

\$150,000,000



COGENT BIOSCIENCES, INC.

Common stock

Pre-funded warrants to purchase common stock

This free writing prospectus relates only to the offering described below and should be read together with the preliminary prospectus supplement dated June 13, 2022 (the "Preliminary Prospectus Supplement"), including the documents incorporated by reference therein, and the accompanying base prospectus. This free writing prospectus supplements the Preliminary Prospectus Supplement primarily to reflect the addition of certain pre-funded warrants, and the shares of common stock issuable upon the exercise of such pre-funded warrants, to the securities being offered by Cogent Biosciences, Inc. Except as otherwise indicated, all information in this free writing prospectus and the Preliminary Prospectus Supplement assumes no exercise of outstanding options or warrants, no exercise of the underwriters' option to purchase additional shares of our common stock and no exercise of the pre-funded warrants included in this offering.

This free writing prospectus is qualified in its entirety by reference to the Preliminary Prospectus Supplement, including the documents incorporated by reference therein, and the accompanying base prospectus. Financial information and other information presented in the Preliminary Prospectus Supplement or incorporated by reference therein is deemed to have changed to the extent affected by the changes described herein. This free writing prospectus should be read together with the Preliminary Prospectus Supplement, including the documents incorporated by reference therein, and the accompanying base prospectus, before making a decision in connection with an investment in the securities. Capitalized terms used in this free writing prospectus but not defined have the meanings given to them in the Preliminary Prospectus Supplement.

Issuer: Cogent Biosciences, Inc.

Common stock offered by us: \$150,000,000 of shares.

Pre-funded warrants offered by us: We are also offering, in lieu of common stock to certain investors, pre-funded warrants to purchase shares of our common stock. The purchase price of each pre-funded warrant equals the price per share at which the shares of our common stock are being sold to the public in this offering, minus \$0.001, which is the exercise price of each pre-funded warrant per share. Each pre-funded warrant will be exercisable at any time after the date of issuance of such pre-funded warrant, subject to an ownership limitation. See "Description of pre-funded warrants." This free writing prospectus and the Preliminary Prospectus Supplement also relate to the offering of the shares of our common stock issuable upon exercise of the pre-funded warrants.

The lock-up restrictions described in the Preliminary Prospectus Supplement under "Underwriting" will not apply to issuance of common stock upon the exercise of the pre-funded warrants during the 90-day period following the date of Preliminary Prospectus Supplement.

Underwriters' option to purchase additional shares:

We have granted the underwriters an option, for a period of 30 days, to purchase additional shares of our common stock. The number of shares subject to the underwriters' option equals 15% of the total number of shares of common stock we are offering plus the shares of common stock underlying the pre-funded warrants.

Dilution:

We present dilution on a pro forma as-adjusted basis to give effect to (i) the assumed conversion of all outstanding shares of our Series A Preferred Stock and (ii) our receipt of the estimated net proceeds from the sale of shares of our common stock and pre-funded warrants to purchase shares of our common stock in this offering, based on the public offering price of \$ per share of common stock and \$ per pre-funded warrant (which equals the public offering price per share of the common stock less the \$0.01 per share exercise price of each such pre-funded warrant) (and excluding shares of common stock issued and any proceeds received upon exercise of the pre-funded warrants or any resulting accounting associated with the pre-funded warrants), after deducting the underwriting discounts and commissions and estimated offering expenses payable by us.

On a pro forma as-adjusted basis, our as-adjusted net tangible book value as of March 31, 2022 would have been \$ million, or \$ per share of common stock. This represents an immediate increase in pro forma as-adjusted net tangible book value to existing stockholders of \$ per share of common stock and immediate dilution in pro forma as-adjusted net tangible book value to purchasers of shares of common stock in this offering of \$ per share of common stock.

Listing:

Shares of our common stock are listed on the Nasdaq Global Select Market, or Nasdaq, under the symbol "COGT." We do not intend to list the pre-funded warrants on Nasdaq, any other nationally recognized securities exchange or any other nationally recognized trading system.

Risk Factors

There is no public market for the pre-funded warrants in this offering.

There is no established public trading market for the pre-funded warrants being offered in this offering, and we do not expect a market to develop. In addition, we do not intend to apply for listing of the pre-funded warrants on any national securities exchange or other nationally recognized trading system. Without an active market, the liquidity of the pre-funded warrants will be limited.

Any holder of the pre-funded warrants will have no rights as a common stockholder until such holder exercises its pre-funded warrant and acquires our common stock.

Until the holder of each pre-funded warrants exercise its pre-funded warrant and acquires shares of our common stock, such holder will have no rights with respect to the shares of our common stock underlying such pre-funded warrant. Upon exercise of their respective pre-funded warrant, the holder will be entitled to exercise the rights of a common stockholder only as to matters for which the record date occurs after the exercise date.

A significant holder or beneficial holder of our common stock may not be permitted to exercise the pre-funded warrant that it holds.

A holder of a pre-funded warrant will not be entitled to exercise any portion of the pre-funded warrant that, upon giving effect to such exercise, would cause the aggregate number of shares of our common stock beneficially owned by such holder (together with its affiliates and any other persons whose beneficial ownership of Common Stock would be aggregated with the holder for purposes of Section 13(d) of the Securities Exchange Act of 1934, as amended (the "Exchange Act")) to exceed 9.99% of the total number of then issued and outstanding shares of common stock, as such percentage ownership is determined in accordance with the terms of the pre-funded warrant and subject to such holder's rights under the pre-funded warrant to increase or decrease such percentage to any other percentage not in excess of 19.99% upon at least 61 days' prior notice from such holder to us. As a result, you may not be able to exercise your pre-funded warrant for shares of our common stock at a time when it would be financially beneficial for you to do so. In such a circumstance, you could seek to sell your pre-funded warrant to realize value, but you may be unable to do so in the absence of an established trading market.

Use of Proceeds

We estimate that we will receive net proceeds from the issuance and sale of shares of our common stock and pre-funded warrants in this offering of approximately \$ million (or approximately \$ million if the underwriters' option to purchase up to \$22,500,000 of additional shares of common stock is exercised in full), based on the public offering price of \$ per share and after deducting the estimated underwriting discounts and commissions and estimated offering expenses payable by us. We will receive nominal proceeds, if any, upon exercise of the pre-funded warrants.

We intend to use the net proceeds from this offering for development, regulatory and commercial preparation activities relating to bezuclastinib and other product candidates, as well as for working capital and general corporate purposes. Our expected use of proceeds from this offering represents our current intentions based on our present plans and business condition.

Description of Pre-Funded Warrants

The following is a summary of the material attributes and characteristics of the pre-funded warrants. The form of pre-funded warrants will be provided to the pre-funded warrant purchasers in this offering and will be filed as an exhibit to a Current Report on Form 8-K with the Securities and Exchange Commission (the SEC) in connection with this offering. The following summary is subject in all respects to the provisions contained in the pre-funded warrants.

Each pre-funded warrant entitles the holder thereof to purchase shares of our common stock at an exercise price equal to \$0.01 per share. Each pre-funded warrant will be exercisable at any time beginning on the date of issuance. The number of shares of our common stock issuable upon exercise of pre-funded warrant is subject to adjustment upon certain corporate events, including certain stock dividends and splits, combinations, reclassifications and certain other events.

The holder of the pre-funded warrant may exercise the pre-funded warrant by delivering an exercise notice, completed and duly signed, and payment in cash of the exercise price for the number of shares of our common stock for which the pre-funded warrant is being exercised. The holder of the pre-funded warrant may also satisfy its obligation to pay the exercise price through a "cashless exercise," in which the holder receives the net value of the pre-funded warrant in shares of common stock determined according to the formula set forth in the pre-funded warrant.

Upon a holder's exercise of the pre-funded warrant, we will issue the shares of common stock to which the holder is entitled pursuant to such exercise within three trading days after the exercise date.

A holder of the pre-funded warrant will not be entitled to exercise any portion of such pre-funded warrant that, upon giving effect to such exercise, would cause the aggregate number of shares of our common stock beneficially owned by such holder (together with its affiliates and any other persons whose beneficial ownership of common stock would be aggregated with the holder for purposes of Section 13(d) of the Exchange Act) to exceed 9.99% of the total number of then issued and outstanding shares of common stock, as such percentage ownership is determined in accordance with the terms of the pre-funded warrant and subject to such holder's rights under the pre-funded warrant to increase or decrease such percentage to any other percentage not in excess of 19.99% upon at least 61 days' prior notice from such holder to us.

Upon the consummation of a fundamental transaction (as described in the pre-funded warrants), the holders of the pre-funded warrants will be entitled to receive, upon exercise of the pre-funded warrants, the kind and amount of securities, cash, or other property that such holders would have received had they exercised the pre-funded warrants immediately prior to such fundamental transaction, without regard to any limitations on exercise contained in the pre-funded warrants.

There is no established public trading market for the pre-funded warrants and we do not expect a market to develop. In addition, we do not intend to apply for listing of the pre-funded warrants on any national securities exchange or other nationally recognized trading system.

Cogent Biosciences, Inc. shall initially serve as the warrant agent under the pre-funded warrants.

The pre-funded warrants do not confer upon the holder any voting or other rights as stockholders of Cogent Biosciences, Inc.

General

Additional conforming changes are hereby made to the Preliminary Prospectus Supplement to reflect the changes described in this free writing prospectus. All terms of the Preliminary Prospectus Supplement applicable to our common stock will be applicable to the shares underlying the pre-funded warrants upon issuance.

Cogent Biosciences, Inc. has filed a registration statement (including a preliminary prospectus supplement dated June 13, 2022 and the accompanying base prospectus) with the SEC for the offering to which this communication relates. Before you invest, you should read the preliminary prospectus supplement and the accompanying base prospectus and other documents the Company has filed with the SEC for more complete information about the Company and the offering. You may get these documents for free by visiting EDGAR on the SEC website at www.sec.gov. Alternatively, copies may be obtained by contacting Jefferies LLC, Attention: Equity Syndicate Prospectus Department, 520 Madison Avenue, 2nd Floor, New York, New York 10022; telephone: 877-821-7388; email: Prospectus_Department@Jefferies.com; or Piper Sandler & Co., Attention: Prospectus Department, 800 Nicollet Mall, J12S03, Minneapolis, Minnesota 55402, or by telephone at (800) 747-3924, or by email at prospectus@psc.com; or Guggenheim Securities, LLC, Attention: Equity Syndicate Department, 330 Madison, New York, New York 10017, by telephone at 212 518-9544, or by email at GSEquityProspectusDelivery@guggenheimpartners.com.