Researchers develop technology to aid COVID-19 vaccine immunity monitoring

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Benjamin Larimer. Credit: UAB

As the COVID-19 vaccine becomes available to the public, immunity monitoring will play an important role in determining whether the vaccine is effective for an individual, and for how long. Benjamin Larimer, Ph.D., researcher at the University of Alabama at Birmingham, has developed a technology with potential use as an in-home antibody test.

Larimer's diagnostic test is an accurate and reliable method for determining whether individuals are protected against COVID-19. The technology identifies neutralizing antibodies—those that block the virus from infecting cells. Emerging research suggests neutralizing antibodies offer the best protection against the virus.

The most widely used antibody tests today do not specifically identify neutralizing antibodies. Currently, these neutralizing antibodies can only be measured at a high level of accuracy using complicated and time-consuming laboratory tests not available to the general public.

According to Larimer, existing antibody tests use a broad approach to locating antibodies, which attach to very small and distinct pieces of the virus. Current tests can mistake antibodies for other viruses, such as the common cold, for COVID-19 antibodies, leading to possible false-positive results.

To create the new test, Larimer began breaking down the COVID-19 virus into small pieces to identify the exact locations where antibodies attached to the virus. The results were better than Larimer's team anticipated, with the test detecting 20 percent more positive cases than the current gold-standard clinical antibody test. The ability to specifically recognize even small amounts of antibodies accurately is an important achievement, according to Larimer.

"The goal of every vaccine is to get the body to produce antibodies, which serve as a first line of defense against the virus," said Larimer, an assistant professor in the UAB Department of Radiology Division of Advanced Medical Imaging Research. "Tests that specifically detect these antibodies can be used to measure whether a vaccine works, and possibly predict how long its protection will last."

Immunity to COVID-19 is not anticipated to last forever, and immunity monitoring could continue for several years, even after widespread administration of a vaccine.

Clinical trials indicated that COVID-19 vaccines may be remarkably successful; however, even 95 percent effectiveness will leave millions of Americans unprotected. Antibody testing helps determine efficacy and should help indicate whether a person is protected against the virus.

Larimer hopes to transition his team's technology to an inexpensive and easy-to-use test that will provide in-home immunity monitoring for the

general public. The UAB Research Foundation has
filed a provisional patent application for the
technology.

Provided by University of Alabama at Birmingham

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