

UNITED STATES  
SECURITIES AND EXCHANGE COMMISSION  
Washington, DC 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, 2024

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: 001-37937

**XENETIC BIOSCIENCES, INC.**

(Exact name of registrant as specified in its charter)

Nevada  
(State or other jurisdiction of  
incorporation or organization)

45-2952962  
(IRS Employer  
Identification No.)

945 Concord Street  
Framingham, Massachusetts 01701  
(Address of principal executive offices and zip code)

781-778-7720  
(Registrant's telephone number, including area code)

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

Title of each class	Trading Symbol(s)	Name of each exchange on which registered
Common Stock, \$0.001 par value per share	XBIO	The Nasdaq Stock Market
Purchase Warrants	XBIOW	The Nasdaq Stock 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	<input type="checkbox"/>	Accelerated filer	<input type="checkbox"/>
Non-accelerated filer	<input checked="" type="checkbox"/>	Smaller reporting company	<input checked="" type="checkbox"/>
		Emerging growth company	<input type="checkbox"/>

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 May 3, 2024, the number of outstanding shares of the registrant's common stock was 1,540,684.

**XENETIC BIOSCIENCES, INC.**  
**FORM 10-Q**  
**QUARTERLY PERIOD ENDED MARCH 31, 2024**

**PART I** [\*\*FINANCIAL INFORMATION\*\*](#)

Item 1	<a href="#">Condensed Consolidated Financial Statements:</a>	3
	<a href="#">Condensed Consolidated Balance Sheets as of March 31, 2024 (Unaudited) and December 31, 2023</a>	3
	<a href="#">Condensed Consolidated Statements of Operations (Unaudited) for the three months ended March 31, 2024 and 2023</a>	4
	<a href="#">Condensed Consolidated Statements of Stockholders' Equity (Unaudited) for the three months ended March 31, 2024 and 2023</a>	5
	<a href="#">Condensed Consolidated Statements of Cash Flows (Unaudited) for the three months ended March 31, 2024 and 2023</a>	6
	<a href="#">Notes to Condensed Consolidated Financial Statements (Unaudited)</a>	7

Item 2	<a href="#">Management's Discussion and Analysis of Financial Condition and Results of Operations</a>	13
Item 3	<a href="#">Quantitative and Qualitative Disclosures About Market Risk</a>	18
Item 4	<a href="#">Controls and Procedures</a>	18
<b>PART II</b>	<b><a href="#">OTHER INFORMATION</a></b>	
Item 1	<a href="#">Legal Proceedings</a>	19
Item 1A	<a href="#">Risk Factors</a>	19
Item 2	<a href="#">Unregistered Sales of Equity Securities and Use of Proceeds</a>	19
Item 3	<a href="#">Defaults Upon Senior Securities</a>	19
Item 4	<a href="#">Mine Safety Disclosures</a>	19
Item 5	<a href="#">Other Information</a>	19
Item 6	<a href="#">Exhibits</a>	19
	<a href="#">Signatures</a>	20

## PART I – FINANCIAL INFORMATION

### ITEM 1 - FINANCIAL STATEMENTS

#### XENETIC BIOSCIENCES, INC. CONDENSED CONSOLIDATED BALANCE SHEETS

	March 31, 2024 (Unaudited)	December 31, 2023
<b>ASSETS</b>		
Current assets:		
Cash	\$ 7,823,701	\$ 8,983,046
Prepaid expenses and other	552,043	603,828
Total current assets	8,375,744	9,586,874
Other assets	1,018,352	1,018,352
Total assets	<u>\$ 9,394,096</u>	<u>\$ 10,605,226</u>
<b>LIABILITIES AND STOCKHOLDERS' EQUITY</b>		
Current liabilities:		
Accounts payable	\$ 210,483	\$ 240,832
Accrued expenses and other current liabilities	506,011	568,753
Total current liabilities	716,494	809,585
Total liabilities	<u>716,494</u>	<u>809,585</u>
Commitments and contingencies		
Stockholders' equity:		
Preferred stock, 10,000,000 shares authorized		
Series B, \$0.001 par value: 1,804,394 shares issued and outstanding as of March 31, 2024 and December 31, 2023	1,804	1,804
Common stock, \$0.001 par value; 10,000,000 shares authorized as of March 31, 2024 and December 31, 2023; 1,543,385 shares issued as of March 31, 2024 and December 31, 2023; 1,540,684 shares outstanding as of March 31, 2024 and December 31, 2023	1,544	1,544
Additional paid in capital	208,131,009	208,053,935
Accumulated deficit	(194,429,309)	(193,234,196)
Accumulated other comprehensive income	253,734	253,734
Treasury stock	(5,281,180)	(5,281,180)
Total stockholders' equity	<u>8,677,602</u>	<u>9,795,641</u>
Total liabilities and stockholders' equity	<u>\$ 9,394,096</u>	<u>\$ 10,605,226</u>

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

**XENETIC BIOSCIENCES, INC.**  
**CONDENSED CONSOLIDATED STATEMENTS OF OPERATIONS**  
(Unaudited)

	<b>Three Months Ended March 31,</b>	
	<b>2024</b>	<b>2023</b>
Revenue:		
Royalty revenue	\$ 510,817	\$ 605,844
Total revenue	<u>510,817</u>	<u>605,844</u>
Operating costs and expenses:		
Research and development	(944,321)	(595,276)
General and administrative	(834,910)	(925,743)
Total operating costs and expenses	<u>(1,779,231)</u>	<u>(1,521,019)</u>
Loss from operations	<u>(1,268,414)</u>	<u>(915,175)</u>
Other income:		
Other income	52	4,520
Interest income, net	73,249	54,101
Total other income	<u>73,301</u>	<u>58,621</u>
Net loss	<u>\$ (1,195,113)</u>	<u>\$ (856,554)</u>
Basic and diluted loss per share	<u>\$ (0.78)</u>	<u>\$ (0.56)</u>
Weighted-average shares of common stock outstanding, basic and diluted	<u>1,540,684</u>	<u>1,516,659</u>

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

**XENETIC BIOSCIENCES, INC.**  
**CONDENSED CONSOLIDATED STATEMENTS OF STOCKHOLDERS' EQUITY**  
(Unaudited)

**THREE MONTHS ENDED MARCH 31, 2024**

	Preferred Stock		Common Stock				Accumulated		
	Number of	Par	Number of	Par	Additional	Accumulated	Other	Treasury	Total
	Shares	Value	Shares	Value	Paid in	Deficit	Comprehensive	Stock	Stockholders'
		(\$0.001)		(\$0.001)	Capital		Income		Equity
Balance as of January 1, 2024	1,804,394	\$ 1,804	1,543,385	\$ 1,544	\$208,053,935	\$(193,234,196)	\$ 253,734	\$(5,281,180)	\$ 9,795,641
Share-based expense	—	—	—	—	77,074	—	—	—	77,074
Net loss	—	—	—	—	—	(1,195,113)	—	—	(1,195,113)
Balance as of March 31, 2024	1,804,394	\$ 1,804	1,543,385	\$ 1,544	\$208,131,009	\$(194,429,309)	\$ 253,734	\$(5,281,180)	\$ 8,677,602

**THREE MONTHS ENDED MARCH 31, 2023**

	Preferred Stock		Common Stock				Accumulated		
	Number of	Par	Number of	Par	Additional	Accumulated	Other	Treasury	Total
	Shares	Value	Shares	Value	Paid in	Deficit	Comprehensive	Stock	Stockholders'
		(\$0.001)		(\$0.001)	Capital		Income		Equity
Balance as of January 1, 2023	2,774,394	\$ 2,774	1,519,360	\$ 1,520	\$207,769,904	\$(189,099,618)	\$ 253,734	\$(5,281,180)	\$ 13,647,134
Share-based expense	—	—	—	—	68,852	—	—	—	68,852
Net loss	—	—	—	—	—	(856,554)	—	—	(856,554)
Balance as of March 31, 2023	2,774,394	\$ 2,774	1,519,360	\$ 1,520	\$207,838,756	\$(189,956,172)	\$ 253,734	\$(5,281,180)	\$ 12,859,432

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

**XENETIC BIOSCIENCES, INC.**  
**CONDENSED CONSOLIDATED STATEMENTS OF CASH FLOWS**  
**(Unaudited)**

	<b>Three Months Ended March 31,</b>	
	<b>2024</b>	<b>2023</b>
<b>CASH FLOWS FROM OPERATING ACTIVITIES:</b>		
Net loss	\$ (1,195,113)	\$ (856,554)
Adjustments to reconcile net loss to net cash used in operating activities:		
Share-based expense	77,074	68,852
Changes in operating assets and liabilities:		
Prepaid expenses and other	51,785	(320,445)
Other assets	—	222,500
Accounts payable, accrued expenses and other liabilities	(93,091)	(216,791)
Net cash used in operating activities	<u>(1,159,345)</u>	<u>(1,102,438)</u>
Net change in cash	(1,159,345)	(1,102,438)
Cash at beginning of period	8,983,046	13,097,265
Cash at end of period	<u>\$ 7,823,701</u>	<u>\$ 11,994,827</u>
<b>SUPPLEMENTAL CASH FLOW INFORMATION:</b>		
Cash paid for interest	<u>\$ —</u>	<u>\$ —</u>

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

**XENETIC BIOSCIENCES, INC.**  
**NOTES TO CONDENSED CONSOLIDATED FINANCIAL STATEMENTS**  
**(Unaudited)**

**1. The Company**

**Background**

Xenetic Biosciences, Inc. ("Xenetic" or the "Company"), incorporated in the state of Nevada and based in Framingham, Massachusetts, is a biopharmaceutical company focused on advancing innovative immune-oncology technologies addressing hard to treat cancers. The Company's proprietary Deoxyribonuclease ("DNase") platform is designed to improve outcomes of existing treatments, including immunotherapies, by targeting neutrophil extracellular traps ("NETs"), which have been implicated in cancer progression and resistance to cancer treatments. Xenetic is currently focused on advancing its systemic DNase program into the clinic as an adjunctive therapy for pancreatic carcinoma and locally advanced or metastatic solid tumors. Additionally, Xenetic has partnered with biotechnology and pharmaceutical companies to develop its proprietary drug delivery platform, PolyXen<sup>®</sup>, and receives royalty payments under an exclusive license arrangement in the field of blood coagulation disorders.

As used in this Quarterly Report on Form 10-Q ("Quarterly Report"), unless otherwise indicated, all references herein to "Xenetic," the "Company," "we" or "us" refer to Xenetic Biosciences, Inc. and its wholly-owned subsidiaries.

The Company, directly or indirectly, through its wholly-owned subsidiaries, Hesperix S.A. ("Hesperix") and Xenetic Biosciences (U.K.) Limited ("Xenetic UK"), and the wholly-owned subsidiaries of Xenetic UK, Lipoxen Technologies Limited ("Lipoxen"), Xenetic Bioscience, Incorporated and SymbioTec, GmbH ("SymbioTec"), own various United States ("U.S.") federal trademark registrations and applications along with unregistered trademarks and service marks, including but not limited to XCART<sup>™</sup>, OncoHist<sup>™</sup>, PolyXen, ErepoXen<sup>™</sup>, and ImuXen<sup>™</sup>, which may be used throughout this Quarterly Report. All other company and product names may be trademarks of the respective companies with which they are associated.

**Going Concern and Management's Plan**

Management evaluates whether there are conditions or events, considered in the aggregate, that raise substantial doubt about the Company's ability to continue as a going concern within one year after the date that the financial statements are issued. The Company has incurred substantial losses since its inception and expects to continue to incur operating losses in the near-term. These factors raise substantial doubt about its ability to continue as a going concern. The Company believes that it has access to capital resources through possible public or private equity offerings, debt financings, corporate collaborations, related party funding, or other means to continue as a going concern. The Company believes that its existing resources will be adequate to fund the Company's operations for a period of at least twelve months from the date of the issuance of these financial statements. However, the Company anticipates it may need additional capital in the long-term to pursue its business initiatives. The terms, timing and extent of any future financing will depend upon several factors, including the achievement of progress in its product development programs, its ability to identify and enter into licensing or other strategic arrangements, its continued listing on the Nasdaq Stock Market ("Nasdaq"), and factors related to financial, economic, geo-political, industry and market conditions, many of which are beyond its control. The capital markets for the biotech industry can be highly volatile, which make the terms, timing and extent of any future financing uncertain.

**2. Risks and Uncertainties**

## **Impact of Global Conflicts on Operations**

The short and long-term implications of Russia's invasion of Ukraine and conflict in the Middle East are difficult to predict at this time. The imposition of current and future sanctions and counter sanctions may have an adverse effect on the economic markets generally and could impact our business, financial condition, and results of operations.

## **3. Summary of Significant Accounting Policies**

### ***Preparation of Interim Financial Statements***

The accompanying condensed consolidated interim financial statements were prepared by the Company pursuant to the rules and regulations of the Securities and Exchange Commission ("SEC") and, in the opinion of management, include all normal and recurring adjustments necessary to present fairly the results of the interim periods shown. Certain information and footnote disclosures normally included in financial statements prepared in accordance with U.S. generally accepted accounting principles have been condensed or omitted pursuant to such SEC rules and regulations. Management believes that the disclosures made are adequate to make the information presented not misleading. The results for the interim periods are not necessarily indicative of results for the full year. The condensed consolidated financial statements contained herein should be read in conjunction with the consolidated financial statements and notes thereto included in the Company's Annual Report on Form 10-K for the year ended December 31, 2023 filed with the SEC on March 21, 2024, and amended on April 26, 2024.

On May 15, 2023, the Company effected a reduction, on a 1-for-10 basis, in its authorized common stock, par value \$0.001, along with a corresponding and proportional decrease in the number of shares issued and outstanding (the "Reverse Stock Split"). On the effective date of the Reverse Stock Split, (i) every 10 shares of common stock were reduced to one share of common stock, with any fractional amounts rounded up to one share; (ii) the number of shares of common stock into which each outstanding warrant, restricted stock unit, or option to purchase common stock was convertible into was proportionately reduced on the same basis as the common stock; (iii) the exercise price of each outstanding warrant or option to purchase common stock was proportionately increased on a 1-to-10 basis; and (iv) the number of shares of common stock into which each share of preferred stock was convertible into was proportionately reduced on the same basis as the common stock. Unless otherwise indicated, all of the share numbers, share prices, and exercise prices have been adjusted in this Quarterly Report, on a retroactive basis, to reflect this 1-for-10 Reverse Stock Split.

### ***Principles of Consolidation***

The condensed consolidated financial statements of the Company include the accounts of Hesperix, Xenetic UK and Xenetic UK's wholly owned subsidiaries: Lipoxen, Xenetic Bioscience, Incorporated, and SymbioTec. All intercompany balances and transactions have been eliminated in consolidation.

Certain prior period amounts have been reclassified in this Quarterly Report to conform to the presentation for the current period and had no impact on the reported results of operations.

### ***Basic and Diluted Net Loss per Share***

The Company computes basic net loss per share by dividing net loss applicable to common stockholders by the weighted-average number of shares of the Company's common stock outstanding during the period. The Company computes diluted net loss per share after giving consideration to the dilutive effect of stock options that are outstanding during the period, except where such non-participating securities would be anti-dilutive.

For the three months ended March 31, 2024 and 2023, basic and diluted net loss per share are the same for each respective period due to the Company's net loss position. Potentially dilutive, non-participating securities have not been included in the calculations of diluted net loss per share, as their inclusion would be anti-dilutive.

## **4. Significant Strategic Collaborations**

### ***Takeda Pharmaceutical Co. Ltd. (together with its wholly-owned subsidiaries, "Takeda")***

In October 2017, the Company granted to Takeda the right to grant a non-exclusive sublicense to certain patents related to the Company's PolyXen technology that were previously exclusively licensed to Takeda in connection with products related to the treatment of blood and bleeding disorders. Royalty payments of approximately \$0.5 million and \$0.6 million were recorded as revenue by the Company during the three months ended March 31, 2024 and 2023, respectively, and are based on single digit royalties on net sales of certain covered products. The Company's policy is to recognize royalty payments as revenue when they are reliably measurable, which is upon receipt of reports from Takeda. The Company receives these reports in the quarter subsequent to the actual sublicensee sales. At the time the revenue was received, there were no remaining performance obligations and all other revenue recognition criteria were met.

### ***Belgian Volition SARL Limited ("Volition") Collaboration***

On August 2, 2022, the Company announced a research and development collaboration with Volition to develop NETs-targeted adoptive cell therapies for the treatment of cancer. The collaboration is an early exploratory program to evaluate the potential combination of Volition's Nu.Q<sup>®</sup> technology Test and the Company's DNase-Armored CAR T platform to develop proprietary adoptive cell therapies potentially targeting multiple types of solid cancers. Under the terms of the collaboration agreement, Volition will fund a research program and the two parties will share proceeds from commercialization or licensing of any products arising from the collaboration. To date, Volition has funded \$26,000 under this agreement.

### ***Catalent Pharma Solutions LLC ("Catalent")***

On June 30, 2022, the Company entered into a Statement of Work (the "SOW") with Catalent to outline the general scope of work, timeline, and pricing pursuant to which Catalent will provide certain services to the Company to perform cGMP manufacturing of the Company's recombinant protein, Human DNase I. The parties agreed to enter into a Master Services Agreement ("MSA") that will contain terms and conditions to govern the project contemplated

by the SOW and that will supersede the addendum to the SOW containing Catalent's standard terms and conditions. In addition, in the event of any conflict between the project-specific terms and conditions set forth in the SOW and the MSA, the MSA terms and conditions shall govern. The Company has paid Catalent approximately \$2.5 million through March 31, 2024, of which \$28,000 and \$0.1 million has been recognized as an advance payment and is included in prepaid expenses and other current assets as of March 31, 2024 and December 31, 2023, respectively. In addition, \$0.3 million has been recognized within other assets as of both March 31, 2024 and December 31, 2023.

#### ***Scripps Research Institute ("Scripps Research")***

On March 17, 2023, the Company and Scripps Research entered into a Research Funding and Option Agreement (the "Agreement"), pursuant to which the Company has agreed to provide Scripps Research an aggregate of up to \$0.9 million to fund research relating to advancing the pre-clinical development of the Company's DNase oncology platform technology. Under the Agreement, the Company has the option to acquire a worldwide exclusive license to Scripps Research's rights in the Technology or Patent Rights (as defined in the Agreement), as well as a non-exclusive, royalty-free, non-transferrable license to make and use TSRI Technology (as defined in the Agreement) solely for the Company's internal research purposes during the performance of the research program contemplated by the Agreement. Unless earlier terminated, the term of the Agreement continues from the date of the Agreement for fifteen (15) months. The Agreement may be terminated by the Company with 30 days advance written notice to Scripps Research or by Scripps Research if the Company fails to make timely payments due under the Agreement, subject to 30 days' written notice to cure such nonpayment. The Agreement may further be terminated by either party in the event of the other party's uncured failure to perform any obligations under the Agreement or the bankruptcy of the other party. The Company has paid Scripps Research approximately \$0.9 million under the Agreement through March 31, 2024, of which approximately \$0.1 million and \$0.4 million has been recognized as an advance payment and is included in prepaid expenses and other current assets as of March 31, 2024 and December 31, 2023, respectively.

#### ***University of Virginia ("UVA")***

On December 21, 2023, the Company entered into a Research Funding and Material Transfer Agreement with UVA (the "UVA Agreement") to advance the development of our systemic DNase program. Under the terms of the UVA Agreement, in addition to advancing our existing intellectual property, we have an option to acquire an exclusive license to any new intellectual property arising from the DNase research program. Allan Tsung, MD, a member of the Company's Scientific Advisory Board and Chair of the Department of Surgery at the UVA School of Medicine, will oversee the research conducted under the UVA Agreement. The Company has paid UVA approximately \$ 0.1 million under the UVA Agreement through March 31, 2024, of which approximately \$29,000 has been recognized as an advance payment and is included in prepaid expenses and other current assets as of March 31, 2024. There were no amounts incurred as of December 31, 2023.

#### ***Other Agreements***

The Company has also entered into various research, development, license and supply agreements with Serum Institute of India ("Serum Institute"), PJSC Pharmsynthez ("Pharmsynthez") and SynBio LLC ("SynBio"), a wholly owned subsidiary of Pharmsynthez. The Company and its collaborative partners continue to engage in research and development activities with no resultant commercial products through March 31, 2024. No amounts were recognized as revenue related to the Serum Institute, Pharmsynthez or SynBio agreements during the three months ended March 31, 2024 and 2023, respectively.

### **5. Fair Value Measurements**

Accounting Standards Codification Topic 820, *Fair Value Measurement*, defines fair value as the price that would be received to sell an asset or be paid to transfer a liability in an orderly transaction between market participants at the measurement date. The Company applies the following fair value hierarchy, which prioritizes the inputs used to measure fair value into three levels and bases the categorization within the hierarchy upon the lowest level of input that is available and significant to the fair value measurement. Level 1 inputs are quoted prices in active markets for identical assets or liabilities that the reporting entity has the ability to access at the measurement date. Level 2 utilizes quoted market prices in markets that are not active, broker or dealer quotations, or alternative pricing sources with reasonable levels of price transparency. Level 3 inputs are unobservable inputs for the asset or liability in which there is little, if any, market activity for the asset or liability at the measurement date. As of March 31, 2024 and December 31, 2023, the carrying amounts of the Company's financial instruments approximates fair value due to their short maturities. There were no financial instruments classified as Level 3 in the fair value hierarchy during the three months ended March 31, 2024 and 2023.

### **6. Stockholders' Equity**

#### ***Common Stock***

Each share of the Company's common stock entitles the holder to one vote on all matters submitted to a vote of the Company's stockholders. Common stockholders are entitled to dividends when and if declared by the Board of Directors. In the event of any voluntary or involuntary liquidation, dissolution or winding-up of the Company, the holders of common stock are entitled to share ratably in the assets of the Company available for distribution.

On May 11, 2023, the Company filed a Certificate of Change to the Company's Articles of Incorporation with the Secretary of State of Nevada to effect the Reverse Stock Split. The Reverse Stock Split was effective at 12:01 a.m., Eastern Time, on May 15, 2023. No fractional shares were issued as a result of the Reverse Stock Split and any remaining share fractions were rounded up to the nearest whole share, resulting in 15,941 new shares of common stock being issued to existing holders of the Company's common stock.

#### ***Warrants***

The Company has warrants to purchase approximately 462,963 shares of the Company's common stock (the "Series A Warrants") outstanding as of both March 31, 2024 and December 31, 2023. The Series A Warrants are immediately exercisable at a price of \$33.00 per share of common stock and expire on February 23, 2025. No Series A Warrants were exercised or forfeited during the three months ended March 31, 2024 and 2023.

In addition, the Company has publicly traded warrants to purchase approximately 2,100 shares of common stock outstanding as of both March 31, 2024 and December 31, 2023. These warrants have an exercise price of \$130.00 per share of common stock and expire on July 17, 2024. The warrants trade on Nasdaq under the symbol "XBIOW." The warrants also provide that if the weighted-average price of common stock on any trading day on or after 30

days after issuance is lower than the then-applicable exercise price per share, each warrant may be exercised, at the option of the holder, on a cashless basis for one share of common stock. None of these warrants were exercised or forfeited during the three months ended March 31, 2024 and 2023.

The Company also has warrants to purchase approximately 800 shares of the Company's common stock outstanding as of both March 31, 2024 and December 31, 2023. These warrants have an exercise price of \$29.09 per share of common stock and expire on July 3, 2026. None of these warrants were exercised or forfeited during the three months ended March 31, 2024 and 2023.

## 7. Share-Based Expense

Total share-based expense related to stock options and restricted stock units ("RSUs") was approximately \$ 0.1 million during each of the three months ended March 31, 2024 and 2023.

Share-based expense is classified in the condensed consolidated statements of operations as follows:

	Three Months Ended March 31,	
	2024	2023
Research and development expenses	\$ 15,237	\$ 13,688
General and administrative expenses	61,837	55,164
	<u>\$ 77,074</u>	<u>\$ 68,852</u>

### Employee Stock Options

No stock option awards to purchase shares of common stock were granted during the three months ended March 31, 2024 and 2023. The Company recognized a total of approximately \$0.1 million of share-based expense related to employee stock options during each of the three months ended March 31, 2024 and 2023. No employee stock options or RSUs were exercised and none expired during the three months ended March 31, 2024 and 2023.

### Non-Employee Stock Options

There were no non-employee stock options granted or exercised during the three months ended March 31, 2024 and 2023. No non-employee stock option grants expired during the three months ended March 31, 2024. During the three months ended March 31, 2023, non-employee stock option grants to purchase approximately 100 shares of common stock expired. The Company did not recognize any share-based expense related to non-employee stock options during the three months ended March 31, 2024 and 2023.

## 8. Income Taxes

During the three months ended March 31, 2024 and 2023, there was no provision for income taxes as the Company incurred losses during both periods. Deferred tax assets and liabilities reflect the net tax effect of temporary differences between the carrying amount of assets and liabilities for financial reporting purposes and the amounts used for income tax purposes. The Company records a valuation allowance against its deferred tax assets as the Company believes it is more likely than not the deferred tax assets will not be realized. The valuation allowance against deferred tax assets was approximately \$40.1 million and \$39.7 million as of March 31, 2024 and December 31, 2023, respectively.

As of March 31, 2024 and December 31, 2023, the Company did not record any unrecognized tax positions.

## 9. Related Party Transactions

The Company has entered into various research, development, license and supply agreements with Serum Institute and Pharmsynthez, each a related party whose relationship has not materially changed from that disclosed in the Company's Annual Report on Form 10-K for the year ended December 31, 2023 filed with the SEC on March 21, 2024, as amended on April 26, 2024.

During the fourth quarter of 2019, the Company entered into a loan agreement with Pharmsynthez (the "Pharmsynthez Loan"), pursuant to which the Company advanced Pharmsynthez an aggregate principal amount of up to \$500,000 to be used for the development of a specific product under the Company's Co-Development Agreement with Pharmsynthez. The Pharmsynthez Loan had an initial term of 15-months and accrued interest at a rate of 10% per annum. The Pharmsynthez Loan was guaranteed by all of the operating subsidiaries of Pharmsynthez, including SynBio and AS Kevelt, and was secured by all of the common and preferred stock of the Company owned by Pharmsynthez and SynBio.

Pharmsynthez paid all obligations due under the Pharmsynthez Loan in May 2023, and no further amounts are due under the Pharmsynthez Loan. As a result, no amounts were outstanding as of March 31, 2024 and December 31, 2023. The Company did not recognize any interest income related to the Pharmsynthez Loan during the three months ended March 31, 2024 and 2023.

## 10. Subsequent Events

The Company performed a review of events subsequent to the balance sheet date through the date the financial statements were issued and determined that there were no such events requiring recognition or disclosure in the financial statements.

## ITEM 2 – MANAGEMENT’S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS

### CAUTIONARY NOTE REGARDING FORWARD-LOOKING STATEMENTS

This report contains forward-looking statements within the meaning of Section 21E of the Securities Exchange Act of 1934, as amended (the “Exchange Act”), and Section 27A of the Securities Act of 1933, as amended. All statements contained in this Quarterly Report other than statements of historical fact, including statements regarding our future results of operations and financial position, our business strategy and plans, future revenues, projected costs, prospects and our objectives for future operations, are forward-looking statements. These forward-looking statements include, but are not limited to, statements concerning: anticipated effects of geopolitical events, including the conflicts in the Ukraine and the Middle East and associated sanctions imposed by the U.S. and other countries in response; our plans to develop our proposed drug candidates; our expectations regarding the nature, timing and extent of clinical trials and proposed clinical trials; our expectations regarding the timing for proposed submissions of regulatory filings; our expectations regarding the nature, timing and extent of collaboration arrangements; the expected results pursuant to collaboration arrangements, including the receipts of future payments that may arise pursuant to collaboration arrangements; the outcome of our plans to obtain regulatory approval of our drug candidates; the outcome of our plans for the commercialization of our drug candidates; our plans to address certain markets, engage third party manufacturers, and evaluate additional drug candidates for subsequent commercial development along with the likelihood and extent of competition to our drug candidates; our plans to advance innovative immune-oncology technologies addressing hard to treat oncology indications; expectations regarding our Deoxyribonuclease (“DNase”) platform, such as regarding the DNase platform being in development for the treatment of solid tumors and being aimed at improving outcomes of existing treatments, including immunotherapies, by targeting neutrophil extracellular traps (“NETs”); our expectations to focus our efforts and resources on advancing the DNase platform into the clinic as an adjunctive therapy for pancreatic carcinoma and locally advanced or metastatic solid tumors; and our expectations regarding our PolyXen® platform, including concerning our plans to leverage the platform.

In some cases, these statements may be identified by terminology such as “may,” “will,” “would,” “could,” “should,” “expect,” “plan,” “anticipate,” “believe,” “estimate,” “seek,” “approximately,” “intend,” “predict,” “potential,” “projects,” or “continue,” or the negative of such terms and other comparable terminology. Although we believe that the expectations reflected in the forward-looking statements contained herein are reasonable, we cannot guarantee future results, the levels of activity, performance or achievements. These statements involve known and unknown risks and uncertainties that may cause our or our industry’s results, levels of activity, performance or achievements to be materially different from those expressed or implied by forward-looking statements.

The Management’s Discussion and Analysis of Financial Condition and Results of Operations (the “MD&A”) should be read together with our condensed consolidated financial statements and related notes included elsewhere in this Quarterly Report. This Quarterly Report, including the MD&A, contains trend analysis and other forward-looking statements. Any statements in this Quarterly Report that are not statements of historical facts are forward-looking statements. These forward-looking statements made herein are based on our current expectations, involve a number of risks and uncertainties and should not be considered as guarantees of future performance.

Some factors that could cause actual results to differ materially include without limitation:

- uncertainty of the expected financial performance of the Company;
- failure to realize the anticipated potential of the DNase or PolyXen technologies;
- our ability to implement our business strategy;
- our failure to maintain compliance with the continued listing requirements of the Nasdaq Stock Market (“Nasdaq”);
- our need to raise additional working capital in the future for the purpose of further developing our pipeline and to continue as a going concern;
- our ability to finance our business;
- our ability to successfully execute, manage and integrate key acquisitions and mergers;
- product development and commercialization risks, including our ability to successfully develop the DNase technology;
- the impact of adverse safety outcomes and clinical trial results for our therapies;
- our ability to secure and maintain a manufacturer for our technologies;
- the impact of new therapies and new uses of existing therapies on the competitive environment;
- our ability to successfully commercialize our current and future drug candidates;
- our ability to achieve milestone and other payments associated with our current and future co-development collaborations and strategic arrangements;
- our reliance on consultants, advisors, vendors and business partners to conduct work on our behalf;
- the impact of new technologies on our drug candidates and our competition;
- changes in laws or regulations of governmental agencies;
- interruptions or cancellation of existing contracts;
- impact of competitive products and pricing;
- product demand and market acceptance and risks;
- the presence of competitors with greater financial resources;
- continued availability of supplies or materials used in manufacturing at the current prices;
- the ability of management to execute plans and motivate personnel in the execution of those plans;
- our ability to attract and retain key personnel;
- costs, diversion and other adverse effects of the actions of activist shareholders;
- adverse publicity related to our products or the Company itself;
- adverse claims relating to our intellectual property;
- the adoption of new, or changes in, accounting principles;
- the costs inherent with complying with statutes and regulations applicable to public reporting companies, such as the Sarbanes-Oxley Act of 2002;
- other new lines of business that we may enter in the future;
- general economic and business conditions, as well as inflationary trends and financial market instability or disruptions to the banking system due to bank failures;
- the impact of natural disasters or public health emergencies, such as the COVID-19 global pandemic, and geopolitical events, such as the Russian invasion of Ukraine and conflict in the Middle East, and related sanctions and other economic disruptions or concerns, on our financial condition and results of operations; and



other factors set forth in the Risk Factors section of our Annual Report on Form 10-K and in subsequent filings with the Securities and Exchange Commission ("SEC").

These factors are not necessarily all of the important factors that could cause actual results to differ materially from those expressed in the forward-looking statements in this Quarterly Report. Other unknown or unpredictable factors also could have material adverse effects on our future results, including, but not limited to, those discussed in the section titled "Risk Factors." The forward-looking statements in this Quarterly Report are made only as of the date of this Quarterly Report, and we do not undertake any obligation to publicly update any forward-looking statements to reflect subsequent events or circumstances. We intend that all forward-looking statements be subject to the safe-harbor provisions of the Private Securities Litigation Reform Act of 1995.

## BUSINESS OVERVIEW

We are a biopharmaceutical company focused on advancing innovative immune-oncology technologies addressing hard to treat cancers. Our DNase platform is designed to improve outcomes of existing treatments, including immunotherapies, by targeting NETs, which have been implicated in cancer progression and resistance to cancer treatments. We are currently focused on advancing our systemic DNase program into the clinic as an adjunctive therapy for pancreatic carcinoma and locally advanced or metastatic solid tumors. Additionally, we have partnered with biotechnology and pharmaceutical companies to develop our proprietary drug delivery platform, PolyXen, and receive royalty payments under an exclusive license arrangement in the field of blood coagulation disorders.

We incorporate our patented and proprietary technologies into drug candidates currently under development with biotechnology and pharmaceutical industry collaborators to create what we believe will be the next-generation biologic drugs with improved pharmacological properties over existing therapeutics. Our drug candidates have resulted from our research activities or that of our collaborators and are in the development stage. As a result, we have committed a significant amount of our resources to our research and development activities and anticipate continuing to do so for the near future. To date, none of our drug candidates have received regulatory marketing authorization or approval in the U.S. by the Food and Drug Administration nor in any other countries or territories by any applicable agencies. We are receiving ongoing royalties pursuant to a license of our PolyXen technology to an industry partner. Although we hold a broad patent portfolio, the focus of our internal efforts during the three months ended March 31, 2024, was on the advancement of our DNase technology.

### Impact of the Global Conflicts on Our Operations

The short and long-term implications of Russia's invasion of Ukraine and conflict in the Middle East are difficult to predict at this time. The imposition of current and future sanctions and counter sanctions may have an adverse effect on the economic markets generally and could impact our business, financial condition, and results of operations.

## RESULTS OF OPERATIONS

### Comparison of Quarter Ended March 31, 2024 and 2023

The comparison of our historical results of operations for the fiscal quarter ended March 31, 2024 to the fiscal quarter ended March 31, 2023 is as follows:

Description	Quarter Ended March 31, 2024	Quarter Ended March 31, 2023	Increase (Decrease)	Percentage Change
Revenue:				
Royalty revenue	\$ 510,817	\$ 605,844	\$ (95,027)	(15.7)
Operating costs and expenses:				
Research and development	(944,321)	(595,276)	349,045	58.6
General and administrative	(834,910)	(925,743)	(90,833)	(9.8)
Total operating costs and expenses	(1,779,231)	(1,521,019)	258,212	17.0
Loss from operations	(1,268,414)	(915,175)	353,239	38.6
Other income:				
Other income	52	4,520	(4,468)	(98.8)
Interest income, net	73,249	54,101	19,148	35.4
Net loss	\$ (1,195,113)	\$ (856,554)	\$ 338,559	39.5

## Revenue

Revenue for the three months ended March 31, 2024 decreased by \$0.1 million, or 15.7%, to \$0.5 million from approximately \$0.6 million for the three months ended March 31, 2023. This decrease represents a decrease in royalty revenue resulting from the timing of rebates related to our sublicense agreement with Takeda Pharmaceuticals Co. Ltd. as compared to the same period in 2023.

## Research and Development Expenses

Research & development ("R&D") expenses for the three months ended March 31, 2024 increased by approximately \$0.3 million, or 58.6%, to approximately \$0.9 million from approximately \$0.6 million in the comparable quarter in 2023. The table below sets forth the R&D costs incurred by the Company by category of expense for the quarters ended March 31, 2024 and 2023:

Category of Expense	Quarter Ended	
	March 31, 2024	March 31, 2023
Outside services and contract research organizations	\$ 745,672	\$ 423,868
Personnel costs	145,805	124,793

Share-based expense	15,237	13,688
Other	37,607	32,927
Total research and development expense	<u>\$ 944,321</u>	<u>\$ 595,276</u>

The increase in outside services and contract research organizations expense was primarily due to increased spending in connection with our pre-clinical development efforts related to our DNase platform.

#### General and Administrative Expenses

General and administrative expenses for the three months ended March 31, 2024 decreased by approximately \$0.1 million, or 9.8%, to approximately \$0.8 million from approximately \$0.9 million in the comparable quarter in 2023. The decrease was primarily due to a decrease in accounting and legal fees during the three months ended March 31, 2024 compared to the same period in 2023.

#### Other Income

Other income was approximately \$52 for the three months ended March 31, 2024 compared to approximately \$4,500 of other income for the comparable quarter in 2023. This decrease in other income was primarily related to unfavorable changes in foreign currency exchange rates during the three months ended March 31, 2024 as compared to the same period in 2023.

#### Interest Income

Interest income increased to approximately \$73,000 during the three months ended March 31, 2024 as compared to approximately \$54,000 for the same period in the prior year. This increase is primarily due to higher interest rates on invested funds during the three months ended March 31, 2024 compared to the same period in 2023.

#### Liquidity and Capital Resources

We incurred a net loss of approximately \$1.2 million for the three months ended March 31, 2024. We had an accumulated deficit of approximately \$194.4 million at March 31, 2024, as compared to an accumulated deficit of approximately \$193.2 million at December 31, 2023. Working capital was approximately \$7.7 million at March 31, 2024 and \$8.8 million at December 31, 2023. During the three months ended March 31, 2024, our working capital decreased by \$1.1 million primarily due to our net loss for the three months ended March 31, 2024.

Our principal source of liquidity consists of cash. At March 31, 2024, we had approximately \$7.8 million in cash and \$0.7 million in current liabilities. At December 31, 2023, we had approximately \$9.0 million in cash and \$0.8 million in current liabilities. We have historically relied upon sales of our equity securities to fund our operations.

We evaluate whether there are conditions or events, considered in the aggregate, that raise substantial doubt about our ability to continue as a going concern within one year after the date that the financial statements are issued. We have incurred substantial losses since our inception, and we expect to continue to incur operating losses in the near-term. These factors raise substantial doubt about our ability to continue as a going concern. We believe that we have access to capital resources through possible public or private equity offerings, debt financings, corporate collaborations, related party funding, or other means to continue as a going concern. We believe that our existing resources will be adequate to fund our operations for a period of at least twelve months from the date of the issuance of these financial statements. However, we anticipate we may need additional capital in the long-term to pursue our business initiatives. The terms, timing and extent of any future financing will depend upon several factors, including the achievement of progress in our clinical development programs, our ability to identify and enter into licensing or other strategic arrangements, our continued listing on Nasdaq, and factors related to financial, economic, geo-political, industry and market conditions, many of which are beyond our control. The capital markets for the biotech industry can be highly volatile, which make the terms, timing and extent of any future financing uncertain.

#### Cash Flows from Operating Activities

Cash flows used in operating activities for the three months ended March 31, 2024 totaled approximately \$1.2 million, which was primarily due to our net loss for the period, partially offset by non-cash charges associated with share-based expense. Cash flows used in operating activities for the three months ended March 31, 2023 totaled approximately \$1.1 million, which was primarily due to our net loss for the period, partially offset by non-cash charges associated with share-based expense and principal repayments on the Pharmsynthez Loan. In addition, prepaid expenses increased and current liabilities decreased during the three months ended March 31, 2023.

#### Cash Flows from Investing Activities

There were no cash flows from investing activities for the three months ended March 31, 2024 and 2023.

#### Cash Flow from Financing Activities

There were no cash flows from financing activities for the three months ended March 31, 2024 and 2023.

#### Contractual Obligations and Commitments

As of March 31, 2024, there were no material changes in our contractual obligations and commitments from those disclosed in our Annual Report on Form 10-K for the year ended December 31, 2023, filed with the SEC on March 21, 2024, as amended on April 26, 2024.

#### Off Balance Sheet Arrangements

We do not have any off-balance sheet financing arrangements that have or are reasonably likely to have a current or future material effect on our financial condition, change in financial condition, revenues or expenses, results of operations, liquidity, capital expenditures, or capital resources.

## **Recent Accounting Standards**

See Note 3 in our Annual Report on Form 10-K for the year ended December 31, 2023, filed with the SEC on March 21, 2024, as amended on April 26, 2024, for a discussion of recent accounting standards.

## **Critical Accounting Estimates**

Our condensed consolidated financial statements are prepared in accordance with U.S. generally accepted accounting principles. The preparation of our condensed consolidated financial statements requires us to make estimates, assumptions and judgments that affect the reported amounts of assets, liabilities, revenue, costs and expenses. We base our estimates and assumptions on historical experience and other factors that we believe to be reasonable under the circumstances. We evaluate our estimates and assumptions on an ongoing basis. The result of these evaluations forms the basis for making judgments about the carrying values of assets and liabilities and the reported amount of expenses that are not readily apparent from other sources. Because future events and their effects cannot be determined with certainty, actual results and outcomes may differ materially from our estimates, judgments and assumptions. There have been no material changes in our critical accounting estimates from those disclosed in our Annual Report on Form 10-K for the year ended December 31, 2023, filed with the SEC on March 21, 2024, as amended on April 26, 2024.

## **ITEM 3 – QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK**

We are not required to provide the information required by this Item because we are a “smaller reporting company” (as defined in Rule 12b-2 of the Exchange Act).

## **ITEM 4 – CONTROLS AND PROCEDURES**

### **Evaluation of Disclosure Controls and Procedures**

Our management, with the participation of our Chief Executive Officer (principal executive officer) and Chief Financial Officer (principal financial officer), evaluated the effectiveness of our disclosure controls and procedures as defined in Rules 13a-15(e) or 15d-15(e) under the Exchange Act, as of the end of the period covered by this Quarterly Report.

Based on this evaluation, our management, including our Chief Executive Officer and Chief Financial Officer, concluded that as of the end of the period covered by this Quarterly Report, our disclosure controls and procedures are designed at a reasonable assurance level and are effective to provide reasonable assurance that information we are required to disclose in 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 Chief Executive Officer and Chief Financial Officer, as appropriate, to allow timely decisions regarding required disclosure.

### **Changes in Internal Control over Financial Reporting**

There were no changes in our internal control over financial reporting that occurred during the period covered by this Quarterly Report that would have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

## **PART II – OTHER INFORMATION**

### **ITEM 1 – LEGAL PROCEEDINGS**

We are not currently subject to any material legal proceedings, nor, to our knowledge, is any material legal proceeding threatened against us. From time to time, we may be a party to litigation and subject to claims incident to the ordinary course of business. Although the results of litigation and claims cannot be predicted with certainty, we currently believe that the final outcome of these ordinary course matters will not have a material adverse effect on our business. Regardless of the outcome, litigation can have an adverse impact on us because of defense and settlement costs, diversion of management resources and other factors.

### **ITEM 1A – RISK FACTORS**

There have been no material changes to the risk factors previously disclosed in our Annual Report on Form 10-K for the year ended December 31, 2023 filed with the SEC on March 21, 2024, as amended on April 26, 2024.

### **ITEM 2 – UNREGISTERED SALES OF EQUITY SECURITIES AND USE OF PROCEEDS**

None.

### **ITEM 3 – DEFAULTS UPON SENIOR SECURITIES**

None.

### **ITEM 4 – MINE SAFETY DISCLOSURES**

Not applicable.

### **ITEM 5 – OTHER INFORMATION**

During the quarter ended March 31, 2024, no director or officer adopted or terminated any Rule 10b5-1 trading arrangement or non-Rule 10b5-1 trading arrangement, as each term is defined in Item 408(a) of Regulation S-K.

### **ITEM 6 – EXHIBITS**

The following exhibits are incorporated herein by reference or filed as part of this report.

EXHIBIT NUMBER	DESCRIPTION
31.1*	<a href="#">Certification of Jeffrey F. Eisenberg, Principal Executive Officer, pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.</a>
31.2*	<a href="#">Certification of James Parslow, Principal Financial Officer, pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.</a>
32.1**	<a href="#">Certifications of Jeffrey F. Eisenberg, Principal Executive Officer, and James Parslow, Principal Financial Officer, pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.</a>
101*	The following financial statements from the Company's Quarterly Report on Form 10-Q for the quarter ended March 31, 2024, formatted in inline XBRL, include: (i) Condensed Consolidated Balance Sheets, (ii) Condensed Consolidated Statements of Operations, (iii) Condensed Consolidated Statements of Stockholders' Equity, (iv) Condensed Consolidated Statements of Cash Flows and (v) the Notes to the Condensed Consolidated Financial Statements.
104*	Cover Page Interactive Data File (formatted in XBRL and included in Exhibit 101).
*	Filed herewith.
**	Exhibit 32.1 is being furnished and shall not be deemed to be "filed" for purposes of Section 18 of the Securities Exchange Act of 1934, as amended, or otherwise subject to the liability of that section, nor shall such exhibits be deemed to be incorporated by reference in any registration statement or other document filed under the Securities Act of 1933, as amended or the Securities Exchange Act of 1934, as amended, except as otherwise stated in such filing.

## 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.

### XENETIC BIOSCIENCES, INC.

May 9, 2024

By: /s/ JEFFREY F. EISENBERG

Jeffrey F. Eisenberg  
Chief Executive Officer  
(Principal Executive Officer)

By: /s/ JAMES PARSLow

James Parslow  
Chief Financial Officer  
(Principal Financial Officer and Principal Accounting Officer)

I, Jeffrey F. Eisenberg, certify that:

1. I have reviewed this Quarterly Report on Form 10-Q of Xenetic Biosciences, Inc.;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
4. The registrant's other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:
  - (a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
  - (b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
  - (c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
  - (d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and
5. The registrant's other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):
  - (a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and
  - (b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: May 9, 2024

By: /s/ Jeffrey F. Eisenberg  
Jeffrey F. Eisenberg  
Chief Executive Officer  
(Principal Executive Officer)

I, James Parslow, certify that:

1. I have reviewed this Quarterly Report on Form 10-Q of Xenetic Biosciences, Inc.;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
4. The registrant's other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:
  - (a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
  - (b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
  - (c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
  - (d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and
5. The registrant's other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):
  - (a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and
  - (b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: May 9, 2024

By: /s/ James Parslow  
James Parslow  
Chief Financial Officer  
(Principal Financial and Principal Accounting Officer)

## CERTIFICATION

Pursuant to the requirement set forth in Rule 13a-14(b) of the Securities Exchange Act of 1934, as amended, (the "Exchange Act") and Section 1350 of Chapter 63 of Title 18 of the United States Code (18 U.S.C. §1350), Jeffrey F. Eisenberg, Chief Executive Officer of Xenetic Biosciences, Inc. (the "Company"), and James Parslow, Chief Financial Officer of the Company, each hereby certifies that, to the best of his knowledge:

The Company's Quarterly Report on Form 10-Q for the period ended March 31, 2024, to which this Certification is attached as Exhibit 32.1 (the "Periodic Report"), fully complies with the requirements of Section 13(a) or Section 15(d) of the Exchange Act; and

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

Date: May 9, 2024

IN WITNESS WHEREOF, the undersigned have set their hands hereto as of the 9th day of May 2024.

/s/ Jeffrey F. Eisenberg  
Jeffrey F. Eisenberg  
Chief Executive Officer

/s/ James Parslow  
James Parslow  
Chief Financial Officer

"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 Xenetic Biosciences, Inc. under the Securities Act of 1933, as amended, or the Securities Exchange Act of 1934, as amended (whether made before or after the date of the Form 10-Q), irrespective of any general incorporation language contained in such filing."