

Testing for long COVID: Eye exam as a new approach

September 18 2023



During an eye examination, the diameter of small blood vessels (left) and the dilation of vessels in response to light pulses (right) can be measured. Both are altered in people with long COVID. Credit: Abteilung für Nephrologie / TUM

A standardized eye examination might reveal in future whether people are suffering from long COVID syndrome or post-COVID. A team at the Technical University of Munich (TUM) was able to demonstrate a clear connection between the disease and certain changes to the blood vessels in the eye.

Between 10% and 35% of those affected continue to experience symptoms such as [respiratory problems](#) or fatigue long after contracting COVID. So far, no [physical features](#), or so-called biomarkers, are known that can be used to reliably diagnose long COVID.

One of the characteristics of COVID-19 is changes to blood vessels. This affects the endothelium, in particular, the inner wall of the blood vessel. As a result of the changes, organs in the body are not supplied with sufficient blood.

To date, the blood vessels studied were mainly large vessels. "However, 90% of [endothelial cells](#) in the body are in small and tiny vessels. What happens to these blood vessels in long COVID is barely known," says the leader of the study, Prof. Christoph Schmaderer, Managing Senior Physician in the Department of Nephrology at Klinikum rechts der Isar, TUM's university hospital.

"Blood vessels in the eye could offer a clue to the condition of [small blood vessels](#) in the whole body," Schmaderer says. They are easily accessible for examination, he adds. The necessary methods and tools are well tested and do not require any intervention in the body.

Schmaderer, co-leader of the study Dr. Timon Kuchler, and their team describe their results in the journal [Angiogenesis](#). Two values, in particular, showed a strong correlation with long COVID illnesses.

First, arterioles, i.e., the smallest arteries, were significantly constricted by comparison with the healthy control group. Second, venules—but not the arterioles—showed an altered response to light stimulation. If you shine a flickering light into the eye, the [blood vessels](#) dilate. In the case of patients with long COVID, this response was significantly reduced.

The more inflammatory markers were measured in the blood of

participants, the more pronounced the changes were. According to studies, persistent inflammatory responses are suspected of being a further important factor in long COVID.

As the study is comparatively small, with 41 sick participants and was only conducted in a single hospital, no reliable test for long COVID can be derived from the results yet. In the researchers' opinion, further studies are needed in order to verify the results.

"I am confident that a tool can be developed on the basis of our results in order to diagnose long COVID with confidence," states Christoph Schmaderer. "We also assume that microcirculation is restricted not just in the eye but also in other parts of the body. This might make the method especially suited for assessing the effectiveness of future therapies for long COVID."

More information: Timon Kuchler et al, Persistent endothelial dysfunction in post-COVID-19 syndrome and its associations with symptom severity and chronic inflammation, *Angiogenesis* (2023). [DOI: 10.1007/s10456-023-09885-6](https://doi.org/10.1007/s10456-023-09885-6)

Provided by Technical University Munich

Citation: Testing for long COVID: Eye exam as a new approach (2023, September 18) retrieved 29 April 2024 from <https://medicalxpress.com/news/2023-09-covid-eye-exam-approach.html>

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