

Rain Therapeutics Inc.

This free writing prospectus relates to the Registration Statement on Form S-3 (File No. 333-265297) (the “Registration Statement”) that Rain Therapeutics Inc. (the “Company”) has filed with the Securities and Exchange Commission (the “SEC”) under the Securities Act of 1933, as amended, and was declared effective on June 6, 2022.

Recent Developments

MANTRA-2 Preliminary Data

On November 4, 2022, The Company announced preliminary data in the multicenter, single arm, open-label, Phase 2 basket trial evaluating milademetan, an oral mouse double minute 2 (MDM2) inhibitor, for the treatment of MDM2-amplified advanced solid tumors (MANTRA-2). The MANTRA-2 trial is designed to evaluate the safety and efficacy of milademetan monotherapy in patients with advanced or metastatic solid tumors refractory or intolerant to standard-of-care therapy and that exhibit wild-type p53 and a prespecified minimum MDM2 gene copy number. Approximately 65 patients are anticipated to be enrolled to receive milademetan. As of the latest data cutoff on October 26, 2022, 17 patients have been enrolled. The primary endpoint of the trial is objective response rate as measured by RECIST criteria. Secondary endpoints include duration of response, disease control rate progression-free survival by investigator assessment, overall survival and growth modulation index.

Preliminary Interim Data

- As of the latest data cutoff on October 26, 2022, 17 patients have been enrolled, 15 of whom have been dosed with milademetan
- Ten patients were efficacy-evaluable with CN \geq 8 by central testing
 - A diverse set of tumor histologies were enrolled amongst the evaluable patients
 - Most tumors had co-alterations in oncogenes or tumor suppressors, including KRAS, EGFR, and PIK3CA amongst others
- Two unconfirmed PRs were observed with tumor regression of 34% and 30% (pancreatic and lung cancer, respectively)
 - The patient with pancreatic cancer is pending response confirmation and ongoing treatment
 - The patient with lung cancer is deceased due to COVID-19
- Two patients exhibited promising activity with tumor regression of 29% and 27% (biliary tract and breast cancer, respectively) and the patients are continuing with the investigational therapy
- Observed anti-tumor effect of milademetan in heavily pretreated, refractory patients, with a median of four prior therapies
- Safety profile to date is preliminarily consistent with prior Phase 1 trial of milademetan

Other Key Development Updates

With respect to the Company’s other ongoing and planned clinical trials, the Company now expects to report topline data from its Phase 3 registrational trial (MANTRA) evaluating milademetan for the treatment of de-differentiated liposarcoma in the first quarter of 2023. The Company expects to commence a Phase 1/2 clinical trial to evaluate the safety, tolerability and efficacy of milademetan in combination with atezolizumab in patients with loss of cyclin-dependent kinase inhibitor 2A (CDKN2A) and wildtype p53 advanced solid tumors (MANTRA-4) also in the first quarter of 2023. The Company is deprioritizing the Phase 2 MANTRA-3 trial in Merkel cell carcinoma as an area of focus due to its continued effort to rationalize use of capital in the current market environment. The Company is now focusing its development efforts on its MANTRA, MANTRA-2 and MANTRA-4 clinical trials within its milademetan program.

Financial Update

While the Company has not finalized its full financial results for the fiscal quarter ended September 30, 2022, it expects to report that the Company had approximately \$90.7 million of cash, cash equivalents and short-term investments as of September 30, 2022. This amount is preliminary, has not been audited and is subject to change pending completion of the Company's unaudited financial statements for the quarter ended September 30, 2022. Additional information and disclosures would be required for a more complete understanding of the Company's financial position and results of operations as of September 30, 2022.

No Sales of Similar Securities

Pursuant to the underwriting agreement to be entered into between the Company and Guggenheim Securities, LLC, as representative of the several underwriters named therein (the "representative"), for the proposed offering, the Company has agreed that it will not, for a period of 90 days after the date of the prospectus supplement for the proposed offering without the prior written consent of the representative:

- i. offer, sell, agree to offer or sell, solicit offers to purchase, grant any call option or purchase any put option with respect to, pledge, borrow or otherwise dispose of, directly or indirectly, or establish or increase a put equivalent position or liquidate or decrease a call equivalent position within the meaning of Section 16 of the Exchange Act and the rules and regulations of the SEC promulgated thereunder, with respect to, any of the Company's common stock or any of its other securities that are substantially similar to its common stock, or any securities convertible into or exchangeable or exercisable for, or any warrants or other rights to purchase, the foregoing;
- ii. file or cause to become effective a registration statement under the Securities Act relating to the offer and sale of any of the Company's common stock or any of its other securities that are substantially similar to its common stock, or any securities convertible into or exchangeable or exercisable for, or any warrants or other rights to purchase, the foregoing, other than any registration statement on Form S-8 filed to register securities to be offered under any of its employee benefit or equity incentive plans disclosed or incorporated by reference into the registration statement of which the prospectus supplement for the proposed offering will form a part;
- iii. enter into any swap or other arrangement that transfers to another, in whole or in part, any of the economic consequences of ownership of the Company's common stock or any of its other securities that are substantially similar to its common stock, or any securities convertible into or exchangeable or exercisable for, or any warrants or other rights to purchase, the foregoing, whether any such transaction is to be settled by delivery of its common stock or any of its other securities, in cash or otherwise; and
- iv. publicly announce an intention to effect any transaction specified in clause (i), (ii) or (iii).

The foregoing shall not apply to (a) the registration of the offer and sale of the securities as contemplated by the underwriting agreement; (b) issuances of the Company's common stock upon the conversion of securities or the exercise of options or warrants disclosed as outstanding in the registration statement of which the prospectus supplement for the proposed offering will form a part (excluding the exhibits thereto), provided that such securities, options and warrants have not been amended since the date of the prospectus supplement to increase the number of such securities, options or warrants or to decrease the exercise price, exchange price or conversion price of such securities, options or warrants (other than in connection with stock splits or combinations) or to extend the term of such securities, options or warrants; (c) issuances of the Company's common stock (including pursuant to restricted stock awards, restricted stock units and upon the exercise of options) and grants of equity-based awards to its employees, officers, directors or consultants pursuant to any employee stock option plan, employee stock incentive plan, employee stock purchase plan, employee dividend reinvestment plan or any other employee benefit plan described or incorporated by reference in the registration statement of which the prospectus supplement for the proposed offering will form a part for services rendered to the Company; or (d) issuances of the Company's common stock, on an arm's-length basis, to unaffiliated collaborators, vendors, manufacturers, lessors, distributors, customers or other similar parties pursuant to a collaboration, licensing agreement, strategic alliance, lease, manufacturing or distribution arrangement or similar transaction, *provided* that any such issuances shall not

represent, in the aggregate, more than 5% of the Company's issued and outstanding shares of common stock as of the date of the prospectus supplement for the proposed offering and that the recipients of such shares agree to be bound by a lock-up agreement (described below for the Company's executive officers and directors) until the earlier of (i) December 31, 2022 or (ii) public announcement by the Company of topline data from its Phase 3 MANTRA trial (the "Lock-Up Period").

In addition, pursuant to certain lock-up agreements, the Company's executive officers, directors and two of the Company's largest securityholders have agreed that they will not, during the Lock-Up Period, without the prior written consent of the representative, directly or indirectly, sell, offer, contract or grant any option to sell (including without limitation any short sale), grant any option, right or warrant to purchase, pledge, transfer, establish an open "put equivalent position" within the meaning of Rule 16a-1(h) under the Exchange Act, lend or otherwise dispose of shares of common stock, options, rights or warrants to acquire shares of common stock, or securities exchangeable or exercisable for or convertible into shares of common stock currently or hereafter owned either of record or beneficially (as defined in Rule 13d-3 under the Exchange Act) by the lock-up signatory (or such spouse or family member), including, without limitation, entering into any swap or other arrangement that transfers, in whole or in part, the economic consequences of the ownership of common stock or publicly announce an intention to do any of the foregoing. The foregoing sentence shall not apply to:

- i. transfers of shares of common stock or any security convertible into or exercisable or exchangeable for common stock as a bona fide gift;
- ii. distributions of shares of common stock or any security convertible into or exercisable or exchangeable for common stock to limited partners, members or stockholders of the lock-up signatory;
- iii. transfers of shares of common stock or any security convertible into or exercisable or exchangeable for common stock by will or intestate succession or to any trust or partnership for the direct or indirect benefit of such person or any member of the immediate family of the lock-up signatory;
- iv. acquisitions relating to shares of common stock or other securities acquired in open market transactions after the completion of the offering contemplated in the prospectus supplement;
- v. the exercise of, and the surrender of shares of common stock directly to us pursuant to tax withholding or net exercise provisions of, any equity awards issued pursuant to the Company's equity incentive plans, which equity incentive plans exist as of the date of the prospectus supplement for the proposed offering;
- vi. the establishment of a trading plan pursuant to Rule 10b5-1 under the Exchange Act for the transfer of shares of common stock, *provided* that (a) such plan does not provide for the transfer of common stock during the lock-up period and (b) no public announcement or filing under the Exchange Act is required of or voluntarily made by or on behalf of the lock-up signatory or us regarding the establishment of such plan; and
- vii. the transfers of shares of common stock or any security convertible into or exercisable or exchangeable for common stock pursuant to a bona fide third-party tender offer for all outstanding shares of the Company, merger, consolidation or other similar transaction made to all holders of the Company's securities involving a change of control of the Company, provided that in the event that such tender offer, merger, consolidation or other such transaction is not completed, such securities held by the lock-up signatory remain subject to the provisions of the lock-up agreement; and
- viii. the transfers of shares of common stock pursuant to any contract, instruction or plan that satisfies all of the requirements of Rule 10b5-1 under the Exchange Act ("Trading Plan") that has been entered into prior to the date of this prospectus supplement, provided, that the existence of such Trading Plan was communicated to the representative and such Trading Plan will not be amended or otherwise modified during the Lock-Up Period;

provided, that (A) in the case of clauses (i), (ii) and (iii) above, each donee, distributee and transferee shall sign and deliver a lock-up agreement; (B) in the case of clauses (i), (ii), (iii), (iv), (v) and (viii) above, any filings required under Section 16 of the Exchange Act clearly indicate in the footnotes thereto the nature of the transfer.

These restrictions terminate after the close of trading of the common stock at the expiration of the Lock-Up Period. The representative may, in its sole discretion and at any time or from time to time before the expiration of the Lock-Up Period release all or any portion of the securities subject to lock-up agreements. There are no existing agreements between the underwriters and any of the Company's stockholders who will execute a lock-up agreement providing consent to the sale of shares prior to the expiration of the lock-up period.

The Company has filed a Registration Statement (including a prospectus) with the SEC relating to its securities to which this communication relates. Before you invest, you should read the prospectus in that Registration Statement and other documents the Company has filed with the SEC for more complete information about the Company and this offering. You may get these documents for free by visiting EDGAR on the SEC Website at www.sec.gov.

Forward Looking Statements

Statements contained in this free writing prospectus regarding matters that are not historical facts are "forward-looking statements" within the meaning of the Private Securities Litigation Reform Act of 1995. Such forward-looking statements include statements regarding, among other things, the Company's ongoing and planned trials for milademetan, including continued patient enrollment in MANTRA-2, the efficacy and safety of milademetan for the treatment of MDM2-amplified advanced solid tumors; timing for efficacy evaluable data in MANTRA-2 trial, expected trial design and the relationship between the results from the interim data from MANTRA-2 trial and results of future or ongoing clinical studies. Because such statements are subject to risks and uncertainties, actual results may differ materially from those expressed or implied by such forward-looking statements. Words such as "plans," "will," "anticipates," "goal," "potential," "expects" and similar expressions are intended to identify forward-looking statements. These forward-looking statements are based upon the Company's current expectations and involve assumptions that may never materialize or may prove to be incorrect. Actual results could differ materially from those anticipated in such forward-looking statements as a result of various risks and uncertainties, which include, without limitation, risks and uncertainties associated with the Company's business in general and limited operating history, the Company's ability to execute on its strategy, the Company's reliance on third parties to conduct and support its preclinical studies and clinical trials, positive results from a clinical trial, or interim data from an ongoing clinical trial, may not necessarily be predictive of the results of future or ongoing clinical studies, the effect of the COVID-19 pandemic on the Company's clinical trials and business operations, the impact of general economic, health, industrial or political conditions in the United States or internationally, additional state and federal healthcare reform measures that could result in reduced demand for the Company's product candidates, the sufficiency of the Company's capital resources and its ability to raise additional capital, and the other risks described in the Company's Annual Report on Form 10-K for the year ended December 31, 2021 and subsequent filings with the Securities and Exchange Commission. All forward-looking statements contained in this press release speak only as of the date on which they were made and are based on management's assumptions and estimates as of such date. the Company undertakes no obligation to update such statements to reflect events that occur or circumstances that exist after the date on which they were made, except as required by law.