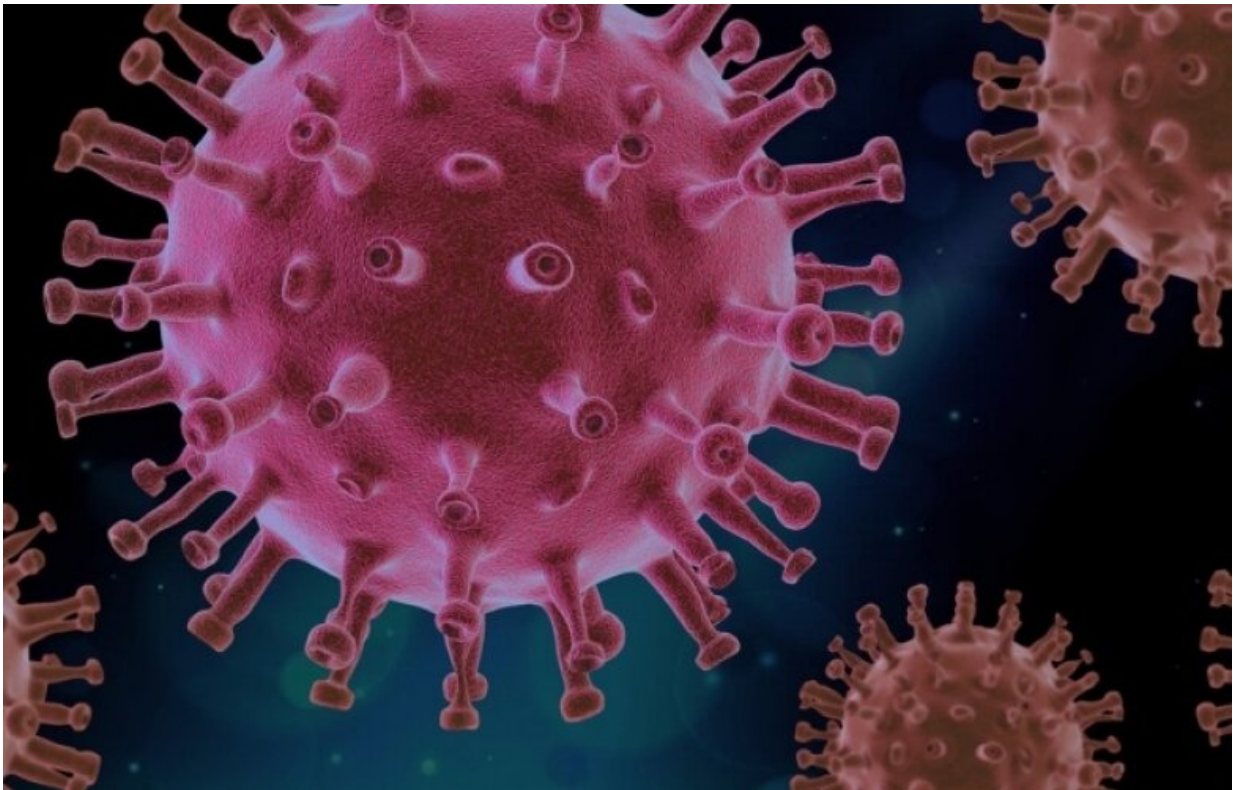


Rheumatoid arthritis drug shows promise against COVID-19, study finds

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Credit: Pixabay

A drug against rheumatoid arthritis called baricitinib could potentially be repurposed to treat patients with COVID-19, according to a study conducted by an international research team including researchers at Karolinska Institutet in Sweden. The findings, published in the journal

EMBO Molecular Medicine, represent an example of how artificial intelligence (AI)-algorithms could help identify existing drugs as potential therapies against as new illnesses.

Baricitinib is a once-daily oral [drug](#) used for treatment of adult patients with moderate to severe [rheumatoid arthritis](#). It acts as an inhibitor of janus kinase, a type of enzyme that acts as an "on" or "off" switch in many cellular functions. The drug works by interfering with the inflammatory processes of the immune system and has been viewed as a potential treatment candidate for COVID-19.

In this study, the researchers used AI-algorithms to identify existing drugs capable of blocking both inflammation and infectivity. Baricitinib was identified as a promising repurposing candidate for COVID-19, due to its previously demonstrated ability to inhibit both cytokine activity and viral spread.

Lab tests and clinical pilot study

In test tubes and 3-D-human miniature livers, the researchers showed that the drug inhibited signaling of cytokines, immune system-proteins known to overreact and drive inflammation in severe cases of COVID-19 infection. It also helped reduce the viral load of SARS-CoV-2, the virus that causes COVID-19, and the level of the signal molecule interleukin-6 (IL-6), a predictor of mortality from acute respiratory distress syndrome associated with COVID-19.

In addition to the [lab tests](#), a small pilot study of three men and one woman with bilateral COVID-19 pneumonia was conducted in Milan, Italy. After 10-12 days of treatment with baricitinib, all four patients showed improvements in signs and symptoms such as cough, fever and reductions in viral load and plasma IL-6 levels.

The clinical study was led by researchers at Imperial College London, U.K., ASST Fatebenefratelli Sacco, Italy, and Eli Lilly and Company, U.S., while the toxicological and functional testing on 3-D human tissue models were conducted at Karolinska Institutet and the Science for Life Laboratory.

May lower inflammation and viral load

"Collectively, these data suggest that baricitinib may lower inflammation and viral load in COVID-19," says Ali Mirazimi, adjunct professor in the Department of Laboratory Medicine, Karolinska Institutet, who led the functional virus studies.

Additional trials of baricitinib are currently underway in 85 hospitalized COVID-19 patients across three hospitals in Northern and Central Italy, with encouraging initial results in patient outcomes, according to the researchers.

"We are integrating and carefully analyzing these trial data and providing functional and mechanistic follow-up studies to scrutinize baricitinib's mode of action," says Volker Lauschke, associate professor of personalized medicine and drug development at the Department of Physiology and Pharmacology, Karolinska Institutet, who led the functional testing of baricitinib.

More information: Justin Stebbing et al. Mechanism of baricitinib supports artificial intelligence-predicted testing in COVID-19 patients, *EMBO Molecular Medicine* (2020). [DOI: 10.15252/emmm.202012697](https://doi.org/10.15252/emmm.202012697)

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