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VIA EDGAR

February 1, 2021

United States Securities and Exchange Commission
Division of Corporation Finance
100 F Street, N.E.
Washington D.C., 20549

Attn: Eric Atallah
Kevin Kuhar
Joe McCann
Margaret Schwartz

Re: Vor Biopharma Inc.
Registration Statement on Form S-1
Submitted January 15, 2021
CIK No. 0001817229

Ladies and Gentlemen:

On behalf of Vor Biopharma Inc. (the "***Company***"), we are providing this response letter in response to the comment (the "***Comment***") received from the staff of the U.S. Securities and Exchange Commission's Division of Corporation Finance (the "***Staff***") contained in its letter, dated January 27, 2021 (the "***Comment Letter***"), relating to the Company's Registration Statement on Form S-1, as filed with the Staff on January 15, 2021.

The Company is concurrently filing Amendment No. 1 to the Registration Statement on Form S-1 (the "***Amended Registration Statement***"), which reflects changes made in response to the Comment contained in the Comment Letter and certain other changes. For your convenience, we have incorporated the Comment into this response letter in italics. Page references in the text of this response letter correspond to the page numbers of the Amended Registration Statement.

Summary

1. *The revised disclosure on page 2 and elsewhere concerning your VCAR33 program indicates that VCAR33 is not the subject of an on-going clinical trial but rather that a third-party is conducting a Phase 1/2 trial of a T cell therapy that uses "the same CAR construct as VCAR33." In light of this revision, it is inappropriate to: (i) identify yourself as a "clinical-stage company", (ii) to highlight this third-party study in your pipeline table and (iii) to refer to the third-party trial/program throughout the prospectus as "VCAR33". With reference to your risk factor disclosure on page 27, also revise page 2 to explain that FDA may disagree with the sufficiency of your right of reference to the preclinical, manufacturing or clinical data generated by the third-party trial.*

Response to Comment: In response to the Comment, the Company revised its disclosure to (i) remove identifications of itself as a "clinical-stage" company, (ii) update its pipeline table and (iii) clarify the relationship between VCAR33 and the third-party trial, including by providing further information regarding the FDA requirements for demonstrating comparability. The Company also revised its disclosure on page 2 and elsewhere in the Amended Registration Statement, as appropriate, to provide additional information about the risks associated with the VCAR33 program.

The Company respectfully requests the Staff's assistance in completing the review of this response letter. Please contact me at (617) 937 2332 with any questions regarding the Company's responses to the Staff's Comment or if you require further information. Thank you in advance for your attention to this matter.

Sincerely,

/S/ RICHARD SEGAL
RICHARD SEGAL

cc: Robert Ang, Vor Biopharma Inc.
Nathan Jorgensen, Vor Biopharma Inc.
Amy Mendel, Vor Biopharma Inc.
Charles S. Kim, Cooley LLP
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