

# Does the COVID-19 cytokine storm exist?

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Inflammatory proteins, also known as cytokines, play a crucial role in the immune response. If this immune response is too strong, a phenomenon known as "cytokine storm," it can cause harm to the patient. It has been thought that a cytokine storm contributes to disease severity in patients with COVID-19. Following the measurement of several important

cytokines in patients with COVID-19 and various other severe diseases, researchers at Radboud university medical center now show that COVID-19 is not characterized by a cytokine storm. This may have consequences for the treatment of these patients, the researchers write in *JAMA*.

The cytokine storm in COVID-19 patients is not clearly defined. In many cases, different cytokines are evaluated and no comparison has been made with other diseases. Therefore, uncertainty and doubt exists concerning the cytokine storm in these patients.

## Various patient groups

Researchers from the Intensive Care (IC) department at Radboud university [medical center](#) have now measured the concentration of three essential cytokines in the blood of patients admitted to the IC with several distinct conditions. They performed these measurements in patients with COVID-19 who met the criteria for a severe acute respiratory infection (ARDS), patients with bacterial [septic shock](#) (with and without ARDS), and patients who had been admitted to the IC after a cardiac arrest or severe trauma. The cytokines were measured using the same methods for each of the groups of patients.

## Cytokine storm?

In the abovedescribed five patient groups, the concentration of tumor necrosis factor alpha (TNF- $\alpha$ ) and interleukins 6 and 8 (IL-6, IL-8) was measured. The results were remarkable. Researcher Matthijs Kox: "The level of cytokines was significantly less elevated in COVID-19 patients than in patients with septic shock and ARDS. Compared to patients with septic shock without ARDS, so without severe pulmonary disease, patients with COVID-19 also displayed markedly lower levels of IL-6

and IL-8. The cytokine concentrations in COVID-19 patients were similar to those in IC patients with trauma or [cardiac arrest](#), conditions that are not noted for a cytokine storm."

## Possible consequences

The results from this study show that COVID-19 is not characterized by a cytokine storm. Professor of Intensive Care Medicine Peter Pickkers: "The severe disease observed in critically ill COVID-19 patients is therefore not explained by strongly elevated levels of inflammatory proteins in the blood. This means that critically ill COVID-19 patients likely will not benefit from specific anti-cytokine therapies."

**More information:** Matthijs Kox et al, Cytokine Levels in Critically Ill Patients With COVID-19 and Other Conditions, *JAMA* (2020). [DOI: 10.1001/jama.2020.17052](https://doi.org/10.1001/jama.2020.17052)

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