A team of University of Minnesota researchers found that metformin, a drug commonly used to treat diabetes, can decrease the amount of
COVID-19 virus in the body and lower the chances of the virus coming back strongly after initial treatment. The study was published in Clinical Infectious Diseases.

A higher viral load—the amount of virus in a person's body—usually indicates a greater concentration of the virus, which can be important in understanding the severity of infection and monitoring the effectiveness of treatments.

"The results of the study are important because COVID-19 continues to cause illness, both during acute infection and for months after infection," said Carolyn Bramante, MD, principal investigator and an assistant professor at the U of M Medical School. She is also an internist and pediatrician with M Health Fairview.

In this phase 3 randomized clinical trial, the researchers tested metformin against a placebo in 1,323 adults infected with COVID-19. The group treated with metformin had a viral load that was about four times lower than the placebo at day 10. The metformin group also had less viral rebound than the placebo group.

The research team concludes that metformin treatment for adults recently infected with COVID-19 is an effective way to reduce the amount of the virus in the nose and to keep the amount of the virus from becoming elevated again.

"Among the volunteers in this randomized trial, there was a more than 41% reduction of long COVID among those receiving metformin and a 58% reduction in hospitalization by 28 days. This new study explains why this occurred. Metformin reduced the amount of SARS-CoV-2 virus present, which likely accounts for why this $1 medication reduced
hospitalizations and long COVID," said David Boulware, MD, MPH, an infectious disease physician and professor at the U of M Medical School and M Health Fairview.

None of the outpatient treatments in current guidelines have been tested in adults who had prior infection. Further research is needed to understand how metformin works in those who had the virus before.

A computer simulator developed by U of M Medical School and College of Science and Engineering faculty accurately predicted metformin's effectiveness against COVID-19—helping steer the direction of the clinical trial. Similarly, the simulation also predicted the failure of medications such as hydroxychloroquine.

"These results are consistent with the model predictions for viral replication that we developed to identify antiviral drugs at the beginning of the pandemic," said David Odde, Ph.D., co-author and biomedical engineering professor in the College of Science and Engineering. "This is another great example of how engineering tools can be used to predict clinical outcomes, steer research efforts and ultimately add to the body of knowledge around disease treatments."

**More information:** Carolyn T Bramante et al, Favorable Antiviral Effect of Metformin on Severe Acute Respiratory Syndrome Coronavirus 2 Viral Load in a Randomized, Placebo-Controlled Clinical Trial of Coronavirus Disease 2019, *Clinical Infectious Diseases* (2024). DOI: 10.1093/cid/ciae159

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