



26 October 2020

## UCT research to shed light on immune system's response to COVID-19

The COVID-19 pandemic has directly affected more than 700 000 South Africans, and each patient experienced the virus differently – many paid the ultimate price. In recent weeks globally, a handful of patients have reportedly been reinfected with COVID-19.

A team of researchers led by Associate Professor Wendy Burgers, a viral immunologist in the Division of Medical Virology at the University of Cape Town (UCT) is trying to understand how the immune system responds to the virus and whether it provides previously infected patients with a level of protection should they be re-exposed to the virus.

Currently, researchers are interested in establishing how long immune memory lasts in COVID-19 patients, and whether cross-reactive immunity in patients who have been exposed to other related coronaviruses, which typically cause the common cold, protects patients from developing severe forms of COVID-19.

"We're trying to understand whether those patients who have been exposed to the common cold viruses (viruses related to COVID-19) build a level of immunity. In this case, T cells that can recognise SARS-CoV-2 might protect patients from contracting severe COVID-19," Burgers said.

Following an in-depth study which spanned a period of 12 weeks (May to July), the findings were presented in a [research paper](#) by lead author Dr Stephen Makatsa, a postdoctoral fellow in the Division of Medical Virology.

The research team has established an antibody assay – a biochemical test that measures the presence or concentration of antibodies in a patient's blood, recognises the virus and signals that infection has occurred and an immune response has formed.

The research involved collecting COVID-19-positive samples from infected volunteers in Cape Town and Johannesburg, recruited by the National Health Laboratory Services. Once the scientists received the participants' samples, they measured their antibody responses to the virus.

Of the 77 participants surveyed, 23 volunteers reported that they had experienced mild disease symptoms; 38 volunteers reported moderate symptoms; five were asymptomatic and three were admitted to hospital with severe disease.

Results indicate that antibodies to the viral spike protein, and to its receptor binding domain, were detected in 51 and 48 participants respectively.

"Results show that our test works really well in measuring antibodies in people who have been infected," Burgers said. The goal now, she explained, is to use the test to measure antibody responses and see how long they last in patients who have been previously infected.

The study also involves regularly sampling a group of healthcare workers who were infected with COVID-19, as well as a group of their peers who have not been infected with the virus, to study their immune responses.

Healthcare workers have been identified as primary participants for this study because of their high risk of exposure to the virus. The study spans a period of three years and study visits will occur every six months to obtain samples and perform tests.

From the antibody data available, Burgers said, scientists are able to measure antibodies in most people who have been infected with COVID-19. However, she added, in some cases, patients have displayed very low antibody responses post-infection, which may be related to the time period after infection, and whether they experienced mild or severe disease. "This has caused quite a lot of alarm, but it's important to remember that this is a normal immune response, where antibodies wane after the initial infection is cleared."

While scientists may not be able to measure the antibody response 100% of the time, Burgers said that if previously infected patients were to be re-exposed to the virus, immune memory could kick in, expand to very high levels and protect the person from reinfection.

For those volunteers who have not been infected with the virus, the group will study whether any "cross-reactive" T cells have any effect in modulating the outcome of infection or the course of COVID-19 disease, should they become infected over the course of the study.

At this stage, scientists have more questions than answers, one of which is: Can patients become reinfected with COVID-19?

"Maybe they've developed a good immune response to the virus as a result of the first infection. Our basic understanding of immunology and our experience of the pandemic thus far suggest that there certainly are some months of immunity because there are no widespread reports of people becoming reinfected," she said. "So, we can safely say that we do build a certain amount of immunity that protects us. We just don't know for sure how long it lasts."

Burgers said: "It's important to understand the immune responses in South Africans. We need to determine whether findings are the same or different with South Africans compared to elsewhere in the world."

The results will give researchers insight into how long immune responses last, and how strong those immune responses are, as well as provide clarity into whether prior exposure to other related coronaviruses helps patients build a level of immunity to COVID-19. "These insights are critical and will tell us a lot about how we need to respond overall and will be especially useful as we conduct clinical trials for a COVID-19 vaccine here in the country," she said.

***ENDS***

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