Study uncovers direct link between blood group A and a higher risk for COVID-19 infection

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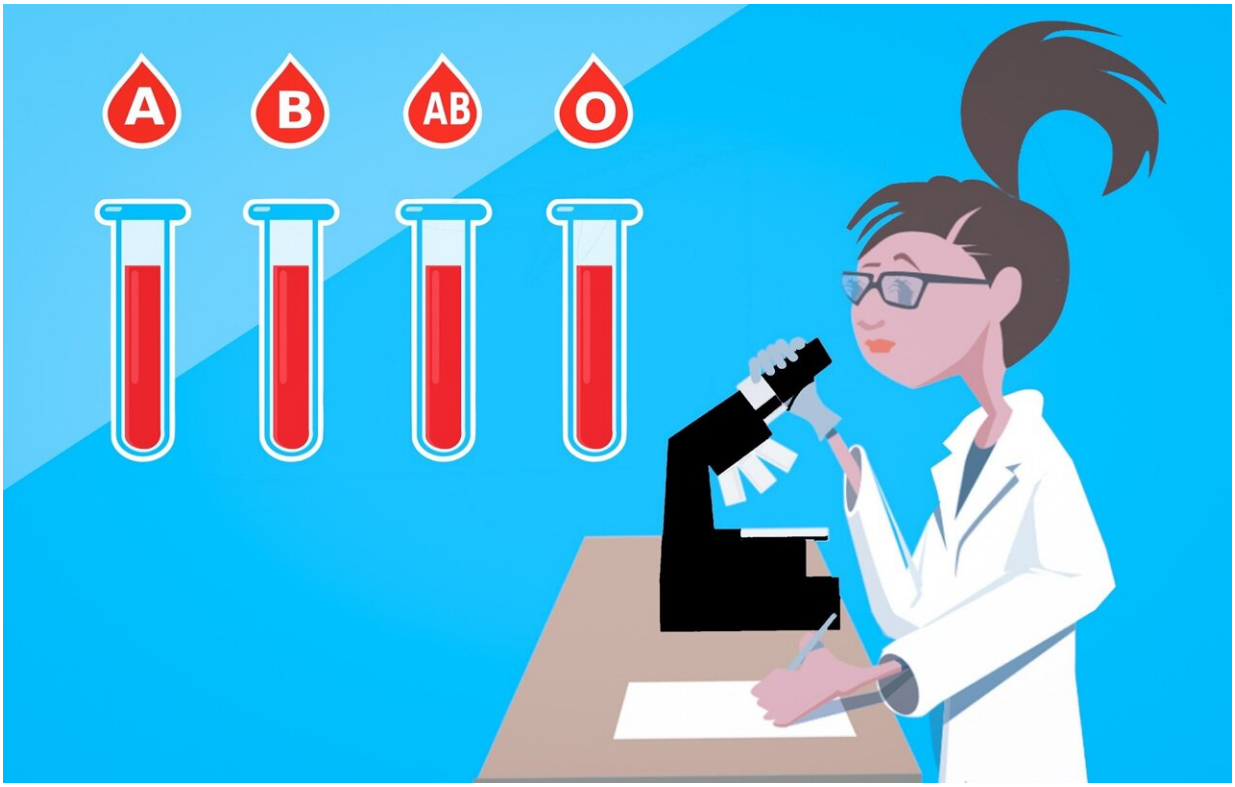

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Ask the average American what their blood type is, and you will likely receive a blank look. For most people, blood type only becomes an issue if they need a blood transfusion. Beginning in the earliest days of the

COVID-19 pandemic, however, results from previous work published in *Blood Advances* suggested that people with blood group A (about a third of the U.S. population) seemed to be more vulnerable to infection with the novel coronavirus, while those with blood group O (about 38% of the population) seemed to be somewhat less susceptible. Until now, however, no study had identified a "smoking gun"—a mechanism that might explain this apparent risk imbalance.

In a paper published today, June 27, in the journal *Blood*, a group of researchers led by Sean R. Stowell, MD, Ph.D., of Harvard Medical School describe their laboratory experiments demonstrating that SARS-CoV-2, the virus that causes COVID-19, preferentially infects blood group A cells, providing a direct link between this blood group and a higher rate of infection with the virus.

"We show that the part of the SARS-CoV-2 spike protein that's key to enabling the virus to invade cells displays affinity for blood group A cells, and the virus in turn also shows a preferential ability to infect blood group A cells," said Dr. Stowell.

In the lab, Dr., Stowell and colleagues found that the addition of a protein that inhibited SARS-CoV-2 from recognizing certain blood group antigens (substances that cause an immune response in the body) blocked the virus' preference for infecting blood group A cells, but had no effect on blood group O cells, he explained. The addition of a different protein that didn't block the recognition of blood group antigens had no infection-inhibiting effects on either A or O cells.

"Blood group A cells were more likely to be infected with SARS-CoV-2 when compared with blood group O cells," Dr. Stowell said. Further experiments showed that the Omicron strain of SARS-CoV-2 had an even stronger preference infecting blood group A cells than the original virus.

While the findings provide one mechanism for how blood group A may directly influence the risk of infection with SARS-CoV-2, Dr. Stowell cautioned that the findings do not mean people with blood group O have no need to take precautions against SARS-CoV-2 infection.

"Among a group of several thousand people, some studies suggest that those with blood group A may be 20% more likely to be infected after exposure to SARS-CoV-2 compared with those who have blood group O. But people with blood group O can still contract the virus and may transmit it to others," he said. "Moreover, factors such as age and chronic conditions like heart disease rank higher than blood type in determining individuals' risk for severe SARS-CoV-2 infection."

"Blood group is one of many variables that influence one's likelihood of becoming infected following exposure to SARS-CoV-2," he said. "Regardless of their blood group, individuals should be fully vaccinated against COVID-19 and should continue to take other preventive measures appropriate to their risk level."

Future studies will be needed to uncover features of the virus that are ultimately responsible for engaging blood group A in addition to the extent to which this preference is preserved as new variants SARS-CoV-2 variants emerge.

More information: Shang-Chuen Wu et al, Blood Group A Enhances SARS-CoV-2 Infection, *Blood Journal* (2023). DOI: 10.1182/blood.2022018903

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