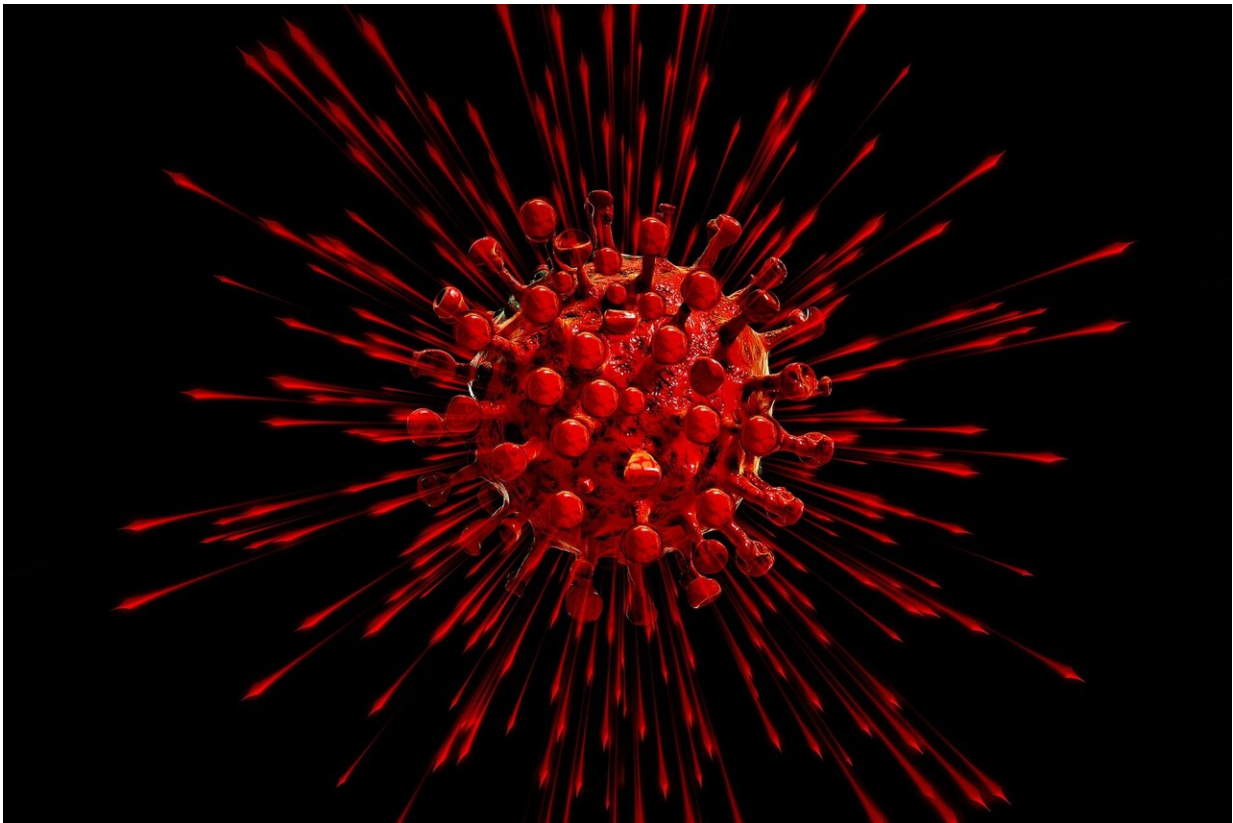# Next-generation triple antibody test for COVID-19 given green light by MHRA

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Credit: Pixabay/CC0 Public Domain

University of Exeter scientists have developed a revolutionary new device that could allow health professionals to test patients' antibody response to COVID-19 in as little as seven minutes.

The pioneering new COVID-19 Triple Antibody Test, has been produced by the University of Exeter spin-out company Attomarker Ltd and is set to spearhead the next-generation of rapid and accurate antibody testing.

While traditional tests that require laboratory analysis can take up to 72 hours to get results, the device is able to deliver quick and accurate quantitative results in just seven minutes.

Following successful trials from an initial patient study at St. Thomas' Hospital in London conducted earlier this year, the test device has received approval by the Medicines and Healthcare Regulatory Agency (MHRA).

Crucially, the Attomarker technology is being developed into a miniaturised hand-held "pocket laboratory"—that can be docked to a smartphone—to provide accurate testing at point-of-care, including care homes and pharmacies.

While many of the currently available tests only measure antibodies for one nucleocapsid protein (N) of the SARS-CoV-2 virus the Attomarker device can simultaneously test for multiple, clinically relevant, biomarkers against the SARS-CoV-2 virus.

The device can test for three virus proteins (Spike 1, Spike 2 & N) and three classes of antibodies (IgM, IgG and IgA), giving a more powerful profile of the patient's immune response to COVID19.

In March, an extensive pilot study for the device was conducted at St. Thomas' Hospital, in London. It was fully funded by University of Exeter alumni and friends, more than 1,300 of whom gave a total of £120,000 through the COVID-19 Emergency Appeal.

Scientists carried out 119 tests over an initial five-day period, investigating the performance of the antibody test on 74 admitted patients from an early stage of the COVID-19 outbreak.

Further analysis with an additional 200 patients shows that Attomarker's Triple Antibody test delivers a sensitivity of up to 96% in detecting COVID-19 antibodies—including in patients who previously presented negative swab tests.

The results of the trial are published this week in the journal of the Royal Society of Chemistry, *Analyst*.

To deliver the technology to the front line, Smiths Detection, part of Smiths Group, is working with Attomarker and has manufactured 10 pre-production devices, with the ability to ramp up volume according to demand. Together with Scienion, the array manufacturer, this gives Attomarker the capacity to provide a testing service in volume from early Autumn.

Attomarker has also begun further testing at the Royal Devon and Exeter Hospital in Exeter for a combined COVID-19/Flu antibody test—in order for healthcare professionals to differentiate between patients with the two infections.

Professor Andrew Shaw, CEO & Founder of Attomarker and Associate Professor of Physical Chemistry at the University of Exeter, said: "The Attomarker team are excited with the high sensitivity and specificity results of our patented new triple-antibody testing technology.

"We are proud to be working alongside the St Thomas' Hospital and Royal Devon and Exeter Hospital to test our technology including the combination COVID19-Flu test ahead of the winter season, and we look forward to sharing results from this crucial study in due course."

The research published in the *Analyst* was developed with methodological support from Professor Chris Hyde, Director of the Exeter Test Group at the University of Exeter's College for Medicine and Health. He said: "I'm delighted to see this exciting research progress to the next phase, towards speeding up COVID-19 testing and having significant benefits for patients and healthcare workers."

Neil Gow, DVC Research at the University of Exeter, said: "It is exciting to see the painstaking development of this technology by the Attomarker team led by Andrew Shaw at Exeter delivering a vital tool to address the health challenge of Covoid-19. The collaboration with colleagues at St. Thomas' Hospital fully validates the considerable potential of this novel diagnostic platform in simultaneously detecting three separate anti-COVID antibodies."

Sean Fielding, Director of Innovation, Impact and Business at the University of Exeter said: "We have been supporting the development of Attomarker technology for several years and we are delighted to see such an effective test for the fight against COVID-19 emerging from this spin-out."

Dr. Shaun Curtis, Director of Global Advancement at the University of Exeter said: "We are delighted to see such a successful outcome to the testing. This exciting innovation couldn't have happened without the support of our alumni community and we are incredibly grateful to each and every person who supported our Emergency Appeal. We hope they are proud to be a part of this accomplishment."

Professor Sir Robert Lechler, Senior Vice President/Provost (Health) Kings College London, said "This technology tests for antibodies against three viral proteins, two spikes and the nucleocapsid, as well as three classes of antibody, showing quantitative results. These differentiators will be key to beginning the next phase of COVID-19 testing urgently

needed in the UK, equipping healthcare professionals initially with the data they need to better manage the epidemic."

Provided by University of Exeter

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