

AMENDMENT NO. 6, dated October 27, 2025
to PROSPECTUS SUPPLEMENT dated January 6, 2025

Up to \$21,917,873



Common Stock

This Amendment No. 6 to Prospectus Supplement (this “Amendment”) amends and updates our prospectus supplement, dated January 6, 2025, filed with the Securities and Exchange Commission as part of our registration statement on Form S-3, File No. 333-283306 (the “Prospectus Supplement”). This Amendment should be read in conjunction with the Prospectus Supplement and the accompanying prospectus dated January 6, 2025 (the “Prospectus”), each of which are to be delivered with this Amendment, as well as any of our SEC filings which amend, supplement and update this Prospectus Supplement. This Amendment amends and/or updates only those sections of the Prospectus Supplement set forth in this Amendment (other than as automatically updated and amended by the Company’s SEC filings available on Edgar, which are incorporated by reference herein). In addition, we refer persons or entities considering making an investment in our securities to also to review information contained in that certain Schedule 13D filed with the SEC on October 23, 2025, which can be found on the SEC’s website regarding Neuphoria Therapeutics Inc. at: www.sec.gov, which discloses a significant accumulation of shares of our common stock in open market transactions shortly preceding the date of such Schedule 13D filing by an investment fund; all other sections of the Prospectus Supplement remain unchanged. This Amendment is not complete without, and may only be delivered or utilized in connection with, the Prospectus Supplement, and any future amendments or supplements hereto or thereto.

We have entered into an At The Market Offering Agreement, or the Sales Agreement, with H.C. Wainwright & Co., LLC, or Wainwright, dated November 18, 2024. Under this Sales Agreement, as updated by this Amendment, we may offer and sell common stock having an aggregate offering price of up to \$ 21,917,873 from time to time through Wainwright, acting as sales agent, in accordance with the Sales Agreement, less any amounts previously sold during the past 12 months, as delineated below.

Sales of the common stock, if any, under this prospectus, as amended, may be made by any method permitted that is deemed an “at the market” offering as defined in Rule 415(a)(4) promulgated under the Securities Act of 1933, as amended, or the Securities Act. Wainwright may sell our common stock by any method permitted by law deemed to be an at-the-market offering as defined in Rule 415(a)(4) promulgated under the Securities Act. Wainwright is not required to sell any specific number or dollar amount of securities but will act as our sales agent using commercially reasonable efforts consistent with their normal trading and sales practices and applicable state and federal laws, rules and regulations and the rules of the Nasdaq, on mutually agreed terms between the Wainwright and us. There are no minimum sale requirements, and there is no arrangement for funds to be received in any escrow, trust or similar arrangement.

We are filing this Amendment to amend the Prospectus Supplement to update the amount of shares of common stock we are eligible to sell under General Instruction I.B.6 of Form S-3 and pursuant to the Sales Agreement. The aggregate market value of our common stock held by non-affiliates, or public float, was approximately \$65,753,620 based on 3,287,681 non-affiliate shares of common stock outstanding, based on a closing price of \$20.00 per share on October 6, 2025, which was the highest closing sale price of our common stock on the Nasdaq Global Market, the principal market for our common equity, within 60 days of the filing date of this registration statement, as amended. In the past 12 calendar months, we have offered and sold an aggregate of \$15,477,836 of shares of our common stock pursuant to General Instruction I.B.6 of Form S-3. In no event will we sell securities registered on this registration statement in a public primary offering with a value exceeding more than one-third of our public float in any 12-month period so long as our public float remains below \$75.0 million.

Wainwright will be entitled to a commission of 3.0% of the gross sales price per share sold under the Sales Agreement. See “*Plan of Distribution*” beginning on page S-11 of our prospectus supplement, dated January 6, 2025 for additional information regarding the compensation to be paid to Wainwright. In connection with the sale of the common stock on our behalf, Wainwright will be deemed to be an “underwriter” within the meaning of the Securities Act, and the compensation paid to Wainwright will be deemed to be underwriting compensation. We have also agreed in the Sales Agreement to provide indemnification and contribution to Wainwright with respect to certain liabilities, including liabilities under the Securities Act.

Our common stock is listed on the Nasdaq under the symbol “NEUP.” On October 24, 2025, the last reported sale price of our common stock on the Nasdaq was \$6.24 per share.

INVESTING IN OUR COMMON STOCK INVOLVES A HIGH DEGREE OF RISK. BEFORE MAKING AN INVESTMENT DECISION, PLEASE READ THE INFORMATION UNDER THE HEADING “RISK FACTORS” BEGINNING ON PAGE S-6 OF THE PROSPECTUS SUPPLEMENT INCLUDED IN THIS REGISTRATION STATEMENT, AND IN THE DOCUMENTS INCORPORATED BY REFERENCE INTO THIS PROSPECTUS SUPPLEMENT.

Neither the Securities and Exchange Commission, any state securities commission, nor any other foreign securities commission has approved or disapproved of these securities or passed upon the adequacy or accuracy of this prospectus supplement. Any representation to the contrary is a criminal offense.

H.C. Wainwright & Co.

The date of this Amendment No. 6 to prospectus supplement is October 27, 2025.