



New Miller School Study Highlights How Obesity Hinders COVID-19 Immune System Response

A new collaborative study by University of Miami Miller School of Medicine researchers in the Departments of Pathology and Laboratory Medicine and Microbiology and Immunology has identified how obesity can hinder the immune system from responding effectively to COVID-19 infections.

“We measured antibodies specific for the spike protein of SARS-CoV-2 – the COVID-19 virus – in the serum of lean and obese patients and in uninfected controls,” said Carolyn Cray, Ph.D., clinical professor and director of the Division of Comparative Pathology. “Our results confirmed that higher body mass index (BMI) is associated with higher infection rate and severe respiratory symptoms.”



From left, Dr. Daniela Frasca, Dr.



Carolyn Cray, Dr. Lisa Reidy, and Dr. Bonnie Blomberg.

This is the first study of immunological and inflammatory profiles of COVID-19 patients with obesity, said Daniela Frasca, Ph.D., research associate professor of microbiology and immunology. “We found that spike-specific antibodies in obese patients were lower with increased BMI, and a higher BMI was also associated with higher serum levels of inflammatory and metabolic markers associated with pulmonary inflammation,” she said. “The finding could help clinicians monitor how well individuals are responding to treatment.”

The study, “Effects of Obesity on Serum Levels of SARS-CoV-2-Specific Antibodies in COVID-19 Patients,” was published March 25 in the journal *PLoS One*. Lisa Reidy, Ph.D., clinical associate professor and director of toxicology in the Division of Laboratory Medicine, and Dr. Frasca were co-principal investigators of the study. Co-authors were Bonnie Blomberg, Ph.D., professor of microbiology and immunology; Alain Diaz, Ph.D.; Maria Romero, M.S.; Kristin Kahl, M.S.; and Dr. Cray.

Epidemiological studies have shown that COVID-19 patients with obesity are at higher risk for infection, said Dr. Cray. “This population group is paying high tolls during the pandemic,” she said, adding that much less has been known about the association between antibodies and obesity.

“We found that obese patients make fewer antibodies than lean controls, and these antibodies are not as good as those made in lean individuals as they are not good at neutralizing the virus,” said Dr. Frasca, who has studied obesity’s impact on the body’s immune system in type 2 diabetes and other



conditions associated with aging. “A 35-year-old with a high BMI might respond to a viral infection similarly to a 65-year-old with normal weight.”

The new study drew on serology testing conducted over many months by the COVID-19 Serology Team in the Division of Laboratory Medicine, said Dr. Reidy. It was supported by awards from the National Institutes of Health and the UM Department of Pathology and Laboratory Medicine.

“As we collect more data, we develop our knowledge for clinical guidelines in diagnosing and treating these patients,” she said. “Now, we are moving into new studies involving the immune system’s response to COVID-19 vaccination.”