NEUROLOGY

Circuits of Parkinson's disease

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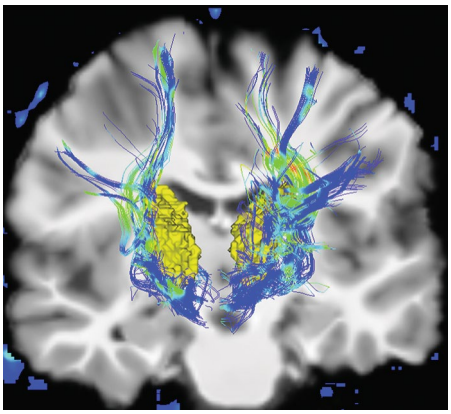

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Parkinson's disease is a neurodegenerative disorder widely associated in the public mind with the striking motor symptoms, but it also leads to cognitive changes. These days it's increasingly common to treat the motor and cognitive symptoms of Parkinson's disease with deep-brain stimulation, which involves implanting electrodes in the brain and using weak electrical currents to affect neural signalling. But why and how does this work?

In a recent study, Wolf-Julian Neumann, of the Charité Universitaetsmedizin, and colleagues combined measures of behaviour, a computational model and brain scans that track the connections between different brain areas, to better understand in which neural circuits the behavioural changes in Parkinson's disease originate, and how deep-brain stimulation alleviates these adverse effects of the disease. Comparing the performance of controlled and cued movements under stimulation and without stimulation, the researchers found that, in particular, cognitively controlled movements rely on a brain circuitry known as the hyperdirect pathway, while motor control relies more heavily on another well-known connection, the indirect pathway.

Teasing apart the contributions of different brain areas and their connections is an important endeavour, not only to better understand the origins of symptoms, but also to tailor interventions to obtain the best outcomes for patients.

Anne-Marike Schiffer

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