Coalition to map COVID-19 effects and treatments in patients' blood

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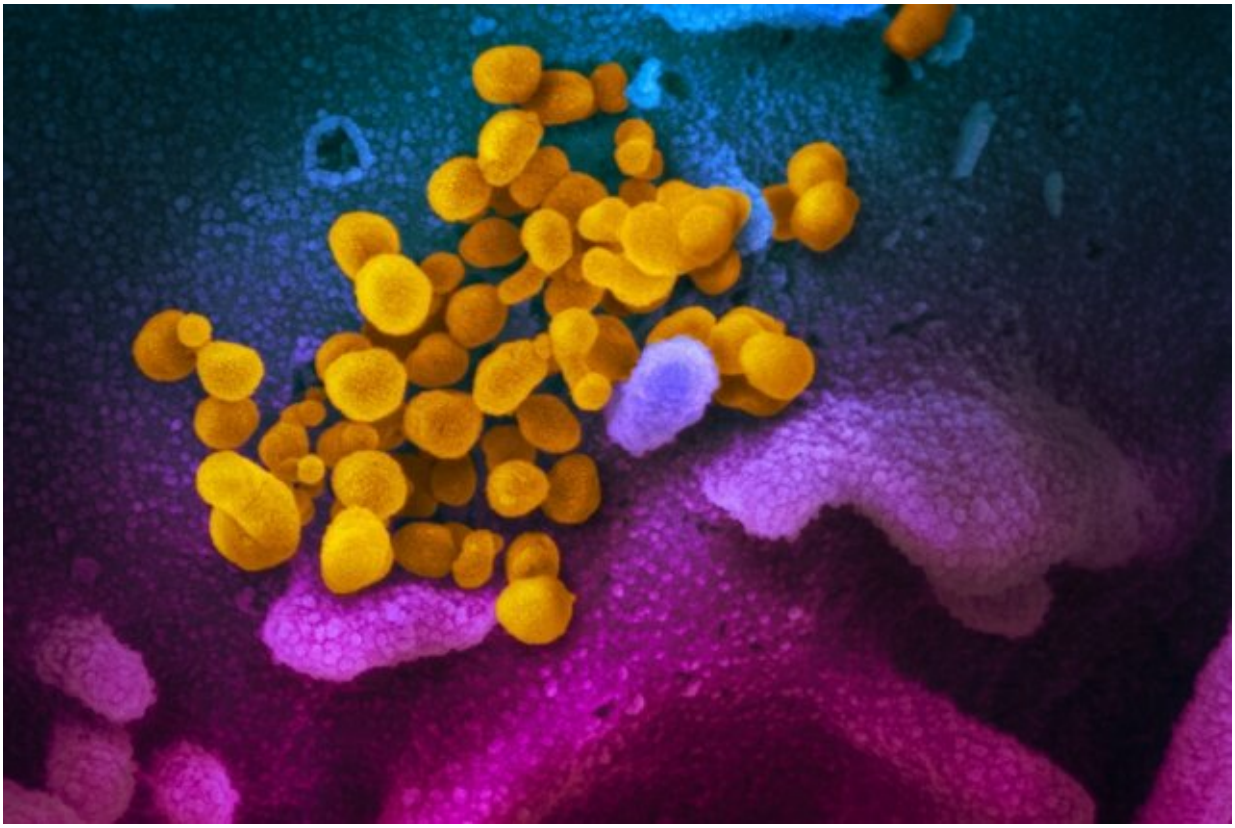

This scanning electron microscope image shows SARS-CoV-2 (yellow)—also known as 2019-nCoV, the virus that causes COVID-19—isolated from a patient, emerging from the surface of cells (blue/pink) cultured in the lab. Credit: NIAID-RML

University researchers are part of a new coalition that has been created

to share data on COVID-19 gleaned from the use of mass spectrometry techniques which examine people's blood and other biomarkers.

The COVID-19 MS Coalition consists of more than 500 scientists from around the world and is announced in the Lancet, and coordinated from the University of Manchester.

It is made up of many of the world's leading mass spectrometry experts who will work together to look at the ways in which the novel coronavirus is present in patients' blood and examine in detail how the virus is structured.

The aim is to refine testing approaches, stratify treatment options, determine isolation requirements and bring much needed speed into measurement aspects of novel therapeutic development programmes—for COVID-19 and future threats.

Mass spectrometry (MS) is able to measure molecules that change in a patient's blood as the infection takes hold. It can be used to find out what they are, and how many of them there are.

These measurements provide precise and reproducible diagnostic data at the molecular level that can complement information from genomic studies.

The coalition partners are also looking for biomarkers that will determine how a given individual will respond to the virus. These allow hospital labs to predict the outcome of the disease and to target treatment accordingly. By finding the biological pathways that alter as the disease takes hold, and considering genetic risk factors, mass spectrometry will provide crucial evidence as to why people respond differently

Mass spectrometry will be also be able to help develop effective treatments by targeted studies that measure the decrease in these markers.

The researchers will also attempt to define the precise structure of the viral spike protein and other antigens. Mass spectrometry is the only method that can map the complex sugar network that coats the surface of the viral spike protein and the human receptor. Coalition partners are working to see which parts of the virus are involved in the interaction with cells, and how this interaction allows the virus to open and drop the infective RNA into the human host. This detailed mapping of the interaction is vital in the development of vaccines, designed to be a weaker form of the virus.

Professor Perdita Barran, Director of the Michael Barber Centre for Collaborative Mass Spectrometry, at The University of Manchester, was inspired along with her colleague Professor Clare Mills to develop the coalition, when her labs were closed during March.

Professor Barran said: "By cooperating in this way, the scientists working in the coalition will have access to many more sources of data from around the world. We will be pooling our expertise and we believe we will be able to work much faster and have an impact on a range of priorities; from testing, to treatment and vaccination."

Liverpool Professor of Biological Mass Spectrometry, Claire Eyers said: "Mass spectrometry is a powerful analytical tool that can be applied in many important ways to help address the COVID-19 pandemic. Our international collaborative endeavour will leverage our diverse technological expertise to respond to current unmet needs in understanding and addressing COVID-19 biology.

"At the University of Liverpool, the Centre for Proteome Research (part

of the newly established Institute of Systems, Molecular & Integrative Biology) is excited to be leading a body of work to define markers that could predict severity of, and response to, SARS-CoV-2 infection."

More information: Weston Struwe et al. The COVID-19 MS Coalition—accelerating diagnostics, prognostics, and treatment, *The Lancet* (2020). DOI: 10.1016/S0140-6736(20)31211-3

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