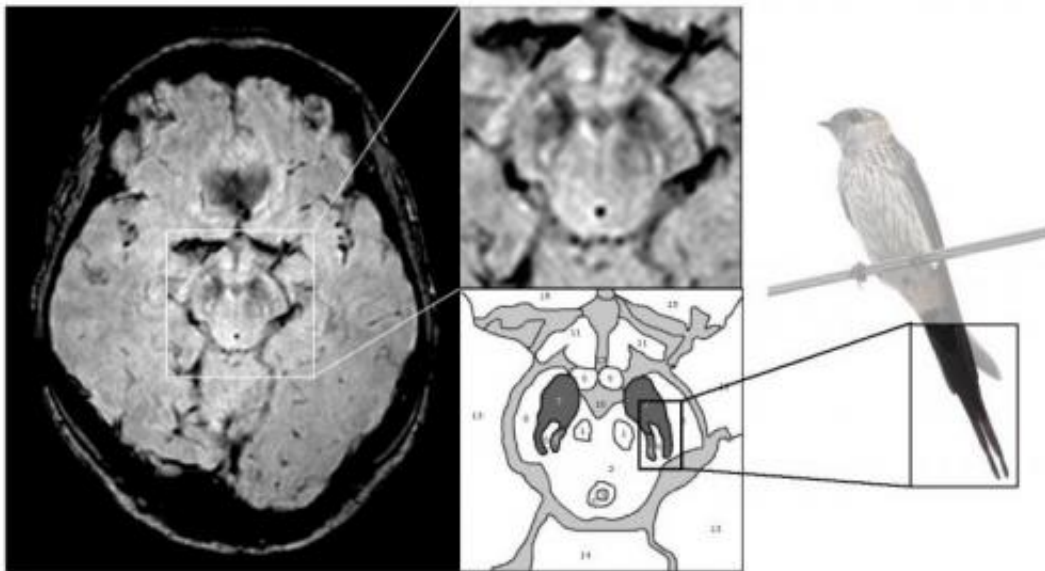


'Tell-tail' MRI image diagnosis for Parkinson's disease

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This is a 'Swallow tale' image from 3T MRI scan. Credit: Dr Stefan Schwarz

An image similar in shape to a Swallow's tail has been identified as a new and accurate test for Parkinson's disease. The image, which depicts the healthy state of a group of cells in the sub-region of the human brain, was singled out using 3T MRI scanning technology – standard equipment in clinical settings today.

The research was led by Dr Stefan Schwarz and Professor Dorothee Auer, experts in neuroradiology in the School of Medicine at The

University of Nottingham and was carried out at the Queen's Medical Centre in collaboration with Dr Nin Bajaj, an expert in Movement Disorder Diseases at the Nottingham University Hospitals NHS Trust.

The findings have been published in the open access academic journal *PLOS one*.

The work builds on a successful collaboration with Professor Penny Gowland at the Sir Peter Mansfield Magnetic Resonance Centre at The University of Nottingham.

'The 'Swallow Tail' Appearance of the Healthy Nigrosome – A New Accurate Test of Parkinson's Disease: A Case-Control and Retrospective Cross-Sectional MRI Study at 3T' – describes how the absence of this imaging sign can help to diagnose Parkinson's disease using standard clinical Magnetic Resonance Scanners.

Parkinson's disease is a progressive neurodegenerative disorder which destroys brain cells that control movement. Around 127,000 people in the UK have the disease. Currently there is no cure but drugs and treatments can be taken to manage the symptoms.

The challenges of diagnosing Parkinson's

Until now diagnosing Parkinson's in clinically uncertain cases has been limited to expensive nuclear medical techniques. The diagnosis can be challenging early in the course of the condition and in tremor dominant cases. Other non-licensed diagnostic techniques offer a varying range of accuracy, repeatability and reliability but none of them have demonstrated the required accuracy and ease of use to allow translation into standard clinical practice.

Using high resolution, ultra high field 7T [magnetic resonance](#) imaging

the Nottingham research team has already pinpointed the characteristic pathology of Parkinson's with structural change in a small area of the mid brain known as the substantia nigra. The latest study has shown that these changes can also be detected using 3T MRI technology which is accessible in hospitals across the country. They subsequently coined the phrase the 'swallow tail appearance' as an easy recognizable sign of the healthy appearing substantia nigra which is lost in Parkinson's disease. A total of 114 high-resolution scans were reviewed and in 94 per cent of cases the diagnosis was accurately made using this technique.

New findings give new hope

Dr Schwarz said: "This is a breakthrough finding as currently Parkinson's disease is mostly diagnosed by identifying symptoms like stiffness and tremor. Imaging tests to confirm the diagnosis are limited to expensive nuclear medical techniques which are not widely available and associated with potentially harmful ionizing radiation.

"Using Magnetic Resonance Imaging (no ionizing radiation involved and much cheaper than nuclear medical techniques) we identified a specific imaging feature which has great similarity to a tail of a swallow and therefore decided to call it the 'swallow tail sign'. This sign is absent in Parkinson's disease."

More information: Paper: www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0093814

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