

What Type of Test Diagnose Active Infection?

It is important to fully understand the antibody testing before making the decision to proceed. Currently we have been testing for active infection using RT-PCR. This type of testing looks for the presence of SARS-COV-2 in the respiratory tract to see if an individual has active infection and /or is contagious. The test is looking for the presence of viral RNA.

How are Antibody Test Different?

The antibody test is different. It is a serological test which assesses an individual's immune response to SARS-COV2 exposure. This is assessing past exposure to the virus, not an active infection. Serological testing from blood, serum or plasma determines if one or more of the immunoglobulin subtypes (IgM, IgA or IgG) are present to specific viral antigens or proteins.

We develop antibodies to different protein components of the virus in a sequential manner with IgM and IgA rising initially followed by IgG which then confers long term protection and immunity. IgM is the immediate response. IgA is typically produced in the mucus membranes of the gut and the bronchial or pulmonary tissues. One hundred percent of those infected with COVID-19 will go on to develop an antibody response to the virus, yet there can be a great deal of variability in how long it takes to develop antibodies, the amount of antibody produced as well as which types of antibodies are produced.

There are numerous viral proteins that act as antigens or immune system stimulators. Antibodies bind to these antigens and form complexes which then trigger T cells (white cells in our immune system) to destroy the antigen/virus.

In choosing an antibody test the choice of viral antigens (proteins) is important as other coronaviruses (like the viruses which cause the common cold) have similar proteins. If the antigens chosen are not specific to the COVID-19 virus the test will not be overly sensitive and specific.

Timing is Essential

The timing of the antibody test is crucial. Most individuals develop some form of antibodies 7-10 days following onset of symptoms. (Remember symptoms can present up to 12 days after exposure). If a patient is tested prior to these 7-10 days a (false) negative antibody test may occur. In one study only 38% of those positive for COVID via the PCR testing had a positive antibody test less than 7 days while 89% were positive if antibodies were tested greater than 7 days. In patients who tested positive and hospitalized, 94% were positive by day 14 after symptoms presented.

FDA Approval

Lab companies have moved quickly to develop the antibody tests, but it is important to understand that NONE of these companies (no matter what they claim) have testing which is FDA approved. FDA approval can take up to 18 months and clearly, we do not have that amount of time currently. The tests have been allowed via an emergency use approval (EUA). Labs which are preferred should be CLIA certified, meet analytic validity and preferably already performing antibody/ELISA testing. It is also preferred that the lab has applied for or received EUA after providing validation via the FDA process. This supports a viable test.

Optimal results must consider the following:

1. A CLIA certified lab, validated or pending validation through EUA
2. A patient who does not have an underlying immunoglobulin deficiency or are not immunocompromised
3. Samples collected greater than 14 days from symptoms and preferably 28 days for optimal results.
4. Testing which includes quantitative IgM and IgG levels
5. Testing which employs multiple specific viral proteins/antigens in the antibody specificities.
6. A test with optimal sensitivity and specificity. (Sensitivity is the ability of a test to correctly identify those with the disease [true positive rate] and the specificity is the ability of the test to correctly identify those without the disease [true negative rate]. These indices cannot truly be measured without a prevalence which currently is not known with respects to COVID-19)

All patients requesting COVID-19 antibody testing will need to perform a basic screening to be sure they are appropriate candidates for the test. We are doing this for research reasons but also to reassure every patient who does perform the tests will get optimal results.