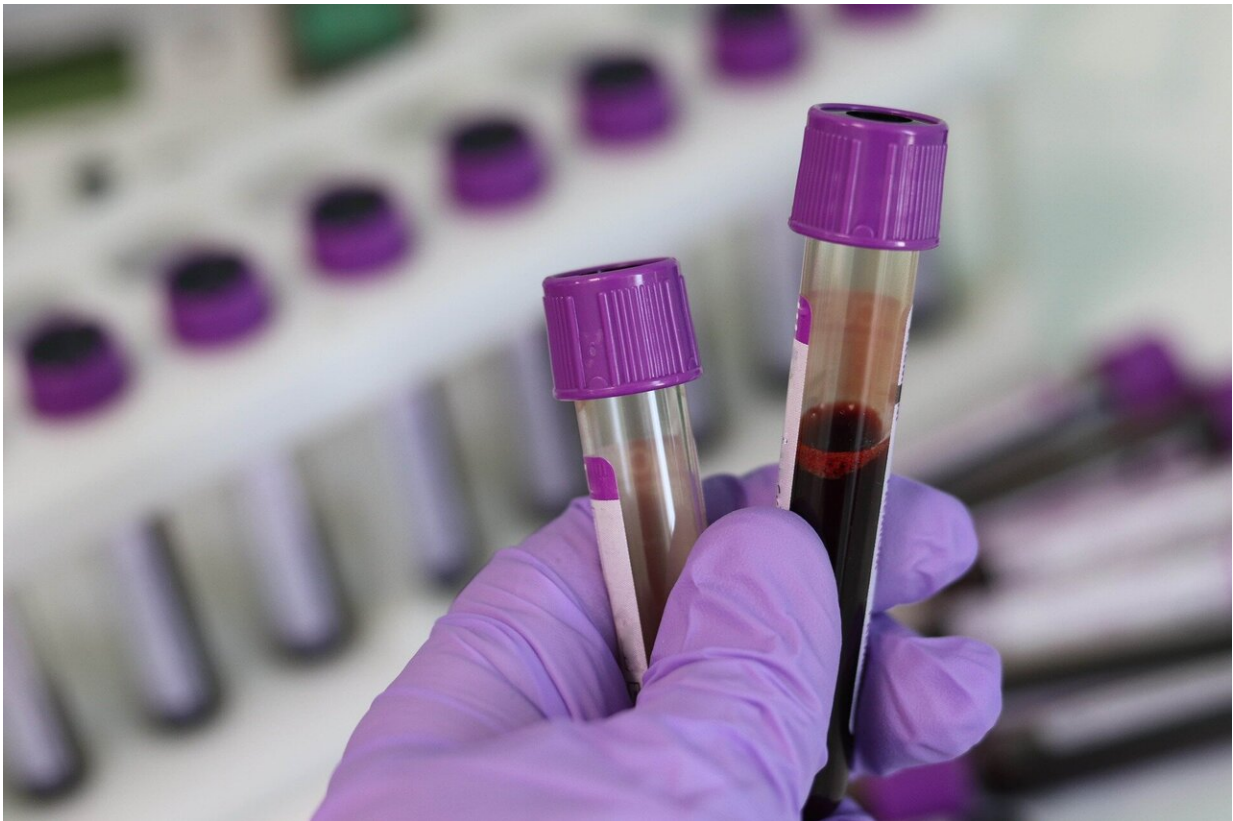


New blood test detects a key indicator of Parkinson's disease

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Researchers have developed a blood test that detects Parkinson's disease, potentially establishing a way to help diagnose the condition before nervous system damage worsens.

A new blood-based [diagnostic test](#) would be a major advancement for Parkinson's disease, which afflicts 10 million people worldwide and is the second-most common neurodegenerative disease after Alzheimer's. Led by a team of Duke Health neuroscientists, the study appeared Aug. 30 in the journal *Science Translational Medicine*.

"Currently, Parkinson's disease is diagnosed largely based on clinical symptoms after significant neurological damage has already occurred," said senior author Laurie Sanders, Ph.D., an associate professor in Duke School of Medicine's departments of Neurology and Pathology and member of the Duke Center for Neurodegeneration and Neurotherapeutics.

"A simple [blood test](#) would allow us to diagnose the disease earlier and start therapies sooner," Sanders said. "Additionally, a clear-cut diagnosis would accurately identify patients who could participate in drug studies, leading to the development of better treatments and potentially even cures."

As a biomarker for their [diagnostic tool](#), Sanders and colleagues focused on DNA damage in the mitochondria. Mitochondria are factories within cells that convert raw energy into a form that powers cells. They contain their own DNA, which can undergo damage separately from the nuclear DNA that encodes most of an organism's genome.

Earlier studies have associated mitochondrial DNA damage with an increased risk of Parkinson's disease, and the Duke-led team had previously reported an accumulation of mitochondrial DNA damage specifically in the [brain tissue](#) of deceased Parkinson's patients.

Using [polymerase chain reaction](#) (PCR) technology, the Duke team developed an assay that successfully quantified higher levels of mitochondrial DNA damage in [blood cells](#) collected from patients with

Parkinson's disease compared to people without the disease.

The new test also identified high levels of the damaged DNA in the blood samples of people who harbor the genetic mutation LRRK2, which has been associated with an increased risk of the disease. The assay was able to detect patients with Parkinson's disease with and without LRRK2 mutations.

A further analysis in cells from patients with Parkinson's disease explored whether the team's PCR-based test could determine the effectiveness of a therapy that targets the effects associated with LRRK2 mutation.

In these samples, the test identified lower mitochondrial DNA damage in cells treated with a LRRK2 inhibitor compared to samples from patients who did not receive the inhibitor. This suggests the assay could help pinpoint Parkinson's disease patients who might benefit from LRRK2 kinase inhibitor treatments, even if they do not have a LRRK2 mutation.

"Our hope is that this assay could not only diagnose Parkinson's disease, but also identify drugs that reverse or halt mitochondrial DNA damage and the disease process," Sanders said. "This disease takes a terrible toll on people, and we are still just treating the symptoms. It's important to get new, effective treatments over the finish line."

Sanders said the research team's future will include further testing of the assay in samples from patients with the earliest stages of disease, before symptoms develop.

More information: Rui Qi et al, A blood-based marker of mitochondrial DNA damage in Parkinson's disease, *Science Translational Medicine* (2023). [DOI: 10.1126/scitranslmed.abo1557](https://doi.org/10.1126/scitranslmed.abo1557). www.science.org/doi/10.1126/scitranslmed.abo1557

Provided by Duke University Medical Center

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