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BRIEF19

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BREAKING NEWS RESEARCH BRIEFING

Moderna vaccine shows reduced activity against South Africa B.1.351, Brazil (P.1), and California (B.1.427/B.1.429) coronavirus variants. However, it remains highly active against U.K. B.1.1.7 variant.

As vaccination rates go up and hospitalizations go down, there is finally reason for optimism in ending the covid-19 pandemic. But variants of SARS-CoV-2 could substantially impede our progress. Scientists are rushing to study whether antibodies generated by the currently authorized vaccines offer as much protection against emerging variants as they have been shown to provide against the original or “wild type” virus.

There are several ways to study this question. Three ways to study this are:

1. Laboratory experiments of cells and viruses.
2. Animal studies
3. Real-world data

Today, the *New England Journal of Medicine* released a paper by researchers at Moderna and their collaborators at the US National Institutes of Health. In it, scientists report data using the first approach; they measured how well antibodies taken from humans previously vaccinated with Moderna’s mRNA-1273 shot (the one being rolled out to the public now) attach to and neutralize viral particles engineered to resemble the new coronavirus variants.

Antibodies taken from patients who received the Moderna vaccine showed reduced ability to neutralize the coronavirus variants found in South Africa (B.1.351), Brazil (P.1), and in California (B.1.427/B.1.429). The good news is that the B.1.1.7 (UK variant) response was not affected. This is good because this variant has been shown to have a [small but real](#) increase in [mortality](#). Of these, the South Africa variant evaded neutralization the most, with a decrease by more than a factor of 6. The reduction in neutralization against the Brazil and California variants was a factor of 2.3 and 3.5, respectively.

However, the neutralizations were still well above detectable levels. This means that it takes a higher quantity of vaccine-derived antibodies to get the same amount of neutralizing that occurs when the antibodies confront the “wild type” virus.

We don’t yet know whether these new data will translate to any clinical impact among vaccinated persons. Many scientists believe that as long as antibody activity remains above a certain level, that the vaccines will still provide broad clinical protection against serious disease. The data today show that the Moderna vaccine is still well above that threshold. One possibility is that those who received the Moderna vaccine would still be protected against serious disease caused by the South Africa B.1.351 variant, but not against mild infection or the ability to spread the virus, especially to unvaccinated individuals.

Yesterday, we learned that the Oxford/AstraZeneca vaccine [does not protect](#) against mild or moderate infections with the B.1.351 South Africa variant, though we do not know about whether that product still protects against more serious illness. On the hopeful side, the Johnson & Johnson vaccine, constructed similarly to the Oxford/AstraZeneca option, has indeed been shown to offer [powerful protection](#) against serious illness from the South Africa variant. In the meantime, we await real-world data on hospitalizations and other markers of serious covid-19 in areas where the new variants are dominant. That will tell us, more than anything, just how the increasingly vaccinated population at large is responding to these new versions of SARS-CoV-2. Finally, scientists are likely to study what happens to non-human primates who

are vaccinated and then exposed to a novel variant. So far, data on these experiments, assuming they exist, have not been made public. In an email to *Brief19*, Darin Edwards, the Director for Infectious Diseases at Moderna said, “I can’t comment specifically on the non-clinical research efforts that we are performing in the variant space, but I will say we are trying to be as comprehensive as possible, as we were in the original evaluation of mRNA-1273.”

Competing companies like Pfizer/BioNtech, Johnson & Johnson, and others are also likely to be addressing these concerns using a combination of the various approaches described above. If and when such data become available, they would add important about what we can expect in the coming weeks and months. Any findings could determine the character of the next phase of the covid-19 pandemic.

—*Jeremy Samuel Faust MD MS*

Kimi Chernoby, MD, JD, Policy Section Founder, Joshua Niforatos, MD Research Section Editor, Frederick Milgrim, MD, Editor-at-Large, Joshua Lesko, MD Lead Policy Analyst, Barb Cunningham, Copy-editor, Benjy Renton, Thread-of-the-Week, Anna Fang, Week-in-Review. Megan Davis, social media. Kane Elfman PhD, Publishing and Design. Jeremy Samuel Faust MD MS, Editor-in-Chief. <http://www.brief19.com/> Twitter: [@brief_19](https://twitter.com/brief_19) submissions@brief19.com. Brief19 is a daily executive summary of covid-19-related medical research, news, and public policy. It was founded and created by frontline emergency medicine physicians with expertise in medical research critique, health and public policy.