Genotyping study shows how COVID variants can be detected more rapidly

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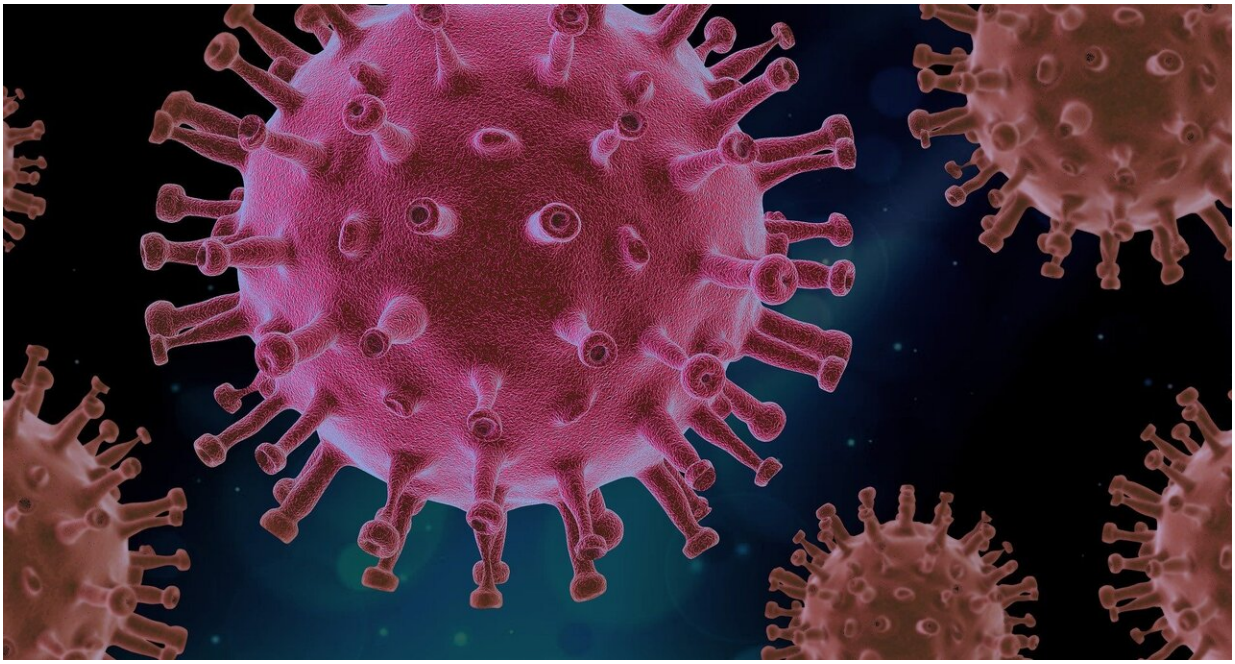

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Genotyping technology detects COVID variants more quickly and cheaply than ever before—according to research from the University of East Anglia and the UK Health Security Agency. The new study published in *The Lancet Microbe* reveals that the technique detects new variants almost a week more quickly than traditional whole genome sequencing methods.

The research team says that genotyping allowed COVID variant information to be more rapidly detected and communicated to frontline health protection professionals at the height of the pandemic. Importantly, it helped to implement local control measures such as contact tracing more rapidly.

Lead researcher Prof. Iain Lake, from UEA's School of Environmental Sciences, said, "When the COVID pandemic began, the variant with which people were infected was initially determined using a highly accurate technique known as whole genome sequencing. This is the gold standard diagnostic tool for identifying and genetically characterizing variants. But where large populations need to be assessed rapidly—then cost, capacity and timeliness limit its utility.

"By the start of 2021, new technology to rapidly detect new variants was being trialed by the government in NHS Test and Trace laboratories. The technology—known as 'genotype assay testing' or genotyping—allows scientists to explore genetic variants."

Neil Bray, from the UK Health Security Agency (UKHSA), said, "We wanted to find out how this technology compares to traditional whole genome sequencing."

The research team studied data for more than 115,000 cases where COVID variant information was available from both genotyping and whole genome sequencing. By comparing the variant result from genotyping with the result from whole genome sequencing, they demonstrated that the genotyping results were very accurate.

Prof. Lake said, "We found that genotyping was able to detect known COVID variants more quickly and cheaply than whole genome sequencing. They produced variant results six days faster than whole genome sequencing—with results back in just three days, compared to

nine days for whole genome sequencing.

"Genotyping enabled a nine-fold increase in the quantity of samples tested for variants. This meant that variants were detected among many more people. Local control measures such as contact tracing could therefore happen more rapidly. Genotyping can be applied to finding variants in a wide range of organisms in humans and animals—so it has huge potential for guiding public health decision-making and disease control globally in the future."

Professor Susan Hopkins, UKHSA Chief Medical Advisor, said, "The world-leading genomics expertise that UKHSA and other institutions across the UK were able to draw on throughout the pandemic was critical to the UK response to COVID-19. Research like this will help us continue to build on our capability in this area and ensure that the UK is as well-prepared as possible to respond quickly to emerging threats to public health in the future."

Professor Dame Anna Dominiczak, Chief Scientist for Health in Scotland who previously led the UK government's operation to expand and run the COVID lighthouse laboratories, said, "Research such as this is really important to ensure that we build upon the huge advances in testing that occurred during COVID to bolster our defenses against future pandemic threats."

This research was led by UEA in collaboration with the UK Health Security Agency (UKHSA), BioClavis Ltd, Thermo Fisher Scientific (US), NHS Test and Trace, the Department of Health & Social Care, the National Institute for Health and Care Research (NIHR), Alderley Lighthouse Labs Ltd, and the University of Glasgow.

More information: RT-PCR genotyping assays for the identification of SARS-CoV-2 variants in England in 2021: a design and retrospective

evaluation study, *The Lancet Microbe* (2024). DOI: 10.1016/S2666-5247(23)00320-8