

WHAT WE KNOW ABOUT COVID-19 ANTIBODY TESTS (SO FAR...)

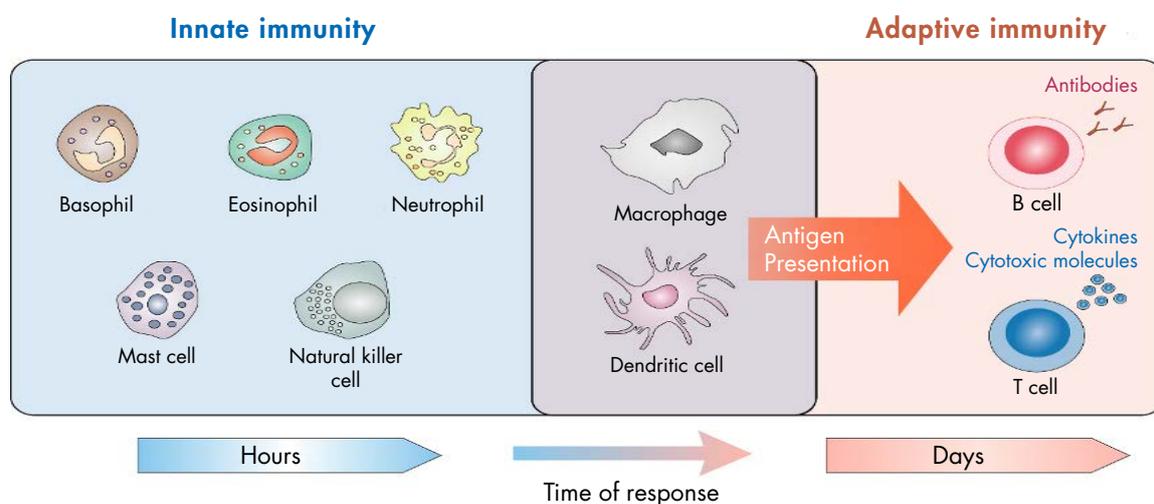
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LET'S START WITH WHAT ANTIBODIES ARE:

Antibodies are proteins that the body's immune system (white blood cells) produce in response to pathogens like bacteria and viruses invading the system. Antibodies specifically recognise and bind to an invading virus, neutralising or recruiting immune cells to eradicate them before they get the chance to infect a cell. Antibodies are part of the immune response generated when vaccinations are given.

AND HOW DO WE PRODUCE ANTIBODIES AGAINST COVID-19?

Developing immunity to a virus like SARS-CoV-2, the virus that causes COVID-19, is a multi-step process that typically takes place over 1–2 weeks. Our immune system consists of two distinct parts, 'innate' and 'adaptive' immunity. The body's first line of defence to slow the progress of the virus is an immediate 'non-specific' innate response, mediated by cells such as macrophages, neutrophils and dendritic cells. This is followed by an 'adaptive response' where B cells make antibodies (proteins called immunoglobulins) that specifically bind or 'stick' to the virus, this takes several days to develop but provides long-lasting protection. The adaptive immune system also includes T cells which recognize and eliminate other cells infected with the virus. If this adaptive response to SARS-CoV-2 is strong enough, it may prevent reinfection.



Cells of the innate and adaptive immune system. From Yamauchi T, Moroishi T. *Cells* 2019;8:398. Reproduced under a Creative Commons Attribution International licence (CC-BY 4.0).

SO THAT MEANS PEOPLE WHO HAVE RECOVERED ARE PROTECTED FROM REINFECTION?

Other types of coronaviruses appear to cause some immunity, with people protected against the coronaviruses that cause the common cold for up to a year after an infection, and our bodies have antibodies against the SARS coronavirus for up to 4 years. This is why there is interest in looking at antibody tests, and the good news is that it looks like people who have recovered from infection do have antibodies to SARS-CoV-2. However, there is currently no evidence they are protected from a second infection. The WHO continues to review the evidence of antibody responses to COVID-19 but (as of 24 April) there have been no studies evaluating whether the presence of these antibodies protects from reinfection.

Many countries are now testing for SARS-CoV-2 antibodies at the population level or in specific groups, such as health workers. Although these studies will provide data on the proportion of people with detectable antibodies, most are not designed to determine whether those people are protected from reinfection.

HOW DO WE TEST FOR THESE ANTIBODIES?

Antibody tests are nothing new and are commonly used to confirm vaccinations or monitor infections. There are two types of antibody test, the most reliable lab-based test is called a 'serological enzyme-linked immunosorbent assay' or ELISA for short and the other is a home-based test. The methods can vary but the tests are quick and start with a sample of blood, which is exposed to proteins from the virus that the antibodies bind to if they are present in the blood. The presence and amount of antibodies can be detected by either a colour change on a lab test or the appearance of a line on a home test.

ARE THE ANTIBODY TESTS FOR COVID-19 READY FOR USE?

It's crucial to make sure the tests are accurate and reliable so that people aren't falsely labelled as negative when they have been infected or labelled as positive when they haven't been infected. The tests also need to distinguish between past infections from the other 6 human coronaviruses – 4 cause the common cold and the other 2 cause Middle East Respiratory Syndrome (MERS) and Severe Acute Respiratory Syndrome (SARS).

The FDA have authorized the emergency use of a number of laboratory antibody tests but are also tightening the rules for antibody tests over fears about flawed tests and fraudulent marketing. However, at this time, the FDA has not authorized any COVID-19 test to be completely used and processed at home.

WHAT'S THIS I HEAR ABOUT 'IMMUNITY PASSPORTS'?



“At this point in the pandemic, there is not enough evidence about the effectiveness of antibody-mediated immunity to guarantee the accuracy of an immunity passport or risk-free certificate” – [WHO](#)

As governments around the world start to think about recovery from the COVID-19 pandemic, it has been suggested that antibody tests could be used to issue so-called 'immunity passports' that would allow people to travel or return to work assuming they are protected against re-infection. We've already discussed above that there is currently no evidence people are protected from a second infection, so there is a risk that these passports would increase the risk of continued transmission.