Medical Xpress

Researchers flag similarities between COVID-19 deaths and severe rheumatic illnesses

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Rheumatologists at the University of Alberta are flagging similarities between the deaths of some COVID-19 patients and those with

rheumatic illnesses, and are testing proven rheumatic treatments to see whether they help against the pandemic virus.

A substantial proportion of COVID-19 patients admitted to intensive care die of pneumonia due to a cytokine storm, where the body attacks itself rather than fighting off the illness, said Jan Willem Cohen Tervaert, director of rheumatology in the Department of Medicine.

In a new paper published in *Autoimmunity Reviews*, Cohen Tervaert and his colleagues note that such storms, whether in patients with COVID-19 or rheumatic diseases, are caused by dysfunctional "natural killer" (NK) immune cells.

They say that SARS-CoV-2, the virus that causes COVID-19, might attack NK cells directly by binding to angiotensin converting enzyme 2 (ACE-2), a receptor on the cells that COVID-19 researchers believe attracts and opens the door to the virus.

"This virus is so smart, it kills the cells that are supposed to kill it," Cohen Tervaert said.

Trials with rheumatoid treatments

Worldwide clinical trials are being carried out to test treatments typically used to treat cytokine storm in patients with juvenile arthritis and other rheumatic diseases.

These include intravenous immunoglobulin, a blood transfusion product prepared from the serum of thousands of healthy or previously infected patients, and rheumatic drugs such as tocilizumab and anakinra. Some researchers in China are even attempting to transplant healthy NK cells.

Cohen Tervaert said the U of A team is collaborating with researchers at

the University of Calgary to further study the role of NK cells in COVID-19 patients. There are more COVID-19 patients in southern Alberta than in the Edmonton area.

A key immune system regulator

In a healthy person, natural killer cells are responsible for both turning on and turning off the immune response when a body is attacked by disease, including viruses and even cancer. Unlike other immune cells (T and B cells), natural killer cells don't need to be trained or primed to fight infection.

"They are not thinkers," Cohen Tervaert said. "They immediately do their work without being exposed previously to a virus. As soon as a virus affects the cell and the cell wall changes, NK cells can attack that cell."

After the NK cells kill the virus-infected cells, the T and B immune cells come along and produce cytokines, making the immune reaction stronger and stronger.

"But at a certain time the immune reaction has to end," he said. "Natural killer cells play an important role in finishing that huge attack.

"If they don't work, the cytokine storm goes on and on, and the patient will die."

Exercise is prevention

For those who have not been infected with the virus, Cohen Tervaert recommends regular mild to moderate exercise to boost their NK cells. His own daily routine includes step climbing, walking and weightlifting.

"If you sit the whole day in your room because you have to be isolated, your NK cell activity goes down," he said. "That's the big warning about the isolation of elderly people who are not allowed to go outside of their rooms. Over time they are more and more at risk to die from COVID-19."

More information: Mohammed S. Osman et al. Fatal COVID-19 infections: Is NK cell dysfunction a link with autoimmune HLH?, *Autoimmunity Reviews* (2020). DOI: 10.1016/j.autrev.2020.102561

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