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Australia identifies unique biomarkers of SARS-CoV-2 acute infections, Long COVID

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Benchtop FT-NMR spectrometer can accelerate SARS-CoV-2 and 'Long COVID' diagnostic research by lowering the barrier to clinical translation and aids in the quick identification of biomarkers in large samples

Researchers at the Australian National Phenome Centre (ANPC) at Murdoch University have successfully detected and quantified newly discovered biomarkers of SARS-CoV-2 acute infections and of 'Long COVID'.

Researchers used a benchtop Fourier Transform-nuclear magnetic resonance (FT-NMR) spectrometer meant for epidemiological and diagnostic research technology with a permanent magnet to lower the barrier to clinical translation.

Lead by Professor Jeremy Nicholson, the researchers quantified the 'Long COVID-19' inflammatory biomarkers using Bruker Avance IVDr NMR system to reproduce on the 80 MHz Bruker Fourier 80 Benchtop FT-NMR spectrometer. The combination of benchtop NMR with high-field NMR allows clinical translation to suit the needs of different clinical and research markets.

The novel N-acetylated glycoprotein (Glyc) and a novel supramolecular phospholipid composite (SPC) from phospholipids in lipoprotein ratio measurement through ANPC-Bruker collaboration using J-edited diffusional (JEDI) NMR experiment has emerged as a useful molecular biomarker of inflammation in Long COVID, which could significantly improve current clinical and therapeutic understanding of the acute disease and of Long COVID. JEDI helps to overcome the issue of reduced dispersion and enhanced signal overlap typically associated with a lower field spectrometer.

The simplified sample preparation developed for benchtop applications also supports data acquisition in a similar timeframe to high-speed instruments, and further experiments suggest the potential of quantification of the SPC/Glyc ratio in just minutes.