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Passive Antibody Therapy: Potentially the First COVID-19 Treatment

Caterina Erdas

While the world anxiously waits for a COVID-19 vaccine, thousands of people are in critical condition, in need of help today. Scientists are wondering what tools they have now to prevent the spread of COVID-19 and help save the lives of patients in critical condition. Passive antibody therapy may be the solution.

An antibody is a small molecule created by the immune system to help fight an infection. Humans only obtain an effective antibody for an infection after they have become infected. Once the body is initially infected, a chain of immune system processes is set off, including the development of a specialized antibody. Through the process of trial and error, the body develops an antibody, creates millions of copies, and disperses them throughout the body in the blood stream. An antibody has a specialized region that binds to the protein coating of a virus or the outer membrane of an invasive cell.¹

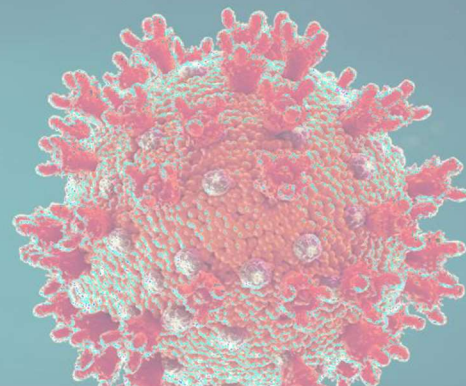
There are many types of antibodies that work in different ways to neutralize an infection. Some work by completely surrounding the infectious agent and preventing it from replicating. Other antibodies bind to the infectious agent and tag it for other cells in the immune system to kill it.¹ Once the infection is cleared, the immune system will keep creating that antibody for a short period of time, or for the rest of the human's life. No matter the strategy, antibodies are a powerful and effective biological adaptation to fight an infection.

The idea behind passive antibody treatment is: Why re-invent the wheel? Humans who have just recovered from an infection, in our case COVID-19, will have high levels of the effective, specialized antibody in their blood. Theoretically, if you take the convales-

cent plasma (filtered blood that doesn't have any blood cells but does have the antibodies for the pathogen of interest) from the recovered patient and inject it into a sick or susceptible patient, they will have the antibodies to fight off the infection. The immune system created a great treatment, so instead of synthesizing anew treatment, which takes a lot of time, doctors can give a plasma transplant from a recovered patient to a critical patient and potentially save their life.

Doctors and scientists have been trying passive antibody treatment for coronaviruses in general and with COVID-19. In SARS1 and MERS, studies showed that convalescent plasma administered early on in the infection improved the health of patients. In China, convalescent plasma was administered to 10 COVID-19 patients, and all 10 patients showed improvement after 1-3 days of treatment. There are other similar studies that show promising results but have small sample sizes and study design limitations. While the extent of the effectiveness of passive antibody treatment cannot currently be determined, the data available suggests that antibody treatment is not harmful and could improve the symptoms of patients permanently.²

The first step to start treating many COVID-19 patients with passive antibody testing is scientific validation. Safety is the first question that scientists need to answer in a rigorous clinical study, followed by evaluating passive antibody testing effectiveness in mildly ill to critically ill adult patients, and finally children. After the extent of the treatment is characterized, a structural framework needs to be built to collect and distribute convalescent plasma. Recovered people from COVID-19 are not hard to find, but blood donation



centers are facing severe blood shortages because they have had to close their hospital locations.²

Scientific investigation and a solution to collect large quantities of convalescent plasma is needed before passive antibody testing can be widely administered. In conclusion, passive antibody treatment has the potential to save the lives of patients and prevent the spread of COVID-19 before a vaccine is created and distributed. If you contract COVID-19 and fully recover, look into convalescent plasma donation. Your donation could be invaluable in saving a patient with COVID-19 or fueling research for a long-term COVID-19 passive antibody treatment.

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