

# New biomarker confirmed for early diagnosis of multiple sclerosis

July 6 2023

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Credit: AI-generated image

A study conducted by researchers from the Department of Neurology at MedUni Vienna and University Hospital Vienna has demonstrated for the first time that the diagnosis of multiple sclerosis (MS) can be significantly improved by additionally measuring the thickness of retinal layers in the eye.

Use of the procedure, which is already available at the Departments of MedUni Vienna and University Hospital Vienna, helps to detect the condition at an earlier stage and predict its progression more accurately. This can lead to a decisive increase in the chance of improved patient outcomes. The findings have been published in the journal *Neurology*.

As part of their investigation, the research team headed by Gabriel Bsteh and Thomas Berger of the Department of Neurology at MedUni Vienna and University Hospital Vienna collaborated with colleagues from MedUni Vienna and University Hospital Vienna's Department of Ophthalmology and Optometrics to examine 267 MS patients over a period of five years.

Their research builds on study results published in 2022, which showed that MS relapse-related damage to the retina reflects the degree of damage caused to the patient's brain. The previous study also demonstrated that a 5 micrometer ( $\mu\text{m}$ ) reduction in the thickness of the retinal layer following [optic neuritis](#) indicated a doubling of the risk of permanent disability after the next relapse. Thanks to the latest research with the large cohort of MS patients, the research team has confirmed that the thickness of the retinal layer can be used as a precise biomarker to assist [early diagnosis](#).

## **Diagnostic procedure already available**

The researchers used a procedure known as [optical coherence tomography](#) (OCT) to measure the thickness of the retinal layer. An imaging method that uses [infrared light](#), OCT allows for the generation of high-resolution, three-dimensional images of extremely thin layers of tissue measuring just a few micrometers (1  $\mu\text{m}$  is 1/1,000th of a millimeter). OCT is also a tool for diagnosing and evaluating the progression of eye diseases such as glaucoma.

"So we already have this procedure at our disposal," commented Gabriel Bsteh, first author of the study. He added, "If we use optical coherence tomography alongside the current criteria to diagnose MS, we obtain significantly more accurate results at a much earlier stage. This means we can initiate treatment measures sooner, which considerably improves the long-term prognosis for patients."

## **Retina as a window on the brain**

Multiple sclerosis is an autoimmune, chronic inflammatory disease that causes inflammation and loss of nerve cells throughout the nervous system. For the most part, patients are unable to feel the consequences of this damage to begin with, so the condition often goes undiagnosed until a late stage, meaning that valuable time is lost during which effective treatment could have been administered.

Given that early detection and prognosis of the disease's progression play a decisive role in MS cases, medical researchers have been trying to find improved detection methods for some time now to help avert serious consequences such as impaired mobility and blindness as far as possible.

"We have identified a new biomarker for MS diagnosis, namely the retinal layer thickness, which can be likened to a window to the brain," said Bsteh, summing up the study's key finding. In the next phases of research, the focus will turn to the importance of retinal layer thickness in measuring responses to MS treatment.

**More information:** Gabriel Bsteh et al, Diagnostic Performance of Adding the Optic Nerve Region Assessed by Optical Coherence Tomography to the Diagnostic Criteria for MS, *Neurology* (2023). [DOI: 10.1212/WNL.0000000000207507](https://doi.org/10.1212/WNL.0000000000207507)

Provided by Medical University of Vienna

Citation: New biomarker confirmed for early diagnosis of multiple sclerosis (2023, July 6)  
retrieved 21 November 2023 from

<https://medicalxpress.com/news/2023-07-biomarker-early-diagnosis-multiple-sclerosis.html>

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