



## Media Release

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# The battle of the SARS-CoV-2 variants: a winning approach

In order to fight the pandemic in the long term, it is crucial to understand why one variant prevails over another. An international study conducted by the Institute of Virology and Immunology and the University of Bern, in collaboration with the Friedrich-Loeffler-Institut in Germany, has provided important answers by comparing the spread and transmission of different emerging variants in parallel. This approach is now applicable to the comparison of new variants, such as delta and omicron. This [unique study](#) has just been published in the scientific journal Nature.

As new SARS-CoV-2 variants continue to emerge and drive the pandemic, the Institute of Virology and Immunology (IVI) and the University of Bern with international collaborators have studied emerging variants in animal (*in vivo*) and biophysical interaction and cell culture (*in vitro*) models. The originality of this new study is to have put the variants in direct competition in multiple models to reveal why some variants had a real advantage to spread globally.

According to Charaf Benarafa, senior author of the study: "Taken independently, each of the variants appears to be as effective as their progenitor, the initial virus: it is difficult to separate them. By recreating the natural conditions of competition, where an emerging variant and its progenitor are simultaneously present, it becomes possible to truly detect which variant will preferentially propagate and be transmitted to another individual. The challenge of our study was to associate different experimental models to better understand these mechanisms; and the combined analyses enabled us to discriminate the differences between the variants."

### Alpha wins in restrictive models, while beta is the "big loser"

The competition between the alpha and beta variants and their progenitor clearly show that the alpha variant has an advantage. Charaf Benarafa explains: "The more restrictive models of virus competition showed us that the alpha variant dominates and spreads better in the upper respiratory tract and transmits more efficiently. All the models also showed that the beta variant is the "big loser". It seems that the beta variant has benefited from favorable epidemiological circumstances to develop locally. On the other hand, the alpha variant, which has spread globally, has demonstrated its intrinsic high transmission potential through its spike mutations.

In cooperation with  
the Vetsuisse Faculty Bern

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**Meanwhile, other variants are emerging**

Predicting which variant will better spread and why continues to be a challenge. Only in-depth studies can provide a better understanding of the factors associated with this spread. According to Charaf Benarafa, "It is with a combination of different in vitro and in vivo models that we were able to consolidate our results to explain the dominance of the alpha variant in immunologically naive populations. Now that a significant proportion of the population is vaccinated, we will also have to consider the impact of immunity on the advantage of new emerging mutants."

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