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# SECURITIES AND EXCHANGE COMMISSION

Washington, D.C. 20549

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## SCHEDULE 13D

Under the Securities Exchange Act of 1934  
(Amendment \_\_\_)\*

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### Rhythm Pharmaceuticals, Inc.

(Name of Issuer)

Common Stock, par value \$0.001 per share  
(Title of Class of Securities)

76243J105  
(CUSIP Number)

Alexander Rakitin  
Perceptive Advisors LLC  
51 Astor Place, 10<sup>th</sup> Floor  
New York, NY 10003  
(646) 205-5340

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

March 13, 2024  
(Date of Event Which Requires Filing of this Statement)

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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.

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**Note:** Schedules filed in paper format shall include a signed original and five copies of the schedule, including all exhibits. See Section 240.13d-7 for other parties to whom copies are to be sent.

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\* 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, as amended ("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. Perceptive Advisors LLC	
2.	Check the Appropriate Box if a Member of a Group (See Instructions) (a) <input type="checkbox"/> (b) <input checked="" 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 Delaware	
Number of Shares Beneficially Owned by Each Reporting Person With	7.	Sole Voting Power 0
	8.	Shared Voting Power 3,268,579
	9.	Sole Dispositive Power 0
	10.	Shared Dispositive Power 3,268,579
11.	Aggregate Amount Beneficially Owned by Each Reporting Person 3,268,579	
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) 5.4%	
14.	Type of Reporting Person (See Instructions) OO	

1.	Names of Reporting Persons. Perceptive Life Sciences Master Fund, Ltd.	
2.	Check the Appropriate Box if a Member of a Group (See Instructions) (a) <input type="checkbox"/> (b) <input checked="" type="checkbox"/>	
3.	SEC Use Only	
4.	Source of Funds (See Instructions) WC	
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 Cayman Islands	
Number of Shares Beneficially Owned by Each Reporting Person With	7.	Sole Voting Power 0
	8.	Shared Voting Power 3,268,579
	9.	Sole Dispositive Power 0
	10.	Shared Dispositive Power 3,268,579
11.	Aggregate Amount Beneficially Owned by Each Reporting Person 3,268,579	
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) 5.4%	
14.	Type of Reporting Person (See Instructions) CO	

1.	Names of Reporting Persons. Joseph Edelman	
2.	Check the Appropriate Box if a Member of a Group (See Instructions) (a) <input type="checkbox"/> (b) <input checked="" 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 of America	
Number of Shares Beneficially Owned by Each Reporting Person With	7.	Sole Voting Power 0
	8.	Shared Voting Power 3,268,579
	9.	Sole Dispositive Power 0
	10.	Shared Dispositive Power 3,268,579
11.	Aggregate Amount Beneficially Owned by Each Reporting Person 3,268,579	
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) 5.4%	
14.	Type of Reporting Person (See Instructions) IN	

**Item 1. Security and Issuer**

This Schedule 13D relates to the Common Stock, par value \$0.001 per share (the “Common Stock”) of Rhythm Pharmaceuticals, Inc. (the “Issuer”), which has its principal executive offices at 222 Berkeley Street, 12<sup>th</sup> Floor, Boston, Massachusetts 02116.

**Item 2. Identity and Background**

- (a) This Schedule 13D is being filed by Perceptive Advisors LLC (“Perceptive Advisors” or “Perceptive”), Joseph Edelman (“Mr. Edelman”) and Perceptive Life Sciences Master Fund, Ltd. (the “Master Fund”), and together with Perceptive Advisors and Mr. Edelman, each of the foregoing, a “Reporting Person,” and collectively, the “Reporting Persons”). Perceptive Advisors serves as the investment advisor to the Master Fund and Mr. Edelman is the managing member of Perceptive Advisors. The agreement among the Reporting Persons to file this Schedule 13D jointly in accordance with Rule 13d-1(k) of the Securities Exchange Act of 1934, as amended, is attached hereto as Exhibit 1.
- (b) The address of the principal business office of each of the Reporting Persons is 51 Astor Place 10th Floor, New York, NY 10003.
- (c) The principal business of Perceptive Advisors is managing funds in connection with purchasing, holding and selling securities for investment purposes. The principal business of the Master Fund is to invest in securities. The principal occupation of Mr. Edelman is as the managing member of Perceptive Advisors and other related entities.
- (d) During the last five years, none of the Reporting Persons, nor to the Reporting Persons’ knowledge, any of the persons listed on Schedule A to this Schedule 13D, has been convicted in a criminal proceeding (excluding traffic violations or similar misdemeanors).
- (e) During the last five years, none of the Reporting Persons, nor to the Reporting Persons’ knowledge, any of the persons listed on Schedule A to this Schedule 13D, 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) Perceptive Advisors is a Delaware limited liability company. Mr. Edelman is a United States citizen. The Master Fund is a Cayman Islands corporation.

Schedule A to this Schedule 13D sets forth the information regarding the directors of the Master Fund.

**Item 3. Source and Amount of Funds or Other Consideration**

The source of funds for the acquisitions of the Common Stock reported on this Schedule 13D was working capital of the Master Fund.

**Item 4. Purpose of Transaction**

The Reporting Persons acquired the Common Stock set forth in this Schedule 13D and hold their shares of Common Stock for investment purposes.

Each Reporting Person expects to continuously review such person’s investment in the Issuer and, depending on various factors including but not limited to, the price of the shares of Common Stock, the terms and conditions of the transaction, prevailing market conditions and such other considerations as such Reporting Person deems relevant, may at any time or from time to time, and subject to any required regulatory approvals, acquire additional shares of Common Stock, preferred stock or other securities convertible into or exercisable or exchangeable for Common Stock from time to time on the open market, in privately- negotiated transactions, directly from the Issuer, or upon the exercise or conversion of securities convertible into or exercisable or exchangeable for Common Stock.

Each Reporting Person also may, at any time, subject to compliance with applicable securities laws and regulatory requirements dispose of or distribute some or all of its Common Stock or such other securities as it owns or may subsequently acquire depending on various factors, including but not limited to, the price of the shares, the terms and conditions of the transaction and prevailing market conditions, as well as the liquidity and diversification objectives.

Consistent with their investment intent, each Reporting Person may from time to time discuss with the Issuer's management, directors, other shareholders and others, the Issuer's performance, business, strategic direction, capital structure, product development program, prospects and management, as well as various ways of maximizing stockholder value, which may or may not include extraordinary transactions.

Representatives of the Reporting Persons have discussed with the Issuer potential financing options, possibly involving additional investment by the Reporting Persons and other investors, and potential governance rights of investors participating in such financing arrangements. There is no certainty that these discussions will continue, or that any specific plan will develop or materialize, or if one does, its timing. Except as indicated herein, no Reporting Person, as a stockholder of the Issuer, has any plans or proposals that relates or would result in any of the transactions or other matters specified in clauses (a) through (j) of Item 4 of Schedule 13D. Each Reporting Person may, at any time and from time to time, review or reconsider its or his position and/or change its or his purpose and/or formulate plans or proposals with respect thereto.

**Item 5. Interest in Securities of the Issuer**

- (a) The information set forth in rows 11 and 13 of the cover pages to this Schedule 13D is incorporated by reference. The percentage set forth in row 13 is based on 60,140,495 shares of Common Stock outstanding as of February 23, 2024, as reported by the Issuer in its Annual Report on Form 10-K filed with the Securities and Exchange Commission on February 29, 2024.
- (b) The information set forth in rows 7 through 10 of the cover pages to this Schedule 13D is incorporated by reference.
- (c) Schedule B to this Schedule 13D sets forth the transactions in the Common Stock of the Issuer effected by the Reporting Persons during the past sixty days, and is incorporated by reference into this Item 5(c).
- (d) No person other than the Reporting Persons disclosed in this Schedule 13D is known to have the right to receive or the power to direct the receipt of dividends from, or the proceeds from the sale of, the Common Shares subject to this Schedule 13D.
- (e) Not applicable.

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

The information set forth in Item 4 above is incorporated by reference to this Item 6.

**Item 7. Material to be Filed as Exhibits**

Exhibit 1 Joint Filing Agreement.

**SIGNATURES**

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.

Dated: March 20, 2024

PERCEPTIVE ADVISORS LLC

By: /s/ Joseph Edelman  
Name: Joseph Edelman  
Title: Managing Member

/s/ Joseph Edelman  
JOSEPH EDELMAN

PERCEPTIVE LIFE SCIENCES MASTER FUND, LTD.

By: /s/ Joseph Edelman  
Name: Joseph Edelman  
Title: Managing Member

**Schedule A**

The following sets forth the name, address, principal occupation, citizenship and beneficial ownership of the shares of Common Stock (to the extent not pursuant to Item 5(a)) of each director of the Master Fund (to the extent not set forth in Item 2).

<b>Master Fund</b>			
<b><u>Name and Citizenship</u></b>	<b><u>Position</u></b>	<b><u>Principal Business Address</u></b>	<b><u>Beneficial Ownership of Shares of Common Stock</u></b>
Scott Dakers (United Kingdom)	Director	c/o Elian Fiduciary Services (Cayman) Limited 190 Elgin Avenue, George Town Grand Cayman KY1-9007 Cayman Islands	None
Ernest A. Morrison (United Kingdom)	Director	Cox Hallett Wilkinson Milner House 18 Parliament Street P.O. Box HM 1561 Hamilton HM FX Bermuda	None
James Nicholas (United States)	Director	c/o GenesisPoint LLC 30 Old Kings Highway S Darien, CT 06820	None

**Schedule B**

<b>Name</b>	<b>Date of Transaction</b>	<b>Number of Securities Acquired or Disposed</b>	<b>Type of Transaction</b>	<b>Price per Security</b>
Master Fund	01/12/2024	1,000	Sale of Call Options	\$ 1.95
Master Fund	01/12/2024	2,808	Purchase of Common Stock	\$ 43.03(1)(2)
Master Fund	01/19/2024	43,576	Purchase of Common Stock	\$ 40.61(1)(3)
Master Fund	01/19/2024	21,424	Purchase of Common Stock	\$ 41.022(1)(4)
Master Fund	01/22/2024	23,429	Purchase of Common Stock	\$ 41.50(1)(5)
Master Fund	01/22/2024	6,830	Purchase of Common Stock	\$ 42.42(1)(6)
Master Fund	01/23/2024	14,158	Purchase of Common Stock	\$ 41.43(1)(7)
Master Fund	01/23/2024	7,870	Purchase of Common Stock	\$ 42.34(1)(8)
Master Fund	01/24/2024	14,368	Purchase of Common Stock	\$ 42.32(1)(9)
Master Fund	01/24/2024	17,881	Purchase of Common Stock	\$ 43.46(1)(10)
Master Fund	01/24/2024	24,758	Purchase of Common Stock	\$ 44.19(1)(11)
Master Fund	01/24/2024	4,900	Purchase of Common Stock	\$ 45.41(1)(12)
Master Fund	01/24/2024	59,258	Purchase of Common Stock	\$ 46.62(1)(13)
Master Fund	01/24/2024	40,496	Purchase of Common Stock	\$ 47.38(1)(14)
Master Fund	01/25/2024	29,221	Purchase of Common Stock	\$ 44.70 (1)(15)
Master Fund	01/25/2024	18,746	Purchase of Common Stock	\$ 45.40 (1)(16)
Master Fund	01/25/2024	2,033	Purchase of Common Stock	\$ 46.16 (1)(17)
Master Fund	01/26/2024	14,404	Purchase of Common Stock	\$ 44.06 (1)(18)
Master Fund	01/26/2024	35,596	Purchase of Common Stock	\$45.165 (1)(19)
Master Fund	01/29/2024	46,480	Purchase of Common Stock	\$ 44.58 (1)(20)
Master Fund	01/29/2024	22,992	Purchase of Common Stock	\$ 45.20 (1)(21)
Master Fund	01/30/2024	14,507	Purchase of Common Stock	\$ 44.44 (1)(22)
Master Fund	01/30/2024	13,953	Purchase of Common Stock	\$ 45.49 (1)(23)
Master Fund	01/31/2024	14,561	Purchase of Common Stock	\$ 44.51 (1)(24)
Master Fund	01/31/2024	14,575	Purchase of Common Stock	\$ 44.61 (1)(25)
Master Fund	01/31/2024	7,123	Purchase of Common Stock	\$ 46.80 (1)(26)
Master Fund	02/01/2024	10,983	Purchase of Common Stock	\$ 44.89 (1)(27)
Master Fund	02/01/2024	12,502	Purchase of Common Stock	\$ 45.24 (1)(28)
Master Fund	02/01/2024	26,515	Purchase of Common Stock	\$ 46.22 (1)(29)
Master Fund	02/02/2024	48,483	Purchase of Common Stock	\$ 44.97 (1)(30)
Master Fund	02/02/2024	1,517	Purchase of Common Stock	\$ 45.51 (1)(31)
Master Fund	02/05/2024	13,686	Purchase of Common Stock	\$ 43.91 (1)(32)
Master Fund	02/05/2024	5,763	Purchase of Common Stock	\$ 44.86 (1)(33)
Master Fund	02/05/2024	29,672	Purchase of Common Stock	\$ 45.90 (1)(34)
Master Fund	02/06/2024	11,767	Purchase of Common Stock	\$ 46.18 (1)(35)
Master Fund	02/06/2024	35,543	Purchase of Common Stock	\$ 47.14 (1)(36)
Master Fund	02/06/2024	27,190	Purchase of Common Stock	\$ 48.01 (1)(37)
Master Fund	02/06/2024	500	Purchase of Common Stock	\$ 48.73 (1)(38)
Master Fund	02/07/2024	4,454	Purchase of Common Stock	\$ 46.03 (1)(39)
Master Fund	02/07/2024	9,362	Purchase of Common Stock	\$ 47.40 (1)(40)
Master Fund	02/07/2024	25,922	Purchase of Common Stock	\$ 47.98 (1)(41)
Master Fund	02/08/2024	4,500	Purchase of Common Stock	\$ 47.37 (1)(42)
Master Fund	02/08/2024	11,465	Purchase of Common Stock	\$ 47.97 (1)(43)
Master Fund	02/08/2024	100	Purchase of Common Stock	\$ 48.54
Master Fund	02/09/2024	400	Purchase of Common Stock	\$ 48.17 (1)(44)
Master Fund	02/09/2024	12,581	Purchase of Common Stock	\$ 49.79 (1)(45)
Master Fund	02/09/2024	14,541	Purchase of Common Stock	\$ 50.59 (1)(46)
Master Fund	02/09/2024	5,597	Purchase of Common Stock	\$ 51.36 (1)(47)
Master Fund	02/15/2024	6,213	Purchase of Common Stock	\$ 50.17 (1)(48)
Master Fund	02/15/2024	2,353	Purchase of Common Stock	\$ 50.55 (1)(49)

- (1) The price reported is a weighted average price. The Reporting Persons undertake to provide to the staff of the Securities and Exchange Commission, upon request, full information regarding the shares of Common Stock sold at each separate price within the ranges of the prices reported.
- (2) These shares were purchased in multiple transactions at prices ranging from \$42.68 to \$43.57, inclusive.
- (3) These shares were purchased in multiple transactions at prices ranging from \$39.95 to \$40.94, inclusive.

- (4) These shares were purchased in multiple transactions at prices ranging from \$40.98 to \$41.96, inclusive.
- (5) These shares were purchased in multiple transactions at prices ranging from \$40.95 to \$41.195, inclusive.
- (6) These shares were purchased in multiple transactions at prices ranging from \$41.985 to \$42.84, inclusive.
- (7) These shares were purchased in multiple transactions at prices ranging from \$40.91 to \$41.89, inclusive.
- (8) These shares were purchased in multiple transactions at prices ranging from \$41.91 to \$42.88, inclusive.
- (9) These shares were purchased in multiple transactions at prices ranging from \$41.81 to \$42.805, inclusive.
- (10) These shares were purchased in multiple transactions at prices ranging from \$42.81 to \$43.80, inclusive.
- (11) These shares were purchased in multiple transactions at prices ranging from \$43.81 to \$44.68, inclusive.
- (12) These shares were purchased in multiple transactions at prices ranging from \$44.94 to \$45.91, inclusive.
- (13) These shares were purchased in multiple transactions at prices ranging from \$46.06 to \$47.05, inclusive.
- (14) These shares were purchased in multiple transactions at prices ranging from \$47.06 to \$47.925, inclusive.
- (15) These shares were purchased in multiple transactions at prices ranging from \$44.05 to \$45.045, inclusive.
- (16) These shares were purchased in multiple transactions at prices ranging from \$45.05 to \$46.00, inclusive.
- (17) These shares were purchased in multiple transactions at prices ranging from \$46.055 to \$46.35, inclusive.
- (18) These shares were purchased in multiple transactions at prices ranging from \$43.315 to \$44.31, inclusive.
- (19) These shares were purchased in multiple transactions at prices ranging from \$44.315 to \$45.165, inclusive.
- (20) These shares were purchased in multiple transactions at prices ranging from \$43.885 to \$44.88, inclusive.
- (21) These shares were purchased in multiple transactions at prices ranging from \$44.885 to \$45.64, inclusive.
- (22) These shares were purchased in multiple transactions at prices ranging from \$43.96 to \$44.95, inclusive.
- (23) These shares were purchased in multiple transactions at prices ranging from \$45.01 to \$45.78, inclusive.
- (24) These shares were purchased in multiple transactions at prices ranging from \$44.11 to \$45.10, inclusive.
- (25) These shares were purchased in multiple transactions at prices ranging from \$45.12 to \$45.61, inclusive.
- (26) These shares were purchased in multiple transactions at prices ranging from \$46.135 to \$46.98, inclusive.
- (27) These shares were purchased in multiple transactions at prices ranging from \$43.90 to \$44.89, inclusive.
- (28) These shares were purchased in multiple transactions at prices ranging from \$44.90 to \$45.85, inclusive.
- (29) These shares were purchased in multiple transactions at prices ranging from \$45.93 to \$46.70, inclusive.
- (30) These shares were purchased in multiple transactions at prices ranging from \$44.415 to \$45.405, inclusive.
- (31) These shares were purchased in multiple transactions at prices ranging from \$45.42 to \$45.65, inclusive.
- (32) These shares were purchased in multiple transactions at prices ranging from \$43.52 to \$44.505, inclusive.
- (33) These shares were purchased in multiple transactions at prices ranging from \$44.52 to \$45.41, inclusive.
- (34) These shares were purchased in multiple transactions at prices ranging from \$45.42 to \$46.21, inclusive.
- (35) These shares were purchased in multiple transactions at prices ranging from \$45.58 to \$46.57, inclusive.
- (36) These shares were purchased in multiple transactions at prices ranging from \$46.58 to \$47.57, inclusive.
- (37) These shares were purchased in multiple transactions at prices ranging from \$47.58 to \$48.525, inclusive.
- (38) These shares were purchased in multiple transactions at prices ranging from \$48.63 to \$48.96, inclusive.
- (39) These shares were purchased in multiple transactions at prices ranging from \$45.46 to \$46.43, inclusive.
- (40) These shares were purchased in multiple transactions at prices ranging from \$46.75 to \$47.71, inclusive.
- (41) These shares were purchased in multiple transactions at prices ranging from \$47.76 to \$48.49, inclusive.
- (42) These shares were purchased in multiple transactions at prices ranging from \$46.565 to \$47.555, inclusive.
- (43) These shares were purchased in multiple transactions at prices ranging from \$47.565 to \$48.52, inclusive.
- (44) These shares were purchased in multiple transactions at prices ranging from \$47.81 to \$48.29, inclusive.
- (45) These shares were purchased in multiple transactions at prices ranging from \$49.175 to \$50.17, inclusive.
- (46) These shares were purchased in multiple transactions at prices ranging from \$50.175 to \$51.17, inclusive.
- (47) These shares were purchased in multiple transactions at prices ranging from \$51.175 to \$51.64, inclusive.
- (48) These shares were purchased in multiple transactions at prices ranging from \$49.465 to \$50.45, inclusive.
- (49) These shares were purchased in multiple transactions at prices ranging from \$50.47 to \$50.735, inclusive.

JOINT FILING AGREEMENT

The persons below hereby agree that the Schedule 13D to which this agreement is attached as an exhibit, as well as all future amendments to such Schedule 13D, shall be filed jointly on behalf of each of them. This agreement is intended to satisfy the requirements of Rule 13d-1(k)(1)(iii) under the Securities Exchange Act of 1934.

Dated: March 20, 2024

PERCEPTIVE ADVISORS LLC

By: /s/ Joseph Edelman  
Name: Joseph Edelman  
Title: Managing Member

/s/ Joseph Edelman  
JOSEPH EDELMAN

PERCEPTIVE LIFE SCIENCES MASTER FUND, LTD.

By: /s/ Joseph Edelman  
Name: Joseph Edelman  
Title: Managing Member