Cooley

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September 18, 2023

U.S. Securities and Exchange Commission
Division of Corporation Finance
100 F Street, N.E.
Washington, DC 20549
Attn: Tim Buchmiller
Jason Drory
Eric Atallah
Lynn Dicker

**Re: Lexeo Therapeutics, Inc.**
**Amendment No. 3 to Draft Registration Statement on Form S-1**
**Submitted August 16, 2023**
**CIK No. 0001907108**

Ladies and Gentlemen:

On behalf of Lexeo Therapeutics, Inc. (the "***Company***"), we are providing this letter in response to the comments of the staff (the "***Staff***") of the U.S. Securities and Exchange Commission (the "***Commission***") Division of Corporation Finance contained in its letter, dated August 18, 2023 (the "***Comment Letter***"), relating to the Company's Amendment No. 3 to Draft Registration Statement on Form S-1, confidentially submitted on August 16, 2023 (the "***Draft Registration Statement***").

The Company is concurrently confidentially submitting Amendment No. 4 to the Draft Registration Statement on Form S-1 (the "***Amendment No. 4***"), which reflects changes made in response to certain of the comments contained in the Comment Letter.

The numbering of the paragraphs below corresponds to the numbering of the comments contained in the Comment Letter, which for your convenience we have incorporated into this response letter in italics. Page references in the text of this response letter correspond to the page numbers of Amendment No. 4. Capitalized terms used but not otherwise defined in this letter shall have the meanings set forth in Amendment No. 4.

Amendment No. 3 to Draft Registration Statement on Form S-1 submitted August 16, 2023

Cover Page

1. *We note your response to prior comment 1 and revised disclosure on page 78. Please revise your cover page disclosure to clarify your proposed offering is contingent upon Nasdaq Listing.*

*Response:* The Company respectfully acknowledges the Staff's comment and has revised the cover page of Amendment No. 4.

Prospectus Summary

Overview, page 1

2. *We note your statement that you have "best in class science in the discovery and development of any next generation genetic medicine candidates." Given the development stage of product candidates and length of the drug approval process, it is premature and inappropriate to speculate or imply that your science is "best-in-class." Please remove this statement.*

   *Response*: The Company respectfully acknowledges the Staff's comment and has revised pages 2, 121 and 127 of Amendment No. 4 to remove this statement.

Our Pipeline, page 2

3. *We note the revisions to the pipeline table on pages 2 and 121. The point of the arrow for each product candidate should end at its current status. For example only, where the LX2020 study has not yet commenced Phase 1, the arrow should end in preclinical until your Phase 1 trial begins. In addition, it appears that you have not completed the discovery of LX2022 as you state you "plan to complete candidate selection for LX2022 in 2024," the arrow should not go all the way to the end of "discover."*

   *Response*: The Company respectfully acknowledges the Staff's comment and has revised pages 2 and 121 of Amendment No. 4.

Our manufacturing approach, page 130

4. *We note your response to prior comments 3 and 5 and reissue in part. Please revise your disclosure to clarify the "next-generation sequencing analysis" that was performed. Your disclosure should clarify which "HEK systems" you compared your process to. For example only, to the extent your analysis evaluated more than one HEK system, your disclosure should state the percentage of impurities observed for each system. In addition, we note your disclosure that "[b]ased on information from a third-party contract development and manufacturing organization and internal estimates, we believe our manufacturing process is approximately 10 times more yield efficient than an HEK process to manufacture AAVrh10." Please revise your disclosure to clarify the specific types of information and estimates you relied upon to support your belief that your process is "10 times more efficient" or otherwise advise.*

   *Response*: The Company respectfully acknowledges the Staff's comment and has revised pages 6, 7, 131 and 132 of Amendment No. 4.

* * * *

Please direct any questions or further comments concerning Amendment No. 4 or this response letter to either the undersigned at (212) 479-6565 or Dayne Brown of Cooley LLP at (212) 479-6712.

Sincerely

/s/ Eric Blanchard
Eric Blanchard

cc: R. Nolan Townsend, Lexeo Therapeutics, Inc.
Jenny Robertson, Lexeo Therapeutics, Inc.
Dayne Brown, Cooley LLP
Peter Byrne, Cooley LLP
Divakar Gupta, Cooley LLP
Siavosh Salimi, Paul Hastings LLP
William A. Magioncalda, Paul Hastings LLP