



PCR vs. Antibody vs. Antigen Testing - 08/11/20

PCR Tests

PCR tests, per the FDA, detect the genetic material from the virus—or the virus' RNA—which can help diagnose an active COVID-19 infection. "Up until now, the tests used to detect [active infections of] the virus detect the genetic material of the virus, not proteins," Ellen Foxman, MD, PhD, a Yale Medicine laboratory medicine doctor in the Clinical Virology Lab at Yale Medicine. These PCR tests are still done through nasal or throat swabs. Specimens are sent to a lab and takes times to receive results.

Antibody Tests

Antibody tests look for antibodies a person's immune system has made in response to the virus—that helps doctors determine whether a person has previously been exposed to COVID-19. (As of right now, while officials presume that the presence of antibodies means a person will have some immunity to COVID-19, it's unclear how much, or how long it lasts). Antibody tests are also done through testing a person's blood (fingerstick) serum or plasma. Produces results in 10-15 minutes.

Antigen Tests

An antigen is a substance recognized by the body's immune system, which can [then] respond by generating nucleocapsid proteins called antibodies that specifically recognize that antigen. That means, "the point of an antigen test is to detect the presence of a protein—the nucleocapsid protein—which is part of the SARS-CoV-2 virus that is the cause of COVID-19," says Dr. Shaw, a Yale Medicine infectious disease doctor and professor of medicine at Yale School of Medicine. In that sense, and per FDA's statement, an antigen test basically looks for those fragments of antigens within a person's body to see if they're infected with the virus. Produces results in 15 minutes.

While antibodies and antigens are both typically proteins, "a positive **antigen test** reflects **active** infection, while a positive **antibody test** reflects **recent or past** infection," says Dr. Shaw.

PCR results can very likely state someone is acutely infected with COVID-19, even when they aren't. This is because the PCR cannot distinguish between the infectious virus and the non-infectious nucleic acid. Depending solely on PCR to test acute viral infection should be proceeded with caution. Antibody tests and antigen tests need to be considered to use in tandem nationwide.

<https://www.cebm.net/covid-19/infectious-positive-pcr-test-result-covid-19/>

<https://www.medrxiv.org/content/10.1101/2020.08.04.20167932v1>

[https://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(20\)30868-0/fulltext](https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(20)30868-0/fulltext)