

## PARKINSON DISEASE

# Gut reactions—can changes in the intestinal microbiome provide new insights into Parkinson disease?

Gastrointestinal dysfunction is acknowledged as an important nonmotor—and probably premotor—manifestation of Parkinson disease (PD). In a new case–control study published in *Movement Disorders*, Filip Scheperjans and colleagues describe alterations in the intestinal microbiome in patients with PD, and they suggest that such changes might provide a biomarker for this condition.

“Most PD patients experience hyposmia and gastrointestinal symptoms, frequently before motor symptoms evolve,” explains Scheperjans. “Interestingly, the nose and gut are where our body mostly gets exposed to environmental agents, including microbes.”

For their study, the researchers selected 72 patients with PD and 72 controls matched for age and sex. Faecal samples from the participants were analysed for their microbial content through pyrosequencing of the bacterial 16S ribosomal RNA gene.

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The investigators found a 77.6% reduction in abundance of Prevotellaceae in the faeces of patients with PD compared with controls. By contrast, five other families of bacteria were more scarce in controls than in patients with PD. On the basis of Prevotellaceae levels alone, patients with PD could be identified with high sensitivity (86.1%) but low specificity (38.9%).

“Within the PD group, abundance of Enterobacteriaceae was related to the severity of postural instability and gait difficulty,” adds Scheperjans. “So, there was a connection between gut microbiota and the motor phenotype of our patients.”

Evidence is emerging that the vagus nerve provides a conduit for the spread of  $\alpha$ -synuclein pathology from the enteric

nervous system to the brain. According to this model, environmental factors might provoke local inflammation and oxidative stress in the gut, thereby initiating  $\alpha$ -synuclein deposition that is subsequently disseminated to the CNS.

“The ultimate question is whether the observed microbiome alterations in PD are present already before disease onset and, thus, could be involved in PD pathogenesis and indicate disease risk,” says Scheperjans. His team is now conducting a 2-year follow-up study to further explore the relationship between gut microbiota and PD progression.

Heather Wood

**Original article** Scheperjans, F. *et al.* Gut microbiota are related to Parkinson's disease and clinical phenotype. *Mov. Disord.* doi:10.1002/mds.26069

**Further reading** Derkinderen, P. *et al.* Gut feelings about smoking and coffee in Parkinson's disease. *Mov. Disord.* 29, 976–979 (2014)