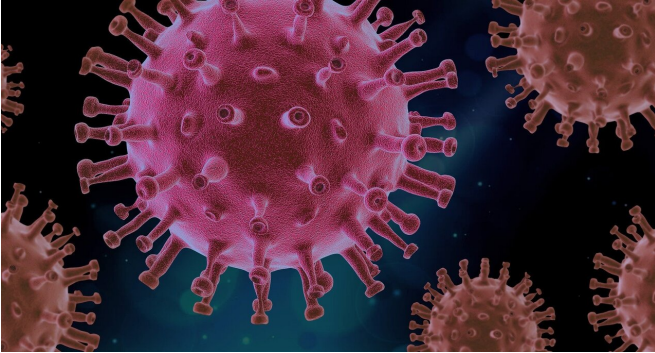


# Immune response to COVID-19's spike protein – the secret to a successful vaccine?

15 July 2020



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Scientists have uncovered how a crucial component of the immune system responds to the spike protein of SARS-CoV-2, the virus that causes COVID-19—important information for future validation of vaccine candidates.

Coronavirus particles have a corona (crown) of proteins that resemble spikes, which enable the virus to attach and enter [cells](#) in humans. The spike protein is crucial in inducing neutralizing antibodies to protect from re-infection.

Neutralizing antibodies not only bind to the viral spike protein, but prevent it from being able to attach to and enter [human cells](#). Generating a strong neutralizing antibody response is an important goal for SARS-CoV-2 vaccines.

The spike protein is the target for most of the current COVID-19 [vaccine](#) human clinical trials and so a team from the Peter Doherty Institute for Infection and Immunity (Doherty Institute) was keen to investigate how the immune system, particularly B and T cells, responds to the spike.

B cells are responsible for producing the antibodies that recognize SARS-CoV-2, while T cells play an important role in supporting the development of the B cell response.

University of Melbourne Dr. Jennifer Juno, a postdoctoral researcher at the Doherty Institute, said they looked at people who had recovered from COVID-19 who had mostly experienced mild or no symptoms, as that kind of immune response mimics what a vaccine might induce.

"We found that those who showed strong neutralizing antibody activity had a robust B cell response, but most surprisingly, we also found that a particular subset of T cells, called T-follicular helper cells, was a great predictor of an effective immune response," Dr. Juno said.

"We have previously demonstrated through influenza research that B cells are key to mounting an effective immune response to influenza, and we also know that T-follicular helper cells specifically help B cells to make antibodies."

The research team hopes the 'immune parameters' they've identified and published today in *Nature Medicine* can be applied to clinical vaccine trials to assess whether or not a vaccine might induce a strong or weak neutralizing antibody response.

"Now we know how the [immune system](#) responds to the spike [protein](#), and we have these biomarkers, or predictors of what elicits a good or poor immune response to COVID-19, we can look at the vaccine candidates and see what will offer the best protection," Dr. Juno explained.

In addition to COVID-19, the researchers also looked at circulating coronaviruses that cause the common cold in an effort to understand what would

predict the neutralizing response to SARS-CoV-2.

These findings were consistent with what was described in the immune responses of other people who had recovered from COVID-19.

**More information:** Jennifer A. Juno et al. Humoral and circulating follicular helper T cell responses in recovered patients with COVID-19, *Nature Medicine* (2020). DOI: [10.1038/s41591-020-0995-0](https://doi.org/10.1038/s41591-020-0995-0)

Provided by Doherty Institute for Infection and Immunity

APA citation: Immune response to COVID-19's spike protein – the secret to a successful vaccine? (2020, July 15) retrieved 8 June 2022 from <https://medicalxpress.com/news/2020-07-immune-response-covid-spike-protein.html>

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