Review of: "Evolution of new variants of SARS-CoV-2 during the pandemic: mutation-limited or selection-limited?"

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Potential competing interests: No potential competing interests to declare.

The paper explores the emergence and evolution of new SARS-CoV-2 variants during the pandemic. It investigates two hypotheses: the mutation-limited paradigm, which suggests that new variants arise due to random mutations, and the selection-limited paradigm, which proposes that new variants are selected due to immunity decline. The document provides evidence that contradicts the mutation-limited paradigm and supports the selection-limited paradigm. It suggests that the decline in immunity could be a common cause for the rise of new waves and the selection of new variants.

Weakness: The document acknowledges potential biases and limitations in the data used for the analysis. For instance, the actual onset of a new variant's invasion could be earlier than what is observed in the data, which could introduce bias in determining the time of origin. Additionally, the bias in the samples chosen for sequencing could result in an overrepresentation of new variants. The document also mentions that the correlation between the increase in the proportion of the new variant and the apparent rate of transmission can be deemed inherently weak. Despite these limitations, the document asserts that there are substantial grounds to reject the mutation-limited perspective and support the selection-limited paradigm.