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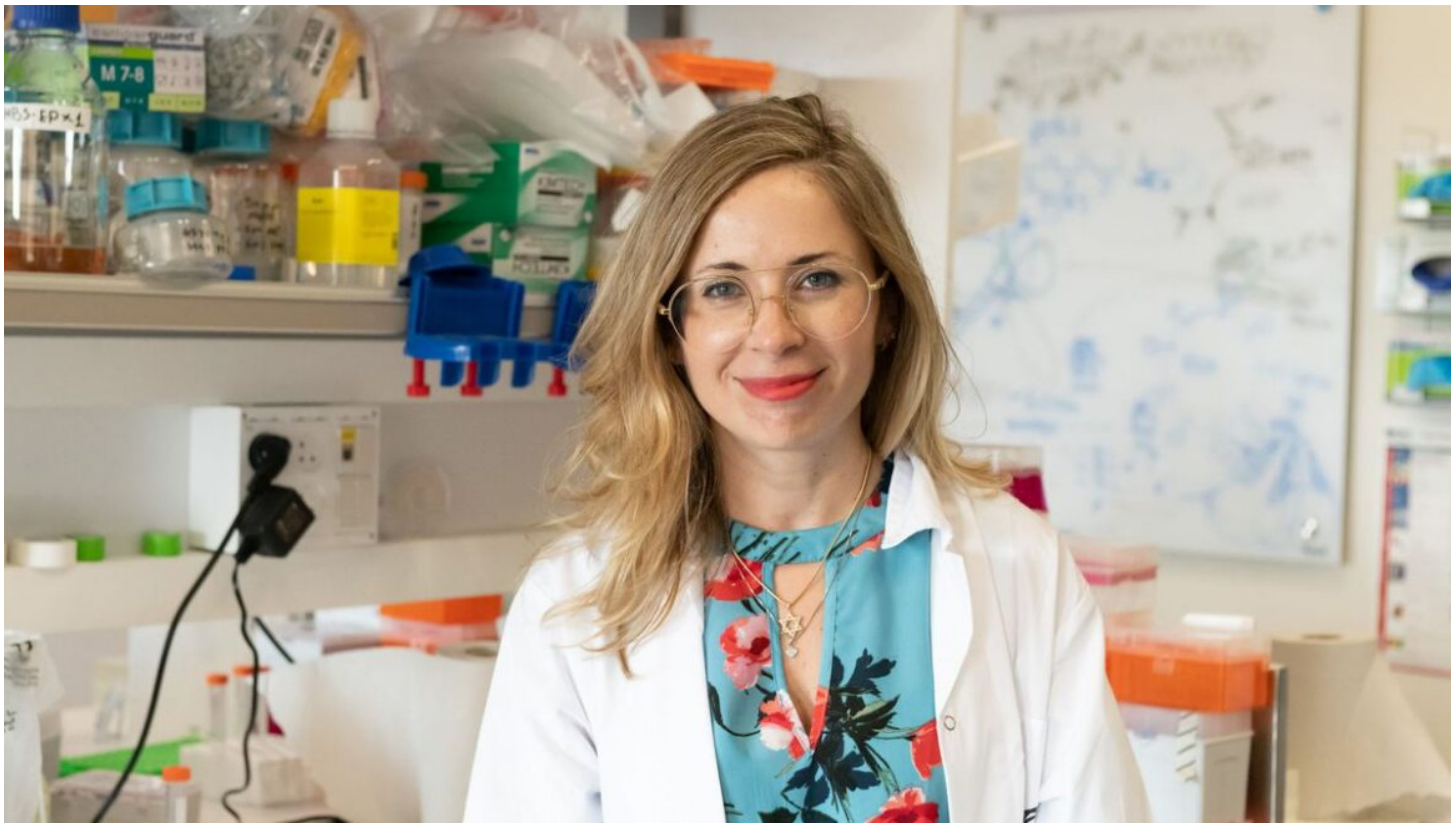
Breakthrough antibody discovery could mean end to Covid vaccines

Researchers in Israel find that antibodies from recovered Covid-19 patients can neutralize all known strains of the virus, including Delta and Omicron.

By Nicky Blackburn | SEPTEMBER 8, 2022, 1:58 PM



Dr. Natalia Freund from Tel Aviv University. Photo courtesy of Tel Aviv University

A team of researchers has discovered that antibodies isolated from the immune system of recovered COVID-19 patients are effective in neutralizing all known strains of the virus, including the Delta and Omicron variants.

According to the researchers, targeted treatment with these antibodies delivered to the body in high concentrations may eliminate the need for repeated booster vaccinations and strengthen the immune system of populations at risk.

The research, which was carried out at Tel Aviv University, is the continuation of a previous study conducted in October 2020.

Led by Dr. Natalia Freund, from the university's Clinical Microbiology and Immunology Department, in the initial study the research team sequenced all the B immune system cells from the blood of people who had recovered from the original COVID strain in Israel, and isolated nine antibodies that the patients produced.

In the new study, the researchers found that some of these antibodies are very effective in neutralizing the new coronavirus variants, Delta and Omicron.

"In the current study, we proved that two antibodies, TAU-1109 and TAU-2310, which bind the viral spike protein in a different area from the region where most of the antibodies were concentrated until now (and were therefore less effective in neutralizing the original strain) are actually very effective in neutralizing the Delta and Omicron variants," said Freund.

"According to our findings, the effectiveness of the first antibody, TAU-1109, in neutralizing the Omicron strain is 92%, and in neutralizing the Delta strain, 90%. The second antibody, TAU-2310, neutralizes the Omicron variant with an efficacy of 84%, and the Delta variant with an efficacy of 97%."

Freund believes that the efficacy of these antibodies might be related to the evolution of the virus, which became increasingly infectious with each variant, changing the amino acid sequence of the part of the spike protein that binds to the ACE2 receptor.

"In contrast, the antibodies TAU-1109 and TAU-2310 don't bind to the ACE2 receptor binding site, but to another region of the spike protein – an area of the viral spike that for some reason does not undergo many mutations – and are therefore effective in neutralizing more viral variants," she said.

"These findings emerged as we tested all the known COVID strains to date," she added.

The two antibodies cloned in Freund's laboratory, were sent for tests to check effectiveness against live viruses in laboratory cultures at the University of California San Diego, and against pseudoviruses in the laboratories of the Faculty of Medicine of Bar-Ilan University in the Galilee; the results were identical and equally encouraging in both tests.

Freund said that she believes these antibodies can bring about a real revolution in the fight against COVID-19, by providing a viable alternative to booster doses.

"We need to look at the COVID-19 pandemic in the context of previous disease outbreaks that humankind has witnessed. People who were vaccinated against smallpox at birth and who today are 50-years-old still have antibodies, so they are probably protected, at least partially, from the monkeypox virus that we have recently been hearing about," she explained.

"Unfortunately, this is not the case with the coronavirus. For reasons we still don't yet fully understand, the level of antibodies against COVID-19 declines significantly after three months, which is why we see people getting infected again and again, even after being vaccinated three times.

“In our view, targeted treatment with antibodies and their delivery to the body in high concentrations can serve as an effective substitute for repeated boosters, especially for at-risk populations and those with weakened immune systems,” she said.

“COVID-19 infection can cause serious illness, and we know that providing antibodies in the first days following infection can stop the spread of the virus. It is therefore possible that by using effective antibody treatment, we will not have to provide booster doses to the entire population every time there is a new variant,” she concluded.

The research was also carried out by doctoral students Michael Mor and Ruofan Lee of the Department of Clinical Microbiology and Immunology at the Sackler Faculty of Medicine, and in collaboration with Dr. Ben Croker of the University of California San Diego, Prof. Ye Xiang of Tsinghua University in Beijing, Prof. Meital Gal-Tanamy and Dr. Moshe Dessau of Bar-Ilan University.

The study was published in the Nature journal *Communications Biology.*