

THE IMMUNE SYSTEM: A POTENTIAL KEY TO TREATING COVID-19

Scientists at the University of Cleveland have identified key findings about the role of the body's first line of defense (innate immune system) in COVID-19 disease. Their study reveals how natural killer (NK) cells, specialized immune cells, behave during infection, opening the way for innovative treatments targeting these crucial immune components.

Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2), the virus responsible for COVID-19, actively spreads and causes severe respiratory disease due to its high transmissibility. The clinical symptoms range from mild to severe and are often associated with immune imbalances, including changes in the number and proportion of immune cells, along with disrupted levels of chemokines and cytokines—critical proteins for immune cell communication. NK cells are a key part of the body's first line of defense, rapidly targeting and destroying infected cells, especially during viral respiratory infections.

To investigate NK cells' behavior during infection, the scientists analyzed blood samples from 74 COVID-19 patients and 25 healthy individuals

Their findings revealed unique combinations of surface proteins on NK cells, acting as ON/OFF switches. Infected patients showed decreased activating signals, suggesting fewer NK cells were fully engaged in fighting the infection.

Examining these protein patterns, they could identify distinct NK cell groups based on the specific combinations of biological molecules. The types associated with a mild/severe infection displayed a prevalence of inhibitory signals and lower NK cell activity. In contrast, the groups linked to healthy subjects exhibited a high rate of activating molecules.

To explore the potential of COVID-19-derived NK cells, researchers blocked the inhibitory units on the cells' surface and assessed if they could improve their ability to fight the infection. The results showed a significant improvement in the efficiency of these NK cells in targeting and destroying the virus.

This study provides a valuable overview of NK cells' role in COVID-19, shedding light on the pivotal role of the innate immune system in the process. It demonstrates the possibility of a new approach to counteract COVID-19, suggesting potential future strategies for more effective and targeted treatments.

Original research article: Lee G, Schauner R, Burke J, et al. NK cells from COVID-19 positive patients exhibit enhanced cytotoxic activity upon NKG2A and KIR2DL1 blockade. *Front Immunol.* 2023;14:1022890. Published 2023 Jul 7. doi:10.3389/fimmu.2023.1022890

