

Researchers are combining new technologies to examine blood proteins in COVID-19 patients

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A team at Canada's Lawson Health Research Institute has discovered unique patterns of blood plasma proteins in critically ill patients that may

help develop a more personalized approach to treating severe COVID-19. Their work is published in the *Journal of Cellular and Molecular Medicine*.

Called the [plasma](#) proteome, the proteins being studied are released by cells that often play an important role in the body's immune response to viruses. The research team studied how they adapt and change in response to a COVID-19 infection.

As part of the study, [blood samples](#) were taken from 30 subjects in three patient groups at London Health Sciences Centre (LHSC). One group had patients with COVID-19, another group had patients with severe infection but were negative for COVID-19, and the third was a healthy control group. Blood samples were drawn on the day of critical care admission and again on days three, seven and ten in hospital.

"We collected plasma from these patients and measured well over a thousand proteins with great accuracy using new technology that combines immunology and genomics," says Dr. Douglas Fraser, Lawson Scientist, Critical Care Physician at Children's Hospital at LHSC and Professor at Western University's Schulich School of Medicine & Dentistry. "With the use of this advanced technology, we were able to better analyze the [protein](#) patterns and better understand what is happening with COVID-19, especially in critically ill patients."

The research team found that COVID-19 patients demonstrated changes in immunosuppression pathways, which typically keep the [immune system](#) balanced. In critically ill patients, the changes were heightened. Analyses of the plasma proteome helped researchers determine which cells in the body are active during the disease state and which signaling pathways were activated.

"In-depth analysis of the human plasma proteome helps us capture tissue

proteins that can provide us with information regarding organ integrity during infection," says Cristiana Iosef, Lawson Research Associate.

"This is important because it will allow us to search for new [blood](#) biomarkers that are specific for COVID-19 patients."

This research, which used state-of the-art analysis technology, was enabled by existing expertise and technologies through Children's Health Research Institute (CHRI), a program of Lawson.

"This study has allowed us to understand the progression of the disease processes in very sick patients, providing us clues on the body's immune system and other systems that were reacting to the [severe disease](#)," says Dr. Victor Han, Lawson Scientist, Director of CHRI and Professor at Schulich Medicine & Dentistry. "We hope that this knowledge will allow us to identify the patients who will become severely ill and develop new therapies to counteract the changes occurring within their bodies."

Dr. Fraser, who is also a scientist at CHRI, adds that the team can now examine potential new drug therapies with the hopes of improving outcomes for these patients.

The next steps for the research team will be to use this technology to examine plasma biomarkers in long COVID patients to determine why some develop prolonged disease after a COVID-19 infection.

More information: Cristiana Iosef et al, COVID-19 plasma proteome reveals novel temporal and cell-specific signatures for disease severity and high-precision disease management, *Journal of Cellular and Molecular Medicine* (2022). [DOI: 10.1111/jcmm.17622](https://doi.org/10.1111/jcmm.17622)

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