# Russia's Sputnik V vaccine, Pfizer, and Moderna induce better than natural immunity from mild COVID

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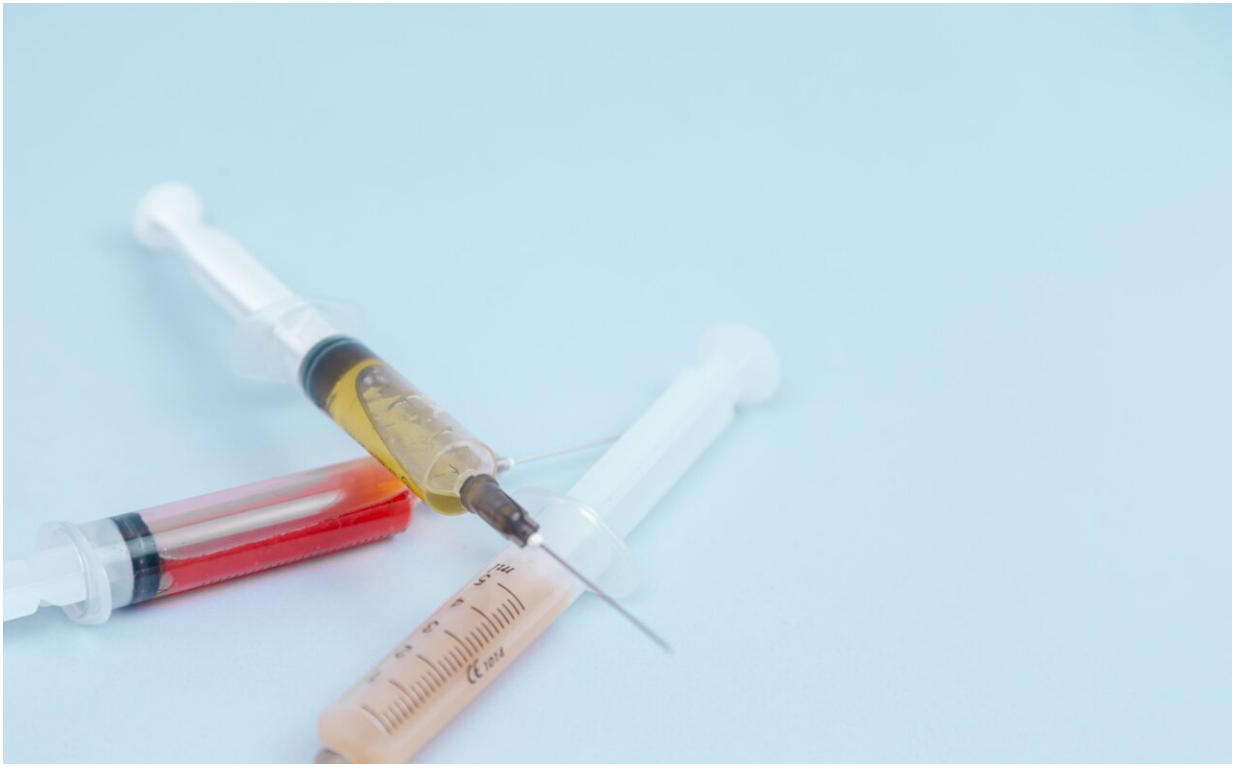

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Researchers from Skoltech, two Russian Academy of Sciences institutes, and U.S. biotech companies VirIntel and Argentys Informatics have investigated the effect of coronavirus immunization with three popular

vaccines: Moderna, Pfizer, and the Russian Sputnik V. The team found that complete vaccination—that is, getting both shots—on average resulted in a similar and sufficiently high immune response regardless of which of the three vaccines was used. The effect was also comparable to that after recovering from a severe or moderate, but not mild, COVID-19 infection. The findings are reported in a study released as a preprint on medRxiv.

All three vaccines induce the production of antibodies of a similar kind. Namely, those targeting what's known as the receptor-binding domain of the viral spike protein—the familiar outgrowth on the surface of the coronavirus particle through which it initially interacts with the host cell. Those were the antibodies considered in the study.

"While the results varied widely from patient to patient, apparently due to the individual features of each person's immune system, the overall distribution was comparable for those with two shots of Sputnik V, Moderna, or Pfizer; or a history of moderate to severe COVID-19," commented Research Scientist Maria Tutukina of Skoltech, the RAS Institute of Cell Biophysics and Institute for Information Transmission Problems (IITP).

The team also assessed the immunity of those having received just one shot of Sputnik V—the injection later adopted in Russia as the single-component Sputnik Light vaccine. "We found that Sputnik Light sometimes doesn't cut it. This probably has to do with the nature of the adenovirus-based vaccines: Each of the two injections uses a different adenovirus as the delivery vehicle. Some people are immune to one of them, rendering one of the two vaccine shots virtually useless. Our antibody measurements confirm this has been the case with a number of patients in our study," said the first author of the study, IITP Research Scientist Anna Kaznadzey, who is also a bioinformatics scientist at Argentys Informatics.

The researchers treated COVID-19 patients who had had a mild case or no symptoms as a distinct group, finding their immune response to be markedly lower than that of the double-vaccinated persons or those having recovered from at least a moderately severe infection.

Besides that, the study looked at how the level of antibodies varied with time after vaccination with Sputnik V. The main observation was that no universal trend emerged. Depending on the patient, the level of antibodies can diminish slowly or sharply, fluctuate, hold steady, or even continue growing for some time. In one case, the vaccination even had no effect on the moderate, yet apparently sufficient antibody count of the patient.

"So we saw all kinds of dynamics, really, but on the whole, it seems that patients receiving Sputnik V tend to retain a decent immunity for as long as 10 months or more," Tutukina said. The researchers hypothesize that this long-lasting effect might be a feature of adenovirus-based vaccines, since it was also observed for AstraZeneca, which belongs to the same class.

The team highlighted an important technical advantage of the study: "We relied on antibody readings from one and the same test system for all groups of patients tested. This is not the case for any other study considering these three vaccines, yet it is essential, because antibody levels measured with different test systems cannot be reliably compared."

All patients treated in the study as having recovered from COVID-19 have had a positive PCR test to confirm their status. The researchers acknowledge that the study this story reports on has been carried out in the preomicron phase of the pandemic.

**More information:** Anna Kaznadzey et al, BNT162b2, mRNA-1273,

and Sputnik V vaccines induce comparable immune responses on a par with severe course of COVID-19 (2022). DOI: 10.1101/2022.02.03.21265607

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