Filed by Sesen Bio, Inc. Pursuant to Rule 425 under the Securities Act of 1933 and deemed filed pursuant to Rule 14a-6(b) under the Securities Exchange Act of 1934 Subject Company: Sesen Bio, Inc. Commission File No.: 001-36296

Carisma Twitter: We are excited to announce another key addition to our SAB, mRNA therapeutics expert and Moderna CSO of External Ventures, Dr. Lin Guey. This appointment follows a strategic collaboration agreement between us and @moderna_tx. Learn more here: https://carismatx.com/carismatherapeutics-appoints-moderna-cso-of-external-research-ventures-lin-guey-to-scientific-advisory-board/

Carisma LinkedIn: We are thrilled to announce another key appointment to our Scientific Advisory Board, leading expert in mRNA therapeutics and Moderna CSO of External Research Ventures, Lin Guey, PhD. Dr. Guey brings nearly 15 years of drug development experience in program leadership, research and nonclinical development. Dr. Guey's appointment also follows a strategic collaboration between us and Moderna and her expertise will be instrumental in our work with engineered macrophages. More on Dr. Guey's background and our partnership with Moderna can be found here: https://carismatx.com/carisma-therapeutics-appoints-moderna-cso-of-external-research-ventures-lin-guey-to-scientific-advisory-board/

Steve LinkedIn: We have another exciting addition to Carisma's Scientific Advisory Board, leading expert in mRNA therapeutics and Moderna CSO of External Research Ventures Lin Guey, PhD. Dr. Guey currently oversees Moderna's partnership with Carisma to develop in vivo CAR-M therapies. She is a leading expert in mRNA therapeutics and brings nearly 15 years of drug development experience in program leadership, research, and nonclinical development. We are thrilled to be working with Dr. Guey as we work to advance multiple programs through pre-clinical development. More here: https://carismatx.com/carisma-therapeutics-appoints-moderna-cso-of-external-research-ventures-lin-guey-to-scientific-advisory-board/

Cautionary Note on Forward-Looking Statements

Any statements in this Current Report on Form 8-K about future expectations, plans and prospects for Sesen Bio, Inc. ("Sesen Bio"), CARISMA Therapeutics Inc. ("Carisma Therapeutics") or the combined company, Sesen Bio's, Carisma Therapeutics' or the combined company's strategy or future operations, and other statements containing the words "anticipate," "believe," "contemplate," "expect," "intend," "may," "plan," "predict," "target," "potential," "possible," "will," "would," "could," "continue," and similar expressions, constitute forward-looking statements within the meaning of The Private Securities Litigation Reform Act of 1995. For example, statements concerning the proposed transaction, the concurrent financing, the contingent value rights and other matters, including without limitation: statements relating to the satisfaction of the conditions to and consummation of the proposed transaction, the expected timing of the consummation of the proposed transaction and the expected ownership percentages of the combined company, Sesen Bio's and Carisma Therapeutics' respective businesses, the strategy of the combined company, future operations, advancement of the combined company's product candidates and product pipeline, clinical development of the combined company's product candidates, including expectations regarding timing of initiation and results of clinical trials of the combined company, the ability of Sesen Bio to remain listed on the Nasdaq Stock Market, the completion of the concurrent financing and the receipt of any payments under the contingent value rights are forward-looking statements. Actual results may differ materially from those indicated by such forward-looking statements as a result of various important factors, including without limitation: (i) the risk that the conditions to the closing of the proposed transaction are not satisfied, including the failure to obtain stockholder approval of matters related to the proposed transaction in a timely manner or at all; (ii) uncertainties as to the timing of the consummation of the proposed transaction and the ability of each of Sesen Bio and Carisma Therapeutics to consummate the proposed transaction, including completing the concurrent financing; (iii) risks related to Sesen Bio's ability to correctly estimate its expected net cash at closing and Sesen Bio's and Carisma Therapeutics' ability to correctly estimate and manage their respective operating expenses and expenses associated with the proposed transaction; (iv) risks related to Sesen Bio's continued listing on the Nasdaq Stock Market until closing of the proposed transaction; (v) the risk that as a result of adjustments to the exchange ratio, Sesen Bio stockholders or Carisma Therapeutics stockholders could own less of the combined company than is currently anticipated; (vi) the risk that the conditions to payment under the contingent value rights will not be met and that the contingent value rights may otherwise never deliver any value to Sesen Bio stockholders; (vii) risks associated with the possible failure to realize certain anticipated benefits of the proposed transaction, including with respect to future financial and operating results; (viii) uncertainties regarding the impact any delay in the closing would have on the anticipated cash resources of the combined company upon closing and other events and unanticipated spending and costs that could reduce the combined company's cash resources; (ix) the effect of uncertainties related to the actions of activist stockholders, which could make it more difficult to obtain the approval

of Sesen Bio stockholders with respect to the transaction related proposals and result in Sesen Bio incurring significant fees and other expenses, including for third-party advisors; (x) the occurrence of any event, change or other circumstance or condition that could give rise to the termination of the merger agreement, as amended; (xi) the effect of the announcement, pendency or completion of the merger on Sesen Bio's or Carisma Therapeutics' business relationships, operating results and business generally; (xii) costs related to the merger; (xiii) the outcome of any legal proceedings instituted against Sesen Bio, Carisma Therapeutics or any of their respective directors or officers related to the merger agreement or the transactions contemplated thereby; (xiv) the ability of Sesen Bio or Carisma Therapeutics to protect their respective intellectual property rights; (xv) competitive responses to the proposed transaction and changes in expected or existing competition; (xvi) the success and timing of regulatory submissions and pre-clinical and clinical trials; (xvii) regulatory requirements or developments; (xviii) changes to clinical trial designs and regulatory pathways; (xix) changes in capital resource requirements; (xx) risks related to the inability of the combined company to obtain sufficient additional capital to continue to advance its product candidates and its preclinical programs; (xxi) legislative, regulatory, political and economic developments; and (xxii) other factors discussed in the "Risk Factors" section of Sesen Bio's Annual Report on Form 10-K, Quarterly Reports on Form 10-Q and other reports filed with the Securities Exchange Commission ("SEC"). In addition, the forward-looking statements included in this communication represent Sesen Bio's and Carisma Therapeutics' views as of the date hereof. Sesen Bio and Carisma Therapeutics anticipate that subsequent events and developments will cause the respective company's views to change. However, while Sesen Bio may elect to update these forward

Important Additional Information

In connection with the proposed transaction between Carisma Therapeutics and Sesen Bio, Sesen Bio filed with the SEC a registration statement on Form S-4 (as amended, the "Registration Statement") that includes a proxy statement of Sesen Bio and also constitutes a prospectus of Sesen Bio with respect to shares of Sesen Bio common stock to be issued in the proposed transaction (the "Proxy Statement/Prospectus"). The definitive Proxy Statement/Prospectus was first mailed to Sesen Bio stockholders on or about January 24, 2023. Sesen Bio may also file other relevant documents regarding the proposed transaction with the SEC. INVESTORS AND SECURITY HOLDERS ARE URGED TO READ THESE MATERIALS, INCLUDING THE REGISTRATION STATEMENT, THE DEFINITIVE PROXY STATEMENT/PROSPECTUS, AND ALL OTHER RELEVANT DOCUMENTS THAT ARE OR WILL BE FILED WITH THE SEC IN CONNECTION WITH THE PROPOSED TRANSACTION, INCLUDING ANY AMENDMENTS OR SUPPLEMENTS TO THESE MATERIALS, BECAUSE THEY CONTAIN OR WILL CONTAIN IMPORTANT INFORMATION ABOUT THE PROPOSED TRANSACTION AND THE PARTIES TO THE PROPOSED TRANSACTION. Investors and security holders are able to obtain the definitive Proxy Statement/Prospectus and other documents that are filed or will be filed by Sesen Bio with the SEC free of charge from the SEC's website at www.sec.gov or from Sesen Bio at the SEC Filings section of www.sesenbio.com.

No Offer or Solicitation

This Current Report on Form 8-K shall not constitute an offer to sell or the solicitation of an offer to buy any securities, nor shall there be any sale of securities in any jurisdiction in which such offer, solicitation or sale would be unlawful prior to registration or qualification under the securities laws of any such jurisdiction. No offering of securities shall be made except by means of a prospectus meeting the requirements of Section 10 of the Securities Act of 1933, as amended. Subject to certain exceptions to be approved by the relevant regulators or certain facts to be ascertained, a public offer will not be made directly or indirectly, in or into any jurisdiction where to do so would constitute a violation of the laws of such jurisdiction, or by use of the mails or by any means or instrumentality (including without limitation, facsimile transmission, telephone or internet) of interstate or foreign commerce, or any facility of a national securities exchange, of any such jurisdiction.

Participants in the Solicitation

Sesen Bio and Carisma Therapeutics and their respective directors, executive officers and other members of management may be deemed to be participants in the solicitation of proxies in respect of the proposed transaction. Information about Sesen Bio's directors and executive officers is available in Sesen Bio's Annual Report on Form 10-K for the fiscal year ended December 31, 2021, its definitive proxy statement dated April 28, 2022 for its 2022 Annual Meeting of Stockholders and its Current Report on Form 8-K filed with the SEC on August 31, 2022. Other information regarding the participants in the proxy solicitation and a description of their interests in the proposed transaction, by security holdings or otherwise, is included in the definitive Proxy Statement/Prospectus and other relevant materials that are or will be filed with the SEC regarding the proposed transaction. Investors should read the definitive Proxy Statement/Prospectus carefully before making any voting or investment decisions. You may obtain free copies of these documents from Sesen Bio or the SEC's website as indicated above.