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**SECURITIES AND EXCHANGE COMMISSION**

Washington, D.C. 20549

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**SCHEDULE 13D/A**

**Under the Securities Exchange Act of 1934  
(Amendment No. 2)\***

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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)

**April 15, 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 (the "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 5,143,575
	9.	Sole Dispositive Power 0
	10.	Shared Dispositive Power 5,143,575
11.	Aggregate Amount Beneficially Owned by Each Reporting Person 5,143,575	
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) 8.3%	
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 3,685,245
	9.	Sole Dispositive Power 0
	10.	Shared Dispositive Power 3,685,245
11.	Aggregate Amount Beneficially Owned by Each Reporting Person 3,685,245	
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) 6.1%	
14.	Type of Reporting Person (See Instructions) CO	

1.	Names of Reporting Persons. C2 Life Sciences 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) 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 Delaware	
Number of Shares Beneficially Owned by Each Reporting Person With	7.	Sole Voting Power 0
	8.	Shared Voting Power 104,166
	9.	Sole Dispositive Power 0
	10.	Shared Dispositive Power 104,166
11.	Aggregate Amount Beneficially Owned by Each Reporting Person 104,166	
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) < 0.1%	
14.	Type of Reporting Person (See Instructions) CO	

1.	Names of Reporting Persons. Perceptive Discovery Fund LP	
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 Delaware	
Number of Shares Beneficially Owned by Each Reporting Person With	7.	Sole Voting Power 0
	8.	Shared Voting Power 1,354,164
	9.	Sole Dispositive Power 0
	10.	Shared Dispositive Power 1,354,164
11.	Aggregate Amount Beneficially Owned by Each Reporting Person 1,354,164	
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) 2.2%	
14.	Type of Reporting Person (See Instructions) PN	

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 5,143,575
	9.	Sole Dispositive Power 0
	10.	Shared Dispositive Power 5,143,575
11.	Aggregate Amount Beneficially Owned by Each Reporting Person 5,143,575	
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) 8.3%	
14.	Type of Reporting Person (See Instructions) IN	

**Item 2. Identity and Background**

Items 2(a) - (c) of the Schedule 13D are amended and restated as follows:

- (a) This Amendment No. 2 is being filed by Perceptive Advisors LLC (“Perceptive Advisors” or “Perceptive”), Joseph Edelman (“Mr. Edelman”), Perceptive Life Sciences Master Fund, Ltd. (the “Master Fund”), Perceptive Discovery Fund, LP (the “Discovery Fund”), and C2 Life Sciences LLC (“C2”, and together with Perceptive Advisors, Mr. Edelman, the Master Fund and the Discovery Fund, each of the foregoing, a “Reporting Person,” and collectively, the “Reporting Persons”). Perceptive Advisors serves as the investment advisor to the Master Fund and C2. Mr. Edelman is the managing member of Perceptive Advisors. Perceptive Discovery GP LLC is the general partner of Perceptive Discovery ID LP, and is managed by Perceptive Discovery Advisors, a relying advisor of Perceptive Advisors LLC. 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 5.
- (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, the Discovery Fund and C2 are to invest in securities. The principal occupation of Mr. Edelman is as the managing member of Perceptive Advisors and other related entities.

**Item 3. Source and Amount of Funds**

Item 3 of the Schedule 13D is amended and supplemented as follows:

The source of funds for the acquisition of the Series A Convertible Preferred Stock reported herein was the working capital of the Master Fund, Discovery Fund and C2.

**Item 4. Purpose of Transaction**

Item 4 of the Schedule 13D is amended and supplemented as follows:

The Information set forth in Item 6 below in this Amendment No. 2 is incorporated by reference into this Item 4.

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

Item 5 of the Schedule 13D is amended and supplemented as follows:

- (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 outstanding shares of Common Stock as reported by the Issuer in its Annual Report on Form 10-K filed with the Securities and Exchange Commission on February 23, 2024, and give effect to the conversion of 90,000 shares of the Issuer’s Series A Convertible Preferred Stock, par value \$0.001 per share (the “Series A Convertible Preferred Stock”) held by the Reporting Persons at the current Conversion Rate of 20.8333 shares of Common Stock to be issued upon the conversion of each \$1,000 of liquidation preference. The shares of Series A Convertible Preferred Stock will be convertible into shares of Common Stock at the option of the holders thereof at any time following the expiration or termination of any applicable waiting period under the Hart-Scott-Rodino Antitrust Improvements Act of 1976, as amended.
- (b) The information set forth in rows 7 through 10 of the cover pages to this Schedule 13D is incorporated by reference and give effect to the conversion of the Series A Convertible Preferred Stock directly held by such Reporting Persons at the Conversion Rate.
- (c) On April 15, 2024, the Discovery Fund acquired 65,000 shares of Series A Convertible Preferred Stock, the Master Fund acquired 20,000 shares of Series A Convertible Preferred Stock, and C2 acquired 5,000 shares of Series A Convertible Preferred Stock, at a price of \$1,000 per share pursuant to the terms of the Investment Agreement dated April 1, 2024.

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

Item 6 of the Schedule 13D is amended and supplemented as follows:

On April 15, 2024, the Discovery Fund, the Master Fund, and C2 entered into the Registration Rights Agreement with the Issuer, a copy of which is attached hereto as Exhibit 3.

On April 15, 2024, the Issuer filed the Certificate of Designations setting forth the terms of the Series A Convertible Preferred Stock with the Secretary of State of the State of Delaware, a copy of which is attached hereto as Exhibit 4.

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

Item 7 of the Schedule 13D is amended and supplemented as follows:

- |           |                                                                                                                                                                                                                             |
|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Exhibit 3 | Form of Registration Rights Agreement by and between the Issuer and the investors named therein (incorporated by reference to Exhibit B of Exhibit 10.1 to the Issuer's Current Report on Form 8-K filed on April 1, 2024). |
| Exhibit 4 | Certificate of Designations (incorporated by reference to Exhibit 3.1 to the Issuer's Current Report on Form 8-K filed on April 16, 2024).                                                                                  |
| Exhibit 5 | 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: April 17, 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

PERCEPTIVE DISCOVERY FUND LP

By: Perceptive Discovery GP, LLC, its general partner

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

C2 LIFE SCIENCES LLC

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

## 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: April 17, 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

## PERCEPTIVE DISCOVERY FUND LP

By: Perceptive Discovery GP, LLC, its general partner

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

## C2 LIFE SCIENCES LLC

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