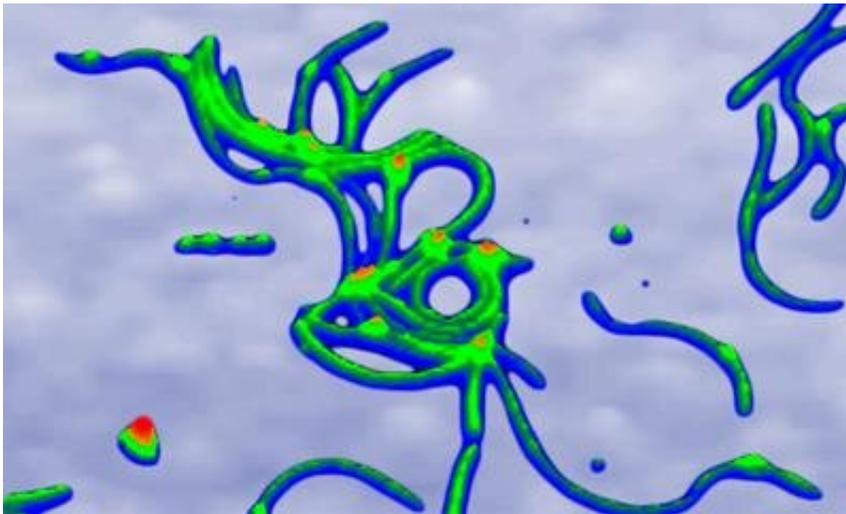


New way to identify and track progression of Huntington's disease

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Protein fibrils that accumulate in brain during neurodegeneration. Credit: George Devitt

Researchers at the universities of Southampton and Cambridge have developed a new technique to analyze biochemical changes unique to Huntington's disease. The breakthrough has the potential to lead to the improved diagnosis of disease onset and possibly better ways to track the effects of new treatments.

Huntington's disease damages nerve cells in the brain and typically develops between the ages of 30 and 50. It leads to uncontrollable movement, loss of cognitive ability and changes in mood.

Until now, it has been difficult to assess the progress of the disease using biomarkers—molecules found in [blood](#) which indicate a condition. This is because the same markers can be associated with other diseases or aging.

In this new study, researchers used two forms of spectroscopy (a way of examining molecules with light) to analyze [blood samples](#) from Huntington's patients. From this they were able to establish the patterns or "fingerprints" of those biomarkers which indicate the presence of the disease.

Determining these fingerprints allowed the team to hone in on the specific biochemical signature of the disease. This could open the door to a better diagnosis of onset and more effective tracking of the disease in the future. The development could also form the foundation for a tool to assess the effectiveness of therapies aimed at slowing the condition. Findings are published in the journal *Chemical Science*.

The technology lead of the study, Professor Sumeet Mahajan of the Chemistry department at the University of Southampton comments: "Currently, clinicians rely on physical signs and symptoms, such as involuntary movements, to diagnose Huntington's disease. We have been able to identify those fingerprint biomarker traits which could ultimately help give a more accurate assessment of when their disease begins and how it is progressing. Just a tiny drop of blood serum is needed for rapid and easy detection."

The researchers collected Raman spectral data by shining a low power laser on blood samples from patients experiencing various stages of Huntington's disease. They then collected additional data by shining the same laser on blood samples mixed with gold nanoparticles. By combining results of these analyses, they were able to identify specific combinations of biochemical peaks which occur in all patients with the

disease and observe how they change in relation to the different stages of the condition.

The team now plan to extend their studies to include patients who have the Huntington's gene, but have not yet developed features of the condition, in order to pinpoint when changes begin. The clinical lead of the study, Professor Roger Barker of the University of Cambridge explains: "Longer-term, we want to see our research benefiting people who have or may develop the disease by creating a portable device which can be used in clinics for diagnosing and tracking [disease](#)."

More information: Anna Huefner et al, Serum Raman spectroscopy as a diagnostic tool in patients with Huntington's disease, *Chemical Science* (2019). DOI: 10.1039/C9SC03711J

Provided by University of Southampton

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