

Rapid lab-free COVID-19 test delivers results in just over an hour

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The NudgeBox analyser. Credit: Imperial College London

A new DnaNudge Lab-in-Cartridge test is beginning evaluation on patients—requiring no lab and significantly reducing waits for results.

Imperial College London's Regius Professor of Engineering, Chris Toumazou FRS, is working with clinical researchers to test a rapid, lab-free PCR test that detects COVID-19 and delivers results in just over an hour.

The Lab-in-cartridge [rapid tests](#)—based on Professor Toumazou's [DnaNudge](#) consumer DNA testing innovation—have been clinically validated after a successful initial trial on COVID-19 patients and are continuing to validate on larger patient groups.

The evaluation, which began in recent days, will now involve large-scale clinical testing with a view to extensive national roll-out, as part of the drive to meet the UK government's testing targets.

The Department of Health and Social Care has procured 10,000 DnaNudge COVID-19 RNA testing cartridges to roll out to clinical sites. The Department of Health's COVID-19 Testing Strategy cited the work as among "Encouraging innovators that are producing promising new types of tests."

Experts at Imperial College Healthcare NHS Trust are working with the Imperial and DnaNudge team to enable the new test to be available for patients and staff if it continues to prove successful.

Accelerating tests

A key advantage of DnaNudge's solution is that the RNA polymerase chain reaction (PCR) test requires no sample handling and is able to deliver processing outside of a laboratory environment—using DnaNudge's patented and miniaturised "NudgeBox" analyser, which can be used anywhere.

With results delivered in a little over an hour, the technology has the

potential to offer a substantial improvement on current lab-based PCR testing times—which take at least 1-2 days before a patient can receive the results. The swab can be placed directly into the cartridge and then straight into the box for analysis.



The DnaNudge consumer device on which the new coronavirus test is based.
Credit: Imperial College London

Professor Toumazou, CEO and co-founder of DnaNudge and founder of the Institute of Biomedical Engineering at Imperial, said: "Early validation results for our technology in the COVID-19 patient study have been excellent. The DnaNudge test was developed as a lab-free, on-the-spot consumer service that can be delivered at scale, so we clearly believe it offers very significant potential in terms of mass population

testing during the COVID-19 pandemic."

Professor Graham Cooke, NIHR Research Professor of Infectious Diseases at Imperial who is leading the clinical development said: "This is one of the most exciting technologies I've seen in this area, particularly because it avoids the need for any sample handling. Our early results are very encouraging and now we need to see how the test performs in different clinical settings and understand where it might have the biggest impact on care at this critical time."

The technology builds on a series of innovations developed by Professor Toumazou and his team at Imperial's Institute of Biomedical Engineering, originally with other applications in mind. These advances include novel integration between biochemistry microfluidics, electronic circuits and miniaturisation based on smartphone technology.

Professor Nick Jennings, Vice Provost (Research and Enterprise) at Imperial, said: "We urgently need to increase [coronavirus](#) testing capacity, which is why Chris Toumazou's innovations are so welcome. In normal times, Imperial researchers constantly seek to apply their discoveries for societal benefit. In this time of crisis, it is heartening to see so many colleagues think laterally and flexibly as they help improve NHS capacity and our understanding of COVID-19."

Professor Toumazou, one of the world's foremost biomedical engineers, is among the [many Imperial researchers repurposing their expertise and resources to fight COVID-19](#). Among his colleagues are some of the world's leading epidemiologists, virologists, diagnosticians, and frontline health workers redeploying labs, people and technologies as they work round-the-clock to help defeat coronavirus.

The [DnaNudge in-store DNA testing service](#), which this coronavirus test is based on, was launched to consumers in November 2019. The service

currently focuses on nutrition, analysing and mapping users' genetic profile to key nutrition-related health traits.

With the results of a quick, one-time test, customers can use a DnaNudge smartphone App or wrist-worn DnaBand to scan product barcodes in the majority of major UK supermarkets, and discover whether a food product is "red" or "green" for their unique genetic make-up. The test has been converted to detect the RNA of COVID-19.

DnaNudge is an Imperial spinout with labs at the College's White City Campus.

The [test](#) was developed in collaboration with TTP in Cambridge, where the CEO and core development team are Imperial alumni.

Provided by Imperial College London

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