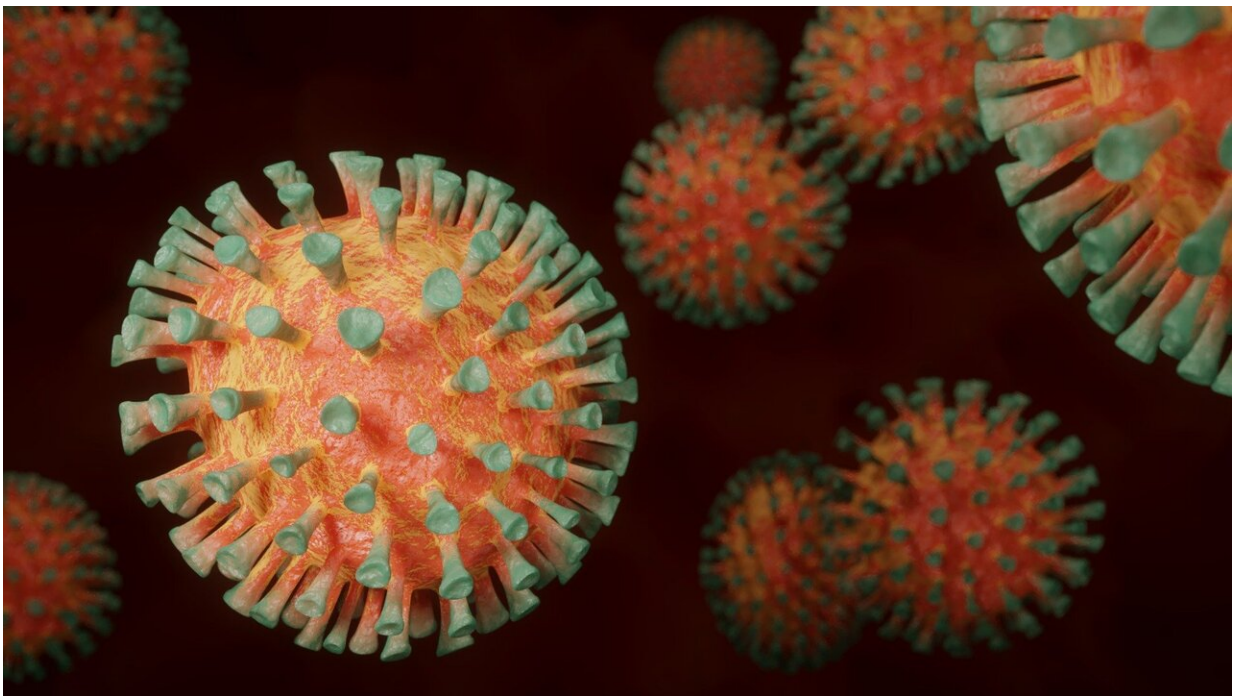


Nitric oxide a possible treatment for COVID-19

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Researchers at Uppsala University have found that an effective way of treating the coronavirus behind the 2003 SARS epidemic also works on the closely related SARS-CoV-2 virus, the culprit in the ongoing COVID-19 pandemic. The substance concerned is nitric oxide (NO), a compound with antiviral properties that is produced by the body itself. The study is published in the journal *Redox Biology*.

"To our knowledge, nitric oxide is the only substance shown so far to have a direct effect on SARS-CoV-2," says Åke Lundkvist, a professor at Uppsala University, who led the study.

Since there is still no effective cure for COVID-19, the main emphasis in the treatments tested has been on relieving symptoms. This can shorten hospital stays and reduce mortality. To date, however, it has not been possible to prove that any of these treatments has affected the actual virus behind the infection.

Nitric oxide (NO) is a compound produced naturally in the body. Its functions include acting like a hormone in controlling various organs. It regulates, for example, tension in the blood vessels and blood flow between and within organs. In acute lung failure, NO can be administered as inhaled gas, in low concentrations, to boost the blood-oxygen saturation level. During the SARS ([severe acute respiratory syndrome](#)) [coronavirus](#) epidemic of 2003, this therapy was tried out with success. One key reason for the successful results was that inflammation in the patients' lungs decreased. This property of [nitric oxide](#)—the protection it affords against infections, by being both antibacterial and antiviral—is the very one that now interests the researchers.

Their study builds further on a discovery about the coronavirus that caused the first SARS epidemic. In 2003, NO released from S-Nitroso-N-acetylpenicillamine (SNAP) proved to have a distinct antiviral effect. The researchers from Uppsala University and Karolinska Institute have now investigated how the novel coronavirus involved in the current pandemic, SARS CoV-2, reacts to the compound. And SNAP was shown to a clear antiviral effect on this virus, too—and an effect that grew stronger as the dose was raised.

"Until we get a vaccine that works, our hope is that inhalation of NO might be an effective form of treatment. The dosage and timing of

starting treatment probably play an important part in the outcome, and now need to be explored as soon as possible," Åke Lundkvist says.

The research group are now planning to proceed by investigating the antiviral effects of NO emitted in gas form. To do so, they will construct a model in the laboratory in order to safely simulate a conceivable form of therapy for patients.

More information: Dario Akaberi et al. Mitigation of the replication of SARS-CoV-2 by nitric oxide in vitro, *Redox Biology* (2020). [DOI: 10.1016/j.redox.2020.101734](https://doi.org/10.1016/j.redox.2020.101734)

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