New understanding in how hydroxychloroquine works undermines its use for coronavirus

June 18 2020

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Researchers at the Radboudumc have discovered an until now, unknown effect of hydroxychloroquine. It inhibits the action of a certain type of

white blood cell, which is important in the fight against infections. Based on this research, hydroxychloroquine is unlikely to have a beneficial effect on corona infections. The researchers report their findings in a preprint on MedRxiv.

Prof. Dr. Willem Mulder, Professor of Precision Medicine at the Department of Biomedical Engineering at Eindhoven University of Technology, who is one of the authors of the scientific article, points out the significance of this research. "This study shows that it is unwise to prescribe the medicine prophylactically as a precaution because this compromises the non-specific immune system. In addition, randomized, placebo-controlled trials are extremely important in determining the efficacy of the drug in COVID19 patients."

Hydroxychloroquine is a drug that has been used for years, originally for the treatment of malaria. In the meantime, it is also widely used to treat patients with rheumatic diseases because hydroxychloroquine inhibits the immune system. Exactly how hydroxychloroquine does this is not known. Currently, it is also used worldwide to treat patients with a corona infection. However, its usefulness is controversial because it is not clear whether it works and how it works.

Quick stop

In the case of a viral infection, such as the new coronavirus SARS-CoV-2, a good immune system reaction is essential to combat the virus. If the immune response at the beginning of the infection is inadequate, the virus can spread further into the body and cause damage. This spread, which in SARS-CoV-2 may result in serious illness or death, is exactly what you want to prevent.

First line of defense

Raphaël Duivenvoorden, internist nephrologist at Radboudumc: "We looked at the immune response of patients admitted with a SARS-CoV-2 infection. We saw in them that a certain type of immune cell, the monocyte, plays an important role in the first line of defense against the coronavirus. That is why we started investigating the effect of hydroxychloroquine on these cells."

Less protection

Monocytes can develop a kind of non-specific memory, something called 'trained immunity'. Thanks to this mechanism, monocytes are able to develop a stronger response to bacteria and viruses. In this way, monocytes can contribute to a better, earlier control of invading microorganisms. Duivenvoorden, who coordinated the research: "We discovered that hydroxychloroquine prevents the development of this protective mechanism of 'trained immunity'. That is why we do not expect hydroxychloroquine to have a beneficial effect on the immune response in case of a SARS-CoV-2 infection."

More information: Nils Rother et al. Hydroxychloroquine inhibits trained immunity - implications for COVID-19, (2020). DOI: 10.1101/2020.06.08.20122143

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