Scientists identify new antibody for COVID-19 and variants

2 November 2021

Credit: Pixabay/CC0 Public Domain

A research collaboration between scientists at Duke University and the University of North Carolina at Chapel Hill has identified and tested an antibody that limits the severity of infections from a variety of coronaviruses, including those that cause COVID-19 as well as the original SARS illness.

The antibody was identified by a team at the Duke Human Vaccine Institute (DHVI) and tested in animal models at UNC-Chapel Hill. Researchers published their findings Nov. 2 in the journal *Science Translational Medicine*.

"This antibody has the potential to be a therapeutic for the current epidemic," said co-senior author Barton Haynes, M.D., director of DHVI. "It could also be available for future outbreaks, if or when other coronaviruses jump from their natural animal hosts to humans."

Haynes and colleagues at DHVI isolated the antibody by analyzing the blood from a patient who had been infected with the original SARS-CoV-1 virus, which caused the SARS outbreak in the early 2000s, and from a current COVID-19 patient.

They identified more than 1,700 antibodies, which the immune system produces to bind at specific sites on specific viruses to block the pathogen from infecting cells. When viruses mutate, many binding cites are altered or eliminated, leaving antibodies ineffectual. But there are often sites on the virus that remain unchanged despite mutations. The researchers focused on antibodies that target these sites because of their potential to be highly effective across different lineages of a virus.

Of the 1,700 antibodies from the two individuals, the Duke researchers found 50 antibodies that had the ability to bind to both the SARS-CoV-1 virus as well as SARS-CoV-2, which causes COVID-19.

Further analysis found that one of those cross-binding antibodies was especially potent—able to bind to a multitude of animal coronaviruses in addition to the two human-infecting pathogens.

"This antibody binds to the coronavirus at a location that is conserved across numerous mutations and variations," Haynes said. "As a result, it can neutralize a wide range of coronaviruses."

With the antibody isolated, the DHVI team turned to researchers at UNC who have expertise in animal coronaviruses. The UNC team, led by co-senior author Ralph S. Baric, Ph.D., epidemiology professor at UNC Gillings School of Global Public Health, tested it in mice to determine whether it could effectively block infections, or minimize the infections that occurred.

They found that it did both. When given before the animals were infected, the antibody protected mice against developing SARS, COVID-19 and its variants such as Delta, and many animal coronaviruses that have the potential to cause human pandemics.

"The findings provide a template for the rational design of universal vaccine strategies that are

variant-proof and provide broad protection from known and emerging coronaviruses," Baric said.

When given after infections, the antibody reduced severe lung symptoms compared to animals that were not treated with the antibody.

"The therapeutic activity even after mice were infected suggests that this could be a treatment deployed in the current pandemic, but also stockpiled to prevent the spread of a future outbreak or epidemic with a SARS-related virus," said David Martinez, Ph.D., a post-doctoral researcher in the Department of Epidemiology at UNC's Gillings School.

"This antibody could be harnessed to prevent maybe SARS-CoV-3 or SARS-CoV-4," Martinez said.

More information: A broadly cross-reactive antibody neutralizes and protects against sarbecovirus challenge in mice, *Science Translational Medicine* (2021). DOI: 10.1126/scitranslmed.abj7125

Provided by University of North Carolina at Chapel Hill

APA citation: Scientists identify new antibody for COVID-19 and variants (2021, November 2) retrieved 8 November 2022 from https://medicalxpress.com/news/2021-11-scientists-antibody-covid-variants.html