

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

SCHEDULE 13D

Under the Securities Exchange Act of 1934

(Amendment No.)

MINERALYS THERAPEUTICS, INC.

(Name of Issuer)

Common Stock, par value \$0.0001 per share

(Title of Class of Securities)

603170101

(CUSIP Number)

RA Capital Management, L.P.
200 Berkeley Street, 18th Floor
Boston, MA 02116
Telephone: 617.778.2500
Attn: Peter Kolchinsky

(Name, Address and Telephone Number of Person Authorized to
Receive Notices and Communications)

February 14, 2023

(Date of Event Which Requires Filing of this Statement)

If the filing person has previously filed a statement on Schedule 13G to report the acquisition that is the subject of this Schedule 13D, and is filing this schedule because of §§240.13d-1(e), 240.13d-1(f) or 240.13d-1(g), check the following box.

Note: Schedules filed in paper format shall include a signed original and five copies of the schedule, including all exhibits. See Rule 13d-7 for other parties to whom copies are to be sent.

* The remainder of this cover page shall be filled out for a reporting person's initial filing on this form with respect to the subject class of securities, and for any subsequent amendment containing information which would alter disclosures provided in a prior cover page.

The information required on the remainder of this cover page shall not be deemed to be "filed" for the purpose of Section 18 of the Securities Exchange Act of 1934 ("Act") or otherwise subject to the liabilities of that section of the Act but shall be subject to all other provisions of the Act (however, see the Notes).

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1 Names of Reporting Persons.

RA Capital Management, L.P.

2 Check the Appropriate Box if a Member of a Group (See Instructions)

(a)

(b)

3 SEC Use Only

4 Source of Funds (See Instructions):

AF

5 Check if disclosure of legal proceedings is required pursuant to Items 2(d) or 2(e):

6 Citizenship or Place of Organization. **Delaware**

7 Sole Voting Power **0 shares**

Number
of Shares
Beneficially
Owned by
Each
Reporting
Person With

8 Shared Voting Power **3,180,920 shares**

9 Sole Dispositive Power **0 shares**

10 Shared Dispositive Power **3,180,920 shares**

11	Aggregate Amount Beneficially Owned by Each Reporting Person 3,180,920 shares
12	Check if the Aggregate Amount in Row (11) Excludes Certain Shares (See Instructions) <input type="checkbox"/>
13	Percent of Class Represented by Amount in Row (11) 7.8%¹
14	Type of Reporting Person (See Instructions) IA, PN

¹ The Reporting Person is the beneficial owner of 3,178,476 shares of the Issuer's Common Stock as well as conversion shares underlying each of 2,444 stock options (right to buy) which will vest within 60 days held by Dr. Derek DiRocco for the benefit of RA Capital. The percentage calculation assumes that there are 40,859,097 outstanding shares of Common Stock of the Issuer, based on 39,056,653 outstanding shares of Common Stock of the Issuer based on the Issuer's Prospectus filed with Securities and Exchange Commission ("SEC") on February 10, 2023, an additional 1,800,000 shares issued and sold pursuant to the underwriters' option, and giving effect to stock options referenced above.

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1	Names of Reporting Persons. Peter Kolchinsky	
2	Check the Appropriate Box if a Member of a Group (See Instructions) (a) <input type="checkbox"/> (b) <input type="checkbox"/>	
3	SEC Use Only	
4	Source of Funds (See Instructions): AF	
5	Check if disclosure of legal proceedings is required pursuant to Items 2(d) or 2(e): <input type="checkbox"/>	
6	Citizenship or Place of Organization. United States	
	7	Sole Voting Power 0 shares
	8	Shared Voting Power 3,180,920 shares
	9	Sole Dispositive Power 0 shares
	10	Shared Dispositive Power 3,180,920 shares

11	Aggregate Amount Beneficially Owned by Each Reporting Person 3,180,920 shares
12	Check if the Aggregate Amount in Row (11) Excludes Certain Shares (See Instructions) <input type="checkbox"/>
13	Percent of Class Represented by Amount in Row (11) 7.8%²
14	Type of Reporting Person (See Instructions) HC, IN

² The Reporting Person is the beneficial owner of 3,178,476 shares of the Issuer's Common Stock as well as conversion shares underlying each of 2,444 stock options (right to buy) which will vest within 60 days held by Dr. Derek DiRocco for the benefit of RA Capital. The percentage calculation assumes that there are 40,859,097 outstanding shares of Common Stock of the Issuer, based on 39,056,653 outstanding shares of Common Stock of the Issuer based on the Issuer's Prospectus filed with Securities and Exchange Commission ("SEC") on February 10, 2023, an additional 1,800,000 shares issued and sold pursuant to the underwriters' option, and giving effect to stock options referenced above.

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1	Names of Reporting Persons. Rajeev Shah
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2	Check the Appropriate Box if a Member of a Group (See Instructions)	
	(a)	<input type="checkbox"/>
	(b)	<input type="checkbox"/>
3	SEC Use Only	
4	Source of Funds (See Instructions): AF	
5	Check if disclosure of legal proceedings is required pursuant to Items 2(d) or 2(e): <input type="checkbox"/>	
6	Citizenship or Place of Organization. United States	
	7	Sole Voting Power 0 shares
	8	Shared Voting Power 3,180,920 shares
	9	Sole Dispositive Power 0 shares
	10	Shared Dispositive Power 3,180,920 shares
11	Aggregate Amount Beneficially Owned by Each Reporting Person 3,180,920 shares	
12	Check if the Aggregate Amount in Row (11) Excludes Certain Shares (See Instructions) <input type="checkbox"/>	
13	Percent of Class Represented by Amount in Row (11) 7.8%³	
14	Type of Reporting Person (See Instructions) HC, IN	

³ The Reporting Person is the beneficial owner of 3,178,476 shares of the Issuer's Common Stock as well as conversion shares underlying each of 2,444 stock options (right to buy) which will vest within 60 days held by Dr. Derek DiRocco for the benefit of RA Capital. The percentage calculation assumes that there are 40,859,097 outstanding shares of Common Stock of the Issuer, based on 39,056,653 outstanding shares of Common Stock of the Issuer based on the Issuer's Prospectus filed with Securities and Exchange Commission ("SEC") on February 10, 2023, an additional 1,800,000 shares issued and sold pursuant to the underwriters' option, and giving effect to stock options referenced above.

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SCHEDULE 13D

Item 1. Security and Issuer

This Schedule 13D relates to the shares of common stock, par value \$0.0001 per share ("Common Stock"), of Mineralys Therapeutics, Inc., a Delaware corporation (the "Issuer"), which has its principal executive offices at 150 N. Radnor Chester Road, Suite F200, Radnor, Pennsylvania 19087.

Item 2. Identity and Background

(a) This Schedule 13D is being filed on behalf of RA Capital Management, L.P. ("RA Capital"), Peter Kolchinsky, and Rajeev Shah. RA Capital, Dr. Kolchinsky, and Mr. Shah, are collectively referred to herein as the "Reporting Persons."

The Reporting Persons ownership of the Issuer's securities includes (1) 1,311,247 shares of Common Stock directly held by the RA Capital Healthcare Fund, L.P. (the "Fund"), (2) 1,867,229 shares of Common Stock directly held by the RA Capital Nexus Fund III, L.P. (the "Nexus Fund III"), and (3) 2,444 stock options (right to buy) which shall vest within 60 days of this filing.

RA Capital Healthcare Fund GP, LLC is the general partner of the Fund and RA Capital Nexus Fund III GP, LLC is the general partner of the Nexus Fund III. The general partner of RA Capital is RA Capital Management GP, LLC, of which Dr. Kolchinsky and Mr. Shah are the controlling persons. RA Capital serves as investment adviser for the Fund and the Nexus Fund III and may be deemed a beneficial owner, for purposes of Section 13(d) of the Securities Exchange Act of 1934 (the "Act"), of any securities of the Issuer held by the Fund or the Nexus Fund III. The Fund and the Nexus Fund III have delegated to RA Capital the sole power to vote and the sole power to dispose of all securities held in the Fund's and the Nexus Fund III's portfolio, including the shares of the Issuer's Common Stock reported herein. Because the Fund and the Nexus Fund III have divested themselves of voting and investment power over the reported securities they hold and may not revoke that delegation on less than 61 days' notice, the Fund and the Nexus Fund III disclaim beneficial ownership of the securities they hold for purposes of Section 13(d) of the Act and therefore disclaim any obligation to report ownership of the reported securities under Section 13(d) of the Act. As managers of RA Capital, Dr. Kolchinsky and Mr. Shah may be deemed beneficial owners, for purposes of Section 13(d) of the Act, of any securities of the Issuer beneficially owned by RA Capital. RA Capital, Dr. Kolchinsky, and Mr. Shah disclaim beneficial ownership of the securities reported in this Schedule 13D other than for the purpose of determining their obligations under Section 13(d) of the Act, and the filing of this Schedule 13D shall not be deemed an admission that either RA Capital, Dr. Kolchinsky, or Mr. Shah is the beneficial owner of such securities for any other purpose.

(b) The address of the principal business office of each of the Reporting Persons is 200 Berkeley Street, 18th Floor, Boston, MA 02116.

(c) The Fund is a private investment vehicle. RA Capital provides investment management services to the Fund and the Nexus Fund III. The principal occupation of Dr. Kolchinsky and Mr. Shah is investment management.

(d) During the last five years, none of the Reporting Persons has been convicted in a criminal proceeding (excluding traffic violations or similar misdemeanors).

(e) During the last five years, none of the Reporting Persons has been a party to a civil proceeding of a judicial or administrative body of competent jurisdiction and as a result of such proceeding was or is subject to a judgment, decree of final order enjoining future violations of, or prohibiting or mandating activities subject to, federal or state securities

laws or finding any violation with respect to such laws.

(f) See Item 6 of the cover pages.

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Item 3. Source and Amount of Funds or Other Consideration

Prior to the Issuer's February 2023 initial public offering (the "IPO"), the Reporting Persons caused the Fund and the Nexus Fund III to purchase an aggregate of 20,823,692 Series B Preferred Stock (the "Preferred Stock") of the issuer in June 2021 for an aggregate of \$17,999,999.38. On February 1, 2023, the Issuer effected a 10.798-for-1 reverse stock split of its issued and outstanding shares of common stock and a proportional adjustment to the existing conversion ratios of each series of the Issuer's preferred stock (the "Reverse Stock Split"). The Preferred Stock discussed above automatically converted into 1,928,476 shares of Common Stock upon completion of the IPO and after accounting for the Reverse Stock Split. The Fund and the Nexus Fund III also purchased an aggregate of 1,250,000 shares of Common Stock from the underwriters of the IPO for an aggregate of \$20,000,000.00. All purchases were for cash and were funded by working capital of the Fund and the Nexus Fund III.

Item 4. Purpose of Transaction

The Reporting Persons acquired the Common Stock reported herein for investment purposes and not with an intent, purpose or effect of changing control of the Issuer. Although the Reporting Persons currently have no plan or proposal to acquire any additional Issuer securities or to dispose of any of the Issuer securities reported herein, the Reporting Persons may acquire additional Issuer securities from time to time or dispose of Issuer securities they beneficially own, on the open market or in private transactions or otherwise (including by means of 10b5-1 programs), consistent with their investment purposes and in amounts, on such terms and at such times as to be determined by the Reporting Persons based upon a number of factors, including, without limitation, their ongoing assessment of the Issuer's business prospects, the availability of Issuer securities at prices that would make the purchase or sale of such securities desirable, prevailing market conditions, the availability of other investment opportunities, and/or other considerations.

In addition, consistent with their investment purpose, the Reporting Persons may engage in communications with persons associated with the Issuer, including shareholders of the Issuer, officers of the Issuer, members of the board of directors of the Issuer, and/or other third parties, to discuss matters regarding the Issuer, including but not limited to its operations, strategic direction, governance or capitalization, and potential business combinations or dispositions involving the Issuer or certain of its businesses. Dr. Derek DiRocco, a Partner of RA Capital, currently serves as a director of the Issuer and therefore will engage in regular discussions with the Issuer's board of directors and management as part of his duties as a director.

Neither Dr. DiRocco (other than in his capacity as a director) nor the Reporting Persons have any present plans or proposals that relate to, or could result in, any of the matters referred to in paragraphs (a) through (j), inclusive, of the instructions to Item 4 of Schedule 13D.

Depending on various factors including, without limitation, the Issuer's financial position, results and strategic direction, actions taken by the Issuer's management and Board, other investment opportunities available to RA Capital, the price levels of the Issuer securities, conditions in the securities markets and general economic and industry conditions, the Reporting Persons may change their purpose and formulate and implement plans or proposals with respect to the Issuer at any time and from time to time. Any such action may be made by the Reporting Persons alone or in conjunction with other shareholders, potential acquirers, financing sources and/or other third parties and could include one or more purposes, plans or proposals that relate to or would result in actions required to be reported herein in accordance with Item 4 of Schedule 13D.

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Item 5. Interest in Securities of the Issuer

(a) and (b) See Items 7-11 of the cover pages above and Item 2.

(c) The following table lists the Reporting Persons' transactions in Common Stock that were effected during the sixty day period prior to the filing of this Schedule 13D:

Transaction	Purchaser	Date	No. Shares	Price
Purchase	The Fund	14-Feb-2023	1,118,400	\$ 16.00
Conversion	The Fund	14-Feb-2023	192,847	(1)
Purchase	Nexus Fund III	14-Feb-2023	131,600	\$ 16.00
Conversion	Nexus Fund III	14-Feb-2023	1,735,629	(1)
Vest Stock Option (Right to Buy)	RA Capital	09-Mar-2023	1,222	(2)*
Vest Stock Option (Right to Buy)	RA Capital	09-April-2023	1,222	(2)*

(1) On February 14, 2023, each share of Preferred Stock converted into Common Stock of the Issuer at a ratio of 1-for10.798 upon closing of the initial public offering of the Issuer's common stock without payment of further consideration.

(2) This option represents a right to purchase a total of 44,000 shares of the Issuer's Common Stock, which will begin to vest on March 9, 2023 in 36 equal monthly installments over three years, subject to Dr. DiRocco's continued service to the Issuer through each vesting date. These options have an exercise price of \$16.00

* Represents future vesting within 60 days from the filing date of this Schedule 13D.

(d) Not applicable.

(e) Not applicable.

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Item 6. Contracts, Arrangements, Understandings or Relationships with Respect to Securities of the Issuer

Lock-up Agreement

The shares reported on this 13D are subject to a lock-up agreement, as referenced in the Issuer's S-1/A filed with the SEC on February 2, 2023. Pursuant to the lock-up agreement, the Fund and the Nexus Fund III may not, with limited exceptions, for a period of 180 days from the date of the Issuer's prospectus, offer, sell, or otherwise transfer or dispose of any of the Issuer's securities, without the prior written consent of BofA Securities, Inc., Evercore Group L.L.C. and Stifel, Nicolaus & Company, Incorporated.

The description of the Lock-Up Agreement contained in this Item 6 is qualified in its entirety by reference to the full text of the agreement (incorporated by reference to Exhibit A of Exhibit 1.1 to the Issuer's Amendment No. 1 to Registration Statement on Form S-1 (File No. 333-269282)).

Investors' Rights Agreement

In June 2022, the Issuer, the Fund, the Nexus Fund III and certain other parties entered into an amended and restated investors' rights agreement (the "Investors' Rights Agreement").

The Investors' Rights Agreement provides the Fund and other parties thereto with certain demand registration rights, including short-form and piggyback registration rights, in respect of the shares of Common Stock issued to it upon conversion of the Preferred Shares, subject to certain conditions. In addition, in the event that the Issuer registers additional shares of Common Stock for sale to the public, it will be required to give notice of such registration to the Fund and certain other parties of its intention to effect such a registration, and, upon request of one or more such parties and subject to certain limitations, include the shares of Common Stock held by them in such registration.

The registration rights will terminate upon the earliest to occur of ((a) five years after the closing of the IPO or (ii) with respect to a particular holder, such time as Rule 144 or another similar exemption under the Securities Act is available for the sale of all shares by such holder without limitation during a three-month period without registration.

The Investors' Rights Agreement contains customary cross-indemnification provisions, pursuant to which the Issuer is obligated to indemnify the Fund and the Nexus Fund III and other parties in the event of material misstatements or omissions in the registration statement attributable to the Issuer or any violation or alleged violation whether by action or inaction by the Issuer under certain securities laws and the Fund and the Nexus Fund III are obligated to indemnify the Issuer for material misstatements or omissions in the registration statement attributable to such party, subject to certain limitations.

The description of the Investors' Rights Agreement contained in this Item 6 is qualified in its entirety by reference to the full text of the agreement (incorporated by reference to Exhibit 4.2 to the Issuer's Amendment No. 1 to Registration Statement on Form S-1 (File No. 333-269282)).

Equity Awards

Dr. DiRocco, a Partner at RA Capital, is a member of the Board of Directors of the Issuer. From time to time, Dr. DiRocco may receive stock options or other awards of equity-based compensation pursuant to the Issuer's compensation arrangements for non-employee directors. Pursuant to an agreement with RA Capital, Dr. DiRocco is obligated to transfer any securities issued under any such stock options or other awards, or the economic benefit thereof, to RA Capital.

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Item 7. Material to Be Filed as Exhibits

Exhibit 1	Joint Filing Agreement
Exhibit 2	Form of Lock-up Agreement (incorporated by reference to Exhibit A of Exhibit 1.1 to the Issuer's Amendment No. 1 to Registration Statement on Form S-1 (File No. 333-269282))
Exhibit 3	Form of Amended and Restated Investors' Rights Agreement (incorporated by reference to Exhibit 4.2 to the Amendment No. 1 to Registration Statement on Form S-1 (File No. 333-269282))

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SIGNATURE

After reasonable inquiry and to the best of my knowledge and belief, I certify that the information set forth in this statement is true, complete and correct.

Date: February 24, 2023

RA CAPITAL MANAGEMENT, L.P.

By: /s/ Peter Kolchinsky
Name: Peter Kolchinsky
Title: Authorized Signatory

PETER KOLCHINSKY

/s/ Peter Kolchinsky

RAJEEV SHAH

/s/ Rajeev Shah

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JOINT FILING AGREEMENT

This Joint Filing Agreement, dated as of February 24, 2023, is by and among RA Capital Management, L.P., Peter Kolchinsky, and Rajeev Shah. (the foregoing are collectively referred to herein as the "Filers").

Each of the Filers may be required to file with the United States Securities and Exchange Commission a statement on Schedule 13G and/or 13D with respect to Common Stock, par value \$0.0001 per share of Mineralys Therapeutics, Inc. beneficially owned by them from time to time.

Pursuant to and in accordance with Rule 13(d)(1)(k) promulgated under the Securities Exchange Act of 1934, as amended, the Filers hereby agree to file a single statement on Schedule 13G and/or 13D (and any amendments thereto) on behalf of each of such parties, and hereby further agree to file this Joint Filing Agreement as an exhibit to such statement, as required by such rule.

This Joint Filing Agreement may be terminated by any of the Filers upon one week's prior written notice or such lesser period of notice as the Filers may mutually agree.

Executed and delivered as of the date first above written.

RA CAPITAL MANAGEMENT, L.P.

By: /s/ Peter Kolchinsky
Name: Peter Kolchinsky
Title: Authorized Signatory

PETER KOLCHINSKY

/s/ Peter Kolchinsky

RAJEEV SHAH

/s/ Rajeev Shah
