

# Antibody disease enhancement of COVID-19 does not appear to occur in animal models

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In the fight against viruses, antibodies have the potential to either block infection or enable infection and make the disease worse, leading to concern about their use as a therapy for COVID-19.

In a study published in the journal *Cell*, Duke investigators demonstrated in mice and monkeys that [human antibodies](#) lacked the ability to make

SARS-CoV-2 infection worse, and instead, exerted their defensive powers against the infection. The findings help reinforce evidence that [antibodies](#) are safe when given as treatments or induced by COVID-19 vaccines.

The two types of antibodies—those that neutralize the virus or those that enhance virus replication—have been the subjects of much research, raising concerns that antibodies could potentially trigger severe infections in some recipients.

But the current research, led by scientists at the Duke Human Vaccine Institute, is the first to use animal models to examine what occurs when SARS-CoV-2 antibodies are tested with the virus.

"Our study, using mice and monkeys, demonstrates that antibodies that are potentially harmful in the test tube do not appear to be harmful in the setting of SARS-CoV-2 infection in mice or monkeys," said co-senior author Barton F. Haynes, M.D., director of the Duke Human Vaccine Institute (DHVI).

"We tested a number of disease-enhancing antibodies in mouse and monkey experiments—multiple trials with different antibodies—and determined that disease enhancement does not occur in the animals, and that's good news for the development of effective treatments and vaccines." Haynes said.

Senior author Kevin Saunders, Ph.D., director of research at DHVI, isolated more than 1,700 antibodies from people who had COVID and screened them for their effects on the virus.

"We quickly found a set that were capable of blocking infection, including a set of antibodies that are candidates for [clinical trials](#) to prevent people from getting COVID," Saunders said. "We also found a

set of antibodies, that instead of preventing infection in [tissue culture](#), they enhanced infection in the [test tube](#)."

But in tests administering the antibodies to mice and monkeys, there were no such effects in the body that could be attributed to antibody administration. The presence of the [infection](#)-enhancing antibodies also did not counter how well the protective antibodies functioned in the body.

"These results in animal models suggest that SARS-CoV-2 antibody treatments or the induction of SARS-CoV-2 antibodies by vaccination have a low likelihood of exacerbating COVID-19 disease in humans," Saunders said. "Our findings are immediately applicable to COVID-19 vaccine candidates under development in use, and to antibodies and plasma being used to treat COVID-19."

**More information:** Dapeng Li et al, In vitro and in vivo functions of SARS-CoV-2 infection-enhancing and neutralizing antibodies, *Cell* (2021). [DOI: 10.1016/j.cell.2021.06.021](https://doi.org/10.1016/j.cell.2021.06.021)

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