UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
WASHINGTON, D.C. 20549

DIVISION OF
CORPORATION FINANCE

January 4, 2021

Robert Ang, M.B.B.S.
President and Chief Executive Officer
Vor Biopharma Inc.
100 Cambridgepark Drive
Suite 400
Cambridge, MA 02140

Re: Vor Biopharma Inc.
Amendment No. 1 to Draft Registration Statement on Form S-1
Submitted December 18, 2020
CIK No. 0001817229

Dear Dr. Ang:

We have reviewed your amended registration statement and have the following comments. In some of our comments, we may ask you to provide us with information so we may better understand your disclosure.

Please respond to this letter by amending your registration statement and providing the requested information. If you do not believe our comments apply to your facts and circumstances or do not believe an amendment is appropriate, please tell us why in your response.

After reviewing any amendment to your registration statement and the information you provide in response to these comments, we may have additional comments. Unless we note otherwise, our references to prior comments are to comments in our December 3, 2020 letter.

Amendment No. 1 to Draft Registration Statement on Form S-1, Submitted December 18, 2020

Summary, page 1

1. We note your response to our prior comment number 1. Please revise your disclosure in the Overview section to clearly state that your lead candidate, VOR33 is preclinical. To explain the novelty and uniqueness of your approach and to highlight the associated challenges, please also revise the Overview to disclose that (i) engineered hematopoietic stem cells have never undergone clinical trials and (ii) the removal of CD33 from hematopoietic stem cells has never been studied in clinical trials.

2. We note your response to our prior comment number 4. On page 18 you state that you have not yet filed an IND application for VOR33. Please revise pages 2 or 4 to state when you plan to submit an IND for VOR33 for AML.

Our Proprietary Vor Platform, page 2

3. We note that your disclosure on page 3 highlights that you have a highly efficient manufacturing process. Please revise page 3 to clarify the meaning of this statement in light of your risk factor disclosure on page 39, where you state that you "have not demonstrated that eHSCs or VCAR33 can be frozen and thawed in large quantities without damage, in a cost-efficient manner and without degradation" and, further, that you "may not be able to commercialize eHSCs, VCAR33 or other cell-based companion therapeutics we may develop on a large scale or in a cost-effective manner."

Risk Factors
Development of a product candidate such as VOR33, which is intended for use in combination or in sequence with an already approved therapy.., page 27

4. We note your response to prior comment 6. With reference to your disclosure on page 28, please revise to clarify whether you will need to work with Pfizer to satisfy the requirement that you reference in this risk factor. In this regard, it should be clear whether you will need to negotiate a license and/or supply agreement so that Mylotarg can be used in combination or in sequence with VOR33.

Business, page 121

5. We note your response to our prior comment number 11. Please revise pages 103 and 127 to expressly state that your companion therapeutic VCAR33, which is intended to be used in conjunction with VOR33, employs viral vectors.

You may contact Eric Atallah at 202-551-3663 or Kevin Kuhar at 202-551-3662 if you have questions regarding comments on the financial statements and related matters. Please contact Margaret Schwartz at 202-551-7153 or Joe McCann at 202-551-6262 with any other questions.

Sincerely,

Division of Corporation Finance
Office of Life Sciences

cc: Richard Segal, Esq.