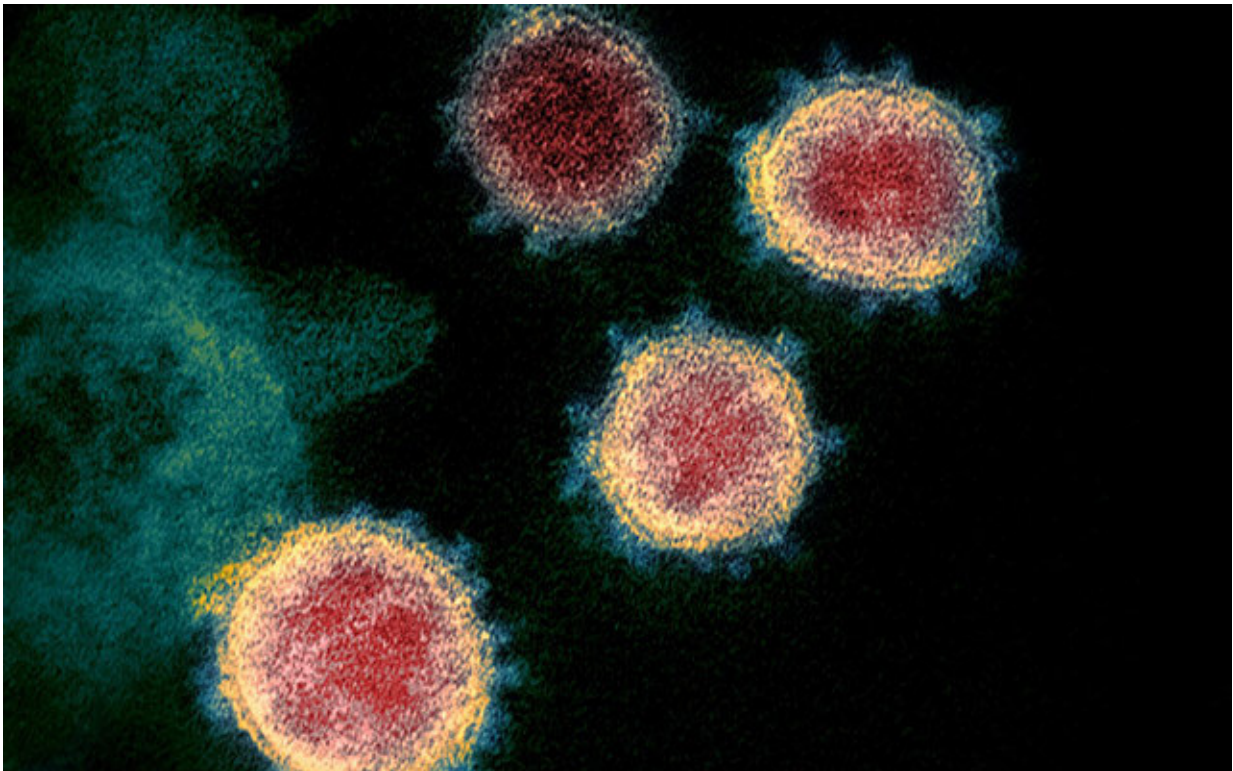


COVID-19: The older you are, the more antibodies you have

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A colored scanning electron micrograph of the SARS-CoV-2 virus. Credit: NIAID

With the emergence of SARS-CoV-2 variants worldwide, the pandemic's spread is accelerating. A research team led by Joelle Pelletier and Jean-François Masson, both professors in Université de Montréal's

Department of Chemistry, wanted to find out whether natural infection or vaccination led to more protective antibodies being generated.

In their study published today in *Scientific Reports*, they observe that those who received the Pfizer BioNTech or AstraZeneca vaccine had [antibody levels](#) that were significantly higher than infected individuals. These [antibodies](#) were also effective against the Delta variant, which wasn't present in Quebec when the samples were collected in 2020.

Masson, a biomedical instruments specialist, and Pelletier, a protein chemistry expert, were interested in an understudied group: people who have been infected by SARS-CoV-2 but were not hospitalized as a result of the infection.

32 non-hospitalized COVID-19 positive Canadian adults

Consequently, 32 non-hospitalized COVID-19 positive Canadian adults were recruited by the Centre hospitalier de l'Université Laval 14 to 21 days after being diagnosed through PCR testing. This was in 2020, before the Beta, Delta and Gamma variants emerged.

"Everyone who had been infected produced antibodies, but [older people](#) produced more than adults under 50 years of age," said Masson. "In addition, antibodies were still present in their bloodstream 16 weeks after their diagnosis."

Antibodies produced after an infection by the original, "native" strain of the virus also reacted to SARS-CoV-2 variants that emerged in subsequent waves, namely Beta (South Africa), Delta (India) and Gamma (Brazil), but to a lesser extent: a reduction of 30 to 50 percent.

A surprising reaction to the Delta variant

"But the result that surprised us the most was that antibodies produced by naturally infected individuals 50 and older provided a greater degree of protection than adults below 50, " said Pelletier.

"This was determined by measuring the antibodies' capacity to inhibit the interaction of the Delta variant's spike protein with the ACE-2 receptor in human cells, which is how we become infected," he added. "We didn't observe the same phenomenon with the other variants."

When someone who has had a mild case of COVID is vaccinated, the antibody level in their blood doubles compared to an unvaccinated person who has been infected by the virus. Their antibodies are also better able to prevent spike-ACE-2 interaction.

"But what's even more interesting," said Masson, "is that we have samples from an individual younger than 49 whose infection didn't produce antibodies inhibiting spike-ACE-2 interaction, unlike vaccination. This suggests that vaccination increases protection against the Delta [variant](#) among people previously infected by the native strain."

Both scientists believe more research should be conducted to determine the best combination for maintaining the most effective level of antibodies reactive to all variants of the virus.

"Cross-reactivity of antibodies from non-hospitalized COVID-19 positive individuals against the native, B.1.351, B.1.617.2, and P.1 SARS-CoV-2 spike proteins," by Jean-François Masson et al, was published on October 26 2021 in *Scientific Reports*.

The study was done in collaboration with Université Laval, the Centre hospitalier de l'Université Laval, Héma-Québec and the National

Research Council of Canada. It was funded by the Canadian Institutes of Health Research, the Natural Sciences and Engineering Research Council of Canada, the National Research Council of Canada's Pandemic Response Challenge Program and the Canada Foundation for Innovation.

More information: Cross-reactivity of antibodies from non-hospitalized COVID-19 positive individuals against the native, B.1.351, B.1.617.2, and P.1 SARS-CoV-2 spike proteins, *Scientific Reports* (2021). DOI: 10.1038/s41598-021-00844-z , www.nature.com/articles/s41598-021-00844-z

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