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

FORM 10-Q

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

For the quarterly period ended March 31, 2022

OR

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

For the transition period from _____ to _____.

Commission File Number: 001-36042

PRECIGEN, INC.
(Exact name of registrant as specified in its charter)

Virginia	**26-0084895**
(State or other jurisdiction of incorporation or organization)	**(I.R.S. Employer Identification Number)**
20374 Seneca Meadows Parkway Germantown, Maryland	**20876**
(Address of principal executive offices)	**(Zip Code)**

(301) 556-9900
(Registrant's telephone number, including area code)

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

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

Title of each class	**Trading Symbol(s)**	**Name of each exchange on which registered**
Common Stock, no par value	PGEN	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 extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act. ☐

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

As of April 30, 2022, 207,693,277 shares of common stock, no par value per share, were issued and outstanding.

PRECIGEN, INC.

FORM 10-Q
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Special Note Regarding Forward-Looking Statements

This Quarterly Report contains forward-looking statements within the meaning of the Private Securities Litigation Reform Act of 1995, which statements involve substantial risks and uncertainties. All statements, other than statements of historical facts, included in this Quarterly Report, including statements regarding our strategy; future events, including their outcome or timing; future operations; future financial position; future revenue; projected costs; prospects; plans; objectives of management; and expected market growth, are forward-looking statements. The words "aim", "anticipate", "assume", "believe", "continue", "could", "due", "estimate", "expect", "intend", "may", "plan", "positioned", "potential", "predict", "project", "seek", "should", "target", "will", "would", and the negatives of these terms or similar expressions are intended to identify forward-looking statements, although not all forward-looking statements contain these identifying words. These statements may relate to, among other things: (i) the impact of the COVID-19 pandemic on our clinical trials, businesses, operating results, cash flows, and/or financial condition; (ii) the timeliness of regulatory approvals; (iii) our strategy and overall approach to our business model, our efforts to realign our business, and our ability to exercise more control and ownership over the development process and commercialization path; (iv) our ability to successfully enter new markets or develop additional product candidates, including the expected timing and results of investigational studies and preclinical and clinical trials, including any delays or potential delays as a result of the COVID-19 pandemic, whether with our collaborators or independently; (v) our ability to consistently manufacture our product candidates on a timely basis or to establish agreements with third-party manufacturers; (vi) our ability to successfully enter into optimal strategic relationships with our subsidiaries and operating companies that we may form in the future; (vii) our ability to hold or generate significant operating capital, including through partnering, asset sales, and operating cost reductions; (viii) actual or anticipated variations in our operating results; (ix) actual or anticipated fluctuations in competitors' or collaborators' operating results or changes in their respective growth rates; (x) our cash position; (xi) market conditions in our industry; (xii) the volatility of our stock price; (xiii) the ability, and the ability of our collaborators, to protect our intellectual property and other proprietary rights and technologies; (xiv) our ability, and the ability of our collaborators, to adapt to changes in laws or regulations or policies, including federal, state, and local government responses to the COVID-19 pandemic; (xv) outcomes of pending and future litigation; (xvi) the rate and degree of market acceptance of any products developed by us, our subsidiaries, collaborations, or joint ventures, or JVs, and competition from existing technologies and products or new technologies and products that may emerge; (xvii) our ability to retain and recruit key personnel; (xviii) expectations related to the use of proceeds from public offerings and other financing efforts; (xix) estimates regarding expenses, future revenue, capital requirements, and needs for additional financing; and (xx) the effects, duration, and severity of the ongoing COVID-19 pandemic and the actions we and others have taken or may take in response.

Forward-looking statements are based on our beliefs, assumptions, and expectations of our future performance, and may also concern our expectations relating to our subsidiaries and other affiliates. We caution you that the foregoing list may not contain all of the forward-looking statements made in this Quarterly Report.

We may not actually achieve the plans, intentions, or expectations disclosed in our forward-looking statements, and you should not place undue reliance on our forward-looking statements. Actual results or events could differ materially from the plans, intentions, and expectations disclosed in the forward-looking statements we make. We have included important factors in the cautionary statements included in this Quarterly Report, particularly in Part II, Item 1A, "Risk Factors," that could cause actual results or events to differ materially from the forward-looking statements that we make. Our forward-looking statements do not reflect the potential impact of any future acquisitions, mergers, dispositions, JVs, or investments that we may make.

You should read this Quarterly Report, the documents that we reference in this Quarterly Report, our Annual Report on Form 10-K for the year ended December 31, 2021, the other reports we have filed with the Securities and Exchange Commission, or SEC, and the documents that we have filed as exhibits to our filings with the SEC completely and with the understanding that our actual future results may be materially different from what we expect. We do not assume any obligation to update any forward-looking statements, whether as a result of new information, future events or otherwise, except as required by law.

PART I. FINANCIAL INFORMATION

Item 1. Condensed Consolidated Financial Statements

Precigen, Inc. and Subsidiaries
Condensed Consolidated Balance Sheets
(Unaudited)

(Amounts in thousands, except share data)	March 31, 2022	December 31, 2021
Assets		
Current assets		
Cash and cash equivalents	$ 40,321	$ 42,920
Short-term investments	71,821	72,240
Receivables		
Trade, less allowance for credit losses of $4,631 and $4,288 as of March 31, 2022 and December 31, 2021, respectively	24,308	20,832
Related parties, less allowance for credit losses of $1,509 as of March 31, 2022 and December 31, 2021	15	73
Other	543	566
Inventory	12,730	13,261
Prepaid expenses and other	5,199	6,736
Total current assets	154,937	156,628
Long-term investments	29,914	48,562
Property, plant and equipment, net	33,583	34,315
Intangible assets, net	51,427	54,115
Goodwill	53,613	54,148
Right-of-use assets	10,963	10,900
Other assets	1,131	1,188
Total assets	$ 335,568	$ 359,856

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

Precigen, Inc. and Subsidiaries
Condensed Consolidated Balance Sheets
(Unaudited)

(Amounts in thousands, except share data)	March 31, 2022	December 31, 2021
Liabilities and Shareholders' Equity		
Current liabilities		
Accounts payable	$ 4,415	$ 5,405
Accrued compensation and benefits	6,052	11,223
Other accrued liabilities	10,494	11,595
Deferred revenue	2,669	4,442
Current portion of long-term debt	355	402
Current portion of lease liabilities	1,590	1,551
Related party payables	26	27
Total current liabilities	25,601	34,645
Long-term debt, net of current portion	201,112	182,749
Deferred revenue, net of current portion, including $21,205 from related parties as of March 31, 2022 and December 31, 2021	23,023	23,023
Lease liabilities, net of current portion	9,508	9,502
Deferred tax liabilities	2,438	2,539
Other long-term liabilities	50	50
Total liabilities	261,732	252,508
Commitments and contingencies (Note 16)		
Shareholders' equity		
Common stock, no par value, 400,000,000 shares authorized as of March 31, 2022 and December 31, 2021; 207,693,277 shares and 206,739,874 shares issued and outstanding as of March 31, 2022 and December 31, 2021, respectively	—	—
Additional paid-in capital	1,991,670	2,022,701
Accumulated deficit	(1,916,135)	(1,915,556)
Accumulated other comprehensive (loss) income	(1,699)	203
Total shareholders' equity	73,836	107,348
Total liabilities and shareholders' equity	$ 335,568	$ 359,856

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

Precigen, Inc. and Subsidiaries
Condensed Consolidated Statements of Operations
(Unaudited)

(Amounts in thousands, except share and per share data)	Three Months Ended March 31, 2022	2021
Revenues		
Collaboration and licensing revenues	$ —	$ 66
Product revenues	8,724	6,381
Service revenues	23,209	17,931
Other revenues	88	133
Total revenues	32,021	24,511
Operating Expenses		
Cost of products	7,510	5,574
Cost of services	9,589	7,402
Research and development	12,760	10,521
Selling, general and administrative	19,576	18,702
Impairment of goodwill	482	—
Total operating expenses	49,917	42,199
Operating loss	(17,896)	(17,688)
Other Expense, Net		
Interest expense	(2,069)	(4,539)
Interest income	434	392
Other income (expense), net	223	(58)
Total other expense, net	(1,412)	(4,205)
Equity in net loss of affiliates	(1)	(3)
Loss from continuing operations before income taxes	(19,309)	(21,896)
Income tax benefit	58	52
Loss from continuing operations	(19,251)	(21,844)
Income from discontinued operations, net of income taxes	—	4,526
Net loss	$ (19,251)	$ (17,318)
Net Loss per Share		
Net loss from continuing operations per share, basic and diluted	$ (0.10)	$ (0.11)
Net income from discontinued operations per share, basic and diluted	—	0.02
Net loss per share, basic and diluted	$ (0.10)	$ (0.09)
Weighted average shares outstanding, basic and diluted	199,629,218	193,499,546

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

Precigen, Inc. and Subsidiaries
Condensed Consolidated Statements of Comprehensive Loss
(Unaudited)

(Amounts in thousands)	Three Months Ended March 31, 2022	2021
Net loss	$ (19,251)	$ (17,318)
Other comprehensive loss:		
Unrealized loss on investments	(802)	(48)
Loss on foreign currency translation adjustments	(1,100)	(2,203)
Comprehensive loss	$ (21,153)	$ (19,569)

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

Precigen, Inc. and Subsidiaries
Condensed Consolidated Statements of Shareholders' Equity
(Unaudited)

(Amounts in thousands, except share data)	Common Stock Shares	Common Stock Amount	Additional Paid-in Capital	Accumulated Other Comprehensive Income (Loss)	Accumulated Deficit	Total Shareholders' Equity
Balances at December 31, 2021	206,739,874	$ —	$2,022,701	$ 203	$(1,915,556)	$ 107,348
Cumulative effect of adoption of ASU 2020-06	—	—	(36,868)	—	18,672	(18,196)
Stock-based compensation expense	—	—	3,562	—	—	3,562
Shares issued upon vesting of restricted stock units and for exercises of stock options	354,089	—	1	—	—	1
Shares issued for accrued compensation	315,327	—	1,698	—	—	1,698
Shares issued as payment for services	283,987	—	576	—	—	576
Net loss	—	—	—	—	(19,251)	(19,251)
Other comprehensive loss	—	—	—	(1,902)	—	(1,902)
Balances at March 31, 2022	207,693,277	$ —	$1,991,670	$ (1,699)	$(1,916,135)	$ 73,836

(Amounts in thousands, except share data)	Common Stock Shares	Common Stock Amount	Additional Paid-in Capital	Accumulated Other Comprehensive Income (Loss)	Accumulated Deficit	Total Shareholders' Equity
Balances at December 31, 2020	187,663,207	$ —	$1,886,567	$ 3,997	$(1,823,390)	$ 67,174
Stock-based compensation expense	—	—	5,415	—	—	5,415
Shares issued upon vesting of restricted stock units and for exercises of stock options	1,426,157	—	153	—	—	153
Shares issued as payment for services	74,771	—	577	—	—	577
Shares issued in public offerings, net of issuance costs	17,250,000	—	121,045	—	—	121,045
Net loss	—	—	—	—	(17,318)	(17,318)
Other comprehensive loss	—	—	—	(2,251)	—	(2,251)
Balances at March 31, 2021	206,414,135	$ —	$2,013,757	$ 1,746	$(1,840,708)	$ 174,795

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

Precigen, Inc. and Subsidiaries
Condensed Consolidated Statements of Cash Flows
(Unaudited)

(Amounts in thousands)	Three Months Ended March 31, 2022	2021
Cash flows from operating activities		
Net loss	$ (19,251)	$ (17,318)
Adjustments to reconcile net loss to net cash used in operating activities:		
Depreciation and amortization	3,292	3,523
Loss (gain) on disposals of assets, net	125	(343)
Impairment of goodwill	482	—
Amortization of premiums on investments, net	265	57
Equity in net loss of affiliates	1	3
Stock-based compensation expense	3,562	5,415
Shares issued as payment for services	576	577
Provision for credit losses	334	162
Accretion of debt discount and amortization of deferred financing costs	284	2,751
Deferred income taxes	(58)	(56)
Noncash gain on termination of operating leases	—	(4,602)
Other noncash items	—	1
Changes in operating assets and liabilities:		
Receivables:		
Trade	(3,696)	(4,949)
Related parties	58	7
Other	21	(279)
Inventory	531	721
Prepaid expenses and other	1,571	844
Other assets	42	95
Accounts payable	(588)	(189)
Accrued compensation and benefits	(3,462)	(1,893)
Other accrued liabilities	(1,086)	(2,216)
Deferred revenue	(1,767)	1,054
Lease liabilities	(18)	218
Related party payables	(1)	33
Net cash used in operating activities	(18,783)	(16,384)

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

Precigen, Inc. and Subsidiaries
Condensed Consolidated Statements of Cash Flows
(Unaudited)

(Amounts in thousands)	Three Months Ended March 31, 2022	Three Months Ended March 31, 2021
Cash flows from investing activities		
Purchases of investments	$ —	$ (174,221)
Sales and maturities of investments	18,000	40,500
Purchases of property, plant and equipment	(1,579)	(1,014)
Proceeds from sale of assets	147	1,944
Proceeds from repayment of notes receivable	—	3,689
Net cash provided by (used in) investing activities	16,568	(129,102)
Cash flows from financing activities		
Proceeds from issuance of shares, net of issuance costs	—	121,045
Payments of long-term debt	(164)	(116)
Proceeds from stock option exercises	1	111
Net cash (used in) provided by financing activities	(163)	121,040
Effect of exchange rate changes on cash, cash equivalents, and restricted cash	(230)	(11)
Net decrease in cash, cash equivalents, and restricted cash	(2,608)	(24,457)
Cash, cash equivalents, and restricted cash		
Beginning of period	43,343	52,250
End of period	$ 40,735	$ 27,793
Supplemental disclosure of cash flow information		
Cash paid during the period for interest	$ 3,535	$ 3,539
Cash paid during the period for income taxes	—	4
Significant noncash activities		
Accrued compensation paid in equity awards	$ 1,698	$ —
Purchases of property and equipment included in accounts payable and other accrued liabilities	251	255
Proceeds from sale of assets included in accounts receivable	132	23

The following table provides a reconciliation of the cash, cash equivalents, and restricted cash balances as of March 31, 2022 and December 31, 2021 as shown above:

	March 31, 2022	December 31, 2021
Cash and cash equivalents	$ 40,321	$ 42,920
Restricted cash included in other assets	414	423
Cash, cash equivalents, and restricted cash	$ 40,735	$ 43,343

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

Precigen, Inc. and Subsidiaries
Notes to the Condensed Consolidated Financial Statements
(Unaudited)
(Amounts in thousands, except share and per share data)

1. Organization

Precigen, Inc. ("Precigen"), a Virginia corporation, is a synthetic biology company with an increasing focus on its discovery and clinical stage activities to advance the next generation of gene and cellular therapies to target the most urgent and intractable challenges in immuno-oncology, autoimmune disorders, and infectious diseases. Precigen operates through the following subsidiaries:

PGEN Therapeutics, Inc. ("PGEN Therapeutics") is a dedicated discovery and clinical stage biopharmaceutical company advancing the next generation of gene and cell therapies using precision technology to target urgent and intractable diseases in immuno-oncology, autoimmune disorders, and infectious diseases. PGEN Therapeutics is a wholly owned subsidiary of Precigen with primary operations in Maryland.

Precigen ActoBio, Inc. ("ActoBio") is pioneering a proprietary class of microbe-based biopharmaceuticals that enable expression and local delivery of disease-modifying therapeutics and is a wholly owned subsidiary of Precigen with primary operations in Belgium.

Exemplar Genetics, LLC, doing business as Precigen Exemplar ("Exemplar"), is committed to enabling the study of life-threatening human diseases through the development of MiniSwine Yucatan miniature pig research models and services, as well as enabling the production of cells and organs in its genetically engineered swine for regenerative medicine applications and is a wholly owned subsidiary of Precigen with primary operations in Iowa.

Trans Ova Genetics, L.C., including its wholly owned subsidiary Progentus, L.C., are providers of reproductive technologies, including services and products sold to cattle breeders and other producers and are hereinafter collectively referred to as "Trans Ova." Trans Ova is a wholly owned subsidiary with primary operations in California, Iowa, Maryland, Missouri, Texas, Washington, and Wisconsin.

Effective October 1, 2019, Precigen transferred substantially all of its proprietary methane bioconversion platform ("MBP") assets to a wholly owned subsidiary, MBP Titan LLC ("MBP Titan"). MBP Titan's proprietary technology is designed to convert natural gas into more valuable and usable energy and chemical products through novel, highly engineered bacteria that utilize specific energy feedstocks. Prior to October 1, 2019, the operation transferred to MBP Titan was an operating division within Precigen. Beginning in the second quarter of 2020, the Company suspended MBP Titan's operations and began the process to wind down MBP Titan's activities and had substantially completed the wind down by December 31, 2020, with the final disposition of certain property and equipment and the facility operating lease occurring in January 2021. With the exception of certain assets and obligations with which the Company has a continuing involvement after the wind down, MBP Titan has been presented as discontinued operations for all periods presented. See Note 3 for further discussion.

Precigen and its consolidated subsidiaries are hereinafter referred to as the "Company."

2. Summary of Significant Accounting Policies

Basis of Presentation

The accompanying interim condensed consolidated financial statements are unaudited and have been prepared in accordance with accounting principles generally accepted in the United States of America ("U.S. GAAP"). Certain information and footnote disclosures normally included in the Company's annual financial statements have been condensed or omitted. These interim condensed consolidated financial statements, in the opinion of management, reflect all normal recurring adjustments necessary for fair statement of the Company's financial position as of March 31, 2022 and results of operations and cash flows for the interim periods ended March 31, 2022 and 2021. The year-end condensed consolidated balance sheet data was derived from the Company's audited financial statements but does not include all disclosures required by U.S. GAAP. These interim financial results are not necessarily indicative of the results to be expected for the year ending December 31, 2022, or for any other future annual or interim period. The accompanying interim unaudited condensed consolidated financial statements should be read in conjunction with the audited consolidated financial statements and related notes thereto included in the Company's Annual Report on Form 10-K for the year ended December 31, 2021.

The accompanying condensed consolidated financial statements reflect the operations of Precigen and its subsidiaries. All intercompany accounts and transactions have been eliminated.

Liquidity

Management believes that existing liquid assets as of March 31, 2022 will allow the Company to continue its operations for at least a year from the issuance date of these condensed consolidated financial statements. These condensed consolidated financial statements are presented in United States dollars. The Company is subject to a number of risks similar to those of other companies conducting high-risk, early-stage research and development of therapeutic product candidates. Principal among these risks are dependence on key individuals and intellectual property, competition from other products and companies, and the technical risks associated with the successful research, development, and clinical manufacturing of its and its collaborators' therapeutic product candidates. Additionally, the accompanying condensed consolidated financial statements have been prepared on a going concern basis, which contemplates the realization of assets and the satisfaction of liabilities in the normal course of business. During the three months ended March 31, 2022, the Company incurred a net loss of $19,251 and, as of March 31, 2022, had an accumulated deficit of $1,916,135. Management expects operating losses and negative cash flows to continue for the foreseeable future and, as a result, the Company will require additional capital to fund its operations and execute its business plan. In the absence of a significant source of recurring revenue, the Company's long-term success is dependent upon its ability to continue to raise additional capital in order to fund ongoing research and development (which could occur through debt or equity issuances, sales or partnerships of non-core assets, corroborations or licensing of core or non-core assets, or other transactions), adequately satisfy or renegotiate long-term debt obligations, obtain regulatory approval of its therapeutic product candidates, successfully commercialize its therapeutic product candidates, generate revenue, meet its obligations and, ultimately, attain profitable operations.

Risks and Uncertainties

COVID-19 has had and continues to have an extensive impact on the global health and economic environments. Furthermore, there is uncertainty regarding the duration and severity of the ongoing pandemic, and the Company could experience delays or other pandemic-related events that may adversely impact the Company's clinical as well as preclinical pipeline candidates in the future.

The Company is closely monitoring the impact of COVID-19 on all aspects of its businesses. Given the dynamic nature of these circumstances, the full impact of the COVID-19 pandemic on the Company's ongoing business, results of operations, and overall financial performance in future periods cannot be reasonably estimated at this time, and it could have a material adverse effect on the Company's results of operations, cash flows, and financial position, including resulting impairments to goodwill and long-lived assets and additional credit losses.

See Note 3 for further discussion of the impact of COVID-19 on MBP Titan.

Equity Method Investments

The Company accounts for its investments in each of its joint ventures ("JVs") using the equity method of accounting based upon relative ownership interest. See additional discussion related to certain of the Company's JVs in Note 4.

Variable Interest Entities

As of March 31, 2022 and December 31, 2021, the Company determined that its JVs were variable interest entities ("VIEs"). The Company was not the primary beneficiary for these entities since it did not have the power to direct the activities that most significantly impact the economic performance of the VIEs. As of March 31, 2022 and December 31, 2021, the Company had no risk of loss related to the identified VIEs. See Note 4 for discussion of the Company's future funding commitments for its significant JVs.

Net Loss per Share

Basic net loss per share is calculated by dividing net loss attributable to common shareholders by the weighted average shares outstanding during the period, without consideration of common stock equivalents. Diluted net loss per share is calculated by adjusting weighted average shares outstanding for the dilutive effect of common stock equivalents outstanding for the period, using the treasury-stock method. For purposes of the diluted net loss per share calculation, shares to be issued pursuant to convertible debt, stock options, RSUs, and warrants are considered to be common stock equivalents but are excluded from the

calculation of diluted net loss per share because their effect would be anti-dilutive and, therefore, basic and diluted net loss per share were the same for all periods presented.

The following potentially dilutive securities as of March 31, 2022 and 2021, have been excluded from the above computations of diluted weighted average shares outstanding for the three months then ended as they would have been anti-dilutive:

	March 31,	
	2022	2021
Convertible debt	11,732,440	11,732,440
Options	16,034,553	11,451,614
Restricted stock units	1,185,205	790,364
Warrants	121,888	133,264
Total	29,074,086	24,107,682

Segment Information

The Company's chief operating decision maker ("CODM") regularly reviews disaggregated financial information for various operating segments. Starting in 2021, the financial information regularly reviewed by the CODM was revised and the operating segments, which were determined to be operating and reportable segments, were (i) Biopharmaceuticals, (ii) Exemplar, and (iii) Trans Ova. The Biopharmaceuticals reportable segment is primarily comprised of the Company's legal entities of PGEN Therapeutics and ActoBio. All of Precigen's consolidated subsidiaries and operating divisions that did not meet the quantitative thresholds to report separately are combined and reported in a single category, All Other. See Note 1 for a description of PGEN Therapeutics, ActoBio, Exemplar, and Trans Ova. Corporate expenses, which are not allocated to the segments and are managed at a consolidated level, include costs associated with general and administrative functions, including the Company's finance, accounting, legal, human resources, information technology, corporate communication, and investor relations functions. Corporate expenses exclude interest expense, depreciation and amortization, gain or loss on disposals of assets, stock-based compensation expense, loss on settlement agreement, and equity in net loss of affiliates and include unrealized and realized gains and losses on the Company's securities portfolio as well as dividend income. See Note 18 for further discussion of the Company's segments.

Use of Estimates

The preparation of financial statements in conformity with U.S. GAAP requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities, the disclosure of contingent assets and liabilities at the date of the financial statements, and the reported amounts of revenues and expenses during the reporting periods. Actual results could differ from those estimates.

Recently Adopted Accounting Pronouncements

In August 2020, the Financial Accounting Standards Board ("FASB") issued Accounting Standards Update ("ASU") 2020-06, *Debt—Debt with Conversion and Other Options (Subtopic 470-20) and Derivatives and Hedging—Contracts in Entity's Own Equity (Subtopic 815-40)—Accounting for Convertible Instruments and Contracts in an Entity's Own Equity* ("ASU 2020-06"). Under ASU 2020-06, the embedded conversion features are no longer separated from the host contract for convertible instruments with conversion features that are not required to be accounted for as derivatives under Topic 815, or that do not result in substantial premiums accounted for as paid-in capital. Consequently, a convertible debt instrument will be accounted for as a single liability measured at its amortized cost, as long as no other features require bifurcation and recognition as derivatives. The new guidance also requires the if-converted method to be applied for all convertible instruments.

We adopted ASU 2020-06 on January 1, 2022 using the modified retrospective transition method, which resulted in an increase to our reported long-term debt outstanding, net of current portion, of $18,196, a decrease to our additional paid-in capital of $36,868, and a corresponding cumulative-effect reduction to our opening accumulated deficit of $18,672. The adoption of ASU 2020-06 is expected to reduce non-cash interest expense related to existing convertible debt outstanding by approximately $11,800 for the year ending December 31, 2022, and did not have an impact on our consolidated cash flows. The use of the if-converted method did not have an impact on our overall earnings per share calculation.

Recently Issued Accounting Pronouncements Not Yet Adopted

There are no accounting standards which have not yet been adopted that are expected to have a significant impact on our financial statements and related disclosures.

3. Discontinued Operations

Where applicable, the notes to the accompanying condensed consolidated financial statements have been updated to reflect information pertaining to the Company's continuing operations based on the discontinued operations summarized below.

MBP Titan

As a result of market uncertainty driven by the COVID-19 pandemic and the state of the energy sector raising significant challenges for the strategic alternatives pursued by MBP Titan, beginning in the second quarter of 2020 and throughout the remainder of 2020, the Company suspended MBP Titan's operations, preserved certain of MBP Titan's intellectual property, terminated all of its personnel, and undertook steps to dispose of its other assets and obligations. The wind down of MBP Titan's activities was substantially completed by December 31, 2020, with the final disposition of certain property and equipment and the facility operating lease occurring in January 2021. This discontinuation of operations represented the continuation of a strategic shift to becoming a primarily healthcare company advancing technologies and products that address complex healthcare challenges that the Company commenced in 2020. The assets, liabilities, and expenses related to the discontinued operations of MBP Titan are reclassified and presented as discontinued operations in the accompanying condensed consolidated financial statements for all periods.

The January 2021 sale of property and equipment resulted in a gain on disposal of assets of $464, which is included in income from discontinued operations in the accompanying condensed consolidated statement of operations for the three months ended March 31, 2021. In January 2021, the Company executed termination and recapture agreements with the landlord of the leased facility used in MBP Titan's operations, thereby relieving the Company of all of its obligations related to the facility that were originally due to expire in July 2025. This lease termination resulted in a gain of $4,602, which is also included in income from discontinued operations in the accompanying condensed consolidated statement of operations for the three months ended March 31, 2021.

After the wind down of MBP Titan, certain assets and contractual obligations which were previously managed by MBP Titan continue to be managed at the Precigen corporate level. These remaining assets and contractual obligations include the Company's equity interest in and collaboration agreements with Intrexon Energy Partners, LLC ("Intrexon Energy Partners"), and Intrexon Energy Partners II, LLC ("Intrexon Energy Partners II"), including the associated deferred revenue remaining under each collaboration agreement (Notes 4 and 5), as well as the associated intellectual property developed by MBP Titan to date. These assets, liabilities, and related historical revenue and equity losses are included in the Company's operating results from continuing operations in the accompanying condensed consolidated financial statements for all periods presented as a result of the Company's continuing involvement.

There were no discontinued operations related to MBP Titan for the three months ended March 31, 2022. The following table presents the financial results of discontinued operations related to MBP Titan for the three months ended March 31, 2021:

	Three Months Ended March 31, 2021
Operating gains	$ 4,526
Operating income	4,526
Income before income taxes	4,526
Income from discontinued operations	$ 4,526

The following table presents the significant noncash items, purchases of property, plant and equipment, and proceeds from sales of assets for the discontinued operations related to MBP Titan for the three months ended March 31, 2021 that are included in the accompanying condensed consolidated statements of cash flows.

	Three Months Ended March 31, 2021
Adjustments to reconcile net loss to net cash used in operating activities	
Gain on disposals of assets, net	$ (464)
Noncash gain on termination of leases	(4,602)
Cash flows from investing activities	
Proceeds from sales of assets	1,083

4. Investments in Joint Ventures

Intrexon Energy Partners

In 2014, the Company and certain investors (the "IEP Investors"), including an affiliate of Third Security, LLC ("Third Security"), entered into a Limited Liability Company Agreement that governs the affairs and conduct of business of Intrexon Energy Partners, a JV formed to optimize and scale-up the Company's MBP technology for the production of certain fuels and lubricants. The Company also entered into an exclusive channel collaboration ("ECC") with Intrexon Energy Partners providing exclusive rights to the Company's technology for the use in bioconversion for the production of certain fuels and lubricants, as a result of which the Company received a technology access fee of $25,000 while retaining a 50% membership interest in Intrexon Energy Partners. The IEP Investors made initial capital contributions, totaling $25,000 in the aggregate, in exchange for pro rata membership interests in Intrexon Energy Partners totaling 50%. In addition, Precigen committed to make capital contributions of up to $25,000, and the IEP Investors, as a group and pro rata in accordance with their respective membership interests in Intrexon Energy Partners, committed to make additional capital contributions of up to $25,000, at the request of Intrexon Energy Partners' board of managers (the "Intrexon Energy Partners Board") and subject to certain limitations. As of March 31, 2022, the Company's remaining commitment was $4,225. Intrexon Energy Partners is governed by the Intrexon Energy Partners Board, which has five members. Two members of the Intrexon Energy Partners Board are designated by the Company and three members are designated by a majority of the IEP Investors. The Company and the IEP Investors have the right, but not the obligation, to make additional capital contributions above the initial limits when and if solicited by the Intrexon Energy Partners Board.

The Company's investment in Intrexon Energy Partners was $(429) and $(428) as of March 31, 2022 and December 31, 2021, respectively, and is included in other accrued liabilities in the accompanying condensed consolidated balance sheets, which represents the Company's equity in losses for contractually committed contributions to Intrexon Energy Partners.

See Note 3 and 16 for additional discussion regarding the Company's investment in Intrexon Energy Partners.

Intrexon Energy Partners II

In 2015, the Company and certain investors (the "IEPII Investors"), entered into a Limited Liability Company Agreement that governs the affairs and conduct of business of Intrexon Energy Partners II, a JV formed to utilize the Company's MBP technology for the production of 1,4-butanediol, an industrial chemical used to manufacture spandex, polyurethane, plastics, and polyester. The Company also entered into an ECC with Intrexon Energy Partners II that provides exclusive rights to the Company's technology for use in the field, as a result of which the Company received a technology access fee of $18,000 while retaining a 50% membership interest in Intrexon Energy Partners II. The IEPII Investors made initial capital contributions, totaling $18,000 in the aggregate, in exchange for pro rata membership interests in Intrexon Energy Partners II totaling 50%. In December 2015, the owners of Intrexon Energy Partners II made a capital contribution of $4,000, half of which was paid by the Company. Precigen committed to make additional capital contributions of up to $10,000, and the IEPII Investors, as a group and pro rata in accordance with their respective membership interests in Intrexon Energy Partners II, committed to make additional capital contributions of up to $10,000, at the request of Intrexon Energy Partners II's board of managers (the "Intrexon Energy Partners II Board") and subject to certain limitations. As of March 31, 2022, the Company's remaining commitment was $10,000. Intrexon Energy Partners II is governed by the Intrexon Energy Partners II Board, which has five

members. One member of the Intrexon Energy Partners II Board is designated by the Company and four members are designated by a majority of the IEPII Investors. The Company and the IEPII Investors have the right, but not the obligation, to make additional capital contributions above the initial limits when and if solicited by the Intrexon Energy Partners II Board.

The Company's investment in Intrexon Energy Partners II was $(435) as of March 31, 2022 and December 31, 2021, and is included in other accrued liabilities in the accompanying condensed consolidated balance sheets, which represents the Company's equity in losses for contractually committed contributions to Intrexon Energy Partners II.

See Notes 3 and 16 for additional discussion regarding the Company's investment in Intrexon Energy Partners II.

5. Collaboration and Licensing Revenue

Historically, the Company has derived collaboration and licensing revenue through agreements with counterparties for the development and commercialization of products enabled by the Company's technology platforms. These collaborations and licensing agreements may provide for multiple promises to be satisfied by the Company and typically include a license to the Company's technology platforms, participation in collaboration committees, and performance of certain research and development services. Based on the nature of the promises in the Company's collaboration and licensing agreements, the Company typically combines most of its promises into a single performance obligation because the promises are highly interrelated and not individually distinct. Options to acquire additional services are considered to determine if they constitute material rights. At contract inception, the transaction price is typically the upfront payment received and is allocated to the performance obligations. The Company has determined the transaction price should be recognized as revenue based on its measure of progress under the agreement primarily based on inputs necessary to fulfill the performance obligation.

The Company recognizes the reimbursement payments received for research and development efforts in the period when the services are performed, in connection with the single performance obligation discussed above. The reimbursements relate specifically to the Company's efforts to provide services, and the reimbursements are consistent with what the Company would typically charge other collaborators for similar services. The Company assesses the uncertainty of when and if any milestones will be achieved to determine whether the milestone is included in the transaction price. The Company then assesses whether the revenue is constrained based on whether it is probable that a significant reversal of revenue would not occur when the uncertainty is resolved. Royalties, including sales-based milestones, received under the agreements will be recognized as revenue when sales have occurred because the Company applies the sales- or usage-based royalties recognition exception provided for under ASC Topic 606. The Company determined the application of this exception is appropriate because at the time the royalties are generated, the technology license granted in the agreement is the predominant item to which the royalties relate.

The Company determines whether collaborations and licensing agreements are individually significant for disclosure based on a number of factors, including total revenue recorded by the Company pursuant to collaboration and licensing agreements, collaborators or licensees with equity method investments, or other qualitative factors. Collaboration and licensing revenues generated from consolidated subsidiaries are eliminated in consolidation.

The following table summarizes the amounts recorded as revenue in the condensed consolidated statements of operations for each significant counterparty to a collaboration or licensing agreement for the three months ended March 31, 2022 and 2021.

	Three Months Ended March 31,	
	2022	2021
Castle Creek Biosciences, Inc.	$ —	$ 59
Other	—	7
Total (1)	$ —	$ 66

(1) Collaboration and licensing revenues include the recognition of $0 and $66 for the three months ended March 31, 2022 and 2021, respectively, associated with upfront and milestone payments which were previously deferred.

There have been no significant changes to the agreements with our collaborators and licensees in the three months ended March 31, 2022.

Deferred Revenue

Deferred revenue primarily consists of upfront and milestone consideration received for the Company's collaboration and licensing agreements. Revenue is recognized as services are performed. The arrangements classified as long-term (of which $21,205 is related to agreements with Intrexon Energy Partners L.L.C. and Intrexon Energy Partners II, L.L.C.) are not active while the respective counterparties evaluate the status of the project and its desired future development activities since the Company cannot reasonably estimate the amount of service to be performed over the next year.

Deferred revenue consisted of the following:

	March 31, 2022	December 31, 2021
Collaboration and licensing agreements	$ 23,023	$ 23,023
Prepaid product and service revenues	2,511	4,229
Other	158	213
Total	$ 25,692	$ 27,465
Current portion of deferred revenue	$ 2,669	$ 4,442
Long-term portion of deferred revenue	23,023	23,023
Total	$ 25,692	$ 27,465

6. Short-term and Long-term Investments

The Company's investments are classified as available-for-sale. The following table summarizes the amortized cost, gross unrealized gains and losses, and fair value of available-for-sale investments as of March 31, 2022:

	Amortized Cost	Gross Unrealized Gains	Gross Unrealized Losses	Aggregate Fair Value
U.S. government debt securities	$ 102,771	$ —	$ (1,133)	$ 101,638
Certificates of deposit	97	—	—	97
Total	$ 102,868	$ —	$ (1,133)	$ 101,735

The following table summarizes the amortized cost, gross unrealized gains and losses, and fair value of available-for-sale investments as of December 31, 2021:

	Amortized Cost	Gross Unrealized Gains	Gross Unrealized Losses	Aggregate Fair Value
U.S. government debt securities	$ 121,036	$ —	$ (331)	$ 120,705
Certificates of deposit	97	—	—	97
Total	$ 121,133	$ —	$ (331)	$ 120,802

The estimated fair value of available-for-sale investments classified by their contractual maturities as of March 31, 2022 was:

Due within one year	$ 71,821
After one year through two years	29,914
Total	$ 101,735

Changes in market interest rates and bond yields cause certain investments to fall below their cost basis, resulting in unrealized losses on investments. We do not intend to sell these investments and nor is it more likely than not that the Company will be required to sell these investments, prior to maturity or recovery of amortized cost.

7. Fair Value Measurements

The carrying amount of cash and cash equivalents, receivables, accounts payable, accrued compensation and benefits, other accrued liabilities, and related party payables approximate fair value due to the short maturity of these instruments.

Assets

The following table presents the placement in the fair value hierarchy of financial assets that are measured at fair value on a recurring basis as of March 31, 2022:

	Quoted Prices in Active Markets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)	March 31, 2022
Assets				
U.S. government debt securities	$ —	$ 101,638	$ —	$ 101,638
Certificates of deposit	—	97	—	97
Total	$ —	$ 101,735	$ —	$ 101,735

The following table presents the placement in the fair value hierarchy of financial assets that are measured at fair value on a recurring basis as of December 31, 2021:

	Quoted Prices in Active Markets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)	December 31, 2021
Assets				
U.S. government debt securities	$ —	$ 120,705	$ —	$ 120,705
Certificates of deposit	—	97	—	97
Total	$ —	$ 120,802	$ —	$ 120,802

The method used to estimate the fair value of the Level 2 short-term and long-term debt investments in the tables above is based on professional pricing sources for identical or comparable instruments, rather than direct observations of quoted prices in active markets.

Liabilities

The carrying values of the Company's long-term debt, excluding the 3.50% convertible senior notes due 2023 (the "Convertible Notes"), approximates fair value due to the length of time to maturity and/or the existence of interest rates that approximate prevailing market rates.

The calculated fair value of the Convertible Notes (Note 11) was approximately $164,000 and $160,000 as of March 31, 2022 and December 31, 2021, respectively, and is based on the recent third-party trades of the instrument as of the balance sheet date. The fair value of the Convertible Notes is classified as Level 2 within the fair value hierarchy as there is not an active market for the Convertible Notes, however, third-party trades of the instrument are considered observable inputs. The Convertible Notes are reflected on the accompanying condensed consolidated balance sheets at amortized cost, which was $198,362 and $179,882 as of March 31, 2022 and December 31, 2021, respectively (see Note 2 regarding adoption of ASU 2020-06 on January 1, 2022).

8. Inventory

Inventory consists of the following:

	March 31, 2022	December 31, 2021
Supplies, embryos and other production materials	$ 2,931	$ 2,588
Work in process	2,539	2,564
Livestock	5,918	6,310
Feed	1,342	1,799
Total inventory	$ 12,730	$ 13,261

9. Property, Plant and Equipment, Net

Property, plant and equipment consist of the following:

	March 31, 2022	December 31, 2021
Land and land improvements	$ 11,118	$ 11,118
Buildings and building improvements	12,903	12,896
Furniture and fixtures	1,193	1,162
Equipment	34,304	33,584
Leasehold improvements	4,822	4,822
Breeding stock	953	1,000
Computer hardware and software	5,169	5,131
Construction and other assets in progress	3,596	3,824
	74,058	73,537
Less: Accumulated depreciation and amortization	(40,475)	(39,222)
Property, plant and equipment, net	$ 33,583	$ 34,315

Depreciation expense was $1,483 and $1,593 for the three months ended March 31, 2022 and 2021, respectively.

10. Goodwill and Intangible Assets, Net

The changes in the carrying amount of goodwill for the three months ended March 31, 2022 were as follows:

Balance at December 31, 2021	$ 54,148
Impairment	(482)
Foreign currency translation adjustments	(53)
Balance at March 31, 2022	$ 53,613

The Company recorded $482 of goodwill impairment related to the total goodwill assigned to one reporting unit within the biopharmaceutical segment during the first quarter of 2022.

The Company had $44,125 and $43,643 of cumulative impairment losses as of March 31, 2022 and December 31, 2021, respectively.

Intangible assets consist of the following as of March 31, 2022:

	Gross Carrying Amount	Accumulated Amortization	Net
Patents, developed technologies and know-how	$ 90,000	$ (39,595)	$ 50,405
Customer relationships	10,850	(10,480)	370
Trademarks	5,900	(5,248)	652
Total	$ 106,750	$ (55,323)	$ 51,427

Intangible assets consist of the following as of December 31, 2021:

	Gross Carrying Amount	Accumulated Amortization	Net
Patents, developed technologies and know-how	$ 91,373	$ (38,630)	$ 52,743
Customer relationships	10,850	(10,252)	598
Trademarks	5,900	(5,126)	774
Total	$ 108,123	$ (54,008)	$ 54,115

Amortization expense was $1,809 and $1,930 for the three months ended March 31, 2022 and 2021, respectively.

11. Lines of Credit and Long-Term Debt

Lines of Credit

Trans Ova had a $5,000 revolving line of credit with First National Bank of Omaha that matured on April 1, 2022. The line of credit bore interest at the greater of the U.S. Prime Rate or 3.00%, and the actual rate was 3.50% as of March 31, 2022. As of March 31, 2022 and December 31, 2021, there was no outstanding balance. The amount available under the line of credit was based on eligible accounts receivable and inventory up to the maximum principal amount and was $5,000 as of March 31, 2022.

Exemplar has a $700 revolving line of credit with American State Bank that matures on October 31, 2022. As of March 31, 2022, the line of credit bore interest at a stated rate of 4.00% per annum. As of March 31, 2022 and December 31, 2021, there was no outstanding balance.

Long-Term Debt

Long-term debt consists of the following:

	March 31, 2022	December 31, 2021
Convertible debt (1)	$ 198,362	$ 179,882
Notes payable	3,105	3,217
Other	—	52
Long-term debt	201,467	183,151
Less current portion	355	402
Long-term debt, less current portion	$ 201,112	$ 182,749

(1) See Note 2 regarding adoption of ASU 2020-06 as of January 1, 2022.

Convertible Debt

Precigen Convertible Notes

In July 2018, Precigen completed a registered underwritten public offering of $200,000 aggregate principal amount of Convertible Notes and issued the Convertible Notes under an indenture (the "Base Indenture") between Precigen and The Bank of New York Mellon Trust Company, N.A., as trustee, as supplemented by the First Supplemental Indenture (together with the Base Indenture, the "Indenture"). Precigen received net proceeds of $193,958 after deducting underwriting discounts and offering expenses of $6,042.

The Convertible Notes are senior unsecured obligations of Precigen and bear interest at a rate of 3.50% per year, payable semiannually in arrears on January 1 and July 1 of each year beginning on January 1, 2019. The Convertible Notes mature on July 1, 2023 and are repayable in cash, unless earlier repurchased or converted. Upon conversion by the holders, the Convertible Notes are convertible into cash, shares of Precigen's common stock or a combination of cash and shares, at Precigen's election. The initial conversion rate of the Convertible Notes is 58.6622 shares of Precigen common stock per $1,000 principal amount of Convertible Notes (equivalent to an initial conversion price of approximately $17.05 per share of common stock). The conversion rate is subject to adjustment upon the occurrence of certain events, but will not be adjusted for any accrued and unpaid interest. In addition, following certain corporate events that occur prior to the maturity date as defined in the Indenture, Precigen will increase the conversion rate for a holder who elects to convert its Convertible Notes in connection with such a corporate event in certain circumstances. Prior to April 1, 2023, the holders may convert the Convertible Notes at their option only upon the satisfaction of the following circumstances:

- During any calendar quarter commencing after the calendar quarter ended on September 30, 2018, if the last reported sales price of Precigen's common stock for at least 20 trading days (whether or not consecutive) during the last 30 consecutive trading days of the immediately preceding calendar quarter is greater than or equal to 130% of the conversion price on each applicable trading day;

- During the five business day period after any five consecutive trading day period in which the trading price, as defined in the Indenture, for the Convertible Notes is less than 98% of the product of the last reported sales price of Precigen's common stock and the conversion rate for the Convertible Notes on each such trading day; or

- Upon the occurrence of specified corporate events as defined in the Indenture.

None of the above events allowing for conversion prior to April 1, 2023 occurred during the three months ended March 31, 2022. On or after April 1, 2023 until June 30, 2023, holders may convert their Convertible Notes at any time. Precigen may not redeem the Convertible Notes prior to the maturity date.

If Precigen undergoes a fundamental change, as defined in the Indenture, holders of the Convertible Notes may require Precigen to repurchase for cash all or any portion of their Convertible Notes at a fundamental change repurchase price equal to 100% of the principal amount of the Convertible Notes to be repurchased, plus accrued and unpaid interest to, but excluding, the fundamental change repurchase date. The Indenture contains customary events of default, as defined in the agreement, and, if any of the events occur, could require repayment of a portion or all of the Convertible Notes, including accrued and unpaid interest. Additionally, the Indenture provides that Precigen shall not consolidate with or merge with or into, or sell, convey, transfer or lease all or substantially all of its properties and assets to, another entity, unless (i) the surviving entity is organized under the laws of the United States and such entity expressly assumes all of Precigen's obligations under the Convertible Notes and the Indenture; and (ii) immediately after such transaction, no default or event of default has occurred and is continuing under the Indenture.

The net proceeds received from the issuance of the Convertible Notes were initially allocated between long-term debt, the liability component, in the amount of $143,723, and additional paid-in capital, the equity component, in the amount of $50,235. Additional paid-in capital was further reduced by $13,367 of deferred taxes resulting from the difference between the carrying amount and the tax basis of the Convertible Notes that is created by the equity component, which also resulted in deferred tax benefit recognized from the reversal of valuation allowances on the then current year domestic operating losses in the same amount.

As described in Note 2, the Company adopted ASU 2020-06 on January 1, 2022. Pursuant to ASU 2020-06, the equity components of the Convertible Notes separated from the debt components as required under the cash conversion model is required to be recombined into the Convertible Notes as a single instrument upon the adoption of ASU 2020-06. The

Convertible Notes shall be accounted for as if the conversion option had not been separated. As the Company elected the modified retrospective approach, the difference between the accounting under the cash conversion model and new model after the adoption of ASU 2020-06 (i.e., the single debt instrument with no separation) was recorded as an adjustment on the adoption date (i.e., January 1, 2022) through accumulated deficit. Tax accounting consequences of the adoption also required the reversal of the previously reported deferred tax benefit on the date of adoption.

Adoption of ASU 2020-06 resulted in an increase to long-term debt outstanding, net of current portion, of $18,196, a decrease to additional paid-in capital of $36,868, and a decrease to accumulated deficit of $18,672. Interest expense recognized on the convertible notes in future periods will be reduced as a result of accounting for the convertible debt instrument as a single liability measured at its amortized cost.

As of March 31, 2022, the outstanding principal balance on the Convertible Notes was $200,000 and the carrying value of long-term debt was $198,362. The effective interest rate on the Convertible Notes, including amortization of the long-term debt discount and debt issuance costs, is 4.25%. As of March 31, 2022, the unamortized long-term debt discount and debt issuance costs totaled $1,638.

The components of interest expense related to the Convertible Notes were as follows:

	Three Months Ended March 31,	
	2022	**2021**
Cash interest expense	$ 1,750	$ 1,750
Non-cash interest expense	284	2,751
Total interest expense	$ 2,034	$ 4,501

Accrued interest of $1,750 is included in other accrued liabilities on the accompanying condensed consolidated balance sheet as of March 31, 2022.

Notes Payable

Trans Ova has a note payable that matures in April 2033 and had an outstanding principal balance of $3,105 as of March 31, 2022. Trans Ova pays monthly installments of $39, which includes interest at 3.95%. The note payable is collateralized by certain of Trans Ova's real estate and non-real estate assets.

Future Maturities

Future maturities of long-term debt as of March 31, 2022 are as follows:

2022	$ 265
2023	200,365
2024	380
2025	395
2026	411
2027	428
Thereafter	861
Total	$ 203,105

12. Income Taxes

Tax provisions for interim periods are calculated using an estimate of actual taxable income or loss for the respective period, rather than estimating the Company's annual effective income tax rate, as the Company is currently unable to reliably estimate its income for the full year. The Company has U.S. taxable loss of approximately $5,300 and $40,400 for the three months ended March 31, 2022 and 2021, respectively. The following table presents the components of income tax benefit from continuing operations.

	Three Months Ended March 31,	
	2022	2021
Current foreign income tax expense from continuing operations	$ —	$ 4
Deferred income tax benefit from continuing operations	(58)	(56)
Total income tax benefit from continuing operations	$ (58)	$ (52)

The Company's net deferred tax assets, excluding certain deferred tax liabilities totaling $2,438, are offset by a valuation allowance due to the Company's history of net losses combined with an inability to confirm recovery of the tax benefits of the Company's losses and other net deferred tax assets. In assessing the realizability of deferred tax assets, management considers whether it is more likely than not that some portion or all of the deferred tax assets will not be realized. The ultimate realization of deferred tax assets is dependent upon the generation of future taxable income during the periods in which those temporary differences become deductible. Management considers the scheduled reversal of deferred tax liabilities, projected future taxable income and tax planning strategies in making this assessment.

As of March 31, 2022, the Company had net operating loss carryforwards for U.S. federal income tax purposes of approximately $861,000 available to offset future taxable income, including approximately $609,000 generated after 2017, U.S. capital loss carryforwards of approximately $212,500, and federal and state research and development tax credits of approximately $11,300, prior to consideration of annual limitations that may be imposed under Section 382 of the Internal Revenue Code of 1986, as amended. Net operating loss carryforwards generated prior to 2018 have begun to expire in 2022, and capital loss carryforwards will expire if unutilized beginning in 2024. As of March 31, 2022, the Company's foreign subsidiaries have foreign loss carryforwards of approximately $74,200, most of which do not expire.

13. Shareholders' Equity

Issuances of Precigen Common Stock

In January 2021, the Company closed a public offering of 17,250,000 shares of its common stock, resulting in net proceeds of $121,045, after deducting underwriting discounts and of capitalized offering expenses.

See Note 11 for discussion regarding conversion features of the convertible notes.

Share Lending Agreement

Concurrently with the offering of the Convertible Notes (Note 11), Precigen entered into a share lending agreement (the "Share Lending Agreement") with J.P. Morgan Securities LLC (the "Share Borrower") pursuant to which Precigen loaned and delivered 7,479,431 shares of its common stock (the "Borrowed Shares") to the Share Borrower. The Share Lending Agreement will terminate, and the Borrowed Shares will be returned to Precigen within five business days of such termination, upon (i) termination by the Share Borrower or (ii) the earliest to occur of (a) October 1, 2023 and (b) the date, if any, on which the Share Lending Agreement is either mutually terminated or terminated by one party upon a default by the other party. The Share Borrower maintains collateral in the form of cash or certain permitted non-cash collateral with a market value at least equal to the market value of the Borrowed Shares as security for the obligation of the Share Borrower to return the Borrowed Shares when required by the terms above. The Borrowed Shares were offered and sold to the public at a price of $13.37 per share under a registered offering (the "Borrowed Shares Offering"). Precigen did not receive any proceeds from the sale of the Borrowed Shares to the public or any lending fees from the Share Lending Agreement. The Share Borrower or its affiliates received all the proceeds from the sale of the Borrowed Shares to the public. Affiliates of Third Security purchased all of the shares of common stock in the Borrowed Shares Offering.

The Share Lending Agreement was entered into at fair value and met the requirements for equity classification. Therefore, the value is netted against the issuance of the Borrowed Shares in additional paid-in capital. Additionally, the Borrowed Shares are not included in the denominator for loss per share attributable to Precigen shareholders unless the Share Borrower defaults on the Share Lending Agreement.

Components of Accumulated Other Comprehensive (Loss) Income

The components of accumulated other comprehensive (loss) income are as follows:

	March 31, 2022	December 31, 2021
Unrealized loss on investments	$ (1,133)	$ (331)
Income (loss) on foreign currency translation adjustments	(566)	534
Total accumulated other comprehensive (loss) income	$ (1,699)	$ 203

14. Share-Based Payments

The Company measures the fair value of stock options and restricted stock units ("RSUs") issued to employees and nonemployees as of the grant date for recognition of stock-based compensation expense. Stock-based compensation expense for employees and nonemployees is recognized over the requisite service period, which is typically the vesting period. Stock-based compensation costs included in the condensed consolidated statements of operations are presented below:

	Three Months Ended March 31,	
	2022	2021
Cost of products	$ 8	$ 9
Cost of services	31	65
Research and development	548	1,038
Selling, general and administrative	2,975	4,303
Total	$ 3,562	$ 5,415

Precigen Stock Option Plans

In April 2008, Precigen adopted the 2008 Equity Incentive Plan (the "2008 Plan") for employees and nonemployees pursuant to which Precigen's board of directors granted share-based awards, including stock options, to officers, key employees and nonemployees. Upon the effectiveness of the 2013 Omnibus Incentive Plan (the "2013 Plan"), no new awards may be granted under the 2008 Plan. As of March 31, 2022, there were 14,843 stock options outstanding under the 2008 Plan.

Precigen adopted the 2013 Plan for employees and nonemployees pursuant to which Precigen's board of directors may grant share-based awards, including stock options and shares of common stock, to employees, officers, consultants, advisors, and nonemployee directors. The 2013 Plan became effective in August 2013, and as of March 31, 2022, there were 27,000,000 shares authorized for issuance under the 2013 Plan, of which 14,121,502 stock options and 569,445 RSUs were outstanding and 2,085,537 shares were available for grant. In April 2022, Precigen's board of directors approved, subject to shareholder approval at Precigen's annual meeting in June 2022, an increase of 10,000,000 shares of common stock to be reserved for issuance under the 2013 Plan.

In April 2019, Precigen adopted the 2019 Incentive Plan for Non-Employee Service Providers (the "2019 Plan"), which became effective upon shareholder approval in June 2019. The 2019 Plan permits the grant of share-based awards, including stock options, restricted stock awards, and RSUs, to non-employee service providers, including board members. As of March 31, 2022, there were 5,000,000 shares authorized for issuance under the 2019 Plan, of which 1,898,208 stock options and 615,760 RSUs were outstanding and 243,025 shares were available for grant. In April 2022, Precigen's board of directors approved, subject to shareholder approval at Precigen's annual meeting in June 2022, an increase of 7,000,000 shares of common stock to be reserved for issuance under the 2019 Plan.

Stock option activity was as follows:

	Number of Shares	Weighted Average Exercise Price	Weighted Average Remaining Contractual Term (Years)
Balances at December 31, 2021	12,260,187	$ 14.06	6.79
Granted	4,009,390	2.27	
Exercised	(375)	2.28	
Forfeited	(210,613)	5.63	
Expired	(24,036)	11.85	
Balances at March 31, 2022	16,034,553	11.22	7.31
Exercisable at March 31, 2022	8,937,195	14.85	5.99

RSU activity was as follows:

	Number of Restricted Stock Units	Weighted Average Grant Date Fair Value	Weighted Average Remaining Contractual Term (Years)
Balances at December 31, 2021	468,481	$ 8.47	0.33
Granted	1,387,831	2.12	
Vested	(669,041)	5.71	
Forfeited	(2,066)	7.26	
Balances at March 31, 2022	1,185,205	2.60	0.59

Precigen currently uses authorized and unissued shares to satisfy share award exercises.

The Company's Executive Chairman ("Executive Chairman"), who previously served as an employee and executive officer until September 24, 2020, received a base salary of $200 per month through March 31, 2020, payable in fully-vested shares of Precigen common stock with such shares subject to a three-year lock-up on resale. In September 2020, the Company's board of directors, upon the recommendation of the compensation committee of the board, approved a new compensation arrangement for the Executive Chairman consisting of (i) an annual retainer of $100 payable in cash or, at the Executive Chairman's election, shares of Precigen common stock; (ii) an annual grant of fully vested stock options having a grant date fair value of $250; and (iii) an annual grant of RSUs having a grant date fair value of $250 vesting over one year. The new compensation arrangement began in calendar year 2021 and was prorated for the nine months of 2020 not covered by the Executive Chairman's previous compensation arrangement discussed above. Expense associated with the arrangements above is included in selling, general, and administrative expenses in the Company's condensed consolidated statements of operations and totaled $433 and $400 for the three months ended March 31, 2022 and 2021.

15. Operating Leases

The Company leases certain facilities and equipment under operating leases. Leases with a lease term of twelve months or less are considered short-term leases and are not recorded on the balance sheet, and expense for these leases is recognized over the term of the lease. All other leases have remaining terms of one to nine years, some of which may include options to extend the lease and some of which may include options to terminate the lease within one year. The Company uses judgment to determine whether it is reasonably possible to extend the lease beyond the initial term or terminate before the initial term ends and the length of the possible extension or early termination. The leases are renewable at the option of the Company and do not contain residual value guarantees, covenants, or other restrictions.

The components of lease costs were as follows:

	Three Months Ended March 31,	
	2022	2021
Operating lease costs	$ 729	$ 839
Short-term lease costs	463	506
Variable lease costs	117	230
Lease costs	$ 1,309	$ 1,575

As of March 31, 2022, maturities of lease liabilities, excluding short-term and variable leases, for continuing operations were as follows:

2022	$ 2,117
2023	2,519
2024	2,528
2025	2,259
2026	1,778
2027	1,345
Thereafter	3,292
Total	15,838
Present value adjustment	(4,740)
Total	$ 11,098
Current portion of operating lease liabilities	$ 1,590
Long-term portion of operating lease liabilities	9,508
Total	$ 11,098

Other information related to operating leases in continuing operations was as follows:

	March 31, 2022	December 31, 2021
Weighted average remaining lease term (years)	6.30	6.65
Weighted average discount rate	10.99 %	10.99 %

	Three Months Ended March 31,	
	2022	2021
Supplemental disclosure of cash flow information		
Cash paid for operating lease liabilities	$ 744	$ 1,005
Operating lease right-of-use assets obtained in exchange for new lease liabilities (includes new leases or modifications of existing leases)	556	55

16. Commitments and Contingencies

Contingencies

On December 1, 2020, Trans Ova settled one of two patent infringement lawsuits brought by XY, LLC ("XY"). The lawsuit, originally filed in 2012, was tried and appealed between 2016 and 2020. On December 1, 2020, the parties reached a settlement resolving all remaining disputes. As part of that settlement, Trans Ova remitted to XY a settlement payment, which, in addition to all the other monies Trans Ova had previously paid XY, constituted full payment and satisfaction of the judgment, including pre-judgment interest, post-judgment interest, costs, and all past, current and future royalty obligations under the judgment. In exchange, XY released and forever discharged Trans Ova from all obligations arising out of the judgment.

XY filed a second lawsuit in December 2016, alleging infringement of seven additional patents. Two of those patents were later invalidated in different proceedings and dismissed from the lawsuit. A third patent was settled out of the case in April 2022. There are thus currently four patents remaining in the case. Of these, one patent expired on May 9, 2021, and another expires on May 21, 2022. As for the last two patents, Trans Ova has stopped practicing the technologies claimed therein. The Company expects a trial to occur sometime in 2023. While Trans Ova is confident in its claims and defenses, litigation is uncertain and there is a possibility that the Trans Ova is found liable and ordered to pay damages for past infringement. In the interim, Trans Ova shall continue to operate its business otherwise unaffected by the litigation.

In September 2020, the Company reached a final settlement with the Securities and Exchange Commission ("SEC") with respect to an investigation concerning the Company's disclosures regarding its MBP program in the first three quarters of 2017. Under the terms of the settlement, the Company, without admitting or denying the allegations of the SEC, consented to the entry of an administrative order requiring that the Company: (i) cease and desist from committing or causing any violations and future violations under Section 13(a) of the Securities Exchange Act of 1934, as amended, and Rules 13a-11 and 12b-20 promulgated thereunder; and (ii) pay a $2,500 civil money penalty to the SEC (which was paid in September 2020).

In October 2020, several shareholder class action lawsuits were filed in the United States District Court for the Northern District of California on behalf of certain purchasers of the Company's common stock. The complaints name as defendants the Company and certain of its current and former officers. The plaintiffs' claims track the allegations in the SEC's administrative order described above but challenge disclosures about the MBP program through September 2020, i.e., the date of the SEC administrative order. The plaintiffs seek compensatory damages, interest, and an award of reasonable attorneys' fees and costs. In April 2021, the court granted an order consolidating the claims and appointed a lead plaintiff and lead counsel in the case, captioned *Abailla v. Precigen, Inc., F/K/A Intrexon Corp., et al*. In May 2021, the lead plaintiff filed an amended complaint. The defendants moved to dismiss that complaint. In September 2021, the court issued an order mooting the defendants' motion to dismiss in light of the lead plaintiff's stated intent to file a second amended complaint in response to the motion to dismiss. On September 27, 2021, the lead plaintiff filed a second amended complaint. On April 7, 2022, at a hearing on the Company’s motion, the Court indicated that the second amended complaint would be dismissed with leave to amend. Plaintiffs’ counsel indicated a new complaint would be filed. The defendants intend to move to dismiss that complaint.

In December 2020, a derivative shareholder action, captioned *Edward D. Wright, derivatively on behalf of Precigen, Inc. F/K/A Intrexon Corp. v. Alvarez et al*, was filed in the Circuit Court for Fairfax County in Virginia on behalf of Precigen, Inc. asserting similar claims under state law against Precigen's current directors and certain officers. The plaintiff seeks damages, forfeiture of benefits received by defendants, and an award of reasonable attorneys' fees and costs. The case was stayed by an order entered on June 14, 2021. On September 24, 2021, an individual shareholder filed a lawsuit in the Circuit Court for Henrico County styled *Kent v. Precigen, Inc.*, Case CL21-6349. The *Kent* action demands inspection of certain books and records of the Company pursuant to Virginia statutory and common law. On April 1, 2022, the court denied the demurrer and referred the matter to a hearing on the merits. The Company is evaluating how best to proceed.

The Company intends to defend the lawsuits vigorously; however, there can be no assurances regarding the ultimate outcome of these lawsuits.

The Company has previously entered into strategic collaborations, including ECCs and JVs, to fund and develop products enabled by its technologies. These relationships involve complex interests, and the Company's interests may diverge with those of its collaborators, which can occur as a result of operations under those collaborations, business or technological developments, or as the Company transitions away from, or terminates, certain strategic collaborations. The Company has had, and has, disagreements and disputes with certain collaborators and JV partners, including the IEP Investors and the IEPII Investors. While the Company believes it is entitled to payment for work performed per its collaborations and JVs, consistent with its policy for accounting for accounts receivable, in 2019, the Company has fully reserved the amount of any disputed accounts receivable that remained outstanding.

On December 29, 2021, the Company received a letter from a group of investors in each of Intrexon Energy Partners and Intrexon Energy Partners II, purporting to refer certain issues to arbitration pursuant to the arbitration provisions of the Amended and Restated Limited Liability Company Agreements of Intrexon Energy Partners and Intrexon Energy Partners II (the “Arbitration Matters”). On January 25, 2022, the Company filed a petition in the Court of Chancery for the State of Delaware seeking to enjoin the arbitration proceeding. In March 2022, the Court of Chancery for the State of Delaware determined that arbitration should proceed. The structure of the arbitration requires each party to propose terms for resolution of each matter and the arbitration panel will be required to award one of the two proposals for each matter without compromise. The Company has proposed terms that the Company would acquire the membership interests of the IEP Investors in exchange of $5,000, and the membership interests of the IEPII Investors in exchange of $2,000. The investor group has proposed terms that the Company would acquire the membership interests of each individual investor in exchange of $34,000 for the membership interests of the IEP Investors and $12,000 for the membership interests of the IEPII Investors, representing the purchase price of their original investments, as well as, in addition, accrued interest from the date of their original investments, which approximates $18,000 for the IEP Investors and $6,000 for the IEPII Investors. The Company expects the arbitration will

be concluded in the second quarter of 2022. While the Company believes the investor groups' claims are without merit, there can be no assurance that the panel will award the Company's proposal and will not award the investors' proposal with respect to either of the Arbitration Matters. In addition, as disclosed in Note 5, as of March 31, 2022, the Company has a deferred revenue liability of $21,205 related to consideration previously received from Intrexon Energy Partners and Intrexon Energy Partners II that will be re-evaluated upon conclusion of the Arbitration Matters.

Such disagreements and disputes result in management distraction and may result in further litigation, arbitration, unfavorable settlements, or concessions by the Company, or adverse regulatory action, any of which could harm the Company's business or operations.

In the course of its business, the Company is involved in litigation or legal matters, including governmental investigations. Such matters are subject to many uncertainties and outcomes are not predictable with assurance. The Company accrues liabilities for such matters when it is probable that future expenditures will be made and such expenditures can be reasonably estimated. As of March 31, 2022, the Company does not believe that any such matters, individually or in the aggregate, will have a material adverse effect on the Company's business, financial condition, results of operations, or cash flows.

17. Related Party Transactions

Third Security and Affiliates

The Company's Executive Chairman is also the Senior Managing Director and Chairman of Third Security and owns 100% of the equity interests of Third Security. The Company had an agreement with Third Security under which the Company reimbursed Third Security for certain tax-related services performed by Third Security as requested by the Company. The Company also reimburses Third Security for certain out-of-pocket expenses incurred on the Company's behalf. The agreement with Third Security expired on December 31, 2021. As the Company evaluates its alternatives, it continues to utilize these services on a limited basis under the terms of the original agreement. The total expenses incurred by the Company under these arrangements were $26 and $41 for the three months ended March 31, 2022 and 2021, respectively.

See also Note 14 regarding compensation arrangements between the Company and its Executive Chairman.

Through November 2021, the Company also subleased certain administrative offices to Third Security. The significant terms of the lease mirrored the terms of the Company's lease with the landlord, and the Company recorded sublease income of $20 for the three months ended March 31, 2021.

See Notes 1, 3, and 13 regarding additional transactions with affiliates of Third Security.

18. Segments

The Company's CODM assesses the operating performance of and allocates resources for several operating segments using Segment Adjusted EBITDA as a basis. Management believes this financial metric is a key indicator of operating results since it excludes noncash revenues and expenses that are not reflective of the underlying business performance of an individual enterprise. The Company defines Segment Adjusted EBITDA as net income (loss) before (i) interest expense, (ii) income tax expense or benefit, (iii) depreciation and amortization, (iv) stock-based compensation expense, (v) loss on settlement agreements where noncash consideration is paid, (vi) adjustments for accrued bonuses paid in equity awards, (vii) gain or loss on disposals of assets, (viii) loss on impairment of goodwill and other noncurrent assets, (ix) equity in net loss of affiliates, and (x) recognition of previously deferred revenue associated with upfront and milestone payments as well as cash outflows from capital expenditures and investments in affiliates, but includes proceeds from the sale of assets in the period sold.

Because the Company uses Segment Adjusted EBITDA as its primary measure of segment performance, it has included this measure in its discussion of segment operating results. The Company has also disclosed revenues from external customers and intersegment revenues for each reportable segment. Corporate expenses are not allocated to the segments and are managed at a consolidated level. The CODM does not use total assets by segment to evaluate segment performance or allocate resources, and accordingly, these amounts are not required to be disclosed. The Company's segment presentation excludes amounts related to the operations of MBP Titan which are reported as discontinued operations (Note 3).

For the three months ended March 31, 2022, the Company's reportable segments were (i) Biopharmaceuticals, (ii) Exemplar, and (iii) Trans Ova. These identified reportable segments met the quantitative thresholds to be reported separately for the three months ended March 31, 2022. See Note 2 for a description of Biopharmaceuticals. See Note 1 for a description of Exemplar and Trans Ova.

Segment Adjusted EBITDA by reportable segment was as follows:

	Three Months Ended March 31,	
	2022	2021
Biopharmaceuticals	$ (11,620)	$ (8,854)
Exemplar	3,558	1,806
Trans Ova	5,397	6,421
Segment Adjusted EBITDA for reportable segments	$ (2,665)	$ (627)

The table below reconciles Segment Adjusted EBITDA for reportable segments to consolidated net loss from continuing operations before income taxes:

	Three Months Ended March 31,	
	2022	2021
Segment Adjusted EBITDA for reportable segments	$ (2,665)	$ (627)
Remove cash paid for capital expenditures, net of proceeds from sale of assets, and cash paid for investments in affiliates	1,314	597
Add recognition of previously deferred revenue associated with upfront and milestone payments	1,446	307
Other expenses:		
Interest expense	(2,069)	(4,539)
Depreciation and amortization	(3,292)	(3,523)
Loss on disposals of assets	(125)	(121)
Impairment losses	(482)	—
Stock-based compensation expense	(3,562)	(5,415)
Adjustment related to accrued bonuses paid in equity awards	1,698	—
Equity in net loss of affiliates	(1)	(3)
Other	—	(7)
Unallocated corporate costs	(10,060)	(8,194)
Eliminations	(1,511)	(371)
Consolidated net loss from continuing operations before income taxes	$ (19,309)	$ (21,896)

Revenues by reportable segment were as follows:

	Three Months Ended March 31, 2022			
	Biopharmaceuticals	Exemplar	Trans Ova	Total
Revenues from external customers	$ 84	$ 5,429	$ 26,508	$ 32,021
Intersegment revenues	1,446	—	147	1,593
Total segment revenues	$ 1,530	$ 5,429	$ 26,655	$ 33,614

	Three Months Ended March 31, 2021			
	Biopharmaceuticals	Exemplar	Trans Ova	Total
Revenues from external customers	$ 178	$ 3,257	$ 21,076	$ 24,511
Intersegment revenues	241	—	107	348
Total segment revenues	$ 419	$ 3,257	$ 21,183	$ 24,859

The table below reconciles total segment revenues from reportable segments to total consolidated revenues:

	Three Months Ended March 31,	
	2022	2021
Total segment revenues from reportable segments	$ 33,614	$ 24,859
Elimination of intersegment revenues	(1,593)	(348)
Total consolidated revenues	$ 32,021	$ 24,511

For the three months ended March 31, 2022 and 2021,13.0% and 8.4%, respectively, of total consolidated revenue was attributable to one customer in the Exemplar segment.

As of March 31, 2022 and December 31, 2021, the Company had $4,148 and $4,463, respectively, of long-lived assets in foreign countries. The Company recognized revenues derived in foreign countries totaling $205 and $99 for the three months ended March 31, 2022 and 2021, respectively.

Item 2. Management's Discussion and Analysis of Financial Condition and Results of Operations

The following "Management's Discussion and Analysis of Financial Condition and Results of Operations" should be read in conjunction with the unaudited financial information and the notes thereto included in this Quarterly Report on Form 10-Q, or Quarterly Report, and our Annual Report on Form 10-K for the year ended December 31, 2021, or Annual Report.

The following discussion contains forward-looking statements that reflect our plans, estimates, expectations, and beliefs. Our actual results could differ materially from those discussed in the forward-looking statements and you are cautioned not to place undue reliance on forward-looking statements. Factors that could cause or contribute to these differences include those discussed below and elsewhere in this Quarterly Report, particularly in "Special Note Regarding Forward-Looking Statements" and "Risk Factors." The forward-looking statements included in this Quarterly Report are made only as of the date hereof.

Overview

We are a dedicated discovery and clinical-stage biopharmaceutical company advancing the next generation of gene and cell therapies with the overall goal of improving outcomes for patients with significant unmet medical needs. We are leveraging our proprietary technology platforms to develop product candidates designed to target urgent and intractable diseases in our core therapeutic areas of immuno-oncology, autoimmune disorders, and infectious diseases. We have developed an extensive pipeline of therapies across multiple indications within these core focus areas.

We believe that our array of technology platforms uniquely positions us among other biotechnology companies to advance precision medicine. Precision medicine is the practice of therapeutic product development that takes into account specific genetic variations within populations impacted by a disease to design targeted therapies to improve outcomes for a disease or patient population. Our proprietary and complementary technology platforms provide a strong foundation to realize the core promise of precision medicine by supporting our efforts to construct powerful gene programs to drive efficacy, deliver these programs through viral, non-viral, and microbe-based approaches to drive lower costs, and control gene expression to drive safety. Our therapeutic platforms, including UltraCAR-T, AdenoVerse immunotherapy, and ActoBiotics, are designed to allow us to precisely control the level and physiological location of gene expression and modify biological molecules to control the function and output of living cells to treat underlying disease conditions.

We are actively advancing our lead clinical programs, including: PRGN-3005 and PRGN-3006, which are built on our UltraCAR-T platform; and PRGN-2009 and PRGN-2012, which are based on our AdenoVerse immunotherapy platform. In addition, we have completed a Phase 1b/2a study of AG019, which is built on our ActoBiotics platform. We also have a robust pipeline of preclinical programs that we are pursuing in order to drive long-term value creation.

We have developed a proprietary electroporation device, UltraPorator, designed to further streamline and ensure the rapid and cost-effective manufacturing of UltraCAR-T therapies. UltraPorator has received U.S. Food and Drug Administration, or FDA, clearance for manufacturing UltraCAR-T cells in clinical trials, and since November 2020, we have been dosing patients with UltraCAR-T cells manufactured with UltraPorator in our PRGN-3005 and PRGN-3006 clinical trials.

We exercise discipline in our portfolio management by systematically evaluating data from our preclinical programs in order to make rapid "go" and "no go" decisions. Through this process, we believe we can more effectively allocate resources to programs that we believe show the most promise and advance such programs to clinical trials.

Our Healthcare Business

Our healthcare business focuses on human therapeutics and developing research models and services for healthcare research applications. Our Biopharmaceuticals segment includes our wholly owned subsidiaries PGEN Therapeutics, Inc., or PGEN Therapeutics, and Precigen ActoBio, Inc., or ActoBio, and our majority ownership interest in Triple-Gene LLC, doing business as Precigen Triple-Gene, or Triple-Gene, as well as royalty interests in therapeutics and therapeutic platforms from companies not controlled by us. Exemplar Genetics LLC, doing business as Precigen Exemplar, or Exemplar, is a wholly owned subsidiary which is focused on developing research models and services for healthcare research applications.

Biopharmaceuticals

PGEN Therapeutics

PGEN Therapeutics is a dedicated discovery and clinical stage biopharmaceutical company advancing the next generation of gene and cell therapies using precision technology to target urgent and intractable diseases in immuno-oncology, autoimmune

disorders and infectious diseases. PGEN Therapeutics operates as an innovation engine, progressing a preclinical and clinical pipeline of well-differentiated therapies toward clinical proof-of-concept and commercialization.

PGEN Therapeutics is developing therapies primarily built on our UltraCAR-T therapeutics platform and our "off-the-shelf" AdenoVerse immunotherapy platform. Through our UltraCAR-T therapeutics platform, we are able to precision-engineer UltraCAR-T cells to produce a homogeneous cell product that simultaneously expresses antigen-specific chimeric antigen receptor, or CAR, kill switch, and our proprietary membrane-bound interleukin-15, or mbIL15, genes in any genetically modified UltraCAR-T cell. Our decentralized and rapid proprietary manufacturing process allows us to manufacture UltraCAR-T cells overnight at a medical center's current good manufacturing practices facility, or cGMP, and reinfuse the patient the following day after gene transfer. This process improves upon current approaches to CAR-T manufacturing, which require extensive *ex vivo* expansion following viral vector transduction to achieve clinically relevant cell numbers that we believe can result in the exhaustion of CAR-T cells prior to their administration, limiting their potential for persistence in patients. We have developed a proprietary electroporation device, UltraPorator, designed to further streamline and ensure the rapid and cost-effective manufacturing of UltraCAR-T therapies. The UltraPorator system includes proprietary hardware and software solutions and potentially represents major advancements over current electroporation devices by significantly reducing the processing time and contamination risk. UltraPorator is intended to be a viable scale-up and commercialization solution for decentralized UltraCAR-T manufacturing. Our AdenoVerse immunotherapy platform utilizes a library of proprietary adenovectors for the efficient gene delivery of therapeutic effectors, immunomodulators, and vaccine antigens. We have established proprietary manufacturing cell lines and production methodologies from our AdenoVerse immunotherapy platform, which we believe are easily scalable for commercial supply. We believe that our proprietary gorilla adenovectors, part of the AdenoVerse technology, have superior performance characteristics as compared to current competition, including standard human adenovirus serotype 5, rare human adenovirus types and other non-human primate adenovirus types.

The most advanced programs within PGEN Therapeutics are as follows:

PRGN-3005 is a first-in-class, investigational autologous CAR-T therapy that utilizes our UltraCAR-T platform to simultaneously express a CAR targeting the unshed portion of the Mucin 16 antigen, mbIL15, and kill switch genes. PRGN-3005 is currently being evaluated in a Phase 1/1b clinical trial for the treatment of advanced, recurrent platinum-resistant ovarian , fallopian tube, or primary peritoneal cancer. In January 2022, we announced the completion of enrollment in the dose escalation phase of both IP and IV arms without lymphodepletion in the ongoing Phase 1 clinical trial. We have received FDA clearance to incorporate lymphodepletion at Dose Level 3 of the IV arm.

PRGN-3006 is a first-in-class, investigational autologous CAR-T therapy that utilizes our UltraCAR-T platform to express a CAR to target CD33 (Siglec-3), mbIL15 and a kill switch gene. PRGN-3006 is currently being evaluated in a Phase 1/1b clinical trial for the treatment of relapsed or refractory, or r/r, acute myeloid leukemia, or AML, high-risk myelodysplastic syndromes, or MDS, and chronic myelomonocytic leukemia, or CMML. In January 2022, we announced the completion of enrollment in the dose escalation phase in both the non-lymphodepletion and the lymphodepletion cohorts of this Phase 1 trial. An expansion phase is planned at the MTD. On April 4, 2022, we announced that PRGN-3006 was granted Fast Track designation in patients with r/r AML by the FDA. Previously PRGN-3006 was granted Orphan Drug Designation in patients with AML by the FDA.

PRGN-3007 is a first-in-class, investigational autologous CAR-T therapy that utilizes the next generation UltraCAR-T platform to express a CAR to target ROR1, mbIL15, kill switch, and a novel mechanism for the intrinsic blockade of the programmed death 1, or PD-1, gene expression. PRGN-3007 has received FDA clearance to initiate a Phase 1/1b clinical trial for patients with advanced receptor tyrosine kinase-like orphan receptor 1-positive, or ROR1^{+}, hematological (Arm 1) and solid tumors (Arm 2). The target patient population for Arm 1 includes relapsed or refractory CLL, relapsed or refractory MCL, relapsed or refractory B-ALL, and relapsed or refractory DLBCL. The target patient population for Arm 2 includes locally advanced unresectable or metastatic histologically confirmed TNBC. The study will enroll in two parts: an initial 3+3 dose escalation in each arm followed by a dose expansion at the maximum tolerated dose. Arm 1 and Arm 2 will enroll in parallel.

PRGN-2009 is a first-in-class, "off-the-shelf" investigational immunotherapy designed to activate the immune system to recognize and target human papillomavirus-positive, or HPV+, solid tumors. PRGN-2009 leverages our UltraVector and AdenoVerse platforms to optimize HPV type 16 and HPV type 18, antigen design for delivery via a proprietary gorilla adenovector with a large genetic payload capacity and the ability for repeat administrations. PRGN-2009 is in a Phase 1/2 clinical trial as a monotherapy or in combination with bintrafusp alfa, or M7824, an investigational bifunctional fusion protein, for patients with HPV-associated cancers in collaboration with the National Cancer Institute, or NCI, pursuant to a cooperative research and development arrangement, or CRADA.

PRGN-2012 is a first-in-class, investigational "off-the-shelf" AdenoVerse immunotherapy for the treatment of recurrent respiratory papillomatosis, or RRP. PRGN-2012 is an innovative therapeutic vaccine with optimized antigen design that uses our gorilla adenovector technology, part of our proprietary AdenoVerse platform, to elicit immune responses directed against

cells infected with HPV type 6 and HPV type 11. PRGN-2012 is in a Phase 1/2 clinical trial for adult patients with RRP. PRGN-2012 is being developed in collaboration with the Center for Cancer Research at the NCI pursuant to a CRADA. PRGN-2012 has been granted Orphan Drug designation for treatment of RRP by the FDA.

In addition to our clinical programs, PGEN Therapeutics has a robust pipeline of preclinical programs in our core therapeutic areas of immune-oncology, infectious diseases, and autoimmune disorders that we are pursuing in order to drive long-term value creation. Our pipeline includes a number of product candidates, including UltraCAR-T therapeutics for various cancers, and "off-the-shelf" AdenoVerse therapeutic platforms. We expect to continue development of various preclinical programs to identify product candidates for evaluation in clinical trials.

Precigen ActoBio, Inc.

ActoBio is pioneering a proprietary class of microbe-based biopharmaceuticals that enable expression and local delivery of disease-modifying therapeutics. We refer to these microbe-based biopharmaceuticals as ActoBiotics. Our ActoBiotics platform is a unique delivery platform precisely tailored for specific disease modification with the potential for superior efficacy and safety. ActoBiotics combine the advantages of highly selective protein-based therapeutic agents with local delivery by the well-characterized and food-grade bacterium *Lactococcus lactis*, or *L. lactis*. ActoBiotics can be delivered orally in a capsule, through an oral rinse, or in a topical solution. We believe ActoBiotics have the potential to provide superior safety and efficacy via the sustained release of appropriate quantities of select therapeutic agents as compared to injectable biologics, while reducing the side effects commonly attributed to systemic delivery and corresponding peaks in concentration. ActoBiotics work via genetically modified bacteria that deliver proteins and peptides at mucosal sites, rather than the insertion of one or more genes into a human cell by means of a virus or other delivery mechanism. By foregoing this insertion, ActoBiotics allow "gene therapy" without the need for cell transformation.

ActoBio's most advanced internal pipeline candidate, AG019, is a first-in-class disease modifying antigen-specific, investigational immunotherapy for the prevention, delay, or reversal of type 1 diabetes mellitus, or T1D. AG019 is an easy-to-take capsule formulation of ActoBiotics engineered to deliver the autoantigen human proinsulin, or hPINS, and the tolerance-enhancing cytokine human interleukin-10 to the mucosal lining of gastro-intestinal tissues in patients with T1D. We have completed a Phase 1b/2a clinical trial of AG019 for the treatment of early-onset T1D. The Phase 1b portion of the study evaluated the safety and tolerability of AG019 monotherapy administered as a single dose and repeated daily doses in adult and adolescent patients. The Phase 2a double-blind portion of the study investigated the safety and tolerability of AG019 in combination with teplizumab, or PRV-031. The primary endpoint of assessing safety and tolerability in both the Phase 1b AG019 monotherapy and the Phase 2a AG019 combination therapy has been met. AG019 was well-tolerated when administered to adults and adolescents either as monotherapy or in combination with teplizumab. A single 8-week treatment cycle of oral AG019 as a monotherapy and in combination with teplizumab showed stabilization or increase of C-peptide levels during the first 6 months post treatment initiation in recent-onset T1D.

Precigen Triple-Gene

Triple-Gene is a clinical stage gene therapy company focused on developing advanced treatments for complex cardiovascular diseases. Triple-Gene's most advanced candidate, INXN-4001, a non-viral triple-effector plasmid based on our UltraVector platform designed for constitutive expression of human S100A1, SDF-1a, and VEGF-165. INXN-4001 is engineered to address multiple pathways of heart failure. Utilizing a single plasmid comprising all three genes, instead of each individual gene on separately delivered plasmids, INXN-4001 can control for delivery and ensure expression of the three genes in all transfected cells.

We have completed a first-in-human, open label Phase 1 study designed to evaluate the safety of retrograde coronary sinus infusion, or RCSI, of INXN-4001 in outpatient left ventricular assist device, or LVAD, recipients. The Phase 1 trial met the primary endpoints to evaluate safety and feasibility for INXN-4001.

Partnered Program

We have partnered with Castle Creek Biosciences, Inc., or Castle Creek, to advance product candidates D-Fi (debcoemagene autoficel), formerly designated FCX-007, for the treatment of recessive dystrophic epidermolysis bullosa, or RDEB, and FCX-013 for the treatment of localized scleroderma. In October 2020, Castle Creek announced the dosing of the first patient in the ongoing Phase 3 trial of D-Fi and the dosing of the first patient in the ongoing Phase 1/2 trial of FCX-013. The FDA has granted Orphan Drug designation to D-Fi for the treatment of Dystrophic Epidermolysis Bullosa, which includes RDEB. In addition, D-Fi has been granted Rare Pediatric Disease designation, Fast Track designation, and Regenerative Medicine Advanced Therapy designation by the FDA for treatment of RDEB. The FDA has granted Orphan Drug designation to

FCX-013 for the treatment of localized scleroderma. In addition, FCX-013 has been granted Rare Pediatric Disease designation and Fast Track designation for the treatment of moderate to severe localized scleroderma. Pursuant to the collaboration, we licensed our technology platforms to Castle Creek for use in certain specified fields, and in exchange, we received and were entitled to certain access fees, milestone payments, royalties, and sublicensing fees related to the development and commercialization of product candidates. In March 2020, we and Castle Creek terminated the original collaboration agreement by mutual agreement, with the parties agreeing that FCX-007 and FCX-013 would be treated as "Retained Products" under the terms of the original agreement. Castle Creek retains a license to continue to develop and commercialize the Retained Products within the field of use for so long as Castle Creek continues to pursue such development and commercialization, and we are also entitled to certain royalties with respect to the Retained Products.

Precigen Exemplar

Exemplar is committed to enabling the study of life-threatening human diseases through the development of MiniSwine Yucatan miniature pig research models and services, as well as enabling the production of cells and organs in its genetically engineered swine for regenerative medicine applications. Historically, researchers have lacked animal models that faithfully represent human diseases. As a result, a sizeable barrier has blocked progress in the discovery of human disease mechanisms; novel diagnostics, procedures, devices, prevention strategies and therapeutics; and the ability to predict in humans the efficacy of those next-generation procedures, devices, and therapeutics. Exemplar's MiniSwine models are genetically engineered to exhibit a wide variety of human disease states, which provides a more accurate platform to test the efficacy of new medications and devices.

Our Non-Healthcare Business

At March 31, 2022, our only non-healthcare business is our established bovine genetics company, Trans Ova Genetics, L.C., or Trans Ova.

Trans Ova

Trans Ova is internationally recognized as a provider of industry-leading bovine reproductive technologies. Trans Ova offers bovine embryo transfer technologies, in addition to other advanced reproductive technologies, including *in vitro* fertilization, or IVF, sexed-semen, genetic preservation, and cloning. Through extensive research programs and applied science, Trans Ova has developed and implemented new technologies that, we believe, have helped to move the science of bovine genetic improvement forward. We are evaluating strategic alternatives to determine the optimal means to utilize these technology assets and Trans Ova's broad customer base and deep industry knowledge to maximize the value of the business for our shareholders, including a potential sale of the business, the development of collaborations with third parties, and other strategic opportunities.

COVID-19 Impact

COVID-19 has had and continues to have an extensive impact on the global health and economic environments. Furthermore, there is uncertainty regarding the duration and severity of the ongoing pandemic, and we could experience delays of other pandemic-related events that may adversely impact our clinical as well as preclinical pipeline candidates in the future.

We are also closely monitoring the impact of COVID-19 on all aspects of our businesses. Given the dynamic nature of these circumstances, the full impact of the COVID-19 pandemic on our ongoing business, results of operations, and overall financial performance cannot be reasonably estimated at this time.

The health and safety of our employees is of the utmost importance. We have implemented safety measures in our facilities for the well-being of our employees and visitors. These measures have permitted us to continue to advance our programs, with the ultimate goal of benefiting patients.

For more information regarding the risks associated with COVID-19 and its impact on our business, see "Risk Factors" in Part II - Item 1A.

Discontinued Operations

Historically, we developed technology platforms for application across a variety of diverse end markets, including health, food, energy, and the environment. In January 2020, we announced that we were increasing our focus on our healthcare opportunities, which reflected our most advanced platforms, and in connection therewith, we divested a number of our non-healthcare assets (referred to collectively as the Transactions) and changed our name to Precigen, Inc.

In 2020, as a result of market uncertainty driven by the COVID-19 pandemic and the state of the energy sector raising significant challenges for the strategic alternatives pursued by MBP Titan, LLC, or MBP Titan, our methane bioconversion business, we suspended MBP Titan's operations, preserved certain of MBP Titan's intellectual property, terminated all of its personnel, and undertook steps to dispose of its other assets and obligations. The wind down of MBP Titan's activities was substantially complete by December 31, 2020, with the final disposition of certain property and equipment and the facility operating lease occurring in January 2021. This discontinuation of operations represented the continuation of a strategic shift that we commenced in early 2020 to becoming a primarily healthcare company advancing technologies and products that address complex healthcare challenges. After the wind down of MBP Titan, certain assets and contractual obligations which were originally related to MBP Titan continue to be managed at the Precigen corporate level. These remaining assets and contractual obligations include our equity interests in and collaboration agreements with Intrexon Energy Partners, LLC, or Intrexon Energy Partners, and Intrexon Energy Partners II, LLC, or Intrexon Energy Partners II, including the associated deferred revenue remaining under each collaboration agreement, as well as the associated intellectual property.

See also "Notes to the Condensed Consolidated Financial Statements (Unaudited) - Note 3" appearing elsewhere in this Quarterly Report for additional discussion of our discontinued operations.

See "Notes to the Condensed Consolidated Financial Statements (Unaudited) - Note 4" appearing elsewhere in this Quarterly Report for a discussion of Intrexon Energy Partners and Intrexon Energy Partners II.

Segments

As of March 31, 2022, our reportable segments were (i) Biopharmaceuticals, (ii) Exemplar, and (iii) Trans Ova. These identified reportable segments met the quantitative thresholds to be reported separately for the three months ended March 31, 2022.

Corporate expenses, which are not allocated to the segments and are managed at a consolidated level, include costs associated with general and administrative functions, including our finance, accounting, legal, human resources, information technology, corporate communication, and investor relations functions. Corporate expenses exclude interest expense, depreciation and amortization, gain or loss on disposals of assets, stock-based compensation expense, loss on settlement agreement, and equity in net loss of affiliates. See "Notes to the Condensed Consolidated Financial Statements (Unaudited) - Note 18" appearing elsewhere in this Quarterly Report for a discussion of our reportable segments and Segment Adjusted EBITDA.

Financial overview

We have incurred significant losses since our inception. We anticipate that we may continue to incur significant losses for the foreseeable future, and we may never achieve or maintain profitability. Our historical collaboration and licensing revenues were generated under a business model from which we have gradually transitioned, and we do not expect to expend significant resources servicing our historical collaborations in the future. We may enter into strategic transactions for individual platforms or programs in the future from which we may generate new collaboration and licensing revenues. We continue to generate product and service revenues through our Trans Ova and Exemplar subsidiaries, and in the three months ended March 31, 2022, both of these subsidiaries generated positive Segment Adjusted EBITDA. Products currently in our clinical pipeline will require regulatory approval and/or commercial scale-up before they may commence significant product sales and operating profits.

As we continue our efforts to focus our business and generate additional capital, we may be willing to enter into transactions involving one or more of our operating segments and reporting units for which we have goodwill and intangible assets. These efforts could result in us identifying impairment indicators or recording impairment charges in future periods. In addition, market changes and changes in judgements, assumptions, and estimates that we have made in assessing the fair value of goodwill could cause us to consider some portion or all of certain assets to become impaired.

Sources of revenue

Historically, we have derived our collaboration and licensing revenues through agreements with counterparties for the development and commercialization of products enabled by our technologies. Generally, the terms of these collaborations provide that we receive some or all of the following: (i) technology access fees upon signing; (ii) reimbursements of costs incurred by us for our research and development and/or manufacturing efforts related to specific applications provided for in the collaboration; (iii) milestone payments upon the achievement of specified development, regulatory and commercial activities; and (iv) royalties on sales of products arising from the collaboration.

Our technology access fees and milestone payments may be in the form of cash or securities of the collaborator. Our collaborations contain multiple arrangements, and we typically defer revenues from the technology access fees and milestone payments received and recognize such revenues in the future over the anticipated performance period. We are also entitled to sublicensing revenues in those situations where our collaborators choose to license our technologies to other parties.

As we continue to shift our focus on our healthcare business, we have and may continue to mutually terminate collaboration agreements or repurchase rights to the exclusive fields from collaborators, relieving us of any further performance obligations under the agreement. Upon such circumstances or when we determine no further performance obligations are required of us under an agreement, we may recognize any remaining deferred revenue as either collaboration revenue or as a reduction of operating expense, depending on the circumstances. See "Notes to the Condensed Consolidated Financial Statements (Unaudited) - Note 5" appearing elsewhere in the Quarterly Report for a discussion of changes to our significant collaborations.

We generate product and service revenues primarily through sales of products or services that are created from technologies developed or owned by us. Our primary current revenues arise from Trans Ova and include sales of advanced reproductive technologies, including our bovine embryo transfer and IVF processes and from genetic preservation and sexed semen processes, and applications of such processes to other livestock, as well as sales of livestock and embryos produced using these processes and used in production. Exemplar also generates product and service revenues through the development and sale of genetically engineered miniature swine models. We recognize revenue when control of the promised product is transferred to the customer or when the promised service is completed.

In future periods, in connection with our focus on healthcare, our revenues will primarily depend on our ability to advance and create our own programs and the extent to which we bring products enabled by our technologies to market. Other than for collaboration revenues recognized upon cancellation or modification of an existing collaboration or for revenues generated pursuant to future strategic transactions for any of our existing platforms or programs, we expect our collaboration revenues will continue to decrease in the near term. Our revenues will also depend upon our ability to maintain or improve the volume and pricing of Trans Ova's and Exemplar's current product and service offerings and to develop and scale up production of new offerings from the various technologies of our subsidiaries. As we focus on our healthcare business, we anticipate that our expenses will increase substantially if, and as, we continue to advance the preclinical and clinical development of our existing product candidates and our research programs. We expect a significant period of time could pass before commercialization of our various product candidates or before the achievement of contractual milestones and the realization of royalties on product candidates commercialized under our collaborations and revenues sufficient to achieve profitability. Accordingly, there can be no assurance as to the timing, magnitude, and predictability of revenues to which we might be entitled.

Cost of products and services

Cost of products and services includes primarily labor and related costs, drugs and supplies used primarily in Trans Ova's embryo transfer and IVF processes, livestock and feed used in production, and facility charges, including rent and depreciation. Fluctuations in the price of livestock and feed have not had a significant impact on our operating margins and no derivative financial instruments are used to mitigate the price risk.

Research and development expenses

We recognize research and development expenses as they are incurred. Our research and development expenses consist primarily of:

- salaries and benefits, including stock-based compensation expense, for personnel in research and development functions;
- fees paid to consultants and contract research organizations who perform research on our behalf and under our direction;

- costs related to laboratory supplies used in our research and development efforts and acquiring, developing, and manufacturing preclinical study and clinical trial materials;
- costs related to certain in-licensed technology rights or reacquired in-process research and development;
- amortization of patents and related technologies acquired in mergers and acquisitions; and
- facility-related expenses, which include direct depreciation costs and unallocated expenses for rent and maintenance of facilities and other operating costs.

Our research and development expenses are generally incurred by our reportable segments and primarily relate to either costs incurred to expand or otherwise improve our technologies or the costs incurred to develop our own products and services. Our Biopharmaceuticals segment is progressing preclinical and clinical programs that target urgent and intractable diseases in our core therapeutic areas of immuno-oncology, autoimmune disorders, and infectious diseases, including PRGN-3005, PRGN-3006, PRGN-2009, PRGN-2012, and AG019. Exemplar's research and development activities relate to new and improved pig research models. Trans Ova's research and development activities support new and improved product and service offerings for its customers. The following table summarizes our research and development expenses incurred by reportable segment and reconciles those expenses to research and development expenses on the condensed consolidated statements of operations for the three months ended March 31, 2022 and 2021.

	Three Months Ended March 31,	
	2022	2021
Biopharmaceuticals	$ 11,718	$ 10,063
Exemplar	83	74
Trans Ova	961	385
Total research and development expenses from reportable segments	12,762	10,522
Eliminations	(2)	(1)
Total consolidated research and development expenses	$ 12,760	$ 10,521

The amount of research and development expenses may be impacted by, among other things, the number and nature of our own proprietary programs, and the number and size of programs we may support on behalf of collaboration agreements. We expect that our research and development expenses will increase as we continue to develop our own proprietary programs, including progression of these programs into preclinical and clinical stages. We believe these increases will likely include increased costs paid to consultants and contract research organizations and increased costs related to laboratory supplies.

Research and development expenses may also increase as a result of in-licensing of technologies or ongoing research and development operations that we might assume through mergers and acquisitions.

Selling, general and administrative expenses

Selling, general and administrative, or SG&A, expenses consist primarily of salaries and related costs, including stock-based compensation expense, for employees in executive, operational, finance, information technology, legal, and corporate communications functions. Other significant SG&A expenses include rent and utilities, insurance, accounting, and legal services (including the cost of settling any claims and lawsuits), and expenses associated with obtaining and maintaining our intellectual property.

SG&A expenses may fluctuate in the future depending on the scaling of our corporate functions required to support our corporate initiatives and the outcomes of legal claims and assessments against us.

Other income (expense), net

Interest income consists of interest earned on our cash and cash equivalents and short-term and long-term investments and may fluctuate based on amounts invested and current interest rates.

Interest expense decreased in the current period, and is expected to decrease in future periods upon the adoption of a new accounting standard effective January 1, 2022, which simplified the accounting for the Convertible Notes. See "Notes to the Condensed Consolidated Financial Statements (Unaudited) - Note 2" appearing elsewhere in this Quarterly Report for further discussion.

Equity in net income (loss) of affiliates

Equity in net income or loss of affiliates is our pro-rata share of our equity method investments' operating results, adjusted for accretion of basis difference. We account for investments in our JVs using the equity method of accounting since we have the ability to exercise significant influence, but not control, over the operating activities of these entities.

Segment performance

We use Segment Adjusted EBITDA as our primary measure of segment performance. We define Segment Adjusted EBITDA as net income (loss) before (i) interest expense, (ii) income tax expense or benefit, (iii) depreciation and amortization, (iv) stock-based compensation expense, (v) loss on settlement agreements where noncash consideration is paid, (vi) adjustments for accrued bonuses paid in equity awards, (vii) gain or loss on disposals of assets, (viii) loss on impairment of goodwill and other noncurrent assets, (ix) equity in net loss of affiliates, and (x) recognition of previously deferred revenue associated with upfront and milestone payments as well as cash outflows from capital expenditures and investments in affiliates, but includes proceeds from the sale of assets in the period sold. Corporate expenses are not allocated to the segments and are managed at a consolidated level. See "Notes to the Condensed Consolidated Financial Statements (Unaudited) - Note 18" appearing elsewhere in this Quarterly Report for further discussion of Segment Adjusted EBITDA.

Results of operations

Comparison of the three months ended March 31, 2022 and the three months ended March 31, 2021

The following table summarizes our results of operations for the three months ended March 31, 2022 and 2021, together with the changes in those items in dollars and as a percentage:

	Three Months Ended March 31,		Dollar Change	Percent Change
	2022	2021		
	(In thousands)			
Revenues				
Collaboration and licensing revenues	$ —	$ 66	$ (66)	(100.0)%
Product revenues	8,724	6,381	2,343	36.7 %
Service revenues	23,209	17,931	5,278	29.4 %
Other revenues	88	133	(45)	(33.8)%
Total revenues	32,021	24,511	7,510	30.6 %
Operating expenses				
Cost of products	7,510	5,574	1,936	34.7 %
Cost of services	9,589	7,402	2,187	29.5 %
Research and development	12,760	10,521	2,239	21.3 %
Selling, general and administrative	19,576	18,702	874	4.7 %
Impairment of goodwill	482	—	482	N/A
Total operating expenses	49,917	42,199	7,718	18.3 %
Operating loss	(17,896)	(17,688)	(208)	1.2 %
Total other expense, net	(1,412)	(4,205)	2,793	(66.4)%
Equity in net loss of affiliates	(1)	(3)	2	(66.7)%
Loss from continuing operations before income taxes	(19,309)	(21,896)	2,587	(11.8)%
Income tax benefit	58	52	6	11.5 %
Loss from continuing operations	(19,251)	(21,844)	2,593	(11.9)%
Income from discontinued operations, net of income taxes (1)	—	4,526	(4,526)	(100.0)%
Net loss	$ (19,251)	$ (17,318)	$ (1,933)	11.2 %

(1) See "Notes to the Condensed Consolidated Financial Statements (Unaudited) - Note 3" appearing elsewhere in this Quarterly Report.

Product revenues and gross margin

Product revenues increased $2.3 million, or 37%, over the three months ended March 31, 2021. The increase in product revenue was primarily due to higher customer demand for animals as a result of stronger beef and dairy industries in the current year. Gross margin on products improved in the current period as a result of the increased revenues and increased focus on selling higher margin products.

Service revenues and gross margin

Service revenues increased $5.3 million, or 29%, over the three months ended March 31, 2021. Trans Ova's revenues improved primarily due to an increase in services performed as a result of higher customer demand as the beef and dairy industries have been stronger in the current year and a change in pricing structure with certain customers. Additionally, Exemplar's service revenues improved in the current period due to an increase in services performed resulting from a higher demand from existing and new customers as well as a combination of price increases and a change in the pricing structure with certain customers. Gross margin on services remained comparable to the prior year as increased revenues were offset by increased costs for supplies, drugs, and personnel costs.

Research and development expenses

Research and development expenses increased $2.2 million, or 21%, over the three months ended March 31, 2021. Contract research organization costs and lab supplies increased $1.6 million with the advancement of our clinical and preclinical programs.

Selling, general and administrative expenses

SG&A expenses increased $0.9 million, or 5%, over the three months ended March 31, 2021. Professional fees increased $1.6 million, primarily due to increased legal fees associated with certain litigation matters. This increase was partially offset with a decrease in salaries, benefits, and other personnel costs of $1.3 million primarily due to reduced stock compensation in 2022 and reduced head count.

Total other expense, net

Total other expense, net, is comprised primarily of interest expense associated with our Convertible Notes issued July 2018. The current period decrease is primarily due to the adoption of a new accounting standard effective January 1, 2022 noted above, which simplified the accounting for the Convertible Notes and reduced non-cash interest expense.

Segment performance

The following table summarizes Segment Adjusted EBITDA, which is our primary measure of segment performance, for the three months ended March 31, 2022 and 2021, for each of our reportable segments as well as unallocated corporate costs.

	Three Months Ended March 31,		Dollar Change	Percent Change
	2022	2021		
	(In thousands)			
Segment Adjusted EBITDA:				
Biopharmaceuticals	$ (11,620)	$ (8,854)	$ (2,766)	(31.2)%
Exemplar	3,558	1,806	1,752	97.0 %
Trans Ova	5,397	6,421	(1,024)	(15.9)%
Unallocated corporate costs	(10,060)	(8,194)	(1,866)	22.8 %

For a reconciliation of Segment Adjusted EBITDA to net loss from continuing operations before income taxes, see "Notes to the Condensed Consolidated Financial Statements (Unaudited) - Note 18" appearing elsewhere in this Quarterly Report.

The following table summarizes revenues from external customers for the three months ended March 31, 2022 and 2021, for each of our reportable segments.

	Three Months Ended March 31,		Dollar Change	Percent Change
	2022	2021		
	(In thousands)			
Biopharmaceuticals	$ 84	$ 178	$ (94)	(52.8)%
Exemplar	5,429	3,257	2,172	66.7 %
Trans Ova	26,508	21,076	5,432	25.8 %

Biopharmaceuticals

Segment Adjusted EBITDA declined as we had increased costs associated with the advancement of our clinical and preclinical programs.

Exemplar

Revenues for Exemplar increased due to an increase in services performed resulting from a higher demand from existing and new customers. The improvement in Segment Adjusted EBITDA was primarily due to the increased revenues.

Trans Ova

Revenues for Trans Ova increased primarily due to (i) higher customer demand for pregnant cows, (ii) more procedures performed as a result of stronger beef and dairy industries in the current year, and (iii) a change in the pricing structure with certain customers. Segment Adjusted EBITDA declined due to (i) increased costs for supplies and drugs, (ii) increased costs for certain legal matters, and (iii) increased salaries, benefits, and other personnel costs.

Unallocated Corporate Costs

Unallocated corporate costs increased primarily due to increased professional fees including legal fees associated with certain litigation matters.

Liquidity and capital resources

Sources of liquidity

We have incurred losses from operations since our inception, and as of March 31, 2022, we had an accumulated deficit of $1.9 billion. From our inception through March 31, 2022, we have funded our operations principally with proceeds received from private and public equity and debt offerings, cash received from our collaborators, and through product and service sales made directly to customers. As of March 31, 2022, we had cash and cash equivalents of $40.3 million and short-term and long-term investments of $101.7 million. Cash in excess of immediate requirements is typically invested primarily in money market funds and U.S. government debt securities in order to maintain liquidity and preserve capital.

We currently generate cash receipts primarily from sales of products and services and from strategic transactions.

Trans Ova is subject to certain restrictive covenants under its line of credit, which matured on April 1, 2022, which is discussed in "Notes to the Condensed Consolidated Financial Statements (Unaudited) - Note 11" appearing elsewhere in this Quarterly Report. As of March 31, 2022, Trans Ova was in compliance with these debt covenants.

Cash flows

The following table sets forth the significant sources and uses of cash for the periods set forth below:

	Three Months Ended March 31,	
	2022	2021
	(In thousands)	
Net cash provided by (used in):		
Operating activities	$ (18,783)	$ (16,384)
Investing activities	16,568	(129,102)
Financing activities	(163)	121,040
Effect of exchange rate changes on cash, cash equivalents, and restricted cash	(230)	(11)
Net decrease in cash, cash equivalents, and restricted cash	$ (2,608)	$ (24,457)

Cash flows from operating activities:

During the three months ended March 31, 2022, our net loss was $19.3 million, which includes the following significant noncash expenses totaling $7.5 million from continuing operations: (i) $3.6 million of stock-based compensation expense, (ii) $3.3 million of depreciation and amortization expense, and (iii) $0.6 million of shares issued as payment for services.

During the three months ended March 31, 2021, our net loss was $17.3 million, which includes the following significant noncash expenses totaling $12.3 million from both continuing and discontinued operations: (i) $5.4 million of stock-based compensation expense, (ii) $3.5 million of depreciation and amortization expense, (iii) $2.8 million accretion of debt discount and amortization of deferred financing costs, and (iv) $0.6 million of shares issued as payment for services. These expenses were partially offset by a $4.6 million noncash gain recognized upon the termination of our MBP Titan facility lease in January 2021.

Our cash outflows from operations during the three months ended March 31, 2022 increased $2.4 million from the three months ended March 31, 2021 primarily due to increased costs associated with the advancement of our clinical and preclinical programs.

Cash flows from investing activities:

During the three months ended March 31, 2022, we received $18.0 million of proceeds from maturities of investments.

During the three months ended March 31, 2021, we purchased $133.7 million of investments, net of maturities, primarily using the proceeds received from the underwritten public offering discussed below.

Cash flows from financing activities:

During the three months ended March 31, 2022, we made payments of long-term debt of $0.2 million.

During the three months ended March 31, 2021, we received $121.0 million proceeds from the sale of our common stock in an underwritten public offering.

Future capital requirements

We believe our existing liquid assets will enable us to fund our operating expenses and capital requirements for at least the next 12 months. Our future capital requirements will depend on many factors, including:

- progress in our research and development programs, as well as the magnitude of these programs;
- any delays or potential delays to our clinical trials as a result of the COVID-19 pandemic;
- the timing of regulatory approval of our product candidates and those of our collaborations;
- the timing, receipt, and amount of any payments received in connection with strategic transactions;
- the timing, receipt, and amount of upfront, milestone, and other payments, if any, from present and future collaborators, if any;
- the timing, receipt, and amount of sales and royalties, if any, from our product candidates;
- the timing and capital requirements to scale up our various product candidates and service offerings and customer acceptance thereof;
- our ability to maintain and establish additional collaborative arrangements and/or new strategic initiatives;
- the resources, time, and cost required for the preparation, filing, prosecution, maintenance, and enforcement of our intellectual property portfolio;
- strategic mergers and acquisitions, if any, including both the upfront acquisition cost as well as the cost to integrate, maintain, and expand the strategic target;
- the costs associated with legal activities, including litigation, arising in the course of our business activities and our ability to prevail in any such legal disputes; and
- the effects, duration, and severity of the ongoing COVID-19 pandemic and the actions we have taken or may take in response, any of which could significantly impact our business, operations, and financial results.

Until such time, if ever, as we can regularly generate positive operating cash flows, we plan to finance our cash needs through a combination of equity offerings, debt financings, government, or other third-party funding, strategic alliances, sales of assets, and licensing arrangements. As the COVID-19 pandemic continues to negatively impact the economy, our future access to capital on favorable terms may be materially impacted. We may not be able to raise sufficient additional funds on terms that are favorable to us, if at all. To the extent that we raise additional capital through the sale of equity or convertible debt securities,

the ownership interests of our common shareholders will be diluted, and the terms of these securities may include liquidation or other preferences that adversely affect the rights of our common shareholders. Our current stock price may make it more difficult to pursue equity financings and lead to substantial dilution if the price of our common stock does not increase. Debt financing, if available, may involve agreements that include covenants limiting or restricting our ability to take specific actions, such as incurring additional debt, making capital expenditures, or declaring dividends. If we raise additional funds through strategic transactions, collaborations, or licensing arrangements with third parties, we may have to relinquish valuable rights to our technologies, future revenue streams, research programs, or product candidates, or to grant licenses on terms that may not be favorable to us.

We are subject to a number of risks similar to those of other companies conducting high-risk, early-stage research and development of product candidates. Principal among these risks are dependence on key individuals and intellectual property, competition from other products and companies, and the technical risks associated with the successful research, development, and clinical manufacturing of its product candidates. Our success is dependent upon our ability to continue to raise additional capital in order to fund ongoing research and development, adequately satisfy or renegotiate long-term debt obligations, obtain regulatory approval of our products, successfully commercialize our products, generate revenue, meet our obligations, and, ultimately, attain profitable operations. Our ability to achieve what is necessary for our success may be negatively impacted by the uncertainty caused by the COVID-19 pandemic.

See the section entitled "Risk Factors" in our Annual Report for additional risks associated with our substantial capital requirements.

Contractual obligations and commitments

The following table summarizes our significant contractual obligations and commitments from continuing operations as of March 31, 2022 and the effects such obligations are expected to have on our liquidity and cash flows in future periods:

	Total	Less Than 1 Year	1 - 3 Years	3 - 5 Years	More Than 5 Years
			(In thousands)		
Operating leases	$ 15,838	$ 2,718	$ 5,035	$ 3,788	$ 4,297
Convertible debt (1)	200,000	—	200,000	—	—
Cash interest payable on convertible debt	10,500	7,000	3,500	—	—
Long-term debt, excluding convertible debt	3,105	355	752	814	1,184
Total	$ 229,443	$ 10,073	$ 209,287	$ 4,602	$ 5,481

(1) See "Notes to the Condensed Consolidated Financial Statements (Unaudited) - Notes 11" appearing elsewhere in this Quarterly Report for further discussion of our convertible debt.

In addition to the obligations in the table above, as of March 31, 2022 we also have the following significant contractual obligations described below.

In conjunction with the formation of our JVs, we committed to making future capital contributions subject to certain conditions and limitations. As of March 31, 2022, our remaining capital contribution commitments to our JVs were $14.2 million. These future capital contributions are not included in the table above due to the uncertainty of the timing and amounts of such contributions.

We are party to in-licensed research and development agreements with various academic and commercial institutions where we could be required to make future payments for annual maintenance fees as well as for milestones and royalties we might receive upon commercial sales of products that incorporate their technologies. These agreements are generally subject to termination by us and therefore no amounts are included in the tables above. As of March 31, 2022, we also had research and development commitments with third parties totaling $22.7 million that had not yet been incurred.

Net operating losses

As of March 31, 2022, we had net operating loss carryforwards of approximately $861.0 million for U.S. federal income tax purposes available to offset future taxable income, including $609.0 million generated after 2017, U.S. capital loss carryforwards of $212.5 million, and U.S. federal and state research and development tax credits of approximately $11.3 million, prior to consideration of annual limitations that may be imposed under Section 382 of the Internal Revenue Code of 1986, as amended, or Section 382. Net operating loss carryforwards generated prior to 2018 have begun to expire in 2022, and capital loss carryforwards will expire if unutilized beginning in 2024. Our foreign subsidiaries included in continuing operations have foreign loss carryforwards of approximately $74.2 million, most of which do not expire. Excluding certain deferred tax liabilities totaling $2.4 million, our remaining net deferred tax assets, which primarily relate to these loss carryforwards, are offset by a valuation allowance due to our history of net losses.

As a result of our past issuances of stock, as well as due to prior mergers and acquisitions, certain of our net operating losses have been subject to limitations pursuant to Section 382. As of March 31, 2022, Precigen has utilized all net operating losses subject to Section 382 limitations, other than those losses inherited via acquisitions. As of March 31, 2022, approximately $42.1 million of available domestic net operating losses were inherited via acquisitions and are limited based on the value of the target at the time of the transaction. Future changes in stock ownership may also trigger an ownership change and, consequently, a Section 382 limitation.

Off-balance sheet arrangements

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

Critical accounting policies and estimates

Our management's discussion and analysis of our financial condition and results of operations is based on our condensed consolidated financial statements, which we have prepared in accordance with generally accepted accounting principles in the United States. The preparation of these condensed consolidated financial statements requires us to make estimates and assumptions that affect the reported amounts of assets and liabilities and the disclosure of contingent assets and liabilities at the date of the financial statements, as well as the reported revenues and expenses during the reporting periods. We evaluate these estimates and judgments on an ongoing basis. We base our estimates on historical experience and on various other factors that we believe are reasonable under the circumstances, the results of which form the basis for making judgments about the carrying value of assets and liabilities that are not readily apparent from other sources. Our actual results may differ from these estimates under different assumptions or conditions.

There have been no material changes to our critical accounting policies from those described in "Management's Discussion and Analysis of Financial Condition and Results of Operations" included in our Annual Report.

Recent accounting pronouncements

For information with respect to recent accounting pronouncements and the impact of these pronouncements on our condensed consolidated financial statements, see "Notes to the Condensed Consolidated Financial Statements (Unaudited) - Note 2" appearing elsewhere in this Quarterly Report.

Item 3. Quantitative and Qualitative Disclosures About Market Risk

The following sections provide quantitative information on our exposure to interest rate risk. We make use of sensitivity analyses that are inherently limited in estimating actual losses in fair value that can occur from changes in market conditions.

Interest rate risk

We had cash, cash equivalents and short-term and long-term investments of $142.1 million and $163.7 million as of March 31, 2022 and December 31, 2021, respectively. Our cash and cash equivalents and short-term and long-term investments consist of cash, money market funds, U.S. government debt securities, and certificates of deposit. The primary objectives of our investment activities are to preserve principal, maintain liquidity, and maximize income without significantly increasing risk. Our investments consist of U.S. government debt securities and certificates of deposit, which may be subject to market risk due to changes in prevailing interest rates that may cause the fair values of our investments to fluctuate. We believe that a

hypothetical 100 basis point increase in interest rates would not materially affect the fair value of our interest-sensitive financial instruments and any such losses would only be realized if we sold the investments prior to maturity.

Item 4. Controls and Procedures

Pursuant to Rule 13a-15(b) under the Securities Exchange Act of 1934, as amended (the "Exchange Act"), we carried out an evaluation, under supervision and with the participation of our management, including our Chief Executive Officer ("CEO"), who is our principal executive officer, and our Chief Financial Officer ("CFO"), who is our principal financial officer, of the effectiveness of the design and operation of our disclosure controls and procedures (as defined under Rule 13a-15(e) and 15d-15(e) under the Exchange Act) as of the end of the period covered by this report. Based upon that evaluation, as of the end of the period covered by this report, our CEO and CFO concluded that our disclosure controls and procedures are effective at the reasonable assurance level to ensure that information required to be disclosed by us in the reports that we file or submit under the Exchange Act, is recorded, processed, summarized and reported, within the time periods specified in the SEC's rules and forms, and that such information is accumulated and communicated to our management, including our CEO and CFO, as appropriate, to allow timely decisions regarding required disclosure.

There has been no change in our internal control over financial reporting during the three months ended March 31, 2022, that has materially affected, or is reasonably likely to materially affect, our internal control over financial reporting.

PART II. OTHER INFORMATION

Item 1. Legal Proceedings

In the course of our business, we are involved in litigation or legal matters, including governmental investigations. Such matters are subject to many uncertainties and outcomes are not predictable with assurance. We accrue liabilities for such matters when it is probable that future expenditures will be made and such expenditures can be reasonably estimated. As of March 31, 2022, we do not believe that any such matters, individually or in the aggregate, will have a material adverse effect on our business, financial condition, results of operations, or cash flows.

See "Notes to the Condensed Consolidated Financial Statements (Unaudited) - Note 16" appearing elsewhere in this Quarterly Report for further discussion of ongoing legal matters.

Item 1A. Risk Factors

As disclosed in "Summary of Risk Factors" and "Item 1A. Risk Factors" in our Annual Report, there are a number of risks and uncertainties that may have a material effect on the operating results of our business and our financial condition. There are no additional material updates or changes to our risk factors since the filing of our Annual Report.

In evaluating our risks, readers also should carefully consider the risk factors discussed in our Annual Report, which could materially affect our business, financial condition, or operating results, in addition to the other information set forth in this report and in our other filings with the SEC.

Item 2. Unregistered Sales of Equity Securities and Use of Proceeds

None.

Item 3. Defaults on Senior Securities

None.

Item 4. Mine Safety Disclosures

Not applicable.

Item 5. Other Information

None.

Item 6. Exhibits

Exhibit No.	Description
31.1	Certification of Helen Sabzevari, Chief Executive Officer (Principal Executive Officer) of the Company, pursuant to Rules 13a-14(a) and 15d-14(a) promulgated under the Securities Exchange Act of 1934, as amended, as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.
31.2	Certification of Harry Thomasian Jr., Chief Financial Officer (Principal Financial Officer) of the Company, pursuant to Rules 13a-14(a) and 15d-14(a) promulgated under the Securities Exchange Act of 1934, as amended, as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.
32.1**	Certification of Helen Sabzevari, Chief Executive Officer (Principal Executive Officer) of the Company, pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.
32.2**	Certification of Harry Thomasian Jr., Chief Financial Officer (Principal Financial Officer) of the Company, pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.
101**	Interactive Data File (Quarterly Report on Form 10-Q, for the quarterly period ended March 31, 2022, formatted in Inline XBRL (eXtensible Business Reporting Language)). Attached as Exhibit 101.0 to this Quarterly Report on Form 10-Q are the following documents formatted in XBRL: (i) the Condensed Consolidated Balance Sheets as of March 31, 2022 and December 31, 2021, (ii) the Condensed Consolidated Statements of Operations for the three months ended March 31, 2022 and 2021, (iii) the Condensed Consolidated Statements of Comprehensive Loss for the three months ended March 31, 2022 and 2021, (iv) the Condensed Consolidated Statements of Shareholders' Equity for the three months ended March 31, 2022 and 2021, (v) the Condensed Consolidated Statements of Cash Flows for the three months ended March 31, 2022 and 2021, and (vi) the Notes to the Condensed Consolidated Financial Statements.
104**	Cover Page Interactive Data File (embedded within the Inline XBRL document).

** Furnished herewith.

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.

Precigen, Inc.
(Registrant)

Date: May 9, 2022

By: /s/ HARRY THOMASIAN JR.
Harry Thomasian Jr.
Chief Financial Officer
(Principal Financial and Accounting Officer)

Exhibit 31.1

CERTIFICATION OF PRINCIPAL EXECUTIVE OFFICER PURSUANT TO SECTION 302 OF THE SARBANES-OXLEY ACT OF 2002

I, Helen Sabzevari, certify that:

1. I have reviewed this Quarterly Report on Form 10-Q of Precigen, 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 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 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: May 9, 2022

/s/ HELEN SABZEVARI
Helen Sabzevari
Chief Executive Officer
(Principal Executive Officer)

Exhibit 31.2

CERTIFICATION OF PRINCIPAL FINANCIAL OFFICER PURSUANT TO SECTION 302 OF THE SARBANES-OXLEY ACT OF 2002

I, Harry Thomasian Jr., certify that:

1. I have reviewed this Quarterly Report on Form 10-Q of Precigen, 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 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 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: May 9, 2022

/s/ HARRY THOMASIAN JR.
Harry Thomasian Jr.
Chief Financial Officer
(Principal Financial Officer)

Exhibit 32.1

CERTIFICATION PURSUANT TO
18 U.S.C. SECTION 1350
AS ADOPTED PURSUANT TO SECTION 906
OF THE SARBANES-OXLEY ACT OF 2002

I, Helen Sabzevari, Chief Executive Officer of Precigen, Inc. (the "Company"), do hereby certify, pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that to the best of my knowledge:

- the Quarterly Report on Form 10-Q of the Company for the quarter ended March 31, 2022 (the "Report") fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934; and

- the information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

Date: May 9, 2022

/s/ HELEN SABZEVARI
Helen Sabzevari
Chief Executive Officer
(Principal Executive Officer)

A signed original of this written statement required by Section 906, or other document authenticating, acknowledging or otherwise adopting the signature that appears in typed form within the electronic version of this written statement required by Section 906, has been provided to the Company and will be retained by the Company and furnished to the Securities and Exchange Commission or its staff upon request.

This certification accompanies the Form 10-Q to which it relates, is not deemed filed with the Securities and Exchange Commission and is not to be incorporated by reference into any filing of the Registrant under the Securities Act of 1933 or the Securities Exchange Act of 1934 (whether made before or after the date of the Form 10-Q), irrespective of any general incorporation language contained in such filing.

Exhibit 32.2

CERTIFICATION PURSUANT TO
18 U.S.C. SECTION 1350
AS ADOPTED PURSUANT TO SECTION 906
OF THE SARBANES-OXLEY ACT OF 2002

I, Harry Thomasian Jr., Chief Financial Officer of Precigen, Inc. (the "Company"), do hereby certify, pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that to the best of my knowledge:

- the Quarterly Report on Form 10-Q of the Company for the quarter ended March 31, 2022 (the "Report") fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934; and

- the information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

Date: May 9, 2022

/s/ HARRY THOMASIAN JR.
Harry Thomasian Jr.
Chief Financial Officer
(Principal Financial Officer)

A signed original of this written statement required by Section 906, or other document authenticating, acknowledging or otherwise adopting the signature that appears in typed form within the electronic version of this written statement required by Section 906, has been provided to the Company and will be retained by the Company and furnished to the Securities and Exchange Commission or its staff upon request.

This certification accompanies the Form 10-Q to which it relates, is not deemed filed with the Securities and Exchange Commission and is not to be incorporated by reference into any filing of the Registrant under the Securities Act of 1933 or the Securities Exchange Act of 1934 (whether made before or after the date of the Form 10-Q), irrespective of any general incorporation language contained in such filing.