shall have sole decision-making authority with respect to the foregoing. GSK shall conduct all commercialization activities under this Agreement in compliance with all Applicable Law. For clarity, nothing in this Agreement shall require GSK to develop or commercialize any minimum number of Licensed Products or limit the number of Licensed Products that GSK may develop or commercialize.

1.6 Availability for Collaborative Projects; Additional Codexis Libraries

. During the TT Term, [***]

[***]; *provided* that the JSC agrees that the performance of such Project Activities by such members of the Codexis Team will not impact negatively the Technology Transfer or any Technology Transfer Project.

1.7 Party Employees. Notwithstanding anything to the contrary under this Agreement, under no circumstance would any employee, contractor, contingent worker or consultant of a Party be considered an employee, contractor, contingent worker or consultant of the other Party. The Party who sends any employee, contractor, contingent worker or consultant to work at the other Party's premises shall assume all liability for such employees, contractors, contingent workers or consultants working at the other Party's premises and shall procure that its employees, contractors, contingent workers or consultants comply with all security, health and safety and other policies applicable to occupiers of the hosting Party's premises.

3. LICENSES

1.1 Licenses to Codexis.

1.1.1 GSK Background IP License. Subject to the terms and conditions of this Agreement, GSK hereby grants to Codexis a worldwide, non-exclusive, non-transferable (except as provided in Section 13.5), fully paid-up, royalty-free right and license, with the right to grant sublicenses solely to Affiliates, under GSK's Background IP in the GSK Exclusive Field solely as necessary for Codexis to perform its obligations during the Technology Transfer and under each Project as set forth in the written research plan applicable to such Project.

1.1.2 Arising GSK Enzyme Technology IP and Arising GSK Process Technology IP. Subject to the terms and conditions of this Agreement, GSK hereby grants to Codexis a worldwide, non-exclusive, non-transferable (except as provided in Section 13.5), fully paid-up, royalty-free right and license, with the right to grant sublicenses through multiple tiers, under the Arising GSK Enzyme Technology IP and the Arising GSK Process Technology IP (in each case, if any) for any use outside of the GSK Exclusive Field; *provided* that the foregoing license [***] which shall include any GSK Selected Enzyme.

1.1.3 Embargo License. If it is determined pursuant to Section 3.1.4**(a)** that GSK, during the Embargo Period, used Platform Technology in any way with respect to any Enzyme or Enzyme fusion protein within the Codexis Exclusive Field that is claimed in any Patent (whether or not filed during the Embargo Period) that is Controlled by GSK, licensed to GSK by a Third Party or licensed by GSK to a Third Party and that such Patent claims the composition, manufacture or use of any product or product candidate in the Codexis Exclusive Field that is Controlled by Codexis or, if applicable, an exclusive licensee or

assignee of Codexis with respect to such product or product candidate ("**Patent Claim**"), then GSK hereby grants to Codexis or, if applicable, each such exclusive licensee or assignee a worldwide, non-exclusive, non-transferable (except as provided in Section 13.5, fully paid-up, royalty-free right and license, with the right to grant sublicenses only to Affiliates, and collaborators, partners, suppliers or vendors, under each Patent Controlled by GSK that includes a Patent Claim, to develop, make, use, sell, offer for sale, market, import and export such product or product candidate in the Codexis Exclusive Field.

1.1.4 Patent Claims.

(a) The determination of the existence of a Patent Claim, as described in Section 3.1.3, shall be made by the Patent Committee pursuant to Section 5.2.1, *provided, however,* that if the Patent Committee is unable to resolve such matter within thirty (30) days (the "**Patent Committee Embargo License Period**"), then notwithstanding Section 5.2.3 and Article 12, the determination will be made pursuant to Section 3.1.4(b).

(b) Independent Patent Counsel. If the Patent Committee cannot make a determination under Section 3.1.4(b), the determination of the existence of a Patent Claim, notwithstanding Article 12, will be made by independent patent counsel in accordance with the following procedure:

(i) Selection of Independent Patent Counsel. The Parties' representatives on the Patent Committee, within fifteen (15) days after the end of the Patent Committee Embargo License Period, shall mutually agree on, and the Patent Committee shall select, one person to serve as an independent patent counsel.

(ii) Process. The Parties may submit evidence and written arguments as deemed necessary by the independent patent counsel; *provided, however*, that any evidence and arguments shall be submitted within fifteen (15) days or any longer period of time mutually agreed between the Parties after the selection of the independent patent counsel.

(iii) Costs and Expenses. Each Party will share equally the cost and expenses of the independent patent counsel selected in 3.1.4(b)(i). Each Party shall bear its own costs and expenses and attorneys' fees in connection with any such determination; *provided, however,* that the prevailing Party in any such determination shall be entitled to recover from the other Party the reasonable attorneys' fees, costs and expenses incurred by such prevailing Party in connection with such determination.

(iv) Binding Decision. The decision of the independent patent counsel shall be the sole, exclusive and binding decision regarding the determination of the existence of a Patent Claim. The independent patent counsel shall prepare and deliver to the Parties a written, reasoned opinion conferring its decision.

(a)

After the grant of a second license under Section 3.1.3, GSK will be deemed in material breach of this Agreement, and Codexis shall have a right to terminate this Agreement pursuant to Section 11.2, such termination to be effective immediately upon notice to GSK, notwithstanding the sixty (60) day cure period set forth in such Section 11.2.

1.1 Licenses to GSK.

1.1.1 Platform Technology Licenses. Subject to the terms and conditions of this Agreement (including the restrictions under Section 3.4), Codexis hereby on behalf of itself and its Affiliates, grants to GSK, during the Term, a nontransferable (except as provided in Section 13.5), right and license, with the right to grant sublicenses to Affiliates and Third Parties, in accordance with, and to the extent permitted under, Section 3.3, under the Licensed IP in the Territory, with respect to enzymes, including any enzyme owned or otherwise controlled by GSK under this Agreement or otherwise, to use the Platform Technology (or any aspect of the Platform Technology), which right and license shall be:

(a) exclusive in the GSK Exclusive Field; and

(b) non-exclusive otherwise in the Field;

in each of Sections 3.2.1(a) and 3.2.1(b), solely to research, develop, use, optimize, modify, isolate, engineer, identify, select, make, have made, import and/or export Enzymes, other than any Restricted Enzyme.

1.1.1 Manufacturing Licenses. Subject to the terms and conditions of this Agreement (including the restrictions under Section 3.4), Codexis hereby on behalf of itself and its Affiliates grants to GSK, during the Term, a non-transferable (except as provided in Section 13.5) right and license, with the right to grant sublicenses solely to Affiliates, contract manufacturing organizations (CMOs), contract research organizations (CROs), or other contract service organizations in accordance with and to the extent permitted under Section 3.3 under the Licensed IP in the Territory, solely to make or have made, for the purpose of sale or to have sold:

(c) Pharmaceutical Products, which shall be exclusive in the GSK Exclusive Field and otherwise non-exclusive in the Field; and

(d) Enzyme Products, which shall be a non-exclusive license in the Field.

1.1.2 Loss of Pharmaceutical Product Exclusivity. The exclusive licenses granted by Codexis to GSK in the GSK Exclusive Field pursuant to Sections 3.2.1, 3.2.2 and 3.5.3 shall become non-exclusive, on a Pharmaceutical Product-by-Pharmaceutical

Product and country-by-country basis, on the first date that both a first and a second Generic Version of such Pharmaceutical Product is commercially available in such country.

1.2 Sublicensing. To the extent that either Party is permitted to grant sublicenses under the licenses granted to it under this Agreement, either Party shall have the right to grant such sublicenses through multiple tiers of sublicensees; *provided* that:

1.1.1 no sublicense may be granted to any Third Party under Section 3.2.1 [***]. For clarity, nothing in this Section 3.3 shall permit the grant by GSK of any sublicense to any Codexis Enzyme or any Codexis Core Technology (except the specific Codexis Methods listed on Exhibit 3.3.1);

1.1.2 in relation to the rights under Section 3.3.1, any sublicense agreement between GSK and a Third Party sublicensee relating to the performance of GSK's obligations or exercise of GSK's rights under this Agreement shall include material transfer terms, and non-use and non-disclosure confidentiality terms, that are no less stringent than terms consistent with GSK's ordinary practice involving GSK proprietary materials and information of a similar nature;

1.1.3 any such sublicense is consistent with and subject to the terms of this Agreement and shall terminate automatically upon termination of the corresponding license hereunder;

1.1.4 each Party, within thirty (30) days after the effective date of any sublicense, shall provide written notice to the other Party of the grant, the date, and the identity of the Third Party of any sublicense to a Third Party;

1.1.5 each Party shall not be relieved of its obligations pursuant to this Agreement as a result of such sublicense; and

1.1.6 any sublicense granted by GSK shall (a) prohibit the sublicensee from using the Platform Technology for any purpose other than as specified in Section 3.2.1 and Section 3.2.2 and (b) require the sublicensee to destroy all Platform Technology, and all Confidential Information of Codexis, in possession of such sublicensee after completion of the sublicensee's obligations under such sublicense.

1.3 Limitations on Licenses.

1.1.3 In-Licensed Patents. With respect to any aspect of the In-Licensed Patents for which Codexis has less than fully exclusive, worldwide rights (e.g., co-exclusive, non-exclusive, limited territorial or otherwise restricted rights), the licenses provided

in Sections 3.2.1, 3.2.2 and 3.5.3 shall be limited to the scope of those rights that Codexis Controls.

1.1.4 Codexis Mayflower Patents. Notwithstanding anything set forth in this Article 3, GSK shall have no right under the Codexis Mayflower Patents with respect to:

(a) the making, having made, using and selling of reagents, instruments and services for the diagnostics and research supply markets, only as follows: (a) clinical and diagnostic tests, including those conducted to identify genetic disease predisposition, genetic or other disease conditions, and infectious or pathogenic agents, as well as those conducted for other medical, agricultural or veterinary purposes; (b) tests for analytical/bioanalytical purposes, including those conducted for biomedical, chemical, or medical research or treatment purposes, for environmental purposes, and for forensic purposes, including paternity, maternity or identity tests; and (c) sequencing and sequence analysis of nucleic acids or other biological polymers for any purposes; but excluding (i) the use of a reagent, other than a nucleic acid array, that specifically binds to selected cells, organs or tissue, and that is sold for medical use in procedures to image selected cells, organs or tissue, which procedure is carried out inside the body of an animal or human, and that requires FDA approval, and (ii) the sale of products and performance of services requiring a license under the In-Licensed Patents, to identify compounds that bind to receptors for use as pharmaceuticals;

(b) any (i) amino acid (including any natural, synthetic, modified or other amino acid analogue) chain that is a human or humanized protein, or any variant, homology, derivative, mutant or fragment thereof, and (ii) any molecule described in subsection (i) that is conjugated or otherwise coupled to any other molecule, in each of cases (i) and (ii) expressly including (iii)(A) any amino acid (including any natural, synthetic, modified or other amino acid analogue) chain that is a cytotoxic T lymphocyte associated antigen 4 or any variant, homolog, derivative, mutant or fragment thereof, and (B) any molecule described in subsection (iii)(A) that is conjugated or otherwise coupled to any other molecule, and (iv)(A) any amino acid (including any natural, synthetic, modified or other amino acid analogue) chain that is a human or animal protein or any variant, homolog, derivative, mutant or fragment of the foregoing, and (B) any molecule described in subsection (iv)(A) that is conjugated or otherwise coupled to any other molecule, and any pharmaceutical products that contain any of the foregoing as an ingredient;

(c) any formulation containing one or more antigens (or a nucleic acid sequence encoding an Antigen) in the form of (a) an infectious agent (e.g., bacteria, viruses, parasite, protozoa) whether live, attenuated or dead, (b) protein(s), (c) nucleic acid(s), (d) cells, spores and vectors (i.e., viruses or virus-like particles, liposomes, beads or other substrates for Antigen presentation), (e) fragments of any of the foregoing, or (f) a combination of any of the preceding, which formulation is administered or is intended to be administered to induce an Antigen-Specific Response in the human or animal recipient to at least one such

antigen for the prevention of the onset of, or treatment of, a disease state, symptom or condition in humans or animals caused by an infectious agent; where "Antigen" means a molecule (e.g., protein, nucleic acid, polypeptide, peptide, carbohydrate, glycoprotein, glycolipid or any combination of the foregoing) that is produced naturally by, or is derived in whole or in part from, an infectious agent (e.g., bacteria, viruses, parasite, protozoa) that produces an Antigen-Specific Response to such molecule in a human or animal recipient (but excluding any molecule that is derived from, in whole or in part, any human gene or protein); and "Antigen-Specific Response" means an immune state resulting from the modulation of activity (i.e., an increase, decrease or qualitatively different activity) or one or more lymphoid cells (e.g., B cells, NK cells, T cells or professional antigen-presenting cells, such as monocytes, macrophages, Langerhans cells, dendritic cells) following the administration of a stimulus, where such immune state is induced in a human or animal recipient to an Antigen that is specifically directed to the subject Antigen;

(d) the development, production and/or sale of any and all polypeptides more than twelve (12) amino acids in length, and the development of organisms and vectors (including without limitation plant vectors and plant hosts) for the expression of such polypeptides, in the areas of (a) processes for textile or garment production, (b) processes for the production of leather, (c) cleaning processes or cleaning products, (d) starch processing, (e) food production processes, (f) animal feed processing, (g) personal care processes, excluding pharmaceutical products and oral, topical and intravaginal medications, (g) the processing of wood, paper, pulp and derived lignin and cellulose, (i) oil drilling, (j) dyestuffs and dyeing processes, (k) electronics industry waste water treatment, (l) detoxification of pesticides, chemical weapons and biological weapons, (m) utilization of industrial waste or co-products to generate energy, compost or industrial raw materials including fermentable substrates for e.g. citric acid production from agricultural waste, (n) polymer production, modification or processing of polymers (tetramers of higher) from monomers (including polymers made by addition of dimers or trimers for reactions proceeding to completion in the same reactor), and the enzymatic modification of chemically synthesized polymers, (o) waste water treatment, sewage sludge treatment or cleanup of contaminated soil, (p) synthesis of fuels including bio-diesel and hydrogen, and (q) bioremediation of water, soil and municipal waste, including without limitation biological waste, sewage and sludge (including without limitation biological waste treatment and cleaning of sewer and drain pipes).

(e) any and all human or humanized granulocyte-colony stimulating factor (G-CSF) protein, or any and all variants, derivatives, mutants or fragments thereof, and any and all pharmaceutical products that contain any of the foregoing.

1.1.1 Government Rights. GSK acknowledges that certain of the inventions claimed in the Codexis Core Technology and/or the Codexis Enzymes and the Intellectual Property rights therein have been made with funds provided by the U.S. government, and that with respect thereto the U.S. government retains a non-exclusive license as set forth in 35 U.S.C. § 202. In addition, GSK acknowledges that this Agreement is subject

to all of the terms and conditions of 35 U.S.C. § 200 et seq., which sets forth additional obligations with regard to inventions made with U.S. government funds and products based thereon, including a preference for manufacture in the U.S. pursuant to 35 U.S.C. § 204.

1.1.2 Prohibited GSK Activities. During the Embargo Period, GSK shall not, and shall cause its Affiliates and permitted sublicensees not to, alone or with a Third Party, on behalf of GSK, its Affiliates or any Third Party, conduct any activities (including, without limitation, any research, drug discovery, development or commercialization activities) in the Codexis Exclusive Field using any Platform Technology; *provided* that the foregoing restriction shall not apply to the use by GSK of any Platform Technology in connection with the use of an Enzyme or Enzyme fusion protein that is contained within a Licensed Accessory Product in combination with a GSK Compound; and it shall not constitute a breach of this Section 3.4 if GSK generates and/or uses Enzymes solely as research reagents or research tools within the Field.

1.1.3 No Use for Third Parties. GSK shall not use, and shall cause its Affiliates and permitted sublicensees not to use, the Platform Technology to engineer, synthesize, manufacture or otherwise develop or produce any Enzymes, molecules, biologic agents, drug products, therapeutic agents or any other compounds for or on behalf of any Third Party and to that Third Party's order or direction. [***]. If GSK or any Affiliate exclusively licenses, assigns, divests or otherwise transfers to a Third Party all of GSK's or such Affiliate's rights relating specifically to a GSK Compound(s) and/or a Licensed Product(s), and GSK or such Affiliate, at the time of such transfer, uses an Enzyme developed using the Platform Technology to manufacture such GSK Compound(s) and/or a Licensed Product(s), then (A) GSK or its Affiliates may synthesize, manufacture and supply such Enzyme (and no other Enzyme) for and to such Third Party solely to manufacture such GSK Compound(s) and/or a Licensed Product(s), and (B) GSK may grant to such Third Party a limited sublicense under the Platform Technology solely to the extent necessary for such Third Party to make and use such Enzyme (and no other Enzyme) solely in connection with the development, making, use, sale, offer for sale, import and export of such GSK Compound(s) and/or a Licensed Product(s) and products incorporating such GSK Compound(s) and/or a Licensed Product(s), but not to make or use such Enzyme (and no other Enzyme) in connection with any other compounds or products. Notwithstanding anything to the contrary herein, GSK shall remain responsible for any payments due to Codexis under Article 7 on account of such Enzyme or such GSK Compounds and/or Licensed Products. For clarity, no payments, other than payments due under Article 7, shall be due to Codexis.

1.1.4 Enzyme Supplier. [***] would supply to GSK or its Affiliates any Enzymes developed using rights licensed by Codexis to GSK under the terms of this Agreement, [***].

1.1.5 Certain Kits and Panels. In the event that GSK or an Affiliate of GSK desires to have a kit or panel containing any Codexis Materials developed for use by GSK or an Affiliate of GSK which was transferred to GSK pursuant to the Technology Transfer, and such kit or panel is not otherwise available, either through development by GSK or an Affiliate of GSK or commercially through Codexis or a Third Party, GSK, subject to the conditions set forth in Section 3.3, [***] request that Codexis develop such kit or panel, [***] exclusively for use by GSK and Affiliates of GSK. Codexis shall have no obligation to develop such GSK requested kit or panel but, if Codexis agrees to develop such a kit or panel, [***] subject to other reasonable terms and conditions agreed upon by the Parties for such work by Codexis. [***].

1.4 Codexis Core Technology Improvements Option.

1.1.5 Option Grant. Subject to the terms and conditions of this Agreement, Codexis hereby grants to GSK an option, exercisable at GSK's sole discretion in accordance with Section 3.5.2, to acquire the rights described in Section 3.5.3, which option shall be exclusive as to the GSK Exclusive Field (the "**Exclusive Option**") and non-exclusive otherwise in the Field (the "**Non-Exclusive Option**", together with the Exclusive Option, the "**Option**").

1.1.6 Option Exercise. At any time during the period beginning on the earlier of the second (2nd) anniversary of the Effective Date and the TT Term Expiration Date, and ending on the date that is three (3) months after the TT Term Expiration Date (an

"**Option Period**"), GSK may exercise the Option by (a) providing written notice thereof to Codexis and (b) paying the First Annual Option Fee. If GSK does not exercise the Option prior to the expiration of the Option Period, the Option shall automatically expire and be of no further force or effect.

1.1.7 Grant of Rights. Subject to the terms and conditions of this Agreement, effective upon GSK's exercise of the Option in accordance with Section 3.5.2, Codexis hereby on behalf of itself and its Affiliates grants to GSK a worldwide, non-transferrable (except as permitted under Section 13.5), non-sublicensable (except in accordance with Section 3.2.1 and Section 3.2.2) license, which license shall be exclusive in the GSK Exclusive Field and non-exclusive otherwise in the Field, under all of Codexis' rights to Codexis Core Technology Improvements practiced by Codexis during the Improvements TT Term. Codexis shall provide any technology transfer or scientific or technical resources reasonably requested by GSK, and reasonably necessary for GSK, to practice such Codexis Core Technology Improvements, at GSK's reasonable expense. During the Improvements TT Term, Codexis' Alliance Manager will periodically disclose to GSK's Alliance Manager information regarding new, updated or improved Enzyme kits or panels (as defined in this Section 3.5.3 below) [***]. For purposes of this Section 3.5.3, the term "new, updated or improved Enzyme kits or panels" means a collection of multiple, genetically-diverse Enzymes, Controlled by Codexis, that are first made commercially available to the general public by Codexis through Codexis' catalog or website. All information, documents and other materials provided by Codexis to GSK pursuant to this Section 3.5.3 shall constitute Confidential Information of Codexis.

1.1.8 Extension of the Improvements TT Term. Upon mutual written agreement of the Parties, and payment by GSK to Codexis of an amount to be mutually agreed in good faith by the Parties, within the sixty (60) day period prior to the then-current Improvements TT Term Expiration Date, the Improvements TT Term Expiration Date may be extended by one (1) year. The Parties may extend the Improvements TT Term Expiration Date any number of times in accordance with this Section 3.5.4.

1.5 Third Party Licences. [***].

1.6 Restricted Enzymes.

1.1.7 During the Term, in its ordinary course of business, Codexis will conduct research and development activities for Third Parties under the Licensed IP using the Platform Technology and, in connection with such research and development activities, will generate Potentially Restricted Enzymes that, in certain cases, on a Potentially Restricted Enzyme-by- Potentially Restricted Enzyme basis,(a) will be owned by such Third Parties or exclusively licensed by Codexis to such Third Parties and (b) will not be Controlled by Codexis. For purposes of this Section 3.7.1, the term "**Potentially Restricted Enzyme**" means any peptide or protein, including derivatives, with enzymatic or biocatalytic activity, or any vector that encodes for any such peptide or protein, derived from the use of the Platform Technology by Codexis after the Effective Date that, in either case, may not be Controlled by Codexis. In the event that any Potentially Restricted Enzyme generated by Codexis is owned by a Third Party or exclusively licensed by Codexis to a Third Party, Codexis, subject to confidentiality obligations owed by Codexis to such Third Party, will inform the Patent Committee of such Potentially Restricted Enzyme at its next regularly scheduled meeting and, if applicable, any particular field(s) and/or use(s) restrictions with respect to such Potentially Restricted Enzyme. The Patent Committee will review information provided by Codexis with respect to any such Potentially Restricted Enzyme and, if applicable, any particular field(s) and/or use(s) restrictions with respect to such Potentially Restricted Enzymes and, in accordance with Section 5.2.3, determine whether the list of Restricted Enzymes set forth on Exhibit 1.112 shall be revised to include such Potentially Restricted Enzyme and, if applicable, any particular field(s) and/or use(s) restrictions with respect to such Potentially Restricted Enzyme. Codexis will provide GSK with the initial list of Restricted Enzymes on Exhibit 1.112 within [***] days after the Effective Date.

1.1.8 In the event that GSK wishes to exercise its rights under Section 3.2 to any Restricted Enzyme for any specific field(s) and/or use(s), it shall notify Codexis in writing of such request. Codexis shall then have [***] days in which to confirm to GSK in writing whether Codexis Controls such Restricted Enzyme for such specific field(s) and/or use(s) requested by GSK. In the event that Codexis does Control such Restricted Enzyme for such specific field(s) and/or use(s) then effective upon the date of such written confirmation from Codexis, such Restricted Enzyme shall be an Enzyme for such specific field(s) or use(s) for the purpose of Section 3.2.

1.7 Responsibility for Freedom to Operate Analyses

. GSK acknowledges and agrees that it is within GSK's discretion to conduct freedom to operate analyses with respect to the use of any enzyme, other than a Codexis Enzyme, to generate an Enzyme and, in addition, any Enzyme generated in accordance with the terms of the license granted by Codexis to GSK and, whether or not GSK elects to conduct a freedom to operate analysis, GSK will be solely responsible for any such enzyme (other than a Codexis Enzyme) and any such Enzyme.

1.8 Public Domain Information and Material. Codexis acknowledges and agrees that GSK shall be free to utilize, without restriction, any information or material that is (a) within the Platform Technology and (b) wholly within the public domain.

1.9 No Implied Licenses. No license or other right is or shall be created or granted hereunder by implication, estoppel or otherwise. All licenses and rights are or shall be granted only as expressly provided in this Agreement. All rights not expressly granted by a Party under this Agreement are reserved by such Party and may be used by such Party for any purpose. For clarity, there shall be no implied license or implied other right in favor of Codexis to any Enzyme, and there shall be no implied license or implied other right in favor of GSK to any Patent(s) of Codexis or any Know-How of Codexis.

4. PROJECTS

1.10 Collaborative Projects. Beginning on the Effective Date and continuing during the TT Term and if mutually agreed for such period following the TT Term, GSK and Codexis (or Affiliates of GSK and Codexis) shall work on Collaborative Projects pursuant to the terms of written project plans to be mutually agreed by the Parties. Upon mutual agreement by the Parties, or agreement of the JSC as applicable, if the JSC is then in existence, upon agreement by the Parties of the written research plan for any Collaborative Project, such research plan shall be attached to and made part of this Agreement. Each such written research plan shall describe each Party's responsibilities and obligations, and the activities to be performed by each Party, in connection with the applicable Collaborative Project and the frequency and content of any reports to be provided by one Party to the other Party. Any amendment to a written research plan in respect of a Collaborative Project must be in writing and signed by both GSK and Codexis or approved by the JSC if the JSC is then in existence. In the event that GSK subsequently decide to resume a terminated Collaborative Project, whether resumed and progressed independently or in further collaboration with Codexis, such project shall continue to be deemed a Collaborative Project for the purposes of Codexis' eligibility to earn such associated milestone payments in Section 7.4.

1.11 Project Summaries . During the Term, within thirty (30) days after the end of the Calendar Year ending December 31 or such other date within such Calendar Year as mutually agreed between the Parties, GSK shall disclose to Codexis a summary of [***]. Such summary shall be provided to Codexis in sufficient detail to provide to Codexis reasonable information into GSK activities with respect to GSK's use of the Platform Technology for the purpose of enabling Codexis to anticipate GSK's progression toward achievement of milestone events as set forth in Article 7 and to monitor GSK's compliance with this Agreement. Each such summary shall include [***]

[***]; *provided* that, in the event [***], the information provided by GSK in any such summary report from such time onwards [***].

1.12 Project Activities. Each Party shall perform the research activities assigned to such Party under each written research plan in respect of a Collaborative Project and shall perform all such research activities in compliance with all Applicable Law. Subject to Article 7, each Party shall be solely responsible for all costs and expenses of research activities performed by such Party, unless otherwise specified in the applicable written research plan; *provided* that, if the Parties agree to perform a Collaborative Project after the expiration of the TT Term, the Parties shall negotiate in good faith and mutually agree upon reasonable compensation from GSK to Codexis for the research activities performed by Codexis in connection with such Collaborative Project.

1.13 Subcontracting.

1.1.2 Generally. Subject to the limitations set forth in Section 4.4.2, GSK may perform any of its obligations or exercise any of its rights under this Agreement through one or more Third Party contractors, contract manufacturing organizations (CMOs), contract research organizations (CROs) or other contract service organizations [***]. Codexis may perform any of its obligations under [***] (as described in the Technology Transfer Plan) and [***] (as described in the Technology Transfer Plan) through one or more Third Party contractors, contract service organizations and academic or government collaborators; *provided* that the activities corresponding to such obligations were performed through subcontractors in the ordinary course of Codexis' business as of the Effective Date including, for illustrative purposes, protein analysis, gene and oligonucleotide synthesis and analysis, polynucleotide and polypeptide sequencing, microbiological testing, protein immobilization, and crystallization.

1.1.3 Limitations.

(a) GSK may not subcontract any activities to a Third Party that would permit such a Third Party to receive and/or use the Platform Technology;

(b) Any agreement between GSK and a Third Party contractor relating to the performance of GSK's obligations or exercise of GSK's rights under this Agreement shall include material transfer terms, and non-use and non-disclosure confidentiality

terms, that are no less stringent than terms consistent with GSK's ordinary practice involving GSK proprietary materials and information of a similar nature; and

(c) GSK may not subcontract activities to any contract service organization unless Codexis consents to the choice of the contract service organization, such consent not to be unreasonably withheld, conditioned, or delayed.

1.1 Records. Each Party shall, and shall require its Affiliates and subcontractors to, maintain complete and accurate records of all research activities under a Project conducted pursuant to a written research plan and Technology Transfer Project Activities and all results, information and data generated in performing such research activities and Technology Transfer Project Activities. Such records shall be complete and accurate and shall fully and properly reflect all work done and results achieved in sufficient detail and in a manner appropriate for accounting, Patent and regulatory purposes.

5. GOVERNANCE

1.3 Joint Steering Committee.

1.1.1 Establishment. Within thirty (30) days after the Effective Date, the Parties shall establish a joint steering committee (the "Joint Steering Committee" or "JSC") to have overall responsibility for managing and directing the Projects and to oversee and make certain decisions regarding the Projects, as set forth in this Section 5.1. The JSC shall also provide a forum for sharing advice, progress and results relating to the activities conducted by the Parties under the Projects and shall attempt to facilitate the resolution of any disputes between the Parties, as described in Section 5.1.4. At each meeting of the JSC, each Party shall brief the JSC regarding the content, execution and results achieved by such Party under each Project, as described in Section 2.6. Each Party, through its representatives on the JSC, shall be permitted to provide advice and commentary with respect to the Projects. The JSC shall have the following specific responsibilities:

(a) oversee, review and provide advice regarding the overall progress of the Projects;

(b) coordinate by way of each Party's Scientific Leads, the research activities under a written research plan relating to a Project agreed by the Parties and coordinate sharing of results and data arising therefrom;

(c) appoint and oversee subcommittees as it deems appropriate for carrying out activities under this Agreement, including for oversight of any specific aspects of any Projects or other matters;

(d) review each written research plan and, if appropriate, propose modifications thereto to the Parties;

(e)

review the Technology Transfer Plan and, if appropriate, propose modifications thereto to the Parties;

(f) perform any other activities or functions as the Parties may mutually agree in writing; and

(g) determine the initiation and termination of Collaborative Projects.

1.1.2 Membership; Meetings. The JSC shall be composed of two (2) employees from each of GSK and Codexis and shall meet, in person, by teleconference, or by video-teleconference, at least one (1) time per Calendar Quarter, or more or less often as the Parties shall determine; *provided* that nothing under this Agreement shall prevent the Parties from meeting in person, by teleconference, or by video-teleconference more frequently as may be mutually agreed by the JSC representatives, in connection with the Technology Transfer. In-person meetings shall alternate between Codexis and GSK locations within the United States whenever possible unless otherwise agreed by the Parties. The first such meeting shall be within forty-five (45) days after the Effective Date. Any member of the JSC may designate a substitute, who shall be an employee of the applicable Party, to attend with prior written notice to the other Party. Ad hoc guests who are subject to written confidentiality obligations at least as stringent as the provisions in Article 9 may be invited to JSC meetings. Each Party may replace its JSC members with other of its employees, at any time, upon written notice to the other Party.

1.1.3 Project Teams. The JSC may establish one (1) or more sub-committees (each, a "Project Team") that includes each Party's Scientific Leads. Such Project Team shall have day-to-day oversight of individual Collaborative Projects and/or the Technology Transfer, shall provide primary scientific and technical expertise with respect to such activities and shall regularly and proactively provide updates to the JSC and escalate issues for discussion and resolution, as appropriate. Any dispute of technical feasibility of any Project that cannot be resolved through good faith negotiation between the members of such Project Team shall be referred for resolution to the JSC.

1.1.4 Decision-Making; Limitations on JSC. Except as provided under Section 5.1.6, decisions of the JSC shall be made by consensus, including issues concerning technical feasibility and the deployment of Codexis resources, with each Party having collectively one (1) vote in all decisions. The JSC shall have only such powers as are specifically delegated to it in this Agreement, and such powers shall be subject to the terms and conditions set forth herein. Without limiting the generality of the foregoing, the JSC shall have no power to amend this Agreement or the Technology Transfer Plan. The Parties shall be alternately responsible for preparing and circulating minutes, for approval by the non-preparing Party, within fourteen (14) days after each meeting including but not limited to a list of topics of discussion at the meeting and a list of any actions, decisions or determinations approved and a list of any issues and actions to be resolved. If the JSC is unable to reach a consensus decision

on a matter that is within its decision-making authority within thirty (30) days after it has met and attempted to reach such decision, then either Party may refer such matter for resolution by the executive officers designated by the Parties for attempted resolution pursuant to Section 12.1. In the event that the executive officers are unable to resolve such matter within the time period specified in Section 12.1, then in the case of any decision relating to the conduct of a Collaborative Project, such Collaborative Project shall immediately terminate. Any matter not expressly provided for hereunder and any matter relating to any GSK Background IP, GSK Compound, Licensed Product, Platform Technology, Licensed IP, or Codexis Background IP shall remain outside of the scope of the JSC.

1.1.5 Duration of JSC. The JSC shall be automatically disbanded upon the expiration of the TT Term or the earlier expiration or termination of this Agreement; *provided* that the Parties may, by mutual written agreement, extend the term of the JSC for additional one (1) year periods after the expiration of the TT Term, with a separate mutual written agreement required for each such one (1) year extension.

1.1.6 Matters Reserved for GSK. Notwithstanding anything contained in this Section 5.1, GSK shall determine in its sole discretion, decisions in connection with the following matters:

(a) Collaborative Project selection and termination;

(b) GSK Sole Projects;

(c) Selection and use of any GSK Selected Enzyme; and

(d) [***].

1.1 Patent Committee.

1.1.1 Establishment. Within sixty (60) days after the Effective Date, the Parties shall establish a Patent committee (the "Patent Committee") to discuss, oversee and coordinate the Prosecution (or abandonment) of Patents, enforcement of Patents, and defense against claims of infringement of Third Party patents relating to Intellectual Property licensed under Article 3, Sections 2.2.9 and 2.2.10**,** including for example Codexis Core Technology Improvements IP, Arising Codexis Enzyme Technology IP, Arising Codexis Process Technology IP, Arising GSK Enzyme Technology IP and Arising GSK Process Technology IP, and any related Intellectual Property matters regarding any Inventions made during the Term, including for example, the Licensed Additional Codexis IP; and to provide recommendations to the Parties regarding the Prosecution of such Patents and related Intellectual Property matters. Within thirty (30) days after the end of each half year, each Party shall provide the Patent Committee with a report listing all Patents relating to such Parties' utilization of the Platform Technology filed by that Party during that half year.

1.1.2 Membership; Meetings. The Patent Committee shall be composed of one (1) employee from each of GSK and Codexis knowledgeable in U.S. patent law and the technology areas that are the subject of this Agreement. The Patent Committee shall meet, in person, by teleconference, or by video-teleconference, at least one (1) time per Calendar Quarter, or more or less often as the Parties shall determine. In-person meetings shall alternate between Codexis and GSK locations within the United States whenever possible unless

otherwise agreed by the Parties. The first such meeting shall be within ninety (90) days after the Effective Date. Any member of the Patent Committee may designate a substitute, who shall be an employee of the applicable Party, to attend with prior written notice to the other Party. Ad hoc guests who are subject to written confidentiality obligations at least as stringent as the provisions in Article 9 may be invited to Patent Committee meetings. Each Party may replace its Patent Committee members with other of its employees with the qualifications set forth in this Section 5.2.2, at any time, upon written notice to the other Party.

1.1.3 Decision-Making; Limitations on Patent Committee. Decisions of the Patent Committee shall be made by consensus, with each Party having collectively one (1) vote in all decisions. The Patent Committee shall have only such powers as are specifically delegated to it in this Agreement, and such powers shall be subject to the terms and conditions set forth herein. Without limiting the generality of the foregoing, the Patent Committee shall have no power to amend this Agreement, the Technology Transfer Plan or any written research plan. If the Patent Committee is unable to reach a consensus decision on a matter that is within its decision-making authority within thirty (30) days after it has met and attempted to reach such decision, then either Party may refer such matter for resolution by the executive officers designated by the Parties for attempted resolution pursuant to Section 12.1. In the event that the executive officers of each Party are unable to resolve such matter within the time period specified in Section 12.1, then Codexis shall have final decision-making authority with respect to any dispute relating specifically to Restricted Enzymes and Codexis Patents and GSK shall have final decision-making authority with respect to any dispute relating specifically to GSK Patents. The Patent Committee shall provide status updates to the JSC once per Calendar Quarter as long as the JSC is in existence and, thereafter, to the Parties.

1.1.4 Duration of Patent Committee. The Patent Committee shall endure beyond the expiration of the TT Term and shall automatically renew on a year-to-year basis. Notwithstanding the aforementioned, the Patent Committee may be disbanded at any time upon mutual written agreement of the Parties.

6. INTELLECTUAL PROPERTY

1.4 Background Rights. Each Party shall retain all right, title and interest to its Background IP, and, except as expressly set forth in this Agreement, no right or license to such Patents, Know-How and other Intellectual Property rights is granted by either Party to the other Party.

1.5 Ownership of Inventions.

1.1.1 Generally. Inventorship of Inventions shall be determined by application of U.S. patent laws. Subject to Sections 6.2.2, 6.2.3 and 6.2.4, all patentable Inventions invented solely by or on behalf of either Party or jointly by or on behalf of both Parties under this Agreement, including without limitation in the performance of any responsibilities under a written research plan relating to a Project, and all Intellectual Property rights therein, shall be owned in accordance with inventorship.

1.1.2 Codexis Core Technology Improvements IP. Codexis shall own any and all Codexis Core Technology Improvements and Codexis Core Technology Improvements IP arising during the TT Term and, if GSK exercises the Option, during the Improvements TT Term. GSK hereby assigns to Codexis all of GSK's right, title and interest in and to the Codexis Core Technology Improvements IP.

1.1.3 Arising Enzyme Technology IP. GSK shall own any and all Arising GSK Enzyme Technology, Arising GSK Enzyme Technology IP, Arising Codexis Enzyme Technology and Arising Codexis Enzyme Technology IP arising during the TT Term and, if GSK exercises the Option, during the Improvements TT Term. Codexis hereby assigns to GSK all of Codexis' right, title and interest in and to the Arising Codexis Enzyme Technology Improvements IP.

1.1.4 Arising Process Technology IP. GSK shall own any and all Arising GSK Process Technology, Arising GSK Process Technology IP, Arising Codexis Process Technology and Arising Codexis Process Technology IP arising during the TT Term and, if GSK exercises the Option, during the Improvements TT Term. Codexis hereby assigns to GSK all of Codexis' right, title and interest in and to the Arising Codexis Process Technology IP.

1.1.5 Ownership of Enzymes. GSK shall exclusively own all Enzymes derived from GSK's use of the Platform Technology pursuant to this Agreement.

1.2 Further Assurances. Each Party and its Affiliates shall sign and deliver to the other Party all writings and do all such things as may be necessary or appropriate to vest in such other Party all right, title and interest in and to all Codexis Core Technology Improvements IP, Arising Enzyme Technology IP and Arising Process Technology IP in accordance with Section 6.2.

1.3 Employees and Agents. Each Party shall ensure that all employees, agents, consultants, contractors and subcontractors (as permitted under Section 4.4) performing activities under or contemplated by this Agreement, have assigned or are obligated to assign their interest in any Invention invented in the course of such activities to the Party for which such employee, agent, consultant, contractor or subcontractor is providing its services.

1.4 Prosecution of Patents.

1.1.6

In General. The Patent Committee shall have oversight regarding the Prosecution of Patents disclosing and/or claiming Inventions directly related to Codexis Core Technology Improvements, Arising GSK Enzyme Technology, Arising GSK Process Technology, Arising Codexis Enzyme Technology and Arising Codexis Process Technology and shall provide recommendations to the Parties to maximize the value of such Patents. To the extent necessary, the Parties agree to cooperate in good faith to coordinate the Prosecution of such Patents, including submissions of Patent applications worldwide (e.g., to coordinate the filing of Patent applications to ensure that the Parties file related applications on the same day). The Parties shall agree in good faith on a strategy with respect to Prosecution of any Patents disclosing and/or claiming any jointly-owned Inventions.

1.1.7 Codexis Prosecution. As between the Parties, Codexis shall have the sole right, but not the obligation, to Prosecute all Patents disclosing and/or claiming all Codexis Core Technology, Codexis Core Technology Improvements, Codexis Enzymes and Codexis Libraries (the "**Codexis Patents**"), in Codexis' sole discretion and at Codexis' sole cost and expense.

1.1.8 GSK Prosecution. As between the Parties, GSK shall have the sole right, but not the obligation, to Prosecute all Patents disclosing and/or claiming all Arising GSK Enzyme Technology, Arising GSK Process Technology, Arising Codexis Enzyme Technology, and Arising Codexis Process Technology (collectively, the " **GSK Patents**"), in GSK's sole discretion and at GSK's sole cost and expense.

1.1.9 Back-Up Rights. If GSK decides not to Prosecute, or not to continue Prosecuting, any GSK Patent, GSK shall provide Codexis with written notice of such decision at least forty-five (45) days prior to the date upon which the subject matter of such GSK Patent shall lapse or become abandoned. The basis for such decision shall be discussed by the Patent Committee pursuant to Section 5.2 and Codexis shall thereupon have the right (but not the obligation) to assume responsibility for Prosecution of such GSK Patent at Codexis' expense, and with counsel of Codexis' choosing, except (a) any GSK Patent covering any Licensed Product; and (b) any GSK Patent relating to any GSK Compound, any GSK Existing Pharmaceutical Product, any GSK Initial Enzyme, and/or any GSK Selected Enzyme. Effective upon the date Codexis assumes responsibility for Prosecution of such GSK Patent, and the costs and expenses relating thereto, GSK hereby assigns any and all interest held by GSK in, to and under such GSK Patent to Codexis.

1.1.10 CREATE Act. Each Party acknowledges and agrees that this Agreement is a "joint research agreement" as contemplated by 35 U.S.C. § 102(c), and that all inventions arising under any Collaborative Projects hereunder are intended to have the benefit of the rights and protections conferred by the Cooperative Research and Enhancement Act of 2004 (CREATE Act). Each Party agrees to disclose the names of both Parties in each Patent application for all inventions arising under all Collaborative Projects in accordance with the requirements of 35 U.S.C. § 102(c)(3).

Enforcement of Patents.

1.1.11 Notice. If either Party becomes aware of any suspected infringement of any GSK Patent or Codexis Patent, or any GSK Patent or Codexis Patent is challenged in any action or proceeding (any of the foregoing, an "**Infringement Action**"), such Party shall notify the other Party's representative on the Patent Committee, and following such notification, the Parties shall confer.

1.1.12 Enforcement. As between the Parties, GSK will have the first right, but not the obligation, to bring any Infringement Action with respect to any GSK Patent at its sole cost and expense, and Codexis shall have the sole right, but not the obligation, to bring any Infringement Action with respect to any Codexis Patent at its sole cost and expense.

1.1.13 Procedure for Enforcement.

(a) The non-enforcing Party pursuant to Section 6.6.2 shall reasonably assist the enforcing Party (at the enforcing Party's expense) in any Infringement Action if so requested, such assistance to be coordinated through the Parties' Patent Committee members, and the non-enforcing Party shall lend its name and be joined as a party plaintiff to such action if reasonably requested by such enforcing Party or required by Applicable Law. The non-enforcing Party shall have the right to participate and be represented in any such action by its own counsel at its own expense. The non-enforcing Party shall cooperate, at the enforcing Party's cost and expense, with the enforcing Party in investigating or terminating any suspected infringement, whether through legal action, negotiation or otherwise, including by producing all reasonably pertinent records, papers, information, samples, specimens and similar items, and directing its employees to testify and grant interviews, upon the request of the enforcing Party. The enforcing Party will keep the non-enforcing Party reasonably informed of the status of the action through the enforcing Party's Patent Committee members.

(b) A settlement, consent judgment or other voluntary final disposition of a suit under this Section 6.6.3 may be entered into by the enforcing Party without the consent of the non-enforcing Party; *provided* that any such settlement, consent judgment or other disposition of any action or proceeding by an enforcing Party under this Article 6 shall not, without the consent of the non-enforcing Party (not to be unreasonably withheld), (a) impose any liability or obligation on the non-enforcing Party, (b) include the grant of any license, covenant or other rights to any Third Party that would conflict with or reduce the scope of the subject matter included under the licenses granted to the non-enforcing Party under this Agreement, (c) conflict with or reduce the scope of the subject matter claimed in any Patent owned by the non-enforcing Party, or (d) adversely affect the interest of the non-enforcing Party in any material respect.

1.1.14 Damages. In the event that a Party exercises the rights conferred in this Section 6.6, and such Party recovers any damages or other sums in such action or in

settlement thereof, such damages or other sums recovered shall first be applied to all out-of-pocket costs and expenses incurred by the Parties in connection therewith, including attorneys' fees. If such recovery is insufficient to cover all such costs and expenses of both Parties, it shall be shared in proportion to the total of such costs and expenses incurred by each Party. If, after such reimbursement of the Parties' cost and expenses, any funds shall remain from such damages or other sums recovered, such remaining funds shall be retained by the prosecuting Party.

1.6 Defense Against Claims of Infringement of Third Party Patents.

1.1.15 Claims of Infringement Relating to Enzyme Products. If a Third Party asserts, or either Party becomes aware of a Third Party's intention to assert, that a Patent owned or otherwise controlled by the Third Party is infringed by the manufacture, use, sale, offer for sale, import or export of an Enzyme Product in the Territory, the Party first obtaining knowledge of such a claim shall immediately provide the other Party written notice of such claim along with the related facts in reasonable detail. In such event, unless the Parties otherwise agree, as between the Parties GSK shall have the first right, but not the obligation, at its expense, to control the defense of such claim with respect to such Enzyme Product. Each Party shall cooperate with the defending Party, at the defending Party's reasonable request and expense, such cooperation to be coordinated through the Parties' Patent Committee members, and the defending Party shall have the right to be represented separately by counsel of its own choice, but at its own expense. The defending Party shall also control settlement of such claim; *provided, however,* that no settlement shall be entered into without the prior consent of the other Party if such settlement would adversely affect the rights and benefits of, or impose or adversely affect any obligations on, the other Party, such consent not to be unreasonably withheld.

1.1.16 Claims of Infringement Relating to Licensed Rights. If a Third Party asserts, or either Party becomes aware of a Third Party's intention to assert, that a Patent owned or otherwise controlled by the Third Party is infringed by the exercise by GSK or its Affiliates of any rights licensed to GSK hereunder (other than by the manufacture, use, sale, offer for sale, import or export of an Enzyme Product in the Territory), the Party first obtaining knowledge of such a claim shall immediately provide the other Party notice of such claim along with the related facts in reasonable detail. In such event, as between the Parties Codexis shall have the sole right, but not the obligation, at its expense, to control the defense of such claim. GSK shall cooperate with Codexis, at Codexis' reasonable request and expense, such cooperation to be coordinated through GSK's Patent Committee members, and GSK shall have the right to be represented separately by counsel of its own choice, but at its own expense. Codexis shall also control settlement of such claim; *provided, however,* that no settlement shall be entered into without the prior consent of GSK if such settlement would adversely affect the rights and benefits of, or impose or adversely affect any obligations on, GSK, such consent not to be unreasonably withheld.

7. FINANCIAL TERMS

1.1

Upfront Payment. In consideration, along with Section 7.3, of the Technology Transfer under this Agreement within [***] Business Days after receiving an Invoice from Codexis, after the Effective Date, GSK shall pay to Codexis a non-creditable, non-refundable upfront payment of six million Dollars ($6,000,000) (the "**Upfront Payment**").

1.2 Annual Option Fee. In consideration of the licenses granted by Codexis to GSK under Section 3.5.3, upon GSK's exercise of the Option, as set forth in Section 3.5.2, GSK shall pay, after GSK receipt of an Invoice from Codexis, to Codexis a non-creditable, non-refundable payment of one million Dollars ($1,000,000) (the "**First Annual Option Fee**"). On each of the first (1st) and second (2nd) anniversaries of the TT Term Expiration Date, GSK shall pay to Codexis, after GSK receipt of an Invoice from Codexis, an additional non-creditable, non-refundable payment of one million Dollars ($1,000,000) (each such payment and the First Annual Option Fee, an "**Annual Option Fee**"); *provided* that GSK's failure to timely pay any Annual Option Fee during the Improvements TT Term shall not constitute a breach of this Agreement, but instead shall cause the Improvements TT Term to immediately terminate without opportunity to cure.

1.3 Technology Transfer Milestones. In consideration for the Technology Transfer, GSK shall pay to Codexis, after GSK receipt of an Invoice from Codexis, each of the milestone payments set forth in this Section 7.3 upon achievement of the applicable milestone event. Such milestone payments shall be non-creditable and non-refundable.

Technology Transfer Milestone Event	Milestone Payment
Completion of Wave 1 including delivery of all deliverables therefor specified in the Technology Transfer Plan.	$5,000,000
Completion of Wave 2, including delivery of all deliverables therefor specified in the Technology Transfer Plan.	$6,500,000
The earlier to occur of the event described in (a) Section 1.120(a) or (b) Section 1.120(c).	$7,500,000

1.4 Collaborative Project Milestones. GSK shall pay to Codexis, after GSK receipt of an Invoice from Codexis, each of the milestone payments set forth in this Section 7.4 upon achievement of the applicable milestone event with respect to a Licensed Collaborative Project GSK Selected Enzyme (or the associated Pharmaceutical Product, as applicable). Each milestone achieved with respect to an associated Pharmaceutical Product shall be paid on a Pharmaceutical Product-by-Pharmaceutical Product basis. Each milestone payment will be made for each Licensed Collaborative Project GSK Selected Enzyme (or the associated Pharmaceutical

Product as applicable) that achieves the applicable milestone event, regardless of the number of Collaborative Projects that achieve each such milestone event. For clarity, each milestone payment will be made only once with respect to each Licensed Collaborative Project GSK Selected Enzyme (or the associated Pharmaceutical Product, as applicable). Such milestone payments shall be non-creditable and non-refundable. Notwithstanding the foregoing, no milestone payments shall be owed by GSK to Codexis under this Section 7.4 with respect to any GSK Sole Project or any Enzyme Product.

Collaborative Project Milestone Event	Milestone Payment
Initiation of [***] of the Licensed Collaborative Project GSK Selected Enzyme used in the synthesis of a GSK Compound for [***].	$[***]
Initiation of [***] of the Licensed Collaborative Project GSK Selected Enzyme used in the synthesis of a GSK Compound for [***] of a Pharmaceutical Product.	$[***]
[***] of a Pharmaceutical Product in [***].	$[***]
First time annual Net Sales of a Pharmaceutical Product in the Territory achieve [***] Dollars ($[***])	$[***]
First time annual Net Sales of a Pharmaceutical Product in the Territory achieve [***] Dollars ($[***])	$[***]
First time annual Net Sales of a Pharmaceutical Product in the Territory achieve [***] Dollars ($[***])	$[***]

1.5 GSK Sole Project Milestones . GSK shall pay to Codexis after GSK receipt of an Invoice from Codexis, each of the milestone payments set forth in this Section 7.5 upon achievement of the applicable milestone event with respect to a Licensed GSK Sole Project GSK Selected Enzyme (or the associated Pharmaceutical Product, as applicable). Each milestone achieved with respect to an associated Pharmaceutical Product shall be paid on a Pharmaceutical Product-by-Pharmaceutical Product basis. Each milestone payment will be made for each GSK Sole Project GSK Selected Enzyme (or the associated Pharmaceutical Product, as

applicable), that achieves the applicable milestone event; *provided* that each milestone payment shall be made no more than two (2) times, on the first two (2) achievements of the applicable milestone event, regardless of the number of GSK Sole Projects that achieve such milestone event. For clarity, each milestone payment will be made only once with respect to each GSK Sole Project GSK Selected Enzyme (or the associated Pharmaceutical Product, as applicable). Such milestone payments shall be non-creditable and non-refundable. Notwithstanding anything to the contrary, no milestone payments shall be owed by GSK to Codexis under this Section 7.5 with respect to any GSK Collaborative Project or Enzyme Product.

GSK Sole Project Milestone Event	Milestone Payment
Initiation of [***] of the Licensed GSK Sole Project GSK Selected Enzyme for use in synthesis of a GSK Compound for [***] of a Pharmaceutical Product.	$[***]
[***] of a Pharmaceutical Product in [***].	$[***]
First time annual Net Sales of Pharmaceutical Product in the Territory achieve [***] Dollars ($[***])	$[***]
First time annual Net Sales of Pharmaceutical Product in the Territory achieve [***] Dollars ($[***])	$[***]
First time annual Net Sales of Pharmaceutical Product in the Territory achieve [***] Dollars ($[***])	$[***]

1.6 GSK Existing Pharmaceutical Product Milestones

. GSK shall pay to Codexis after GSK receipt of an Invoice from Codexis, each of the milestone payments set forth in this Section 7.6 upon achievement of the applicable milestone event with respect to a GSK Existing Pharmaceutical Product (or the Licensed (GSK Sole or Collaborative, as the case may be) Project GSK Selected Enzyme used in the synthesis of such GSK Existing Pharmaceutical Product, as applicable). Each milestone achieved with respect to an associated Pharmaceutical Product shall be paid on a Pharmaceutical Product-by-Pharmaceutical Product basis. For a GSK Existing Pharmaceutical Product that is the subject of a GSK Sole Project, each milestone payment will be made for each GSK Existing Pharmaceutical Product (or Licensed GSK Sole Project GSK Selected Enzyme used in the synthesis of such GSK Existing Pharmaceutical

Product, as applicable) that achieves the applicable milestone event; *provided* that with respect to all GSK Sole Projects described in BOTH Sections 7.5 and 7.6, each milestone payment shall be made no more than three (3) times, on the first three (3) achievements of the applicable milestone event, regardless of the number of GSK Sole Projects. By way of example, if milestones were paid twice for any milestone event per Section 7.5, there would remain one additional opportunity for the equivalent milestone event to be earned by Codexis in Section 7.6. For a GSK Existing Pharmaceutical Product that is the subject of a Collaborative Project, each milestone payment will be made for each GSK Existing Pharmaceutical Product (or Licensed Collaborative Project GSK Selected Enzyme used in the synthesis of such GSK Existing Pharmaceutical Product, as applicable) with respect to Collaborative Projects that achieves the applicable milestone event, regardless of the number of GSK Existing Pharmaceutical Products (or Licensed GSK Collaborative Project GSK Selected Enzyme used in the synthesis of such GSK Existing Pharmaceutical Product, as applicable) with respect to Collaborative Projects that achieve each such milestone event. For clarity, each milestone payment will be made only once with respect to each GSK Existing Pharmaceutical Product (or Licensed Collaborative Project GSK Selected Enzyme used in the synthesis of such GSK Existing Pharmaceutical Product, as applicable). Such milestone payments shall be non-creditable and non-refundable.

GSK Existing Pharmaceutical Product Milestone Event	**Milestone Payment for Collaborative Project**	**Milestone Payment for GSK Sole Project**
Initiation of a Project following selection of an Initial Enzyme for Initial Enzyme Optimization.	$[***]	$[***]
Initiation of [***] of the GSK Selected Enzyme used in the synthesis of a GSK Existing Pharmaceutical Product for [***] of a Pharmaceutical Product.	$[***]	$[***]
[***] of a GSK Existing Pharmaceutical Product synthesized using a GSK Selected Enzyme in [***].	$[***]	$[***]
First time annual Net Sales of a GSK Existing Pharmaceutical Product synthesized using a GSK Selected Enzyme in the Territory achieve [***] Dollars ($[***])	$[***]	$[***]

1.7 Enzyme Product Milestones. GSK shall pay to Codexis, after GSK receipt of an Invoice from Codexis, each of the milestone payments set forth in this Section 7.7 upon achievement of the applicable milestone event with respect to an Enzyme Product. Each milestone payment will be made on an Enzyme Product-by-Enzyme Product basis; *provided* that with respect to each of Enzyme Products listed in Column 2 and Column 3s, each milestone payment shall be made no more than two (2) times with respect Enzyme Products listed in Column 2 and no more than two (2) times with respect to Enzyme Products listed in Column 3, on the first two (2) achievements of the applicable milestone event with respect to Enzyme Products listed in Column 2 and the first two (2) achievements of the applicable milestone event with respect to Enzyme Products listed in Column 3, regardless of the number of Enzyme Products listed in Column 2 and Column 3 that achieve such milestone event. Each milestone payment will be made for each Licensed Enzyme Therapeutic Product listed in Column 1 that achieves the applicable milestone event, regardless of the number of Licensed Enzyme Therapeutic Products that achieve each such milestone event. For clarity, each milestone payment will be made only once with respect to each Enzyme Product. Such milestone payments shall be non-creditable and non-refundable.

Enzyme Product Milestone Event	**Column 1** **Milestone Payment for Licensed Enzyme Therapeutic Products**	**Column 2** **Milestone Payment for Licensed Prophylactic Products, Licensed Other Therapeutic Products and Licensed Accessory Products**	**Column 3** **Milestone Payment for Licensed Diagnostic Products**
Demonstration of [***] for an Enzyme Product.	$[***]	$[***]	$[***]
[***] of an Enzyme Product in [***].	$[***]	$[***]	$[***]

First time annual Net Sales of an Enzyme Product in the Territory achieve [***] Dollars ($[***])	$[***]	$[***]	$[***]
First time annual Net Sales of an Enzyme Product in the Territory achieve [***] Dollars ($[***])	$[***]	$[***]	$[***]
First time annual Net Sales of an Enzyme Product in the Territory achieve [***] Dollars ($[***])	$[***]	$[***]	$[***]
First time annual Net Sales of an Enzyme Product in the Territory achieve [***] Dollars ($[***])	$[***]	$[***]	$[***]

1.8 Manner of Milestone Payments and Other Payments. GSK shall notify Codexis in writing of the achievement of any milestone event under Sections 7.3 - 7.7 as applicable, within [***] days after its achievement. Each such milestone event together with the First Annual Option Fee and any Annual Option Fee and all other payments agreed under this Agreement shall be made within [***] days after receipt of an Invoice from Codexis.

1.9 Royalties . GSK, on an Enzyme Product-by-Enzyme Product and country-by-country basis, shall pay to Codexis royalties based upon the total quarterly Net Sales in the Territory, during a Calendar Quarter in which such Enzyme Product is sold, during the Royalty Term, at a rate equal to [***] percent ([***]%) of Net Sales of Licensed Enzyme Therapeutic Products in Column 1, [***] percent ([***]%) of Net Sales of Enzyme Products listed in Column 2 of the table in Section 7.7 and [***] percent ([***]%) of Net Sales of Enzyme Products listed in Column 3 (collectively, "**Royalties**"). With respect to Enzyme Products listed in Column 2 and Column 3 of the table in Section 7.7, Royalties will be due only with respect to the first two (2) Enzyme Products listed in Column 2 and the first two (2) Enzyme Products listed in Column 3 of the table in Section 7.7 to achieve First Commercial Sale, regardless of the number of Enzyme Products listed in Column 2 and Column 3 of the table in Section 7.7 that are commercialized by or on behalf of GSK. Royalties will be due with respect to all Licensed Enzyme Therapeutic Products in Column 1 of the table in Section 7.7 that achieve First Commercial Sale, regardless

of the number of Licensed Enzyme Therapeutic Products that are commercialized by or on behalf of GSK.

1.10 Royalty Payment Reports. After the First Commercial Sale of an Enzyme Product that is subject to the payment of Royalties in accordance with Section 7.9, and for the Royalty Term for such Product, GSK shall furnish to Codexis a written report, within [***] days after the end of each Calendar Quarter (or portion thereof if this Agreement terminates during a Calendar Quarter), showing the amount of Royalties due for such Calendar Quarter (or portion thereof) pursuant to Section 7.9. Royalty payments for each Calendar Quarter shall be due at the same time as such written report for the Calendar Quarter. With each quarterly payment, GSK shall deliver to Codexis a full and accurate accounting to include at least the following information:

(e) the Net Sales on an Enzyme Product-by-Enzyme Product and country-by-country basis in the reporting currency in which sales were made and in Dollars after the application of the exchange rate during the reporting period as reported in Section 7.10(c);

(f) the Royalties payable in Dollars which shall have accrued hereunder in respect of such Net Sales and the basis for calculating such Royalties;

(g) the exchange rates used in converting into Dollars, from the currencies in which sales were made;

(h) dispositions of Enzyme Products other than pursuant to sale for cash for which a royalty is due; and

(i) withholding taxes, if any, required by Applicable Law to be deducted in respect of such Royalties.

1.11 Applicability of Milestones and Royalties. All milestone payments and Royalties set forth in Sections 7.3 through 7.9, inclusive, shall be made during the Term and, after expiration or termination of this Agreement, with respect to all applicable Pharmaceutical Products or Enzyme Products, regardless of whether the applicable Project was initiated during or after the TT Term, or before or after the effective date of expiration or termination of this Agreement; *provided* that the applicable Project is initiated or, in the case of an Enzyme Product, any Enzyme is generated using the Platform Technology, in either case, prior to the [***] of (a) the date of expiration of the last-to-expire Patent within the Codexis Core Technology licensed to GSK under this Agreement and (b) the date that is [***] years after the Effective Date.

1.12 Manner of Payment . All payments to be made by GSK to Codexis hereunder shall be made in Dollars by wire transfer of immediately available funds to such U.S. bank account as shall be designated by Codexis; *provided, however,* that any notice by Codexis

of a change in such account shall not be effective until [***] days after receipt thereof by GSK. Late payments shall bear interest at the rate provided in Section 7.16.

1.13 Records Retention. Commencing with the First Commercial Sale of a Product, GSK shall keep, and shall cause each of its Affiliates and permitted sublicensees to keep, full and accurate books of accounting in accordance with IFRS, containing all particulars that may be necessary for the purpose of calculating all Royalties payable to Codexis under this Article 7, for a period of [***] years after the Calendar Year in which such sales occurred, in sufficient detail to permit Codexis to confirm the accuracy of Royalties paid hereunder. Such books of accounting, including those of GSK's Affiliates and Sublicensees, shall be kept at the GSK site where such records are stored in the normal course of GSK's business.

1.14 Audit Rights.

1.1.1 Technical Audit Right. If Codexis has a reasonable basis for believing that a product sold by or on behalf of GSK for which GSK has not paid any milestone payments or Royalties under Sections 7.4 through 7.9, inclusive, constitutes a Licensed Product for which such milestone payments and/or Royalties may be payable, Codexis may notify GSK of its belief in writing. GSK shall allow a designee chosen by Codexis and reasonably acceptable to GSK to review such reasonable documentation and other reasonable materials of GSK as is necessary for such designee to determine whether such product constitutes a Licensed Product. Results of such investigation shall be made available to both GSK and Codexis; *provided* that such designee shall disclose to Codexis only its determination of whether the product constitutes a Licensed Product and shall disclose no other information revealed in such investigation to Codexis. Any materials examined by such designee shall be deemed GSK's Confidential Information, which may not be disclosed by such designee to any Third Party. GSK may require such designee to enter into an appropriate written agreement obligating it to be bound by obligations of confidentiality and restrictions on use of such Confidential Information that are no less restrictive than the obligations set forth in Article 9. If, as a result of any such investigation, such designee determines that such product constitutes a Licensed Product, then GSK shall (a) make all payments required to be made to Codexis under Sections 7.4 through 7.9, inclusive, with respect to such Licensed Product for achievement of milestones and/or Net Sales that occurred prior to the date the Parties receive such results, within [***] days after such date, and shall be responsible for any such payments with respect to such Licensed Product thereafter, (b) pay interest on all late payments in accordance with Section 7.16 and (c) pay Codexis' reasonable out-of-pocket costs of the investigation.

1.1.2 Financial Audit Right. During the Term and for a period of [***] years thereafter, GSK shall permit an independent, certified public accountant appointed by Codexis, and reasonably acceptable to GSK, during normal business hours and upon [***] days prior written notice, but in no case more than [***] per Calendar Year, to examine (but not copy) such records as may be necessary for the sole purpose of verifying the calculation and reporting of Net Sales and milestone payments and the correctness of any

payment made under this Agreement for any period within the preceding [***] years. The report of the independent public accountant shall be shared with GSK prior to distribution to Codexis such that GSK can provide the independent, certified public accountant with justifying remarks for inclusion in the report prior to sharing the conclusions of such report with Codexis. Results of any such examination shall be made available to both GSK and Codexis. The independent, certified public accountant shall disclose to Codexis only the amounts that the independent auditor believes to be due and payable hereunder to Codexis and details concerning any discrepancy from the amount paid and the amount due, and shall disclose no other information revealed in such audit. Any and all records examined by such independent accountant shall be deemed GSK's Confidential Information, which may not be disclosed by said independent, certified public accountant to any Third Party. GSK may require such independent accountant to enter into an appropriate written agreement obligating it to be bound by obligations of confidentiality and restrictions on use of such Confidential Information that are no less restrictive than the obligations set forth in Article 9. If, as a result of any inspection of the books and records of GSK, it is shown that payments under this Agreement were less than the amount that should have been paid, then GSK shall make all payments required to be made to Codexis to eliminate any discrepancy revealed by such inspection within [***] days. Codexis shall pay for such audits, except that in the event that the audited amounts were underpaid by GSK by more than [***] of the undisputed amounts that should have been paid during the period in question as per the audit, GSK shall pay Codexis' out-of-pocket costs of the audit and pay interest on all late payments in accordance with Section 7.16. In the event that the audited amounts were overpaid by GSK, GSK shall withhold such overpayment from future Royalties or milestone payments.

1.1.3 In the event that GSK is determined, as a consequence of an audit conducted by Codexis pursuant to either Section 7.14.1 or Section 7.14.2, as applicable, to have:

(a) not paid to Codexis any milestone payments or Royalties with respect to a Licensed Product for which milestone payments and/or Royalties are payable; or

(b) underpaid any amounts by more than [***] of the undisputed amounts that should have been paid to Codexis; and

(c) whether in the case of (a) or (b), for each occurrence after the first occurrence that GSK is determined, as a consequence of a separate, independent audit conducted by Codexis pursuant to either Section 7.14.1 or Section 7.14.2, as applicable, to have:

(i) not paid any milestone payments or Royalties with respect to a Licensed Product for which milestone payments and/or Royalties are payable; or

(ii) underpaid any amounts by more than [***] of the undisputed amounts that should have been paid to Codexis;

GSK shall pay to Codexis, in accordance with Section 7.8: (A) the outstanding amount due to Codexis as determined under this Section 7.14.3; (B) the amount calculated to be [***] percent ([***]%) of the amount noted in (A) above; and (C) the interest of due in respect of the amount noted in (A) above pursuant to Section 7.16.

1.15 Taxes.

1.1.4 No Deductions or Withholding. GSK will make all payments to Codexis under this Agreement without deduction or withholding for taxes, except to the extent that any such deduction or withholding is required by Applicable Law in effect at the time of payment.

1.1.5 Withholding Required by Applicable Law. Any tax required to be withheld on amounts payable under this Agreement shall be paid promptly by GSK on behalf of Codexis to the appropriate governmental authority, and GSK will furnish Codexis with proof of payment of such tax. Any such tax required to be withheld will be borne by Codexis.

1.1.6 Cooperation. GSK and Codexis will cooperate with respect to all documentation required by any taxing authority or reasonably requested by GSK to secure a reduction in the rate of applicable withholding taxes. Within thirty (30) days after the execution of this Agreement, Codexis will deliver to GSK an accurate and complete Internal Revenue Service Form W-9.

1.1.7 Reimbursement. If GSK had a duty to withhold taxes in connection with any payment it made to Codexis under this Agreement but GSK failed to withhold, and such taxes were assessed against and paid by GSK, then Codexis will reimburse GSK for such taxes actually paid by GSK. If GSK makes a claim under this Section 7.15.4, it will comply with the obligations imposed by Section 7.15.2 as if GSK had withheld taxes from a payment to Codexis.

1.16 Interest Due. Without limiting any other rights or remedies available to either Party, GSK shall pay to Codexis interest on any payments that are not paid on or before the date such payments are due under this Agreement at a rate equal to the lesser of (a) [***] as reported by Citibank, New York, New York, on the date such payment was due to be paid or (b) the maximum applicable legal rate on such date, in either (a) or (b), calculated on the total number of days payment was delinquent.

8. REPRESENTATIONS, WARRANTIES, AND COVENANTS; DISCLAIMERS; LIMITATION OF LIABILITY

1.17 Mutual Representations and Warranties. Each Party represents and warrants to the other Party as of the Effective Date, that:

1.1.8 such Party is duly organized, validly existing, and in good standing under the Applicable Law of the jurisdiction of its incorporation and has full corporate power and authority to enter into this Agreement and to carry out the provisions hereof;

1.1.9 execution of this Agreement and the performance by such Party of its obligations hereunder have been duly authorized;

1.1.10 this Agreement has been duly executed and delivered on behalf of such Party, and constitutes a legal, valid, binding obligation of such Party, enforceable against it in accordance with the terms hereof;

1.1.11 the performance of this Agreement by such Party does not create a breach or default under any other agreement to which it is a party, which breach or default would adversely affect the other Party;

1.1.12 the execution, delivery, and performance of this Agreement by such Party does not conflict with any agreement, instrument, or understanding, oral or written, to which it is a party or by which it is bound, nor violate any Applicable Law of any court, governmental body or administrative or other agency having jurisdiction over such Party;

1.1.13 no government authorization, consent, approval, license, exemption, filing or registration with any court or governmental department, commission, board, bureau, agency or instrumentality, domestic or foreign, under any Applicable Law currently in effect, is or will be necessary for, or in connection with, the transaction contemplated by this Agreement or any other agreement or instrument executed in connection herewith, or for the performance by such Party of its obligations under this Agreement and such other agreements, except as may be required to obtain applicable Regulatory Approvals or Regulatory Filings related to the development of any Licensed Product; and

1.1.14 such Party has not employed and, to its knowledge, has not used a contractor or consultant that has employed, any individual or entity (a) debarred by the FDA (or subject to a similar sanction of any other applicable Regulatory Authority), (b) who is the subject of an FDA debarment investigation or proceeding (or similar proceeding of any other applicable Regulatory Authority), or (c) has been charged with or convicted under Applicable Law of the United States for conduct relating to the development or approval, or otherwise relating to the regulation of any product under the Generic Drug Enforcement Act of 1992, in each case, in the conduct of its activities prior to the Effective Date.

1.18 Additional Representations and Warranties of Codexis. Codexis, on behalf of itself and its Affiliates, hereby represents and warrants to GSK that, except as

otherwise disclosed in writing by Codexis to GSK and accepted in writing by GSK, as of the Effective Date:

1.1.1 [***];

1.1.2 Codexis is the sole and exclusive owner of the Licensed Patents (other than In-Licensed Patents) and the Licensed Know-How (other than In-Licensed Know-How) and has the full authority to grant the full and unencumbered scope of rights and licenses (other than as set forth in Section 3.4.2) granted to GSK under this Agreement;

1.1.3 to the knowledge of the Codexis Senior Management, no licenses under any Third Party Intellectual Property rights are necessary for Codexis to grant to GSK the licenses hereunder (other than licenses to commercially available software such as, by way of example only, [***] or [***]);

1.1.4 the Licensed Patents are all of the Patents Controlled by Codexis that are (i) necessary to practice the Platform Technology; and (ii) which Cover the practice of the Platform Technology;

1.1.5 the Licensed Know-How accounts for all of the Codexis Know-How that is (i) necessary to practice the Platform Technology; and (ii) which Cover the practice of the Platform Technology;

1.1.6 neither Codexis nor any of its Affiliates has granted any right, license or interest to any Third Party relating to or under the Licensed IP or to the Platform Technology that would conflict or would otherwise be inconsistent with any of the rights, licenses or interests granted to GSK under this Agreement;

1.1.7 the Licensed Know-How (other than In-Licensed Know How) were generated either by employees or contractors of Codexis, and in each case the terms of employment or engagement of such employees or contractors vested in Codexis all right, title and interest in and to any Know-How generated by them or has obtained or has the legal right to obtain assignments of all such Licensed Know-How;

1.1.8 to the knowledge of Codexis Senior Management, no Third Party has rights in the Licensed Patents, the Licensed Know-How or the Platform Technology that would adversely affect GSK's rights under this Agreement;

1.1.9 [***];

1.1.10 [***];

1.1.11 [***];

1.1.12 to the knowledge of Codexis Senior Management, neither Codexis nor any of its Affiliates:

(a) is a party to any legal action relating to the Licensed IP; and

(b) [***];

1.1.15 in respect of each of the In-License Agreements, to the knowledge of Codexis Senior Management:

(c) each of the In-License Agreements is in full force and effect and neither Codexis nor its Affiliates have materially breached or received any written or oral notice of any breach or any written or oral notice of the intent to terminate under any of the In-License Agreements;

(d) each sublicense granted to GSK has been granted to GSK pursuant to the terms of each respective In-License Agreement; and

(e) each of the In-License Agreements disclosed to GSK is true, accurate and not misleading as to the terms thereof that have not been redacted;

1.1.6 the license limitations in Section 3.4.2 with respect to the Codexis Mayflower Patents are exhaustive, complete, accurate and not misleading; and

1.1.7 [***].

1.19 Mutual Covenants. Each Party hereby covenants to the other Party that:

1.1.16

all employees of such Party or its Affiliates, and all agents, consultants, contractors and subcontractors (as provided in Section 4.4) of such Party or its Affiliates performing any research activities under a research plan under a Project shall be under the obligation to assign all right, title and interest in and to their inventions and discoveries, whether or not patentable, if any, to such Party as the sole owner thereof;

1.1.17 such Party shall perform its obligations and activities in compliance with Applicable Law and industry standards, including, without limitation, GLP, GCP and GMP, in each case as applicable under Applicable Law of the country and the state and local government wherein such activities are conducted, and with respect to the care, handling and use in research and development activities hereunder of any non-human animals by or on behalf of such Party, shall at all times comply (and shall ensure compliance by any of its subcontractors) with Applicable Law, and also with the standards in the pharmaceutical industry for the development and manufacture of pharmaceutical products, and (b) with individuals who are appropriately trained and qualified;

1.1.18 neither Party shall employ (or, to its knowledge, use any contractor or consultant that employs) any individual or entity (a) debarred by the FDA (or subject to a similar sanction of any other applicable Regulatory Authority), (b) who is the subject of an FDA debarment investigation or proceeding (or similar proceeding of any other applicable Regulatory Authority), or (c) has been charged with or convicted under any Applicable Law of the United States for conduct relating to the development, approval or otherwise relating to the regulation of any product under the Generic Drug Enforcement Act of 1992, in each case, in the conduct of its activities under this Agreement; and

1.1.19 neither Party shall, during the Term, grant any right or license to any Third Party relating to any of the Intellectual Property rights it Controls that would conflict or interfere with any of the rights or licenses granted to the other Party hereunder.

1.20 Additional Covenants of GSK. GSK hereby covenants to Codexis that:

1.1.13 GSK acknowledges and agrees that the use of any enzyme, other than a Codexis Enzyme, to generate an Enzyme and, in addition, any Enzyme generated in accordance with the terms of the license granted by Codexis to GSK may be Covered by a Patent(s) owned or otherwise controlled by a Third Party;

1.1.14 all GSK employees and contractors that will have access to Codexis Confidential Information and/or Platform Technology shall be subject to a confidentiality obligations with GSK subjecting the employee or contractor to GSK's maintenance, non-disclosure, and non-use obligations under Article 9;

1.1.15 the financial information contained in any GSK report delivered pursuant to Article 7 will be generated using the same financial reporting system, using the same

data, and in the same manner that GSK uses to generate financial information for GSK's public reporting obligations; and

1.1.16 GSK shall pay Codexis' costs relating to the prosecution of the [***] Patents in accordance with Section 7.8 up to a maximum amount of [***] dollars ($[***]) per Calendar Year.

1.21 Additional Covenant of Codexis. Codexis hereby covenants to GSK that:

1.1.20 with respect to each In-License Agreement, Codexis shall maintain and keep such In-License Agreement in full force and effect under each In-License Agreement's respective terms for the term of the In-Licensed IP licensed pursuant to such In-License Agreement;

1.1.21 Codexis shall not amend any such In-License Agreement in a manner that adversely affects GSK's rights under Section 3.2 and/or imposes any additional obligations upon GSK not disclosed to GSK under the In-License Agreements; and

1.1.22 except in respect of Section 8.4.4, Codexis, pursuant to the terms of the In-License Agreements, shall be responsible for any and all annual maintenance fees due to all Third Party licensors during the Term required to maintain each In-License Agreement; *provided, however*, that (i) GSK shall be responsible for any and all milestones and royalties due to such Third Party licensors during the Term as a consequence of GSK's activities under the terms of this Agreement and (ii) nothing contained herein shall require Codexis to be responsible for Losses arising from the breach of such In-License Agreements by GSK as a sublicensee.

1.1.23 In the event of the termination of any of the In-License Agreements set forth on Exhibit 8.5.4, Codexis shall, at GSK's sole discretion, either:

(a) [***]; or

(b) [***].

Notwithstanding anything to the contrary, Codexis shall have no obligation under this Section 8.5.4 in the event of (i) expiration of any of the In-License Agreements set forth on Exhibit 8.5.4 in accordance with the terms of such In-License Agreement or (ii) a decision by the relevant

Third Party licensor to abandon the Patents licensed under any of the In-License Agreements set forth on Exhibit 8.5.4 and dedicate the subject matter of such abandoned Patents to the public domain.

1.2 DISCLAIMERS.

1.1.1 CODEXIS DISCLAIMER. EXCEPT AS EXPRESSLY SET FORTH IN SECTIONS 8.1 THROUGH 8.5, CODEXIS MAKES NO REPRESENTATIONS, WARRANTIES OR COVENANTS OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY EXPRESS OR IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO ANY CODEXIS CONFIDENTIAL INFORMATION, CODEXIS PATENTS, CODEXIS CORE TECHNOLOGY, CODEXIS CORE TECHNOLOGY IMPROVEMENTS, ARISING CODEXIS ENZYME TECHNOLOGY OR ARISING CODEXIS PROCESS TECHNOLOGY OR ANY LICENSE GRANTED BY CODEXIS HEREUNDER, OR WITH RESPECT TO THE PRODUCTS. EXCEPT AS EXPRESSLY SET FORTH IN SECTIONS 8.1 THROUGH 8.5, NOTHING IN THIS AGREEMENT SHALL BE CONSTRUED AS A REPRESENTATION OR WARRANTY THAT ANY PATENT OR OTHER PROPRIETARY RIGHTS INCLUDED IN THE CODEXIS PATENTS ARE VALID OR ENFORCEABLE OR THAT USE OF THE CODEXIS PATENTS, CODEXIS CORE TECHNOLOGY, CODEXIS CORE TECHNOLOGY IMPROVEMENTS, ARISING CODEXIS ENZYME TECHNOLOGY AND ARISING CODEXIS PROCESS TECHNOLOGY CONTEMPLATED HEREUNDER [***].

1.1.2 GSK DISCLAIMER. EXCEPT AS EXPRESSLY SET FORTH IN SECTIONS 8.1 AND 8.4, GSK MAKES NO REPRESENTATIONS, WARRANTIES OR COVENANTS OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY EXPRESS OR IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO ANY GSK CONFIDENTIAL INFORMATION OR ANY LICENSE GRANTED BY GSK HEREUNDER. EXCEPT AS EXPRESSLY SET FORTH IN SECTIONS 8.1 AND 8.5, NOTHING IN THIS AGREEMENT SHALL BE CONSTRUED AS A REPRESENTATION OR WARRANTY THAT ANY PATENT OR OTHER PROPRIETARY RIGHTS INCLUDED IN THE GSK BACKGROUND IP, ARISING GSK ENZYME TECHNOLOGY OR ARISING GSK PROCESS TECHNOLOGY ARE VALID OR ENFORCEABLE OR THAT THE USE OF THE GSK BACKGROUND IP, ARISING GSK ENZYME TECHNOLOGY OR ARISING GSK PROCESS TECHNOLOGY CONTEMPLATED HEREUNDER [***].

1.1 LIMITATION OF LIABILITY .

EXCEPT FOR A BREACH OF [***], OR CLAIMS OF A THIRD PARTY THAT ARE SUBJECT TO

INDEMNIFICATION UNDER ARTICLE 10, NEITHER PARTY SHALL BE LIABLE TO THE OTHER PARTY WITH RESPECT TO ANY SUBJECT MATTER OF THIS AGREEMENT, WHETHER UNDER ANY CONTRACT, NEGLIGENCE, STRICT LIABILITY OR OTHER LEGAL OR EQUITABLE THEORY, FOR ANY INCIDENTAL, INDIRECT, SPECIAL, EXEMPLARY, PUNITIVE, MULTIPLE OR CONSEQUENTIAL DAMAGES, INCLUDING WITHOUT LIMITATION, LOST PROFITS, LOSS OF USE, DAMAGE TO GOODWILL OR LOSS OF BUSINESS.

9. CONFIDENTIALITY

1.7 Nondisclosure. Each Party agrees that, during the Term and for a period of ten (10) years thereafter, a Party (the "**Receiving Party**") receiving Confidential Information from the other Party (the "**Disclosing Party**") (or that has received any such Confidential Information from the other Party prior to the Effective Date) shall (a) maintain in confidence such Confidential Information using not less than the efforts such Receiving Party uses to maintain in confidence its own proprietary information of similar kind and value, but in no event less than reasonable efforts, (b) not disclose such Confidential Information to any Third Party without the prior written consent of the Disclosing Party, except for disclosures expressly permitted pursuant to Section 9.3, and (c) not use such Confidential Information for any purpose, except as permitted by this Agreement (it being understood that this clause (c) shall not create or imply any rights or licenses not expressly granted under this Agreement).

1.8 Exceptions. The obligations in Section 9.1 shall not apply with respect to any portion of the Confidential Information received from the Disclosing Party that the Receiving Party can show by competent written proof:

1.1.1 was publicly disclosed by the Disclosing Party, either before or after disclosure to the Receiving Party hereunder;

1.1.2 was known to the Receiving Party or any of its Affiliates, without any obligation to keep it confidential or any restriction on its use, prior to disclosure by the Disclosing Party, as evidenced by contemporaneous written records;

1.1.3 was subsequently disclosed to the Receiving Party or any of its Affiliates by a Third Party lawfully in possession thereof and without any obligation to keep it confidential or any restriction on its use;

1.1.4 was published by a Third Party or otherwise becomes publicly available or enters the public domain, either before or after it is disclosed to the Receiving Party; or

1.1.5 was developed independently by or for the Receiving Party or its Affiliates, as evidenced by written records, without reference to or reliance upon the Disclosing Party's Confidential Information.

1.2

Authorized Disclosure. The Receiving Party may disclose Confidential Information belonging to the Disclosing Party, and Confidential Information deemed to belong to both Parties under the terms of this Agreement, to the extent (and only to the extent) such disclosure is reasonably necessary in the following instances:

1.1.6 Prosecuting Patents;

1.1.7 Regulatory Filings;

1.1.8 Prosecuting or defending litigation, including responding to a subpoena in a Third Party litigation;

1.1.9 subject to Section 9.5, complying with Applicable Law (including the rules and regulations of the Securities and Exchange Commission or any national securities exchange) and with judicial process, if in the reasonable opinion of the Receiving Party's counsel, such disclosure is necessary for such compliance; and

1.1.10 disclosure, solely on a "need to know basis," to Affiliates, potential and future collaborators (including sublicensees), potential or actual acquirers, merger partners, or assignees permitted under Section 13.5, potential or actual research and development collaborators, permitted subcontractors, investment bankers, investors, lenders or other potential financial partners, and their and each of the Parties' respective directors, employees, consultants, contractors and agents, each of whom prior to disclosure must be bound by written obligations of confidentiality and non-use no less restrictive than the obligations set forth in this Article 9; *provided, however,* that, in each of the above situations, the Receiving Party shall remain responsible for any failure by any Person who receives Confidential Information pursuant to this Section 9.3.5 to treat such Confidential Information as required under this Article 9.

If and whenever any Confidential Information is disclosed in accordance with this Section 9.3, such disclosure shall not cause any such information to cease to be Confidential Information, except to the extent that such disclosure results in a public disclosure of such information (other than by breach of this Agreement). Where reasonably possible and subject to Section 9.5 and other than pursuant to Section 9.3.5, the Receiving Party shall notify the Disclosing Party of the Receiving Party's intent to make such disclosure pursuant to this Section 9.3 sufficiently prior to making such disclosure so as to allow the Disclosing Party adequate time to take whatever action it may deem appropriate to protect the confidentiality of the information, and the Receiving Party will provide reasonable assistance to the Disclosing Party with respect thereto; *provided* that, in any event, the Receiving Party will use reasonable measures to ensure confidential treatment of such information.

1.2 Terms of this Agreement. The Parties acknowledge that this Agreement and all of the respective terms of this Agreement shall be treated as Confidential Information of both Parties.

1.3

Securities Filings. In the event either Party proposes to file with the Securities and Exchange Commission or the securities regulators of any state or other jurisdiction a registration statement or any other disclosure document which describes or refers to the terms and conditions of this Agreement under the Securities Act of 1933, as amended, the Securities Exchange Act of 1934, as amended, or any other securities Applicable Law, the Party shall notify the other Party of such intention and shall provide such other Party with a copy of relevant portions of the proposed filing prior to such filing (and any revisions to such portions of the proposed filing a reasonable time prior to the filing thereof), including any exhibits thereto relating to the terms and conditions of this Agreement, and shall use reasonable efforts to obtain confidential treatment of the terms and conditions of this Agreement that such other Party reasonably requests be kept confidential, and shall only disclose Confidential Information that it is advised by counsel is legally required to be disclosed. No such notice shall be required under this Section 9.5 if the description of or reference to this Agreement contained in the proposed filing has been included in any previous filing made by the either Party hereunder or otherwise approved by the other Party.

1.4 Publicity.

1.1.11 Upon execution of this Agreement, Codexis shall issue the press release mutually agreed upon by the Parties and set forth in Exhibit 9.6. [***]. Notwithstanding the foregoing, any disclosure that is required by Applicable Law (including the Securities Act of 1933, as amended, and the Securities Exchange Act of 1934, as amended), or the rules of a securities exchange or the Securities and Exchange Commission or the securities regulations of any state or other jurisdiction, may be made by Codexis or GSK; *provided* that any such required disclosure will not contain any Confidential Information of, respectively, GSK or Codexis and, if disclosure of such information is required by Applicable Law or such rules or regulations, the Parties will comply with Sections 9.3.4 and 9.5, as applicable, and will use reasonable efforts to minimize such disclosure and obtain confidential treatment for any such information that is disclosed to a governmental agency. Notwithstanding the foregoing, Codexis may publicly disclose any information that has previously been disclosed in accordance with this Section 9.6 without any requirement to receive GSK's approval thereof or to provide GSK with an opportunity to review such disclosure.

1.1.12 Codexis agrees to provide to GSK a copy of any public announcement regarding this Agreement or the subject matter thereof within a reasonable period of time under the circumstances prior to its scheduled release, which period of time shall not be less than fifteen (15) Business Days where practicable, for GSK's review. Except as otherwise required by Applicable Law, Codexis shall remove any Confidential Information of GSK that GSK deems to be inappropriate for disclosure. Codexis agrees not to use the name or trademark

of GSK, its Affiliates, or its employees, without the prior written consent of GSK, except that Codexis may disclose that GSK is a licensee of Codexis hereunder.

1.1.13 GSK may make public announcements and publications regarding any Pharmaceutical Product in its sole discretion, and such announcement or publication shall not be subject to this Section 9.6. In addition, GSK may publish scientific papers and make scientific presentations; *provided, however,* that such publications and presentations do not include the Confidential Information of Codexis.

10. INDEMNITY AND INSURANCE

1.1 GSK Indemnity. GSK shall indemnify, defend, and hold harmless Codexis and its Affiliates, and their respective officers, directors, employees, agents, licensors, and their respective successors, heirs and assigns, and representatives (the "**Codexis Indemnitees**"), from and against any and all Losses from Third Party claims to the extent arising out of or relating to, directly or indirectly: (a) the negligence, recklessness or wrongful intentional acts or omissions of GSK, its Affiliates, and sublicensees and its or their respective directors, officers, employees and agents, in connection with GSK's performance of its obligations or exercise of its rights under this Agreement, including without limitation under any Project; (b) any breach by GSK of any representation, warranty or covenant set forth in this Agreement; (c) research, development, synthesis, transfer, handling, storage, sale, use, optimization, modification, isolation, engineering, identification, selection, making, having made, importation, exportation or other disposition of any Licensed Product by or on behalf of GSK or any of its Affiliates, sublicensees, agents and contractors (other than Codexis) , including for each of clauses (a), (b), and (c) above, claims and threatened claims based on (i) product liability, bodily injury, risk of bodily injury, death or property damage or (ii) the failure to comply with Applicable Law; except (A) in any such case for Losses from Third Party claims to the extent reasonably attributable to any Codexis Indemnitee having committed an act or acts of negligence, recklessness or willful misconduct, (B) any breach by Codexis of any representation, warranty or covenant; or (C) for which Codexis is required to indemnify GSK pursuant to Section 10.2.

1.2 Codexis Indemnity. Codexis shall indemnify, defend and hold harmless GSK and its Affiliates, and their respective officers, directors, employees, agents, licensors, and their respective successors, heirs and assigns, and representatives (the "**GSK Indemnitees**"), from and against any and all Losses from Third Party claims, to the extent arising out of or relating to, directly or indirectly: (a) the negligence, recklessness or wrongful intentional acts or omissions of Codexis, its Affiliates, and sublicensees (excluding GSK) and its or their respective directors, officers, employees and agents, in connection with Codexis' performance of its obligations or exercise of its rights under this Agreement, including without limitation under any Project; and (b) any breach by Codexis of any representation, warranty or covenant set forth in this Agreement; including for each of clauses (a) and (b), claims and threatened claims based on (i) product liability, bodily injury, risk of bodily injury, death or property damage or (ii) the

failure to comply with Applicable Law; except (A) in any such case for Losses from Third Party claims to the extent reasonably attributable to any GSK Indemnitee having committed an act or acts of negligence, recklessness or willful misconduct, (B) any breach by GSK of any representation, warranty or covenant; or (C) for which GSK is required to indemnify Codexis pursuant to Section 10.1.

1.3 Indemnification Procedure. A claim to which indemnification applies under Section 10.1 or Section 10.2 shall be referred to herein as an "**Indemnification Claim**." If any Person or Persons (collectively, the "**Indemnitee**") intends to claim indemnification under this Article 10, the Indemnitee shall notify the other Party (the "**Indemnitor**") in writing promptly upon becoming aware of any claim that may be an Indemnification Claim (it being understood and agreed, however, that the failure by an Indemnitee to give such notice shall not relieve the Indemnitor of its indemnification obligation under this Agreement, except and only to the extent that the Indemnitor is actually prejudiced as a result of such failure to give notice). The Indemnitor shall have the right to assume and control the defense of the Indemnification Claim at its own expense with counsel selected by the Indemnitor and reasonably acceptable to the Indemnitee; *provided, however,* that an Indemnitee shall have the right to retain its own counsel, with the fees and expenses to be paid by the Indemnitor, if representation of such Indemnitee by the counsel retained by the Indemnitor would be inappropriate due to actual or potential conflicting interests between such Indemnitee and the Indemnitor; *provided* that the Indemnitor shall not be obligated to pay the fees of more than one counsel retained by all Indemnitees. If the Indemnitor does not assume the defense of the Indemnification Claim as described in this Section 10.3 above, the Indemnitee may defend the Indemnification Claim, but shall have no obligation to do so. The Indemnitee shall not settle or compromise the Indemnification Claim without the prior written consent of the Indemnitor, and the Indemnitor shall not settle or compromise the Indemnification Claim in any manner which would have an adverse effect on the Indemnitee's interests (including any rights under this Agreement, or the scope or enforceability of any Patent within the Codexis Patent Rights or of the Codexis Know-How), without the prior written consent of the Indemnitee, which consent, in each case, shall not be unreasonably withheld or delayed. The Indemnitee shall reasonably cooperate with the Indemnitor at the Indemnitor's reasonable expense and shall make available to the Indemnitor all pertinent information under the control of the Indemnitee, which information shall be subject to Article 9.

1.4 Insurance . Each Party shall maintain at all times during the Term commercial general liability insurance and product liability insurance in respect of any Third Party claim, the subject of Section 10.1 and Section 10.2, from a recognized, creditworthy insurance company, with coverage limits of at least [***] Dollars ($[***]) per Third Party claim. With respect to GSK, such product liability insurance shall include coverage for any Third Party claim subject to Section 10.1 in respect of any Licensed Product undergoing clinical trials. The minimum level of insurance set forth herein shall not be construed to create a limit on either Party's liability hereunder. Within ten (10) days following reasonable written request from either Party, the other Party shall furnish to such Party a certificate of insurance

evidencing such coverage. In the case of a material modification or cancellation of such coverage, the covered Party shall notify the other Party as soon as reasonably practicable and provide such other Party with a new certificate of insurance evidencing that the covered Party's coverage meets the requirements of this Section 10.4. Notwithstanding the aforementioned, each Party may elect to self-insure or re-insure all or parts of the limits described above and, in such event, this Section 10.4 shall apply to such self-insurance or re-insurance arrangements *mutatis mutandis*.

11. TERM AND TERMINATION.

1.5 Term; Expiration. This Agreement shall become effective on the Effective Date and, unless earlier terminated pursuant to this Article 11, or by mutual agreement of the Parties, shall remain in effect until the expiration on a country-by-country basis of all payment obligations under this Agreement. The period from the Effective Date until the date of expiration of this Agreement, or termination of this Agreement pursuant to this Article 11, shall be the "**Term**".

1.6 Termination for Material Breach. Either Party (the "**Non-Breaching Party**") may, without prejudice to any other remedies available to it at law or in equity, terminate this Agreement, in its entirety, in the Non-Breaching Party's sole discretion in the event the other Party (the "**Breaching Party**") has materially breached this Agreement, and such material breach has continued for sixty (60) days (the "**Cure Period**") after written notice thereof is provided to the Breaching Party by the Non-Breaching Party, such notice describing the alleged material breach in sufficient detail to put the Breaching Party on notice. If at the end of the Cure Period, the Breaching Party can demonstrate that it is actively seeking to remedy such material breach, then at the Breaching Party's request and with the consent of the Non-Breaching Party (not to be unreasonably withheld), the Non-Breaching Party shall grant an additional forty-five (45) days for the Breaching Party to remedy such breach.

1.7 Insolvency or Bankruptcy. To the extent permitted under Applicable Law, either Party may terminate this Agreement, (a) if, at any time, the other Party files in any court or agency pursuant to any statute or regulation of any state or country, a petition in bankruptcy or insolvency or for reorganization or for an arrangement or for the appointment of a receiver or trustee of the Party or of substantially all of its assets, or (b) if the other Party is served with an involuntary petition against it, filed in any insolvency proceeding, and such petition shall not be dismissed within ninety (90) days after the filing thereof, or (c) if the other Party shall propose or be a party to any dissolution or liquidation, or (d) if the other Party shall make an assignment of substantially all of its assets for the benefit of creditors. Each Party agrees to give the other Party prompt notice of the foregoing events giving rise to termination under this Section 11.3. All rights and licenses granted under or pursuant to any section of this Agreement are and shall otherwise be deemed to be for purposes of Section 365(n) of Title 11, United States Code (the "**Bankruptcy Code**") licenses of rights to "intellectual property" as defined in Section 101(35A) of the Bankruptcy Code. The Parties shall retain and may fully

exercise all of their respective rights and elections under the Bankruptcy Code. All materials required to be delivered by the non-bankrupt Party under this Agreement (including all manufacturing information) shall be considered to be "embodiments" of such intellectual property for purposes of Section 365(n) of the Bankruptcy Code. Upon the bankruptcy of any Party, the non-bankrupt Party shall further be entitled to a complete duplicate of, or complete access to, any intellectual property licensed to the non-bankrupt Party, and such, if not already in its possession, shall be promptly delivered to the non-bankrupt Party, unless the bankrupt Party elects to continue, and continues, to perform all of its obligations under this Agreement. All written agreements entered into in connection with the Parties' performance under this Agreement from time to time shall be considered agreements "supplementary" to this Agreement for purposes of Section 365(n) of the Bankruptcy Code.

1.8 Termination for Challenge of any Codexis Patent. If GSK or any of its Affiliates (the "**Challenging Party**") challenges the validity, scope or enforceability of or otherwise opposes any Codexis Patent in any country (each, a "**Patent Challenge**"), Codexis has the right to give notice to the Challenging Party that this Agreement will terminate in its entirety forty-five (45) days after such notice, and, unless the Challenging Party withdraws or causes to be withdrawn such Patent Challenge within such forty-five (45) day period, this Agreement will so terminate.

1.9 Consequences of Expiration or Termination.

1.1.1 In General. Expiration or termination of this Agreement for any reason shall not (a) release either Party from any obligation that has accrued prior to the effective date of such expiration or termination; (b) preclude either Party from claiming any other damages, compensation, or relief that it may be entitled to upon such expiration or termination; or (c) terminate any right to obtain performance of any obligation provided for in this Agreement that shall survive expiration or termination. Upon any expiration or termination of this Agreement, each Party shall return to the other Party and cease using all Confidential Information of such other Party; *provided* that the legal department of each Party may retain one (1) copy of such Confidential Information. Upon expiration (but not earlier termination) of this Agreement, the licenses granted to GSK pursuant to Sections 3.5.2 (if GSK exercised the Option) and 3.2.2 shall become perpetual and non-exclusive in the Field; *provided* that GSK shall remain responsible for any payments due to Codexis after the effective date of such expiration in accordance with Section 7.11. In the event of termination of this Agreement in accordance with this Article 11, [***] GSK shall have no rights to practice the Platform Technology.

1.1.2 Partial Termination of Licenses. All licenses granted to GSK under this Agreement shall terminate on a country-by-country basis to the extent that they relate to a country in the Territory that GSK has selected for termination in accordance with Section 11.7. Upon termination of this Agreement by GSK with respect to a country in the Territory (a

"**Terminated Country**"), Codexis' rights and GSK's obligations under Section 11.5.3 shall apply as to the Terminated Country. In addition, the certification signed by [***], or a successor, provided to Codexis pursuant to Section 11.5.3 shall certify that all use of Platform Technology by GSK, its Affiliates or sublicensees, either alone or with a Third party, in the Terminated Country(ies) has ceased as of the date of such certification. For the avoidance of doubt, partial termination of this Agreement with respect to any Terminated Country(ies) does not relieve GSK of obligations under Article 7 that arise from GSK's exercise of rights or obligations under this Agreement within such Terminated Country(ies) existing as of the effective date of such partial termination. For clarity, in the event that GSK, on a country-by-country basis, terminates this Agreement with respect to all countries in the Territory, this Agreement will be deemed to be terminated in its entirety.

1.1.3 Codexis Audit Right on GSK Breach or Termination. In the event of termination of this Agreement by Codexis as a result of GSK's material breach under Section 11.2, or by GSK pursuant to Section 11.7, GSK shall provide to Codexis, within ninety (90) days after the effective date of such termination, a certification signed by [***] certifying that all Codexis proprietary materials, information, and technology in custody or control of GSK or sublicensee of GSK has been destroyed. In addition, Codexis shall have a right to conduct an audit to determine that all Codexis materials, information, and/or technology have been destroyed and that such destruction is complete (the "**Termination Audit Right**"). Under the Termination Audit Right, GSK shall allow a designee chosen by Codexis and reasonably acceptable to GSK to review documentation, materials, and facilities of GSK as reasonably necessary for such designee to determine whether all Codexis materials, information, and/or technology has been destroyed. Results of such investigation shall be made available to both GSK and Codexis; *provided* that such designee shall disclose to Codexis only its determination of whether all Codexis materials, information, and/or technology has been destroyed. GSK may require such designee to enter into an appropriate written agreement obligating it to be bound by obligations of confidentiality and restrictions on use of such Confidential Information that are comparable to the obligations set forth in Article 9. The Termination Audit Right shall continue until the earlier of (a) ten (10) years after the effective date of termination of this Agreement by Codexis as a result of GSK's material breach under Section 11.2, or by GSK pursuant to Section 11.7 or (b) until a designee determines, pursuant to the Codexis' exercise of the Termination Audit Right, that all Codexis materials, information, and/or technology has been destroyed. All reasonable expenses arising from the first audit shall be at Codexis' expense, and all subsequent audits, if any, shall be at GSK's expense.

1.10 GSK Continuing Rights. Upon termination of this Agreement by GSK pursuant to Section 11.2 and 11.3, GSK shall continue to have the rights to research, develop, use, optimize, modify, isolate, engineer, identify, select, make, have made, import and/or export Enzymes and their derivatives under the licenses granted to GSK pursuant to Section 3.2, which

shall remain in effect to the fullest extent possible subject only to the payment by GSK of the applicable amounts set out in Article 7.

1.11 GSK Termination at Will. At any time following Completion of Wave 1, GSK may terminate this Agreement in its entirety, or on a country-by-country basis, upon providing ninety (90) days' written notice to Codexis at any time and for any reason or for no reason at all. In such event, GSK shall pay to Codexis all reasonable non-cancellable and non-terminable costs incurred by Codexis upon such event of termination. If GSK terminates this Agreement in its entirety pursuant to this Section 11.7 during the TT Term, GSK shall pay to Codexis the applicable termination payment set forth in this Section 11.7.

Termination at Will During TT Term	Termination At Will Payment
During Technology Transfer Project 1, as defined in the Technology Transfer Plan	$[***]
During Technology Transfer Project 2, as defined in the Technology Transfer Plan	$[***]
During Technology Transfer Project 3, as defined in the Technology Transfer Plan	$[***]
During Technology Transfer Project 4, as defined in the Technology Transfer Plan	$[***]

1.12 Additional Consequence of Certain Terminations. If Codexis terminates this Agreement pursuant to Section 11.2, or if GSK terminates this Agreement in its entirety, then, in addition to the consequences set forth in Sections 11.5 - 11.7, [***].

1.13 Survival . Notwithstanding anything to the contrary in this Agreement, the following provisions shall survive, as well as any other provision which by its terms or by the context thereof, is intended to survive expiration or termination of this Agreement: Articles 1 (Definitions), 6 (Intellectual Property), 7 (Financial Terms) (in accordance with Section 7.11), 9 (Confidentiality) (for the period of time set forth in Section 9.1), 12 (Dispute Resolution), and 13 (Miscellaneous), and Sections 3.1.2, 3.1.3, 3.4.1 and 3.4.2 (for the remaining term of the relevant Patents), 3.7.2, 8.6, 8.7, 10.1, 10.2, 10.3, 11.5, 11.8 and 11.9. Except as otherwise expressly

provided, all other rights, licenses and obligations shall terminate upon expiration or termination of this Agreement.

12. DISPUTE RESOLUTION.

1.14 Resolution by Executive Officers. The Parties agree that the procedures set forth in this Article 12 shall be the exclusive mechanism for resolving any dispute, controversy, or claim (each, a "**Dispute**") between the Parties that may arise from time to time pursuant to this Agreement relating to any Party's rights and/or obligations. Except as otherwise provided in this Agreement, in the event of any Dispute between the Parties in connection with this Agreement, the construction hereof, or the rights, duties or liabilities of either Party hereunder, the Parties shall first attempt in good faith to resolve such Dispute by negotiation and consultation between themselves. In the event that such Dispute is not resolved on an informal basis within ten (10) Business Days, either Party may, by written notice to the other Party, refer the Dispute to the executive officers designated by the Parties for attempted resolution. Such officers, or their designees, shall attempt in good faith to promptly resolve such Dispute within thirty (30) Business Days thereafter. In the event that any matter is not resolved under the foregoing provisions, each Party may, at its sole discretion, seek resolution of such matter in accordance with Section 12.2.

1.15 Mediation. If a Dispute arises out of or relating to this Agreement, or the breach thereof, and if said Dispute is not resolved through negotiation by the Parties under Section 12.1, the Parties agree that they shall try in good faith to resolve the Dispute by referring it for confidential mediation under the CPR Mediation Procedure in effect at the start of mediation. Unless otherwise agreed, the Parties shall select a mediator from the CPR Panels of Distinguished Neutrals. If the Parties cannot agree, they will defer to the CPR to select a mediator. The cost of the mediator shall be borne equally by the Parties. The place of mediation shall be New York, New York, United States of America. Any Dispute not resolved within forty-five (45) days (or within such other time period as may be agreed to by the Parties in writing) after appointment of the mediator shall be finally resolved by arbitration pursuant to Section 12.3.

1.16 Arbitration. Subject to Section 12.4, any Dispute referred for arbitration shall be finally resolved by binding arbitration before a panel of three (3) arbitrators in accordance with the rules of the American Arbitration Association (**"AAA"**) in effect at the time the proceeding is initiated. If the issues in Dispute involve scientific, technical or commercial matters, then any arbitrator chosen under this Agreement shall have educational training and industry experience sufficient to demonstrate a reasonable level of relevant scientific, technical and commercial knowledge relevant to the subject matter of the Dispute. All proceedings and communications as part of the arbitration shall be in English. Following selection of the third arbitrator, the arbitrators shall use all reasonable efforts to complete the arbitration proceedings and render an award within six (6) months after the last arbitrator is appointed. In any such arbitration, the following additional procedures shall apply:

1.1.4

Rules. The arbitration shall be conducted pursuant to the then-current AAA rules in effect for disputes between U.S. parties on the date of commencement of the arbitration; *provided, however*, that discovery in any arbitration shall be conducted in accordance with the AAA Commercial Arbitration Rules in effect immediately prior to October 1, 2013, for large complex commercial disputes between U.S. based entities.

1.1.5 Panel. Within thirty (30) days after a Party demands arbitration, each Party shall select one (1) arbitrator and the third chosen by the two (2) Party-chosen arbitrators. If either, or both, of GSK or Codexis fails to choose an arbitrator within thirty (30) days after receiving notice of commencement of arbitration or if the two arbitrators fail to choose a third arbitrator within thirty (30) days after their appointment, then either or both Parties shall immediately request that the AAA select the remaining number of arbitrators to be selected, which arbitrator(s) shall have an appropriate background, experience and expertise in the subject matter at issue in the Dispute. The place of arbitration shall be San Francisco, California, United States of America. The seat of arbitration shall be the State of New York, United States of America (for clarity, the Parties intend this to mean that the procedural rules of the State of New York, United States of America, will apply to any arbitration).

1.1.6 Injunctive Relief; Costs and Expenses. Either Party may apply to the arbitrators for interim injunctive relief until the arbitration decision is rendered or the Dispute is otherwise resolved. Either Party may, without waiving any right or remedy under this Agreement, seek from any court having jurisdiction any injunctive or provisional relief necessary to protect the rights or property of that Party pending resolution of the Dispute pursuant to this Article 12. The arbitrators shall have no authority to award punitive or any other type of damages not measured by a Party's compensatory damages. Each Party will share equally the cost and expenses of the panel selected in Section 12.3.2 and any administrative fees unless in each case the arbitrators agree otherwise, which they are hereby empowered, authorized and instructed to do if they determine that to be fair and appropriate. Each Party shall bear its own costs and expenses and attorneys' fees in connection with any such arbitration; *provided, however,* that the prevailing Party in any such arbitration shall be entitled to recover from the other Party the reasonable attorneys' fees, costs and expenses incurred by such prevailing Party in connection with such arbitration.

1.1.7 Confidentiality. Except to the extent necessary to confirm an award or decision or as may be required by Applicable Law, or the requirement of any exchange on which a Party's shares are traded, neither Party nor any arbitrator may disclose the existence or results of any arbitration without the prior written consent of both Parties. In no event shall any arbitration be initiated after the date when commencement of a legal or equitable proceeding based on the Dispute would be barred by the applicable Delaware statute of limitations.

1.1.8 Breach of the Agreement. In the event of a Dispute involving the alleged breach of this Agreement (including, without limitation, whether a Party has satisfied its diligence obligations hereunder), (a) neither Party may terminate this Agreement under

Article 11 until resolution of the Dispute pursuant to this Article 12 and (b) if the arbitrators render a decision that a breach of this Agreement has occurred, the arbitrators shall have no authority to modify the right of the non-breaching Party to terminate this Agreement in accordance with Section 11.2.

1.1.9 Performance. Any disputed performance or suspended performance pending the resolution of a Dispute that the arbitrators determine to be required to be performed by a Party shall be completed within a reasonable time period following the final decision of the arbitrators.

1.1.10 Binding Decision. The decision of the arbitrators shall be the sole, exclusive and binding remedy between the Parties regarding the determination of all Disputes presented. The arbitrators shall prepare and deliver to the Parties a written, reasoned opinion conferring their decision. Judgment on the award so rendered may be entered in any court having competent jurisdiction thereof. Any monetary payment to be made by a Party pursuant to a decision of the arbitrators shall be made in Dollars, free of any tax or other deduction.

1.17 Confidentiality and Patent Disputes. Notwithstanding anything in this Agreement to the contrary, any and all issues regarding (a) breach or threatened breach of a Party's confidentiality obligations under this Agreement or (b) the ownership, scope, construction, validity and enforceability of any Patent shall be determined in a court of competent jurisdiction under the local Patent laws of the jurisdictions having issued the Patent in question.

13. MISCELLANEOUS.

1.18 Non-Solicitation. During the period beginning on the Effective Date and ending on the date that is [***], (the "**Non-Solicitation Period**"), GSK and its Affiliates shall not, directly or indirectly, solicit, hire, employ or attempt to solicit, hire or employ any person acting in a scientific role who is or was an employee or contractor of Codexis or any Codexis Affiliate during the Non-Solicitation Period, or in any other way directly or indirectly seek to solicit, induce, bring about, influence, promote, facilitate, or encourage any such individual to work for GSK or any party other than GSK; *provided* that the foregoing shall not restrict GSK or its Affiliates from advertising employment opportunities in any manner that does not directly target Codexis or its Affiliates or from hiring or employing any person who responds to such generalized public advertisements.

1.19 Severability . If one or more of the provisions of this Agreement is held to be invalid or unenforceable, the provision shall be considered severed from this Agreement and shall not serve to invalidate any remaining provisions hereof. The Parties shall make a good faith effort to replace any invalid or unenforceable provision with a valid and enforceable one

such that the objectives contemplated by the Parties when entering this Agreement may be realized.

1.20 Notices. Any notice required or permitted to be given by this Agreement shall be in writing and shall be (a) delivered by hand or by overnight courier with tracking capabilities, (b) mailed postage prepaid by first class, registered or certified mail, or (c) delivered by facsimile or e-mail followed by delivery via either of the methods set forth in (a) or (b), in each case, addressed as set forth below unless changed by notice so given:

If to GSK:

GlaxoSmithKline

709 Swedeland Road
P.O. Box 1539, Mail Code UW2318
King of Prussia, PA 19406-0939
United States

Attention: [***]
Email: [***]

With a copy to:

GlaxoSmithKline
2301 Renaissance Boulevard
Mailcode RN0220
King of Prussia, PA 19406-2772
United States

Attention: [***]
Email: [***]

If to Codexis:

Codexis, Inc.
200 Penobscot Drive
Redwood City, CA 94063
Attention: Chief Executive Officer
Telephone: [***]
Fax: [***]
Email: [***]

With a copy to:

Codexis, Inc.
200 Penobscot Drive
Redwood City, CA 94063
Attention: General Counsel
Telephone: [***]
Fax: [***]
Email: [***]

Any such notice shall be deemed given on the date received. A Party may add, delete or change the Person or address to which notices should be sent at any time upon written notice delivered to the Party's notices in accordance with this Section 13.3.

1.21 Force Majeure. Except for the payment of money, neither Party shall be liable for delay or failure in the performance of any of its obligations hereunder if such delay or failure is due to causes beyond its reasonable control, including acts of God, fires, earthquakes, acts of war, terrorism, or civil unrest ("**Force Majeure**"); *provided, however,* that the affected Party promptly notifies the other Party; *provided further* that the affected Party shall use its Commercially Reasonable Efforts to avoid or remove such causes of non-performance and to mitigate the effect of such occurrence, and shall continue performance with the utmost dispatch whenever such causes are removed. When such circumstances arise, the Parties shall negotiate in good faith any modifications of the terms of this Agreement that may be necessary or appropriate in order to arrive at an equitable solution.

1.22 Assignment. Neither Party may, without the consent of the other Party, assign or transfer any of its rights and obligations hereunder; *provided* that no such consent is required for an assignment or transfer to an Affiliate of such Party or to a successor in interest to such Party by reason of merger or consolidation or sale of all or substantially all of the business of such Party relating to the subject matter of this Agreement, whether by merger, sale of stock, sale of assets or otherwise. This Agreement shall inure to the benefit of and be binding on the Parties' successors and assigns. Any assignment or transfer in violation of the foregoing shall be null and void.

1.23 Change of Control [***] . [***]

[***].

1.24 GSK Divestments. If GSK sells, leases, loans, provides or otherwise transfers to any Third Party any asset, facility, business unit or personnel that practice or otherwise use any Codexis Core Technology, Codexis Core Technology Improvements or Enzyme Technology, GSK shall provide a certification to Codexis and Codexis shall have an audit right as set forth in Section 11.5.3.

1.25 Waivers and Modifications. The failure of any Party to insist on the performance of any obligation hereunder shall not be deemed to be a waiver of such obligation. Waiver of any breach of any provision hereof shall not be deemed to be a waiver of any other breach of such provision or any other provision on such occasion or any succeeding occasion. No waiver, modification, release or amendment of any obligation under or provision of this Agreement shall be valid or effective unless in writing and signed by both Parties.

1.26 Choice of Law. This Agreement shall be governed by, enforced and construed in accordance with the laws of the State of Delaware, United States of America, excluding: (a) any conflicts of law principles that would result in the application of the laws of any state other than the State of Delaware; (b) the United Nations Convention on Contracts for the International Sales of Goods; (c) the 1974 Convention on the Limitation Period in the International Sale of Goods (the "**1974 Convention**"); and (d) the Protocol amending the 1974 Convention, done at Vienna April 11, 1980; *provided, however,* that with respect to matters involving the enforcement, validity or scope of Intellectual Property rights, the laws of the applicable country shall apply.

1.27 Relationship of the Parties. Each Party is an independent contractor under this Agreement. Nothing contained herein is intended or is to be construed so as to constitute Codexis and GSK as partners, agents or joint venturers. Neither Party shall have any express or implied right or authority to assume or create any obligations on behalf of or in the name of the other Party or to bind the other Party to any contract, agreement or undertaking with any Third Party.

1.28 Entire Agreement. This Agreement, together with the attached exhibits and schedules, constitutes the entire agreement between the Parties as to the subject matter of this Agreement, and supersedes and merges all prior and contemporaneous negotiations, representations, agreements and understandings regarding the same.

1.29 Counterparts . This Agreement may be executed in counterparts with the same effect as if both Parties had signed the same document. All such counterparts shall be deemed an original, shall be construed together and shall constitute one and the same instrument.

Signatures to this Agreement transmitted by facsimile, by email in "portable document format" (".pdf"), or by any other electronic means intended to preserve the original graphic and pictorial appearance of this Agreement shall have the same effect as physical delivery of the paper document bearing original signature. Notwithstanding the aforementioned, the Parties shall as soon as reasonably practicable exchange original signed counterparts to this Agreement.

1.30 Interpretation.

1.1.11 Drafting Party. Each of the Parties acknowledges and agrees that this Agreement has been diligently reviewed by and negotiated by and between them, that in such negotiations each of them has been represented by competent counsel and that the final agreement contained herein, including the language whereby it has been expressed, represents the joint efforts of the Parties and their counsel. Accordingly, in interpreting this Agreement or any provision hereof, no presumption shall apply against any Party as being responsible for the wording or drafting of this Agreement or any such provision, and ambiguities, if any, in this Agreement shall not be construed against any Party, irrespective of which Party may be deemed to have authored the ambiguous provision.

1.1.12 Singular and Plural; Gender. The definitions of the terms herein shall apply equally to the singular and plural forms of the terms defined. Whenever the context may require, any pronoun shall include the corresponding masculine, feminine and neuter forms. The word "will" shall be construed to have the same meaning and effect as the word "shall." The word "any" means "any and all" unless otherwise clearly indicated by context. The word "including" will be construed as "including without limitation." The word "or" is disjunctive but not necessarily exclusive.

1.1.13 References. Unless the context requires otherwise, (a) any definition of or reference to any agreement, instrument or other document herein shall be construed as referring to such agreement, instrument or other document as from time to time amended, supplemented or otherwise modified (subject to any restrictions on such amendments, supplements or modifications set forth herein or therein), (b) any reference to Applicable Law herein shall be construed as referring to such Applicable Law as from time to time enacted, repealed or amended, (c) any reference herein to any Person shall be construed to include the Person's successors and assigns, and (d) all references herein to Articles, Sections or Exhibits, unless otherwise specifically provided, shall be construed to refer to Articles, Sections and Exhibits of this Agreement.

1.1.14 Headings and Captions. Headings and captions are for convenience only and are not to be used in the interpretation of this Agreement.

1.31

Anti-Bribery and Corruption.

1.1.1 Codexis acknowledges that it has read GSK's 'Prevention of Corruption – Third Party Guidelines' attached at Exhibit 13.14 and agrees to perform its obligations under the Agreement in accordance with the principles set out therein.

1.1.2 Codexis shall comply fully at all time with all applicable laws and regulations, including but not limited to applicable anti-corruption laws, of the territory in which Codexis conducts business with GSK.

1.1.3 GSK shall be entitled to terminate this Agreement immediately on written notice to Codexis, if Codexis fails to perform its obligations in accordance with this Section 13.14. [***].

1.32 Ethical Standards and Human Rights. Codexis represents and warrants, to the best of its knowledge, that in connection with this Agreement, it respects the human rights of its staff and does not employ child labor, forced labor, unsafe working conditions, discrimination on the basis of race, religion, disability or gender, or cruel or abusive disciplinary practices in the workplace; and that it pays each employee at least the minimum wage, provides each employee with all legally mandated benefits, and complies with the laws on working hours and employment rights in the countries in which it operates. Codexis shall encourage compliance with these standards by any supplier of goods or services that it uses in performing its obligations under this Agreement.

1.33 Good Data Management. During the Technology Transfer or under any Collaborative Project conducted pursuant to this Agreement, each Party shall, and shall cause any Third Party acting for and on behalf of such Party to, carry out its obligations under the Agreement, and collect and record any data generated therefrom, in accordance with the following good data management practices:

1.1.15 Data are being generated using sound scientific techniques and processes;

1.1.16 Data are being accurately recorded in accordance with good scientific practices;

1.1.17 Data are being analyzed appropriately without bias in accordance with good scientific practices;

1.1.18

Data and results are being stored securely and can be retrieved, and

1.1.19 Data trails exist to demonstrate and/or reconstruct key decisions.

[Signature Page Follows]

IN WITNESS WHEREOF, the Parties have caused this Platform Technology Transfer, Collaboration and License Agreement to be executed by their respective duly authorized officers as of the Effective Date.

Codexis, Inc.
By: /s/ John J. Nicols

Name: John J. Nicols

Title: President & CEO

GlaxoSmithKline Intellectual Property Development Limited
By: /s/ Paul Williamson

Name: Paul Williamson
For and on behalf of
Edinburgh Pharmaceutical Industries Limited

Title: Corporate Director

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Exhibit 1.18

Codexis Core Patents

CODEXIS CORE PATENTS							
Country	**Application Title**	**Application Status**	**Application Number**	**Filing Date**	**Publication Number**	**Patent Number**	**Issue Date**
US	COMBINED AUTOMATED PARALLEL SYNTHESIS OF POLYNUCLEOTIDE VARIANTS	Granted	12/562988	09/18/2009	2010/0093560	8,383,346	02/26/2013
CN	METHOD OF SYNTHESIZING POLYNUCLEOTIDE VARIANTS	Granted	200980122093.2	12/13/2010	102066561	200980122093.2	09/25/2013
CA	METHOD OF SYNTHESIZING POLYNUCLEOTIDE VARIANTS	Published	2,726,850	12/02/2010	2726850		
EP	METHOD OF SYNTHESIZING POLYNUCLEOTIDE VARIANTS	Published	09763625.2	11/29/2010	2285958		
IN	METHOD OF SYNTHESIZING POLYNUCLEOTIDE VARIANTS	Published	8090/CHEN/2010	12/13/2010	8090/CHENP/2010		
SG	METHOD OF SYNTHESIZING POLYNUCLEOTIDE VARIANTS	Granted	201009215-3	12/13/2010		167342	05/31/2013

CA	COMBINED AUTOMATED PARALLEL SYNTHESIS OF POLYNUCLEOTIDE VARIANTS	Published	2763017	11/21/2011	2763017		
CN	COMBINED AUTOMATED PARALLEL SYNTHESIS OF POLYNUCLEOTIDE VARIANTS	Published	200980159766.1	12/08/2011	102803489		
EP	COMBINED AUTOMATED PARALLEL SYNTHESIS OF POLYNUCLEOTIDE VARIANTS	Published	09845944.9	12/05/2011	2451951		
IN	COMBINED AUTOMATED PARALLEL SYNTHESIS OF POLYNUCLEOTIDE VARIANTS	Published	9101/CHENP/2011	12/07/2011	9101/CHENP/2011		
US	COMBINED AUTOMATED PARALLEL SYNTHESIS OF POLYNUCLEOTIDE VARIANTS	Published	13/756778	02/01/2013	2013/0143767		
US	METHOD OF SELECTING AN OPTIMIZED, DIVERSE POPULATION OF VARIANTS	Granted	12/867429	08/12/2010	2011/0029468	8,504,498	08/06/2013

EP	METHOD OF SELECTING AN OPTIMIZED, DIVERSE POPULATION OF VARIANTS	Published	09710859.1	02/12/2009	2250595		
EP	METHOD OF GENERATING AN OPTIMIZED, DIVERSE POPULATION OF VARIANTS	Published	09710490.5	02/12/2009	2250594		
US	METHOD OF GENERATING AN OPTIMIZED, DIVERSE POPULATION OF VARIANTS	Granted	12/867433	10/21/2010	2011/0034342	8,768,871	07/01/2014
[***]	[***]	[***]	[***]	[***]			
EP	REDUCED CODON MUTAGENESIS	Published	10817881.5	03/30/2012	2478137		
US	PROTEIN VARIANT GENERATION BY REGION SHUFFLING	Published	13/577651	08/07/2012	2014/0005057		
EP	PROTEIN VARIANT GENERATION BY REGION SHUFFLING	Published	12803889.0	12/12/2013	2726651		
WO	GENE SHUFFLING METHODS	Published	PCT/US2013/030526	03/12/2013	WO2013138339		

[***]	[***]	[***]	[***]	[***]			
[***]	[***]	[***]	[***]	[***]			
[***]	[***]	[***]	[***]	[***]			
[***]	[***]	[***]	[***]	[***]			
[***]	[***]	[***]	[***]	[***]			
[***]	[***]	[***]	[***]	[***]			

Exhibit 1.19

Codexis Core Technology

The enzyme optimization process starts by identifying genes that code for enzymes known to have the general type of catalytic reactivity for a desired chemical reaction. Typically, we identify gene sequences in published databases and then synthesize candidate genes having those sequences. Using a variety of biotechnology tools, we diversify these genes by introducing mutations, giving rise to changes in the enzymes for which they encode. The methods for diversifying these genes, and types of diversity being tested, often vary over the course of an enzyme optimization program. For finding initial diversity, methods typically include random mutagenesis and site-directed (included structure-guided) mutagenesis. We also test mutational variations that distinguish related enzymes among different organisms. Once we have identified potentially beneficial mutations, we test combinations of these mutations in libraries made using our proprietary gene recombination methodologies, gene shuffling and multiplexed gene SOEing, or Splicing by Overlap Extension.

With our proprietary gene shuffling methodology, we generate libraries of genes that have random combinations of the mutations we are testing. The pool of genes is used to transform host cells, which entails introducing the various genes, one by one, into host cells. These cells are then segregated and grown into colonies. Cells from individual colonies are cultured in high throughput to produce the enzyme encoded by the shuffled gene in those cells. The enzymes are then screened in high throughput using test conditions relevant to the desired process. The screening results identify individual shuffled genes that produce improved enzymes having combinations of beneficial mutations and weed out enzymes having detrimental ones. Using different test conditions and/or different analytical methods, we can identify variant enzymes that exhibit various improved performance characteristics, such as stability, activity and selectivity, under conditions relevant to the desired chemical process.

In the next step in our optimization process, we use our proprietary software tool, ProSAR™, to analyze protein sequence-activity relationships. ProSAR™ aids in identifying specific gene and enzyme mutations that are beneficial, neutral or detrimental with respect to the desired performance characteristics. Earlier directed evolution methods did not separately evaluate individual mutations in libraries of variants which carry multiple mutations, where beneficial and detrimental performance characteristics may be mixed in an individual gene or enzyme. Capitalizing on the advent of inexpensive gene sequencing, we are able to determine which particular mutations are present in the genes and proteins we have screened. Our ProSAR™ bioinformatics software relates the screening results to the mutations and ranks the individual mutations with regard to their degree of benefit or detriment, relative to whichever process parameter(s) the screening tested. Using that information, we can bias the pool of mutational diversity in the next iteration to further the accumulation of beneficial diversity and cancel out detrimental diversity in the individual genes in the resulting shuffled library. The ProSAR™ results also help us develop ideas about new diversity to test. ProSAR™, combined with efficient gene synthesis and high quality library generation methods, has led to a significant increase in the efficiency and speed of enzyme improvement and optimization.

In another step of our optimization process, we take the best variants we have identified and prepare enough of each to test in the desired chemical process at laboratory scale, for in-process confirmation. This optimization routine is done iteratively, typically adding new diversity to the

pool in each iteration. The gene that codes for the best performing enzyme in one iteration is used as the starting gene for the next iteration of shuffling and screening. As the enzymes improve over these iterations, the screening conditions are made increasingly more stringent. In this way, enzymes are rapidly optimized until all in-process performance requirements have been achieved and the economic objectives for the desired process have been met.

Multiplexed gene SOEing is our proprietary methodology for rapidly generating gene variants. Using multiplexed gene SOEing, we rapidly generate collections of individual gene variants that have predetermined, as opposed to random, combinations of mutations we are testing. It is based on a biotechnology technique, which we refer to as SOEing, generally used to make a hybrid, or spliced, gene from fragments of two genes and/or to introduce a specific mutation into a splice between fragments of one gene. We have automated the process to make robotically, in parallel, one hundred to several hundred variants, each with a predetermined combination of the mutations we are testing. The variants are introduced into host cells, and the encoded enzyme is produced and screened in high throughput, as described above.

Using multiplexed gene SOEing, we can test many mutations and combinations thereof in parallel, and because the mutation incorporation is controlled and predetermined before screening, as opposed to random incorporation and selection after screening, the resulting data set can be more optimal for ProSAR™ analysis.

We believe using multiplexed gene SOEing to survey many mutations quickly, followed by ProSAR™-driven shuffling of beneficial mutations, is a particularly effective approach, providing rapid gains in enzyme performance

Exhibit 1.24

Codexis Enzyme Patents

CODEXIS ENZYME PATENTS							
Country	**Application Title**	**Application Status**	**Application Number**	**Filing Date**	**Publication Number**	**Patent Number**	**Issue Date**
US	TRANSAMINASE POLYPEPTIDES	Granted	12/684864	01/08/2010	2010/0209981	8,470,564	06/25/2013
EP	TRANSAMINASE POLYPEPTIDES	Published	10729606.3	01/08/2010	2385983		
SG	TRANSAMINASE POLYPEPTIDES	Published	201104947-5	07/06/2011	0172891		
IN	TRANSAMINASE POLYPEPTIDES	Published	5648/CHENP/2011	08/04/2011	5648/CHENP/2011		
IL	TRANSAMINASE POLYPEPTIDES	Pending	213950	07/06/2011			
CN	TRANSAMINASE POLYPEPTIDES	Published	201080010926.9	01/08/2010	102341494		
US	TRANSAMINASE POLYPEPTIDES	Published	13/920,902	06/18/2013	2013/0266994		
US	TRANSAMINASE BIOCATALYSTS	Granted	12/714397	02/26/2010	2010/0285541	8,293,507	10/23/2012
CN	TRANSAMINASE BIOCATALYSTS	Published	201080017312.3	10/19/2011	102405281		
EP	TRANSAMINASE BIOCATALYSTS	Granted	10746948.8	09/26/2011	2401366	2401366	12/18/2013
IN	TRANSAMINASE BIOCATALYSTS	Published	6857/CHENP/2011	09/22/2011	6857/CHENP/2011		

SG	TRANSAMINASE BIOCATALYSTS	Granted	201106064-7	02/26/2010	0173815	173815	11/15/2013
JP	TRANSAMINASE BIOCATALYSTS	Published	2011-552209	08/23/2011	2012-519004		
US	TRANSAMINASE BIOCATALYSTS	Published	13/604,323	09/05/2012	2012/0329108		
DE	TRANSAMINASE BIOCATALYSTS	Granted	10746948.8	09/26/2011	2401366	202010012539.4	12/18/2013
FR	TRANSAMINASE BIOCATALYSTS	Granted	10746948.8	09/26/2011	2401366	2401366	12/18/2013
ES	TRANSAMINASE BIOCATALYSTS	Granted	10746948.8	09/26/2011	2401366	2401366	12/18/2013
CH	TRANSAMINASE BIOCATALYSTS	Granted	10746948.8	09/26/2011	2401366	2401366	12/18/2013
GB	TRANSAMINASE BIOCATALYSTS	Granted	10746948.8	09/26/2011	2401366	2401366	12/18/2013
IE	TRANSAMINASE BIOCATALYSTS	Granted	10746948.8	09/26/2011	2401366	2401366	12/18/2013
IT	TRANSAMINASE BIOCATALYSTS	Granted	10746948.8	09/26/2011	2401366	2401366	12/18/2013
NL	TRANSAMINASE BIOCATALYSTS	Granted	10746948.8	09/26/2011	2401366	2401366	12/18/2013
CN	KETOREDUCTASE-MEDIATED STEREOSELECTIVE ROUTE TO ALPHA CHLOROALCOHOLS	Published	201080027481.5	12/20/2011	102482648		
EP	KETOREDUCTASE-MEDIATED STEREOSELECTIVE ROUTE TO ALPHA CHLOROALCOHOLS	Published	10797576.5	12/22/2011	2446025		

IN	KETOREDUCTASE-MEDIATED STEREOSELECTIVE ROUTE TO ALPHA CHLOROALCOHOLS	Pending	9363/CHENP/2011	12/21/2011			
SG	KETOREDUCTASE-MEDIATED STEREOSELECTIVE ROUTE TO ALPHA CHLOROALCOHOLS	Allowed	201109538-7	12/21/2011	0177331		
US	KETOREDUCTASE-MEDIATED STEREOSELECTIVE ROUTE TO ALPHA CHLOROALCOHOLS	Allowed	13/378618	12/15/2011	2012/0190086		
EP	KETOREDUCTASE POLYPEPTIDES FOR THE PREPARATION OF PHENYLEPHRINE	Published	10810597.4	03/15/2012	2467473		
IN	KETOREDUCTASE POLYPEPTIDES FOR THE PREPARATION OF PHENYLEPHRINE	Published		03/15/2012	2372/CHENP/2012		
US	KETOREDUCTASE POLYPEPTIDES FOR THE PREPARATION OF PHENYLEPHRINE	Published	13/390677	02/15/2012	2012/0149073		
SG	KETOREDUCTASE POLYPEPTIDES FOR THE PREPARATION OF PHENYLEPHRINE	Published	201201086-4	02/16/2012	0178456		
CN	TRANSAMINASE [illegible]	Published	201080057744	12/21/2011	102597220		

EP	TRANSAMINASE REACTIONS	Published	10797544.3	12/22/2011	2446026		
IN	TRANSAMINASE REACTIONS	Published	9683/CHENP/2011	12/22/2011	9683/CHENP/2011		

SG	TRANSAMINASE REACTIONS	Published	201109536-1	12/21/2011	0177329		
US	TRANSAMINASE REACTIONS	Published	13/378963	04/09/2012	2012/0190085		
IL	TRANSAMINASE REACTIONS	Pending	216099	11/02/2011			
US	BIOCATALYTIC PROCESSES FOR THE PREPARATION OF SUBSTANTIALLY STEREOMERICALLY PURE FUSED BICYCLIC PROLINE COMPOUNDS	Granted	12/490190	06/23/2009	2010/0063300	8,178,333	05/15/2012
CN	BIOCATALYTIC PROCESSES FOR THE PREPARATION OF SUBSTANTIALLY STEREOMERICALLY PURE FUSED BICYCLIC PROLINE COMPOUNDS	Allowed	200980133157.9	06/24/2008	102131813		
SG	BIOCATALYTIC PROCESSES FOR THE PREPARATION OF SUBSTANTIALLY STEREOMERICALLY PURE FUSED BICYCLIC PROLINE COMPOUNDS	Granted	201009300-3	06/23/2009		167392	08/15/2013
EP	BIOCATALYTIC PROCESSES FOR THE PREPARATION OF SUBSTANTIALLY STEREOMERICALLY PURE FUSED BICYCLIC PROLINE COMPOUNDS	Granted	09798485.0	06/23/2009	2307419	2307419	11/06/2013

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IN	BIOCATALYTIC PROCESSES FOR THE PREPARATION OF SUBSTANTIALLY STEREOMERICALLY PURE FUSED BICYCLIC PROLINE COMPOUNDS	Published	397/CHENP/2011	01/19/2011	397/CHENP/2011		
US	STEREOMERICALLY PURE FUSED BICYLIC PROLINE COMPOUNDS USEFUL FOR PREPARING HEPATITIS C PROTEASE INHIBITORS	Allowed	13/294930	11/11/2011	2012/0130087		
US	BIOCATALYTIC PROCESSES FOR THE PREPARATION OF STEREOMERICALLY PURE FUSED BICYCLIC PROLINE COMPOUNDS	Granted	13/436506	03/30/2012	2012/0244581	8,574,876	11/05/2013
FR	BIOCATALYTIC PROCESSES FOR THE PREPARATION OF SUBSTANTIALLY STEREOMERICALLY PURE FUSED BICYCLIC PROLINE COMPOUNDS	Granted	09798485.0	06/23/2009	2307419	2307419	11/06/2013
DE	BIOCATALYTIC PROCESSES FOR THE PREPARATION OF SUBSTANTIALLY STEREOMERICALLY PURE FUSED BICYCLIC PROLINE COMPOUNDS	Granted	09798485.0	06/23/2009	2307419	602009019988.9	11/06/2013

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IE	BIOCATALYTIC PROCESSES FOR THE PREPARATION OF SUBSTANTIALLY STEREOMERICALLY PURE FUSED BICYCLIC PROLINE COMPOUNDS	Granted	09798485.0	06/23/2009	2307419	2307419	11/06/2013
IT	BIOCATALYTIC PROCESSES FOR THE PREPARATION OF SUBSTANTIALLY STEREOMERICALLY PURE FUSED BICYCLIC PROLINE COMPOUNDS	Granted	09798485.0	06/23/2009	2307419	2307419	11/06/2013
NL	BIOCATALYTIC PROCESSES FOR THE PREPARATION OF SUBSTANTIALLY STEREOMERICALLY PURE FUSED BICYCLIC PROLINE COMPOUNDS	Granted	09798485.0	06/23/2009	2307419	2307419	11/06/2013

ES	BIOCATALYTIC PROCESSES FOR THE PREPARATION OF SUBSTANTIALLY STEREOMERICALLY PURE FUSED BICYCLIC PROLINE COMPOUNDS	Granted	09798485.0	06/23/2009	2307419	2307419	11/06/2013
CH	BIOCATALYTIC PROCESSES FOR THE PREPARATION OF SUBSTANTIALLY STEREOMERICALLY PURE FUSED BICYCLIC PROLINE COMPOUNDS	Granted	09798485.0	06/23/2009	2307419	2307419	11/06/2013

GB	BIOCATALYTIC PROCESSES FOR THE PREPARATION OF SUBSTANTIALLY STEREOMERICALLY PURE FUSED BICYCLIC PROLINE COMPOUNDS	Granted	09798485.0	06/23/2009	2307419	2307419	11/06/2013
US	KETOREDUCTASE POLYPEPTIDES AND USES THEREOF	Granted	12/545761	08/21/2009	2010/0055751	8,288,131	10/16/2012
US	POLYNUCLEOTIEDES ENCODING ENGINEERED KETOREDUCTASE POLYPEPTIDES	Granted	13/610723	09/11/2012	2013/0005018	8,455,230	06/04/2013
US	KETOREDUCTASE POLYPEPTIDES FOR THE PRODUCTION OF A 3-ARYL-3-HYDROXYPROPANAMINE FROM A 3-ARYL-3-KETOPROPANAMINE	Granted	12/549154	08/27/2009	2010/0151534	8,426,178	04/23/2013

EP	KETOREDUCTASE POLYPEPTIDES FOR THE PRODUCTION OF A 3-ARYL-3-HYDROXYPROPANAMINE FROM A 3-ARYL-3-KETOPROPANAMINE	Published	09810573.7	08/27/2009	2329013		
IN	KETOREDUCTASE POLYPEPTIDES FOR THE PRODUCTION OF A 3-ARYL-3-HYDROXYPROPANAMINE FROM A 3-ARYL-3-KETOPROPANAMINE	Published	2014/CHENP/2011	03/22/2011	2014/CHENP/2011		

US	KETOREDUCTASE POLYPEPTIDES FOR THE PRODUCTION OF A 3-ARYL-3-HYDROXYPROPANAMINE FROM A 3-ARYL-3-KETOPROPANAMINE	Granted	13/796985	03/12/2013	2013/0177962	8,673,607	03/18/2014
US	KETOREDUCTASE POLYPEPTIDES FOR THE STEREOSELECTIVE PRODUCTION OF (4S)-3-[(5S)-5(4-FLUOROPHENYL)-5-HYDROXYPENTANOLYL]-4PHENYL1,3-OXAZOLIDIN-2-ONE	Granted	12/545034	08/20/2009	2010/0062499	8,273,554	09/25/2012
CN	KETOREDUCTASE POLYPEPTIDES FOR THE STEREOSELECTIVE PRODUCTION OF (4S)-3-[(5S)-5(4-FLUOROPHENYL)-5-HYDROXYPENTANOYL]-4PHENYL-1,3-OXAZOLIDIN-2-ONE	Published	200980141486.8	04/19/2011	102186972		
SG	KETOREDUCTASE POLYPEPTIDES FOR THE STEREOSELECTIVE PRODUCTION OF (4S)-3-[(5S)-5(4-FLUOROPHENYL)-5-HYDROXYPENTANOYL]-4PHENYL-1,3-OXAZOLIDIN-2-ONE	Pending	201101090-7	02/16/2011			

EP	KETOREDUCTASE POLYPEPTIDES FOR THE STEREOSELECTIVE PRODUCTION OF (4S)-3-[(5S)-5(4-FLUOROPHENYL)-5-HYDROXYPENTANOYL]-4PHENYL-1,3-OXAZOLIDIN-2-ONE	Published	09810477.1	03/29/2011	2329014		
IN	KETOREDUCTASE POLYPEPTIDES FOR THE STEREOSELECTIVE PRODUCTION OF (4S)-3-[(5S)-5(4-FLUOROPHENYL)-5-HYDROXYPENTANOYL]-4PHENYL-1,3-OXAZOLIDIN-2-ONE	Published	2000/CHENP/2011	03/22/2011	2000/CHENP/2011		
US	POLYNUCLEOTIDES ENCODING RECOMBINANT KETOREDUCTASE POLYPEPTIDES	Granted	13/590882	08/21/2012	2012/0322136A1	8,415,126	04/09/2013
US	KETOREDUCTASE POLYPEPTIDES FOR THE STEREOSELECTIVE PRODUCTION OF (4S)-3-[(5S)-5(4-FLUOROPHENYL)-5-HYDROXYPENTANOLYL]-4PHENYL1,3-OXAZOLIDIN-2-ONE	Published	13/764596	02/11/2013	2013/0210098		
US	ENONE REDUCTASES	Granted	12/644907	12/23/2009	2010/0159528	8,329,438	12/11/2012

EP	ENONE REDUCTASES	Published	09835878.1	12/23/2009	2382308		
IN	ENONE REDUCTASES	Published	4505/CHENP/2011	12/23/2009	4505/CHENP/2011		

SG	ENONE REDUCTASES	Published	201104630-7	12/23/2009	0172783		
US	ENONE REDUCTASES	Published	13/658582	10/23/2012	2013/0115663		
US	RECOMBINANT HALOHYDRIN DEHALOGENASE POLYPEPTIDES	Granted	12/642586	12/18/2009	2010/0173372	8,187,856	05/29/2012
IN	RECOMBINANT HALOHYDRIN DEHALOGENASE POLYPEPTIDES	Published	5068/CHENP/2011	12/18/2009	5068/CHENP/2011		
US	RECOMBINANT HALOHYDRIN DEHALOGENASE POLYPEPTIDES	Granted	13/452328	04/20/2012	2012/0220002	8,580,555	11/12/2013
US	PENICILLIN G ACYLASES	Granted	12/615139	11/09/2009	2010/0143968	8,247,192	08/21/2012
US	PENICILLIN G ACYLASES	Granted	13/542835	07/06/2012	2012/0270282	8,569,013	10/29/2013
US	NITRILASE BIOCATALYSTS	Granted	13/381155	12/28/2011	2012/0142063	8,614,081	12/24/2013
US	KETOREDUCTASE POLYPEPTIDES FOR THE PRODUCTION OF 3-ARYL-3-HYDROXYPROPANAMINE FROM A 3-ARYL-3-KETOPROPANAMINE	Granted	12/549293	08/27/2009	2010/0173369	8,288,141	10/16/2012
US	POLYNUCLEOTIDES ENCODING ENGINEERED KETOREDUCTASE POLYPEPTIDES	Published	13/610166	09/11/2012	2013/0005017		

CN	SYNTHESIS OF PRAZOLE COMPOUNDS	Published	201080054980.3	06/04/2012	102884178		
EP	SYNTHESIS OF PRAZOLE COMPOUNDS	Published	10836590.9	07/05/2012	2510089		
IN	SYNTHESIS OF PRAZOLE COMPOUNDS	Published	5934/CHENP/2012	07/05/2012	5934/CHENP/2012		
SG	SYNTHESIS OF PRAZOLE COMPOUNDS	Published	201204152-1	06/06/2012	0181535		
US	SYNTHESIS OF PRAZOLE COMPOUNDS	Published	13/514750	06/08/2012	2013/0017580		
EP	BIOCATALYSTS FOR EZETIMIBE SYNTHESIS	Published	11778262.3	12/03/2012	2566497		
IN	BIOCATALYSTS FOR EZETIMIBE SYNTHESIS	Published	10077/CHENP/2012	11/30/2012	10077/CHENP/2012		
US	BIOCATALYSTS FOR EZETIMIBE SYNTHESIS	Published	13/695856	11/02/2012	2013/0052699		
US	PROCESSES USING AMINO ACID DEHYDROGENASES AND KETOREDUCTASE-BASED COFACTOR REGENERATING SYSTEM	Published	13/577772	10/16/2012	2013/0029385		

IN	PROCESSES USING AMINO ACID DEHYDROGENASES AND KETOREDUCTASE-BASED COFACTOR REGENERATING SYSTEM	Published	7740/CHENP/2012	09/07/2012	7740/CHENP/2012		
SG	STRUCTURE-ACTIVITY RELATIONSHIPS	Published	201200817-3	02/12/2001	178753		
US	STRUCTURE-ACTIVITY RELATIONSHIPS	Published	13/757554	02/01/2013	2013/0165341		
US	STRUCTURE-ACTIVITY RELATIONSHIPS	Published	13/764252	02/11/2013	2013/0157900		
CN	KETOREDUCTASES AND USES THEREOF	Granted	200880004582.3	02/08/2008	CN 101627116A	ZL2008 8 0004582.3	07/10/2013
SG	KETOREDUCTASES AND USES THEREOF	Granted	200904674-9	02/08/2008		154045	03/30/2012
KR	KETOREDUCTASES AND USES THEREOF	Pending	10-2009-7016084	02/08/2008			
US	KETOREDUCTASES AND USES THEREOF	Granted	12/028,780	02/08/2008	2008/0318295	7,820,421	10/26/2010
EP	KETOREDUCTASES AND USES THEREOF	Granted	08725329.0	02/08/2008	2115130	2115130	08/03/2011
IL	KETOREDUCTASES AND USES THEREOF	Pending	199399	02/08/2008			

JP	KETOREDUCTASES AND USES THEREOF	Published	2009-549110	02/08/2008	2010-517574		
US	KETOREDUCTASES AND USES THEREOF	Granted	12/881734	09/14/2010	2011/0165670	8,071,347	12/06/2011

CH	KETOREDUCTASES AND USES THEREOF	Granted	08725329.0	02/08/2008	2115130	2115130	08/03/2011
DE	KETOREDUCTASES AND USES THEREOF	Granted	08725329.0	02/08/2008	2115130	2115130	08/03/2011
FR	KETOREDUCTASES AND USES THEREOF	Granted	08725329.0	02/08/2008	2115130	2115130	08/03/2011
GB	KETOREDUCTASES AND USES THEREOF	Granted	08725329.0	02/08/2008	2115130	2115130	08/03/2011
IE	KETOREDUCTASES AND USES THEREOF	Granted	08725329.0	02/08/2008	2115130	2115130	08/03/2011
NL	KETOREDUCTASES AND USES THEREOF	Granted	08725329.0	02/08/2008	2115130	2115130	08/03/2011
US	KETOREDUCTASES AND USES THEREOF	Granted	13/290773	11/07/2011	2012/0178142	8,415,127	04/09/2013
US	KETOREDUCTASES AND USES THEREOF	Published	13/793158	03/11/2013	2013/0196408		
JP	ALCOHOL DEHYDROGENASE FOR THE STEREOSELECTIVE PRODUCTION OF HYDROXY COMPOUNDS	Allowed	2007-526267	06/04/2005		5042831	
DE	ALCOHOL DEHYDROGENASE FOR THE STEREOSELECTIVE PRODUCTION OF HYDROXY COMPOUNDS	Granted	102004029112.8	06/11/2004		1763577	10/06/2010

EP	ALCOHOL DEHYDROGENASE FOR THE STEREOSELECTIVE PRODUCTION OF HYDROXY COMPOUNDS	Granted	05756002.1	06/04/2005	1763577	1763577	10/06/2010
US	ALCOHOL DEHYDROGENASE FOR THE STEREOSELECTIVE PRODUCTION OF HYDROXY COMPOUNDS	Granted	11/629000	12/08/2006	2009/0162893	7,943,356	05/17/2011
GB	ALCOHOL DEHYDROGENASE FOR THE STEREOSELECTIVE PRODUCTION OF HYDROXY COMPOUNDS	Granted	05756002.1	06/04/2005	1763577	1763577	10/06/2010
IT	ALCOHOL DEHYDROGENASE FOR THE STEREOSELECTIVE PRODUCTION OF HYDROXY COMPOUNDS	Granted	05756002.1	06/04/2005	1763577	1763577	10/06/2010
AT	ALCOHOL DEHYDROGENASE FOR THE STEREOSELECTIVE PRODUCTION OF HYDROXY COMPOUNDS	Granted	05756002.1	06/04/2005	1763577	1763577	10/06/2010

FR	ALCOHOL DEHYDROGENASE FOR THE STEREOSELECTIVE PRODUCTION OF HYDROXY COMPOUNDS	Granted	05756002.1	06/04/2005	1763577	1763577	10/06/2010
SG	KETOREDUCTASE POLYPEPTIDES FOR THE STEREOSELECTIVE PRODUCTION OF (R)-3-HYDROXYTHIOLANE	Granted	201000745-8	08/24/2008		159008	09/14/2012
IN	KETOREDUCTASE POLYPEPTIDES FOR THE STEREOSELECTIVE PRODUCTION OF (R)-3-HYDROXYTHIOLANE	Pending	1624/CHENP/2010	08/24/2008			
EP	KETOREDUCTASE POLYPEPTIDES FOR THE STEREOSELECTIVE PRODUCTION OF (R)-3-HYDROXYTHIOLANE	Published	08798570.1	08/24/2008	2195443		
CN	KETOREDUCTASE POLYPEPTIDES FOR THE STEREOSELECTIVE PRODUCTION OF (R)-3-HYDROXYTHIOLANE	Published	200880104011.7	08/24/2008	101784669		

US	KETOREDUCTASE POLYPEPTIDES FOR THE STEREOSELECTIVE PRODUCTION OF (R)-3-HYDROXYTHIOLANE	Granted	12/197286	08/24/2008	2009/0093031	7,977,078	07/12/2011
US	KETOREDUCTASE POLYPEPTIDES FOR THE PRODUCTION OF (r)-3-HYDROXYTHIOLANE	Granted	13/110789	05/18/2011	2011/0217754	8,227,229	07/24/2012
US	KETOREDUCTASE POLYPEPTIDES FOR THE PRODUCTION OF (r)-3-HYDROXYTHIOLANE	Published	13/525048	06/15/2012	2012/0276599		
CN	KETOREDUCTASE POLYPEPTIDES FOR THE REDUCTION OF ACETOPHENONES	Granted	200880115770.3	09/13/2008	101855342	ZL 2008 8 0115770.3	07/10/2013
JP	KETOREDUCTASE POLYPEPTIDES FOR THE REDUCTION OF ACETOPHENONES	Published	2010-525057	09/13/2008	2010-538657		
US	KETOREDUCTASE POLYPEPTIDES FOR THE REDUCTION OF ACETOPHENONES	Granted	12/210195	09/13/2008	2009/0191605	8,748,143	06/10/2014

IN	KETOREDUCTASE POLYPEPTIDES FOR THE REDUCTION OF ACETOPHENONES	Pending	2039/CHENP/2010	09/13/2008			
SG	KETOREDUCTASE POLYPEPTIDES FOR THE REDUCTION OF ACETOPHENONES	Granted	201001576-6	09/13/2008		159828	04/13/2012

EP	KETOREDUCTASE POLYPEPTIDES FOR THE REDUCTION OF ACETOPHENONES	Granted	08830789.7	09/13/2008	2198018	2198018	11/20/2013
KR	KETOREDUCTASE POLYPEPTIDES FOR THE REDUCTION OF ACETOPHENONES	Pending	10-2010-7007675	09/13/2008			
US	KETOREDUCTASE POLYPEPTIDES FOR THE REDUCTION OF ACETOPHENONES	Granted	13/682600	11/20/2012	2013/0078692	8,512,973	08/20/2013
US	KETOREDUCTASE POLYPEPTIDES FOR THE REDUCTION OF ACETOPHENONES	Allowed	13/970284	08/19/2013	2013/0344552		
DE	KETOREDUCTASE POLYPEPTIDES FOR THE REDUCTION OF ACETOPHENONES	Granted	08830789.7	09/13/2008	2198018	602008028883.8	11/20/2013
FR	KETOREDUCTASE POLYPEPTIDES FOR THE REDUCTION OF ACETOPHENONES	Granted	08830789.7	09/13/2008	2198018	2198018	11/20/2013
CH	KETOREDUCTASE POLYPEPTIDES FOR THE REDUCTION OF ACETOPHENONES	Granted	08830789.7	09/13/2008	2198018	2198018	11/20/2013

GB	KETOREDUCTASE POLYPEPTIDES FOR THE REDUCTION OF ACETOPHENONES	Granted	08830789.7	09/13/2008	2198018	2198018	11/20/2013
IE	KETOREDUCTASE POLYPEPTIDES FOR THE REDUCTION OF ACETOPHENONES	Granted	08830789.7	09/13/2008	2198018	2198018	11/20/2013

NL	KETOREDUCTASE POLYPEPTIDES FOR THE REDUCTION OF ACETOPHENONES	Granted	08830789.7	09/13/2008	2198018	2198018	11/20/2013
SG	KETOREDUCTASE POLYPEPTIDES AND USES THEREOF	Granted	201001902-4	09/28/2008		160022	07/31/2013
US	KETOREDUCTASE POLYPEPTIDES AND USES THEREOF	Granted	12/240986	09/29/2008	2009/0155863	8,088,610	01/03/2012
CN	KETOREDUCTASE POLYPEPTIDES AND USES THEREOF	Allowed	200880118039.6	09/28/2008	101889081	ZL200880118039.6	06/18/2014
EP	KETOREDUCTASE POLYPEPTIDES AND USES THEREOF	Granted	08833139.2	09/28/2008	2203557	2203557	02/29/2012
IN	KETOREDUCTASE POLYPEPTIDES AND USES THEREOF	Pending	2378/CHENP/2010	09/28/2008			
IL	KETOREDUCTASE POLYPEPTIDES AND USES THEREOF	Granted	204331	09/28/2008		204331	07/31/2013

US	KETOREDUCTASE POLYPEPTIDES FOR THE PRODUCTION OF (S,3)-METHYL2-(3-(3-(2(7-CHLOROQUINOLIN-2-YL)VINYL)PHENYL)-3-HYDROXYPROPYL)BENZOATE	Granted	13/329986	12/19/2011	2012/0184000	8,617,853	12/31/2013
DE	KETOREDUCTASE POLYPEPTIDES AND USES THEREOF	Granted	08833139.2	09/28/2008	2203557	2203557	02/29/2012

IE	KETOREDUCTASE POLYPEPTIDES AND USES THEREOF	Granted	08833139.2	09/28/2008	2203557	2203557	02/29/2012
NL	KETOREDUCTASE POLYPEPTIDES AND USES THEREOF	Granted	08833139.2	09/28/2008	2203557	2203557	02/29/2012
CH	KETOREDUCTASE POLYPEPTIDES AND USES THEREOF	Granted	08833139.2	09/28/2008	2203557	2203557	02/29/2012
GB	KETOREDUCTASE POLYPEPTIDES AND USES THEREOF	Granted	08833139.2	09/28/2008	2203557	2203557	02/29/2012
EP	BIOCATALYSTS AND METHODS FOR THE SYNTHESIS OF ARMODAFINIL	Published	EP11846568.1	06/14/2013	2649187		
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US	BIOCATALYSTS AND METHODS FOR THE SYNTHESIS OF ARMODAFINIL	Published	13/992138	06/06/2013	2013/0260426		
EP	BIOCATALYSTS AND METHODS FOR THE SYNTHESIS OF (S)-3-(1-AMINOETHYL)-PHENOL	Published	11796441.1	12/17/2012	2582799		

IN	BIOCATALYSTS AND METHODS FOR THE SYNTHESIS OF (S)-3-(1-AMINOETHYL)-PHENOL	Pending	267/CHENP/2013	01/11/2013			
US	BIOCATALYSTS AND METHODS FOR THE SYNTHESIS OF (S)-3-(1-AMINOETHYL)-PHENOL	Allowed	13/704507	12/14/2012	2013/0089898		
EP	BIOCATALYSTS AND METHODS FOR THE SYNTHESIS OF (1R,2R)-2-(3,4-DIMETHOXYPHENETHOXY)CYCLOHEXANAMINE	Published	11818555.2	04/29/2013	2606139		
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US	BIOCATALYSTS AND METHODS FOR THE SYNTHESIS OF (1R,2R)-2-(3,4-DIMETHOXYPHENETHOXY)CYCLOHEXANAMINE	Published	13/817295	03/12/2013	2013/0164794		
SG	KETOREDUCTASE POLYPEPTIDES FOR THE PRODUCTION OF AZETIDINONE	Granted	201001989-1	10/01/2008		160517	05/05/2014
US	KETOREDUCTASE POLYPEPTIDES FOR THE PRODUCTION OF AZETIDINONE	Granted	12/243,968	10/01/2008	2009/0162909	7,883,879	02/08/2011

EP	KETOREDUCTASE POLYPEPTIDES FOR THE PRODUCTION OF AZETIDINONE	Published	08836133.2	10/01/2008	2205727		
IL	KETOREDUCTASE POLYPEPTIDES FOR THE PRODUCTION OF AZETIDINONE	Pending	204379	10/01/2008			
JP	KETOREDUCTASE POLYPEPTIDES FOR THE PRODUCTION OF AZETIDINONE	Pending	2010-527257	10/01/2008			
IN	KETOREDUCTASE POLYPEPTIDES FOR THE PRODUCTION OF AZETIDINONE	Pending	2450/CHENP/2010	10/01/2008			
US	KETOREDUCTASE POLYPEPTIDES FOR THE PRODUCTION OF AZETIDINONE	Granted	12/977,825	12/23/2010	2011/0159567	8,257,952	09/04/2012
US	KETOREDUCTASE POLYPEPTIDES FOR THE PRODUCTION OF AZETIDINONE	Granted	13/569900	08/08/2012	2013/0034895	8,470,572	06/25/2013
US	KETOREDUCTASE POLYPEPTIDES FOR THE PRODUCTION OF AZETIDINONE	Published	13/925096	06/24/2013	2014/0057330		
[***]	[***]	[***]	[***]	[***]			
EP	BIOCATALYTIC PROCESS FOR PREPARING ESLICARBAZEPINE AND ANALOGS THEREOF	Published	12771861.7	11/06/2013	2697662		

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WO	BIOCATALYSTS AND METHODS FOR HYDROXYLATION OF CHEMICAL COMPOUNDS	Published	PCT/US13/039874	05/07/2013	WO2013/169725		
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WO	BIOCATALYSTS FOR THE PREPARATION OF HYDROXY SUBSTITUTED CARBAMATES	Published	PCT/US2012/065046	11/14/2012	WO2013/074650		

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IN	IMPROVED KETOREDUCTASE POLYPEPTIDES AND RELATED POLYNUCLEOTIDES	Granted	514/CHENP/2006	08/11/2004		239120	03/09/2010

SG	IMPROVED KETOREDUCTASE POLYPEPTIDES AND RELATED POLYNUCLEOTIDES	Granted	200600860-1	08/11/2004		119648	12/31/2008
US	KETOREDUCTASE POLYPEPTIDES AND RELATED POLYNUCLEOTIDES	Granted	10/916311	08/11/2004	2006/0195947	7,629,157	12/08/2009
US	KETOREDUCTASE POLYPEPTIDES AND RELATED POLYNUCLEOTIDES	Granted	12/576195	10/08/2009	2010/0028972	7,833,767	11/16/2010
EP	ENZYMATIC PROCESSES FOR THE PRODUCTION OF 4-SUBSTITUTED 3-HYDROXYBUTYRIC ACID DERIVATIVES	Granted	03785237.3	08/11/2003	1537222	1537222	03/09/2011
US	ENZYMATIC PROCESSES FOR THE PRODUCTION OF 4-SUBSTITUTED 3-HYDROXYBUTYRIC ACID DERIVATIVES	Granted	11/502745	08/10/2006	2007/0161094	7,807,423	10/05/2010
US	ENZYMATIC PROCESSES FOR THE PRODUCTION OF 4-SUBSTITUTED 3-HYDROXYBUTYRIC ACID DERIVATIVES AND VICINAL CYANO, HYDROXY SUBSTITUTED CARBOXYLIC ACID ESTERS	Granted	10/782258	02/18/2004	2004/0214297 A1	7,132,267	11/07/2006

US	ENZYMATIC PROCESSES FOR THE PRODUCTION OF 4-SUBSTITUTED 3-HYDROXYBUTYRIC ACID DERIVATIVES	Granted	10/639159	08/11/2003	2004/0137585	7,125,693	10/24/2006
IN	ENZYMATIC PROCESSES FOR THE PRODUCTION OF 4-SUBSTITUTED 3-HYDROXYBUTYR1C ACID DERIVATIVES	Granted	158/CHENP/2005	08/11/2003		220964	06/11/2008
SG	ENZYMATIC PROCESSES FOR THE PRODUCTION OF 4-SUBSTITUTED 3-HYDROXYBUTYRIC ACID DERIVATIVES	Granted	2005007634-8	08/11/2003		109875	08/31/2007
SG	ENZYMATIC PROCESSES FOR THE PRODUCTION OF 4-SUBSTITUTED 3-RYDROXYBUTYRIC ACID DERIVATIVES AND VICINAL CYANO, HYDROXY SUBSTITUTED CARBOXYLIC ACID ESTERS	Granted	200600847-8	02/18/2004		119636	02/29/2008

JP	ENZYMATIC PROCESSES FOR THE PRODUCTION OF 4-SUBSTITUTED 3-HYDROXYBUTYRIC ACID DERIVATIVES	Granted	2004-528083	08/11/2003	2005-535330	4578240	09/03/2010
HK	ENZYMATIC PROCESSES FOR THE PRODUCTION OF 4-SUBSTITUTED 3-HYDROXYBUTYRIC ACID DERIVATIVES	Granted	05108017.7	08/11/2003		HK1074059	09/09/2011

FR	ENZYMATIC PROCESSES FOR THE PRODUCTION OF 4-SUBSTITUTED 3-HYDROXYBUTYRIC ACID DERIVATIVES	Granted	03785237.3	08/11/2003	1537222	1537222	03/09/2011
DE	ENZYMATIC PROCESSES FOR THE PRODUCTION OF 4-SUBSTITUTED 3-HYDROXYBUTYRIC ACID DERIVATIVES	Granted	03785237.3	08/11/2003	1537222	1537222	03/09/2011
IE	ENZYMATIC PROCESSES FOR THE PRODUCTION OF 4-SUBSTITUTED 3-HYDROXYBUTYRIC ACID DERIVATIVES	Granted	03785237.3	08/11/2003	1537222	1537222	03/09/2011
NL	ENZYMATIC PROCESSES FOR THE PRODUCTION OF 4-SUBSTITUTED 3-HYDROXYBUTYRIC ACID DERIVATIVES	Granted	03785237.3	08/11/2003	1537222	1537222	03/09/2011
GB	ENZYMATIC PROCESSES FOR THE PRODUCTION OF 4-SUBSTITUTED 3-HYDROXYBUTYRIC ACID DERIVATIVES	Granted	03785237.3	08/11/2003	1537222	1537222	03/09/2011

SG	IMPROVED GLUCOSE DEHYDROGENASE POLYPEPTIDES AND RELATED POLYNUCLEOTIDES	Granted	200600859-3	08/11/2004		119647	02/27/2009
US	IMPROVED GLUCOSE DEHYDROGENASE POLYPEPTIDES AND RELATED POLYNUCLEOTIDES	Granted	12/790784	05/28/2010	2010/0304459	7,939,309	05/10/2011

IN	IMPROVED GLUCOSE DEHYDROGENASE POLYPEPTIDES AND RELATED POLYNUCLEOTIDES	Granted	521/CHENP/2006	08/11/2004		239922	04/09/2010
AU	IMPROVED GLUCOSE DEHYDROGENASE POLYPEPTIDES AND RELATED POLYNUCLEOTIDES	Granted	2004288134	08/11/2004		2004288134	04/01/2010
US	IMPROVED GLUCOSE DEHYDROGENASE POLYPEPTIDES AND RELATED POLYNUCLEOTIDES	Granted	10/915927	08/11/2004	2005/0095619A1	7,816,111	10/19/2010
EP	IMPROVED GLUCOSE DEHYDROGENASE POLYPEPTIDES AND RELATED POLYNUCLEOTIDES	Granted	04816807.4	08/11/2004	1660648	1660648	10/09/2013
FR	IMPROVED GLUCOSE DEHYDROGENASE POLYPEPTIDES AND RELATED POLYNUCLEOTIDES	Granted	04816807.4	08/11/2004	1660648	1660648	10/09/2013

DE	IMPROVED GLUCOSE DEHYDROGENASE POLYPEPTIDES AND RELATED POLYNUCLEOTIDES	Granted	04816807.4	08/11/2004	1660648	602004043547.3	10/09/2013
IE	IMPROVED GLUCOSE DEHYDROGENASE POLYPEPTIDES AND RELATED POLYNUCLEOTIDES	Granted	04816807.4	08/11/2004	1660648	1660648	10/09/2013

NL	IMPROVED GLUCOSE DEHYDROGENASE POLYPEPTIDES AND RELATED POLYNUCLEOTIDES	Granted	04816807.4	08/11/2004	1660648	1660648	10/09/2013
CH	IMPROVED GLUCOSE DEHYDROGENASE POLYPEPTIDES AND RELATED POLYNUCLEOTIDES	Granted	04816807.4	08/11/2004	1660648	1660648	10/09/2013
GB	IMPROVED GLUCOSE DEHYDROGENASE POLYPEPTIDES AND RELATED POLYNUCLEOTIDES	Granted	04816807.4	08/11/2004	1660648	1660648	10/09/2013
US	HALOHYDRIN DEHALOGENASES AND RELATED POLYNUCLEOTIDES	Granted	12/573824	10/05/2009	2010/0167345	8,101,395	01/24/2012
US	HALOHYDRIN DEHALOGENASES AND RELATED POLYNUCLEOTIDES	Granted	10/917179	08/11/2004	2005/0153417	7,824,898	11/02/2010
IN	IMPROVED HALOHYDRIN DEHALOGENASES AND RELATED POLYNUCLEOTIDES	Granted	519/CHENP/2006	08/11/2004		239852	04/06/2010

SG	IMPROVED HALOHYDRIN DEHALOGENASES AND RELATED POLYNUCLEOTIDES	Granted	200808477-4	11/14/2008	0148180	148180	01/30/2014
US	IMPROVED HALOHYDRIN DEHALOGENASES AND RELATED POLYNUCLEOTIDES	Granted	11/266747	11/02/2005	2006/0099700	7,588,928	09/15/2009

US	IMPROVED HALOHYDRIN DEHALOGENASES AND RELATED POLYNUCLEOTIDES	Granted	11/067323	02/23/2005	2005/0272064	7,541,171	06/02/2009
US	IMPROVED HALOHYDRIN DEHALOGENASES AND RELATED POLYNUCLEOTIDES	Granted	12/505374	07/17/2009	2009/0298125	8,252,554	08/28/2012
US	HALOHYDRIN DEHALOGENASES AND RELATED POLYNUCLEOTIDES	Granted	13/349514	01/12/2012	2012/0208259	8,535,910	09/17/2013
US	ALANINE 2,3-AMINOMUTASES AND RELATED POLYNUCLEOTIDES	Granted	11/919271	03/20/2009	2010/0099143	7,790,432	09/07/2010
IN	COMPOSITIONS AND METHODS FOR PRODUCING STEREOISOMERICALLY PURE STATINS AND SYNTHETIC INTERMEDIATES THEREFOR	Pending	2322/CHENP/2009	10/01/2007			
SG	COMPOSITIONS AND METHODS FOR PRODUCING STEREOISOMERICALLY PURE STATINS AND SYNTHETIC INTERMEDIATES THEREFOR	Granted	200901677-5	10/01/2010		150849	01/30/2014

EP	COMPOSITIONS AND METHODS FOR PRODUCING STEREOISOMERICALLY PURE STATINS AND SYNTHETIC INTERMEDIATES THEREFOR	Allowed	07843631.8	10/01/2007	2066788		
CN	COMPOSITIONS AND METHODS FOR PRODUCING STEREOISOMERICALLY PURE STATINS AND SYNTHETIC INTERMEDIATES THEREFOR	Published	200780036841.6	10/01/2007	101528917		
US	COMPOSITIONS AND METHODS FOR PRODUCING STEREOISOMERICALLY PURE STATINS AND SYNTHETIC INTERMEDIATES THEREFOR	Granted	11/865696	10/01/2007	2004/0248539	7,879,585	02/01/2011
US	COMPOSITIONS AND METHODS FOR PRODUCING STEREOISOMERICALLY PURE STATINS AND SYNTHETIC INTERMEDIATES THEREFOR	Granted	12/978022	12/23/2010	2011/0195465	8,273,547	09/25/2012
US	POLYNUCLEOTIDES ENCODING KETOREDUCTASES FOR PRODUCING STEREOISOMERICALLY PURE STATINS AND SYNTHETIC INTERMEDIATES THEREFOR	Granted	13/571,248	08/09/2012	2013/0040364	8,617,864	12/31/2013

EP	ENZYMATIC CONVERSION OF EPOXIDES	Granted	01934641.0	05/23/2001	1287155	1287155	08/23/2006
CH	ENZYMATIC CONVERSION OF EPOXIDES	Granted	01934641.0	05/23/2001	1287155	1287155	08/23/2006
US	ENZYMATIC CONVERSION OF EPDXIDES	Granted	11/833933	08/03/2007	2008/0220485	7,695,942	04/13/2010
FR	ENZYMATIC CONVERSION OF EPOXIDES	Granted	01934641.0	05/23/2001	1287155	1287155	08/23/2006
DE	ENZYMATIC CONVERSION OF EPOXIDES	Granted	01934641.0	05/23/2001	1287155	60122505.8	08/23/2006
GB	ENZYMATIC CONVERSION OF EPOXIDES	Granted	01934641.0	05/23/2001	1287155	1287155	08/23/2006
IE	ENZYMATIC CONVERSION OF EPOXIDES	Granted	01934641.0	05/23/2001	1287155	1287155	08/23/2006
NL	ENZYMATIC CONVERSION OF EPOXIDES	Granted	01934641.0	05/23/2001	1287155	1287155	08/23/2006
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Exhibit 1.30

Codexis Mayflower Patents

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CODEXIS MAYFLOWER PATENTS							
Country	**Application Title**	**Application Status**	**Application Number**	**Filing Date**	**Publication Number**	**Patent Number**	**Issue Date**
GB	METHOD FOR IN VITRO RECOMBINATION	Granted	96940934.1	12/02/1996	0876509	0876509	09/19/2001
US	METHOD FOR IN VITRO RECOMBINATION	Granted	09/075511	05/08/1998		6,165,793	12/26/2000
AU	METHOD FOR IN VITRO RECOMBINATION	Granted	2005202165	12/02/1996		2005202165	06/26/2008
CA	METHOD FOR IN VITRO RECOMBINATION	Granted	2239099	12/02/1996	2239099	2239099	11/30/2004
EP	METHOD FOR IN VITRO RECOMBINATION	Granted	96940934.1	12/02/1996	0876509	0876509	09/19/2001
BE	METHOD FOR IN VITRO RECOMBINATION	Granted	96940934.1	12/02/1996	0876509	0876509	09/19/2001
NL	METHOD FOR IN VITRO RECOMBINATION	Granted	96940934.1	12/02/1996	0876509	0876509	09/19/2001
DK	METHOD FOR IN VITRO RECOMBINATION	Granted	96940934.1	12/02/1996	0876509	0876509	09/19/2001

FR	METHOD FOR IN VITRO RECOMBINATION	Granted	96940934.1	12/02/1996	0876509	0876509	09/19/2001
DE	METHOD FOR IN VITRO RECOMBINATION	Granted	96940934.1	12/02/1996	0876509	0876509	09/19/2001
KR	METHOD FOR IN VITRO RECOMBINATION	Granted	96-0704465	02/17/1995		491810	05/19/2005
CH	METHOD FOR IN VITRO RECOMBINATION	Granted	96940934.1	12/02/1996	0876509	0876509	09/19/2001
US	END-COMPLEMENTARY POLYMERASE REACTION	Granted	08/425684	04/18/1995		5,834,252	11/10/1998
US	END-COMPLEMENTARY POLYMERASE REACTION	Granted	08/675502	07/03/1996		5,928,905	07/27/1999
US	END-COMPLEMENTARY POLYMERASE REACTION	Granted	09/245802	02/05/1999		6,489,146	12/03/2002
US	EVOLVING CELLULAR DNA UPTAKE BY RECURSIVE SEQUENCE RECOMBINATION	Granted	09/724067	11/28/2000		6,482,647	11/19/2002
US	EVOLVING CELLULAR DNA UPTAKE BY RECURSIVE SEQUENCE RECOMBINATION	Granted	08/792409	02/03/1997		6,096,548	08/01/2000

US	EVOLVING CELLULAR DNA UPTAKE BY RECURSIVE SEQUENCE RECOMBINATION	Granted	09/430927	11/01/1999		6,358,742	03/19/2002
US	METHODS AND COMPOSITIONS FOR POLYPEPTIDE ENGINEERING	Granted	10/646221	08/22/2003		7,534,564	05/19/2009
US	METHODS AND COMPOSITIONS FOR POLYPEPTIDE ENGINEERING	Granted	09/954692	09/12/2001		6,946,296	09/20/2005
US	METHODS AND COMPOSITIONS FOR POLYPEPTIDE ENGINEERING	Granted	08/769062	12/18/1996		6,335,160	01/01/2002
GB	METHODS AND COMPOSITIONS FOR POLYPEPTIDE ENGINEERING	Granted	01202350.3	12/17/1997		1149905	09/15/2010
US	METHODS AND COMPOSITIONS FOR POLYPEPTIDE ENGINEERING	Granted	09/693389	10/20/2000		6,586,182	07/01/2003
US	METHODS AND COMPOSITIONS FOR POLYPEPTIDE ENGINEERING	Granted	09/693350	10/20/2000		6,579,678	06/17/2003

US	METHODS AND COMPOSITIONS FOR POLYPEPTIDE ENGINEERING	Granted	09/339913	06/24/1999		6,303,344	10/16/2001
US	METHODS AND COMPOSITIONS FOR POLYPEPTIDE ENGINEERING	Granted	09/339926	06/24/1999		6,653,072	11/25/2003

US	METHODS AND COMPOSITIONS FOR POLYPEPTIDE ENGINEERING	Granted	12/069011	02/05/2008		7,776,598	08/17/2010
CA	METHODS AND COMPOSITIONS FOR POLYPEPTIDE ENGINEERING	Granted	2274319	12/17/1997		2274319	04/09/2013
BE	METHODS AND COMPOSITIONS FOR POLYPEPTIDE ENGINEERING	Granted	01202350.3	12/17/1997		1149905	09/15/2010
CA	METHODS AND COMPOSITIONS FOR POLYPEPTIDE ENGINEERING	Published	2589337	12/17/1997	2589337		
MC	METHODS AND COMPOSITIONS FOR POLYPEPTIDE ENGINEERING	Granted	01202350.3	12/17/1997		1149905	09/15/2010
CH	METHODS AND COMPOSITIONS FOR POLYPEPTIDE ENGINEERING	Granted	01202350.3	12/17/1997		1149905	09/15/2010
EP	METHODS AND COMPOSITIONS FOR POLYPEPTIDE ENGINEERING	Granted	10075154.4	12/17/1997		2202308	02/13/2013

EP	METHODS AND COMPOSITIONS FOR POLYPEPTIDE ENGINEERING	Granted	01202350.3	12/17/1997		1149905	09/15/2010
DK	METHODS AND COMPOSITIONS FOR POLYPEPTIDE ENGINEERING	Granted	01202350.3	12/17/1997		1149905	09/15/2010

JP	METHODS AND COMPOSITIONS FOR POLYPEPTIDE ENGINEERING	Granted	10-528054	12/17/1997		5008784	06/08/2012
FR	METHODS AND COMPOSITIONS FOR POLYPEPTIDE ENGINEERING	Granted	01202350.3	12/17/1997		1149905	09/15/2010
LU	METHODS AND COMPOSITIONS FOR POLYPEPTIDE ENGINEERING	Granted	01202350.3	12/17/1997		1149905	09/15/2010
FI	METHODS AND COMPOSITIONS FOR POLYPEPTIDE ENGINEERING	Granted	01202350.3	12/17/1997		1149905	09/15/2010
DE	METHODS AND COMPOSITIONS FOR POLYPEPTIDE ENGINEERING	Granted	01202350.3	12/17/1997	1149905	69739996.6-08	09/15/2010
GR	METHODS AND COMPOSITIONS FOR POLYPEPTIDE ENGINEERING	Granted	01202350.3	12/17/1997		1149905	09/15/2010
NL	METHODS AND COMPOSITIONS FOR POLYPEPTIDE ENGINEERING	Granted	01202350.3	12/17/1997		1149905	09/15/2010

BE	METHODS AND COMPOSITIONS FOR POLYPEPTIDE ENGINEERING	Granted	10075154.4	12/17/1997		2202308	02/13/2013
DE	METHODS AND COMPOSITIONS FOR POLYPEPTIDE ENGINEERING	Granted	10075154.4	12/17/1997		2202308	02/13/2013

GB	METHODS AND COMPOSITIONS FOR POLYPEPTIDE ENGINEERING	Granted	10075154.4	12/17/1997		2202308	02/13/2013
CH	METHODS AND COMPOSITIONS FOR POLYPEPTIDE ENGINEERING	Granted	10075154.4	12/17/1997		2202308	02/13/2013
DK	METHODS AND COMPOSITIONS FOR POLYPEPTIDE ENGINEERING	Granted	10075154.4	12/17/1997		2202308	02/13/2013
FR	METHODS AND COMPOSITIONS FOR POLYPEPTIDE ENGINEERING	Granted	10075154.4	12/17/1997		2202308	02/13/2013
NL	METHODS AND COMPOSITIONS FOR POLYPEPTIDE ENGINEERING	Granted	10075154.4	12/17/1997		2202308	02/13/2013
US	METHOD FOR PRODUCING POLYNUCLEOTIDES WITH DESIRED PROPERTIES	Granted	09/333762	06/15/1999		6,337,186	01/08/2002
US	OPTIMIZATION OF INSECT RESISTANCE GENES USING DNA SHUFFLING	Granted	09/296886	04/22/1999		6500617	12/31/2002
US	DNA SHUFFLING OF MONOOXYENASE GENES FOR PRODUCTION OF INDUSTRIAL CHEMICALS	Granted	09/373,928	08/12/1999		6,605,430	08/12/2003

US	HIGH THROUGHPUT MASS SPECTROMETRY	Granted	09/502,283	02/11/2000		7,384,387	06/10/2008
US	METHODS OF MAKING CHARACTER STRINGS, POLYNUCLEOTIDES & POLYPEPTIDES HAVING DESIRED CHARACTERISTICS	Granted	11/339090	01/24/2006		7,620,502	11/17/2009
US	METHODS OF MAKING CHARACTER STRINGS, POLYNUCLEOTIDES & POLYPEPTIDES HAVING DESIRED CHARACTERISTICS	Granted	11/975638	10/18/2007		7,853,410	12/14/2010
US	METHODS OF MAKING CHARACTER STRINGS, POLYNUCLEOTIDES & POLYPEPTIDES HAVING DESIRED CHARACTERISTICS	Granted	12/557463	09/10/2009		7,957,912	06/07/2011
US	METHODS OF MAKING CHARACTER STRINGS, POLYNUCLEOTIDES & POLYPEPTIDES HAVING DESIRED CHARACTERISTICS	Granted	11/982405	10/31/2007		7,904,249	03/08/2011

US	METHODS OF MAKING CHARACTER STRINGS, POLYNUCLEOTIDES & POLYPEPTIDES HAVING DESIRED CHARACTERISTICS	Granted	09/618579	07/18/2000		7,024,312	04/04/2006
US	METHODS OF MAKING CHARACTER STRINGS, POLYNUCLEOTIDES & POLYPEPTIDES HAVING DESIRED CHARACTERISTICS	Granted	09/539486	03/30/2000		7,058,515	06/06/2006
US	METHODS OF MAKING CHARACTER STRINGS, POLYNUCLEOTIDES & POLYPEPTIDES HAVING DESIRED CHARACTERISTICS	Granted	09/494282	01/18/2000		6,917,882	07/12/2005
US	METHODS OF MAKING CHARACTER STRINGS, POLYNUCLEOTIDES & POLYPEPTIDES HAVING DESIRED CHARACTERISTICS	Granted	11/075231	03/07/2005		7,421,347	09/02/2008
US	OLIGONUCLEOTIDE MEDIATED NUCLEIC ACID RECOMBINATION	Granted	09/626929	07/27/2000		6,319,714	11/20/2001
GB	OLIGONUCLEOTIDE MEDIATED NUCLEIC ACID RECOMBINATION	Granted	00909923.5	01/18/2000		1072010	04/21/2010

US	OLIGONUCLEOTIDE MEDIATED NUCLEIC ACID RECOMBINATION	Granted	09/694863	10/23/2000		6,521,453	02/18/2003
US	OLIGONUCLEOTIDE MEDIATED NUCLEIC ACID RECOMBINATION	Granted	11/987555	11/30/2007		8,029,988	10/04/2011
US	OLIGONUCLEOTIDE MEDIATED NUCLEIC ACID RECOMBINATION	Granted	12/557829	09/11/2009		8,058,001	11/15/2011
CA	OLIGONUCLEOTIDE MEDIATED NUCLEIC ACID RECOMBINATION	Published	2320697	01/18/2000	2320697		
CH	OLIGONUCLEOTIDE MEDIATED NUCLEIC ACID RECOMBINATION	Granted	00909923.5	01/18/2000		1072010	04/21/2010
EP	OLIGONUCLEOTIDE MEDIATED NUCLEIC ACID RECOMBINATION	Granted	00909923.5	01/18/2000		1072010	04/21/2010
EP	OLIGONUCLEOTIDE MEDIATED NUCLEIC ACID RECOMBINATION	Published	10075153.6	01/18/2000	2253704		
BE	OLIGONUCLEOTIDE MEDIATED NUCLEIC ACID RECOMBINATION	Granted	00909923.5	01/18/2000		1072010	04/21/2010
DK	OLIGONUCLEOTIDE MEDIATED NUCLEIC ACID RECOMBINATION	Granted	00909923.5	01/18/2000		1072010	04/21/2010

FR	OLIGONUCLEOTIDE MEDIATED NUCLEIC ACID RECOMBINATION	Granted	00909923.5	01/18/2000		1072010	04/21/2010
DE	OLIGONUCLEOTIDE MEDIATED NUCLEIC ACID RECOMBINATION	Granted	00909923.5	01/18/2000		1072010	04/21/2010
NL	OLIGONUCLEOTIDE MEDIATED NUCLEIC ACID RECOMBINATION	Granted	00909923.5	01/18/2000		1072010	04/21/2010
US	OLIGONUCLEOTIDE MEDIATED NUCLEIC ACID RECOMBINATION	Granted	09/626595	07/27/2000		6,479,652	11/12/2002
US	RECOMBINATION OF INSERTION MODIFIED NUCLEIC ACIDS	Granted	09/723520	11/27/2000		6,413,745	07/02/2002
US	RECOMBINATION OF INSERTION MODIFIED NUCLEIC ACIDS	Granted	09/723473	11/27/2000		6,358,740	03/19/2002
US	RECOMBINATION OF INSERTION MODIFIED NUCLEIC ACIDS	Granted	09/517933	03/03/2000		6,365,377	04/02/2002
US	OPTIMIZATION OF CROSSOVER POINTS FOR DIRECTED EVOLUTION	Granted	12/557434	09/10/2009		8,108,150	01/31/2012
US	OPTIMIZATION OF CROSSOVER POINTS FOR DIRECTED EVOLUTION	Granted	11/818237	06/12/2007		8,224,580	07/17/2012

US	OPTIMIZATION OF CROSSOVER POINTS FOR DIRECTED EVOLUTION	Granted	10/386903	03/10/2003	0198988	7620500	11/17/2009
JP	OPTIMIZATION OF CROSSOVER POINTS FOR DIRECTED EVOLUTION	Granted	2003-576577	03/10/2003		4851687	
EP	OPTIMIZATION OF CROSSOVER POINTS FOR DIRECTED EVOLUTION	Published	03711540.9	03/10/2003	1488335		
US	INTEGRATED SYSTEMS AND METHODS FOR DIVERSITY GENERATION AND SCREENING	Granted	11/677505	02/21/2007		8,014,961	09/06/2011
US	INTEGRATED SYSTEMS AND METHODS FOR DIVERSITY GENERATION AND SCREENING	Granted	10/154936	05/23/2002		7,462,469	12/09/2008
US	METHODS OF POPULATING DATA STRUCTURES FOR USE IN EVOLUTIONARY SIMULATIONS	Granted	12/557746	09/11/2009		8,170,806	05/01/2012
US	METHODS OF POPULATING DATA STRUCTURES FOR USE IN EVOLUTIONARY SIMULATIONS	Granted	11/973805	10/09/2007		7,873,499	01/18/2011

US	METHODS OF POPULATING DATA STRUCTURES FOR USE IN EVOLUTIONARY SIMULATIONS	Granted	11/210239	08/22/2005		7,430,477	09/30/2008
US	METHODS OF POPULATING DATA STRUCTURES FOR USE IN EVOLUTIONARY SIMULATIONS	Granted	13/434261	03/29/2012		8,589,085	11/19/2013
US	METHODS OF POPULATING DATA STRUCTURES FOR USE IN EVOLUTIONARY SIMULATIONS	Granted	09/495668	02/01/2000		6,961,664	11/01/2005
CA	METHODS OF POPULATING DATA STRUCTURES FOR USE IN EVOLUTIONARY SIMULATIONS	Granted	2337949	01/18/2000		2337949	03/15/2011
US	METHOD AND SYSTEM USING SYSTEMATICALLY VARIED DATA LIBRARIES	Granted	10/225564	08/20/2002		7,873,477	01/18/2011
US	METHOD AND APPARATUS FOR PREFERREED CODON DETERMINING SIMULATIONS	Granted	10/232770	08/30/2002		7,702,464	04/20/2010

US	METHOD AND APPARATUS FOR PREFERREED CODON DETERMINING SIMULATIONS	Granted	13/229228	09/09/2011		8,457,903	06/04/2013
EP	METHODS, SYSTEMS AND SOFTWARE FOR IDENTIFYING FUNCTIONAL BIOMOLECULES	Granted	10181057.0	09/28/2010		2390803	11/20/2013
US	METHODS, SYSTEMS AND SOFTWARE FOR IDENTIFYING FUNCTIONAL BIOMOLECULES	Published	12/979,637	12/28/2010	2011/0161265		
BE	METHODS, SYSTEMS AND SOFTWARE FOR IDENTIFYING FUNCTIONAL BIOMOLECULES	Granted	05779687.2	06/21/2005		1761879	08/14/2013
FR	METHODS, SYSTEMS AND SOFTWARE FOR IDENTIFYING FUNCTIONAL BIOMOLECULES	Granted	05779687.2	06/21/2005		1761879	08/14/2013
GB	METHODS, SYSTEMS AND SOFTWARE FOR IDENTIFYING FUNCTIONAL BIOMOLECULES	Granted	05779687.2	06/21/2005		1761879	08/14/2013

DE	METHODS, SYSTEMS AND SOFTWARE FOR IDENTIFYING FUNCTIONAL BIOMOLECULES	Granted	05779687.2	06/21/2005		1761879	08/14/2013
DK	METHODS, SYSTEMS AND SOFTWARE FOR IDENTIFYING FUNCTIONAL BIOMOLECULES	Granted	05779687.2	06/21/2005		1761879	08/14/2013
BE	METHODS, SYSTEMS AND SOFTWARE FOR IDENTIFYING FUNCTIONAL BIOMOLECULES	Granted	10181057.0	09/28/2010		2390803	11/20/2013
GB	METHODS, SYSTEMS AND SOFTWARE FOR IDENTIFYING FUNCTIONAL BIOMOLECULES	Granted	10181057.0	09/28/2010		2390803	11/20/2013
DE	METHODS, SYSTEMS AND SOFTWARE FOR IDENTIFYING FUNCTIONAL BIOMOLECULES	Granted	10181057.0	09/28/2010		2390803	11/20/2013
NL	METHODS, SYSTEMS AND SOFTWARE FOR IDENTIFYING FUNCTIONAL BIOMOLECULES	Granted	10181057.0	09/28/2010		2390803	11/20/2013

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FR	METHODS, SYSTEMS AND SOFTWARE FOR IDENTIFYING FUNCTIONAL BIOMOLECULES	Granted	10181057.0	09/28/2010		2390803	11/20/2013
CH	METHODS, SYSTEMS AND SOFTWARE FOR IDENTIFYING FUNCTIONAL BIOMOLECULES	Granted	10181057.0	09/28/2010		2390803	11/20/2013
DK	METHODS, SYSTEMS AND SOFTWARE FOR IDENTIFYING FUNCTIONAL BIOMOLECULES	Granted	10181057.0	09/28/2010		2390803	11/20/2013
CH	METHODS, SYSTEMS AND SOFTWARE FOR IDENTIFYING FUNCTIONAL BIOMOLECULES	Granted	05779687.2	06/21/2005		1761879	08/14/2013
NL	METHODS, SYSTEMS AND SOFTWARE FOR IDENTIFYING FUNCTIONAL BIOMOLECULES	Granted	05779687.2	06/21/2005		1761879	08/14/2013

JP	METHODS, SYSTEMS AND SOFTWARE FOR IDENTIFYING FUNCTIONAL BIOMOLECULES	Granted	2003-573522	03/03/2003		5,319,865	07/19/2013
US	METHODS, SYSTEMS AND SOFTWARE FOR IDENTIFYING FUNCTIONAL BIOMOLECULES	Granted	11/981577	10/30/2007		7,751,986	07/06/2010
US	METHODS, SYSTEMS AND SOFTWARE FOR IDENTIFYING FUNCTIONAL BIOMOLECULES	Granted	11/706034	02/12/2007		7,747,393	06/29/2010
US	METHODS, SYSTEMS AND SOFTWARE FOR IDENTIFYING FUNCTIONAL BIOMOLECULES	Allowed	11/429628	05/05/2006	2006/0205003		
US	METHODS, SYSTEMS AND SOFTWARE FOR IDENTIFYING FUNCTIONAL BIOMOLECULES	Granted	10/629351	07/29/2003		7,747,391	06/29/2010
US	METHODS, SYSTEMS AND SOFTWARE FOR IDENTIFYING FUNCTIONAL BIOMOLECULES	Granted	10/379378	03/03/2003		7,783,428	08/24/2010

EP	METHODS, SYSTEMS AND SOFTWARE FOR IDENTIFYING FUNCTIONAL BIOMOLECULES	Granted	05779687.2	06/21/2005		1761879	08/14/2013
EP	METHODS, SYSTEMS AND SOFTWARE FOR IDENTIFYING FUNCTIONAL BIOMOLECULES	Allowed	03743748.0	03/03/2003	1493027		
EP	METHODS, SYSTEMS AND SOFTWARE FOR IDENTIFYING FUNCTIONAL BIOMOLECULES	Published	10181000.0	09/28/2010	2278509		
US	METHODS, SYSTEMS AND SOFTWARE FOR IDENTIFYING FUNCTIONAL BIOMOLECULES	Granted	11/981578	10/30/2007		8,762,066	06/24/2014
EP	METHODS, SYSTEMS AND SOFTWARE FOR IDENTIFYING FUNCTIONAL BIOMOLECULES	Published	10181159.4	09/28/2010	2315145		

Exhibit 1.74

In-License Agreements

[***]

[Signature Page to Platform Technology Transfer, Collaboration and License Agreement]

Exhibit 1.77

In-Licensed Patents

Country	Application Title	Application Status	Application No.	Filing Date	Publication No.	Pat. No.	Issue Date
[***]	[***]	[***]	[***]	[***]	[***]	[***]	[***]
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Exhibit 1.80

Invoice Requirements

All payments subsequent to the Upfront Payment to Codexis due under this Agreement shall be paid within [***] days after the date of receipt of the relevant Invoice by GSK, and as according to Article 7 of this Agreement. The Upfront Payment to Codexis shall be paid within [***] after receipt of the relevant Invoice from Codexis by GSK in accordance with Section 7.1.

The invoice should include the following details:

(a) "INVOICE" stated at the top and addressed to

GlaxoSmithKline Intellectual Property Development Limited
980 Great West Road,
Brentford,
Middlesex,
TW8 9GS
United Kingdom

(b) Bank details

(c) Codexis letterhead.

(d) Invoice Number, Currency and Date

(e) Complete Name, Address, Contact name and number

(f) Amount being invoiced

(g) VAT Registration number where VAT is being charged

(i) Following GSK Information:

• GSK Contact for Invoices : [***]

Exhibit 1.112

Restricted Enzymes

To be provided in accordance with Section 3.7.1

[Signature Page to Platform Technology Transfer, Collaboration and License Agreement]

Exhibit 1.117

Technology Transfer Plan

[Signature Page to Platform Technology Transfer, Collaboration and License Agreement]

Technology Transfer Plan

Establishment of Codexis CodeEvolver®
Directed Evolution Technology
at GSK's site in Upper Merion, PA

1. EXECUTIVE SUMMARY

The scope of this Plan is the full implementation of Codexis' biocatalyst screening and CodeEvolver® directed evolution technology within GlaxoSmithKline (GSK), in order to augment GSK's capabilities in cost efficient development and manufacture of pharmaceutical compounds (also referred to within the plan as API's). The complete transfer of Codexis technology to one GSK site (Upper Merion, PA (UM)) will be accomplished across the following three Waves:

1) Transfer of the Codexis [***].
2) Enabling GSK to practice CodeEvolver® comprising:
   a. GSK laboratory set-up; including transfer of the Codexis informatics [***].
   b. Training in Codexis labs with Technology Transfer Evolution [***]
   c. Training in GSK labs with Technology Transfer Evolution [***]
3) Demonstration of proficiency of the GSK team with Technology Transfer Evolution [***].

Codexis and GSK will establish dedicated Training Teams to facilitate the Technology Transfer. Codexis Team (as defined in Section 2.2.5 (b) in the Platform Technology Transfer, Collaboration, and License Agreement) will include personnel for [***]. Based on the work plan, [***].

Likewise, dedicated GSK personnel will shadow Codexis Team and then conduct evolution programs at GSK, to set up and deploy equipment, and provide general program management support. [***].

2. TECHNOLOGY TRANSFER PROGRAM SCOPE

2.1 WAVE 1: TRANSFER OF CODEXIS SCREENING CAPABILITIES TO GSK

[***]

[***]

[***]

[***]

[***]

[***]

Step	Inputs	Process	Output
Materials			
	[***] [***]	[***]	[***]
	[***]	[***]	[***]
	[***]	[***]	[***]
	[***]	[***]	[***]
Methods			
	[***]	[***]	[***]

	[***]	[***]	[***]
	[***] **[***]**	[***]	[***]
	[***] **[***]**	[***]	[***]

Wave 1 Milestone Success Criteria

1. [***]
2. [***]
3. [***]
4. [***]

[***]

2.2 WAVE 2: ENABLING GSK TO PRACTICE CODEEVOLVER®

[***]

[***]

1) [***]

2) [***]

3) [***]

[***]

[***]

Step	Inputs	Process	Output
Materials			
	[***]	[***]	[***]
Methods			
	[***]	[***]	[***]
	[***]	[***]	[***]
	[***]	[***] [***] [***] [***] [***] [***]	[***]

	[***]	[***] [***]	[***]
	[***]	[***] [***]	[***]
	[***]	[***] [***]	[***]
	[***]	[***] [***]	[***]
	[***]	[***] [***] [***] [***] [***] [***]	[***]

	[***]	[***] [***]	[***]
	[***]	[***] [***]	[***]
	[***]	[***] [***]	[***]
	[***]	[***] [***]	[***]
	[***]	[***]	[***] [***] [***]
	[***]	[***]	[***] [***] [***]

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Wave 2 Milestone Success Criteria

1. [***]
2. [***]
   - [***]
   - [***]
   - [***]
   - [***]
   - [***]
3. [***]

2.3 WAVE 3: DEMONSTRATED PROFICIENCY OF GSK TEAM ACROSS TWO INDEPENDENT PROJECTS

[***]

[***]

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Wave 3 Milestone Success Criteria

4. [***]
   - [***]

[***]

[***]
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5. [***]

[***]

[***]

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[***]

2.4 INDICATIVE GANTT CHART

[***]

3. PERSONNEL COMPETENCY REQUIREMENTS

Codexis will provide the following competencies to support successful technology transfer:

[***]
[***]
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APPENDIX I - TRANSFER OF MATERIALS (WAVE 1)

[***]

1) [***]

A) [***]

Platform	Short Name	# of 96-well Plates per Panel	# of Enzymes per Kit	Format	Quantity Provided
[***]	[***]	[***]	[***]	[***]	[***]
[***]	[***]	[***]	[***]	[***]	[***]
[***]	[***]	[***]	[***]	[***]	[***]
[***]	[***]	[***]	[***]	[***]	[***]
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[***]	[***]	[***]	[***]	[***]	[***]

[***]
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[***] [***]

B) [***]

[***]

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2) [***]

Platform	Short Name	Format	Number of Enzymes	Quantity Provided
[***]	[***]	[***]	[***]	[***]
[***]	[***]	[***]	[***]	[***]
[***]	[***]	[***]	[***]	[***]
[***]		[***]	[***]	[***]
[***]	[***]	[***]	[***]	[***]

3) [***]

Platform	Short Name	Format
[***]	[***]	[***]

[***]

APPENDIX II – EQUIPMENT LIST

Principal Equipment
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APPENDIX III - SOFTWARE LIST

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APPENDIX IV- PROTOCOLS AND SOP LIST

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Exhibit 2.5

Material Transfer Record Form

GSK and Codexis

Capitalized terms used herein that are not defined herein shall have the meanings set forth in the Platform Technology Transfer and License Agreement dated 10 July 2014 made between GSK and Codexis.

In connection with the performance of the Agreement and pursuant to the terms of the Agreement:

(i) GSK will transfer to Codexis the Materials set forth below;
and/or
(ii) Codexis will transfer to GSK the Materials set forth below.

This Material Transfer Record Form shall be used as the record of all such Material transfers, whether from GSK to Codexis or from Codexis to GSK.

Transfer Date:

Description of Materials

Description of Research for which the Material(s) will be Used

Signature – GSK Scientific Lead …….

Date

Signature – Codexis Scientific Lead ……..

Date

Note: This MTR is to be completed and signed by the Codexis and the GSK Scientific Lead for each transfer. A copy of each completed MTR is to be timely provided to Alliance Manager (for GSK) and to the Alliance Manager (for Codexis). This MTR should not be used to transfer any materials in which the Transferor believes that Third Parties have rights, or which the Transferor believes infringe or misappropriate any Intellectual Property rights held by any Third Party. If there are any questions about the appropriateness of a transfer, please contact the GSK Scientific Lead or the Codexis Scientific Lead, as appropriate, identified herein before making the transfer.

Exhibit 3.3.1

Codexis Strain-Related Protocols

[***]

[***]

[***]

[***]

Exhibit 8.5.4

Third Party In-License Agreements

[***]

Exhibit 9.6

Press Release

SV\1263057.27

Exhibit 13.14

Prevention of Corruption – Third Party Guidelines

PREVENTION OF CORRUPTION – THIRD PARTY GUIDELINES

The GSK Anti-Bribery and Corruption Policy (POL-GSK-007) requires compliance with the highest ethical standards and all anti-corruption laws applicable in the countries in which GSK (whether through a third party or otherwise) conducts business. POL-GSK-007 requires all GSK employees and any third party acting for or on behalf of GSK to ensure that all dealings with third parties, both in the private and government sectors, are carried out in compliance with all relevant laws and regulations and with the standards of integrity required for all GSK business. GSK values integrity and transparency and has zero tolerance for corrupt activities of any kind, whether committed by GSK employees, officers, or third-parties acting for or on behalf of the GSK.

Corrupt Payments – GSK employees and any third party acting for or on behalf of GSK, shall not, directly or indirectly, promise, authorize, ratify or offer to make or make any "payments" of "anything of value" (as defined in the glossary section) to any individual (or at the request of any individual) including a "government official" (as defined in the glossary section) for the improper purpose of influencing or inducing or as a reward for any act, omission or decision to secure an improper advantage or to improperly assist the company in obtaining or retaining business.

Government Officials – Although GSK´s policy prohibits payments by GSK or third parties acting for or on its behalf to any individual, private or public, as a "quid pro quo" for business, due to the existence of specific anticorruption laws in the countries where we operate, this policy is particularly applicable to "payments" of "anything of value" (as defined in the glossary section), or at the request of, "government officials" (as defined in the glossary section).

Facilitating Payments – For the avoidance of doubt, facilitating payments (otherwise known as "greasing payments" and defined as payments to an individual to secure or expedite the performance of a routine government action by government officials) are no exception to the general rule and therefore prohibited.

GLOSSARY

The terms defined herein should be construed broadly to give effect to the letter and spirit of the ABAC Policy. GSK is committed to the highest ethical standards of business dealings and any acts that create the appearance of promising, offering, giving or authorizing payments prohibited by this policy will not be tolerated.

Anything of Value: this term includes cash or cash equivalents, gifts, services, employment offers, loans, travel expenses, entertainment, political contributions, charitable donations, subsidies, per diem payments, sponsorships, honoraria or provision of any other asset, even if nominal in value.

Payments: this term refers to and includes any direct or indirect offers to pay, promises to pay, authorizations of or payments of anything of value.

Government Official shall mean:

Any officer or employee of a government or any department, agency or instrument of a government;

Any person acting in an official capacity for or on behalf of a government or any department, agency, or instrument of a government;

Any officer or employee of a company or business owned in whole or part by a government;

Any officer or employee of a public international organization such as the World Bank or United Nations;

Any officer or employee of a political party or any person acting in an official capacity on behalf of a political party; and/or

Any candidate for political office

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: August 5, 2022

/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: August 5, 2022

/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 June 30, 2022, 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: August 5, 2022

/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)