

# Genomic analyses provide insights into the microbiome of patients with early Parkinson's disease

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## Video Abstract

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# Abstract

A new study published in *Genome Medicine* adds to the growing body of evidence that Parkinson's disease is linked to microbes in the gut. Investigating the composition and function of this microbial community, the research team found pronounced differences between healthy patients and those in the early stages of the disease. Parkinson's disease is most commonly associated with tremors, muscle stiffness, and impaired movement. While these symptoms are caused by the breakdown of nerve cells in the brain, the root cause and progression of this disorder are still not fully understood. Emerging evidence, however, suggests microorganisms found in the intestines may have something to do with it. The human gut contains trillions of microbes, including bacteria, archaea, fungi, and viruses. These organisms, collectively termed the microbiome, have been suggested to profoundly impact human health and disease. While seemingly unrelated, the observation that many early signs of Parkinson's present as gastrointestinal symptoms suggests the gut microbiome may play a role in this neurodegenerative disorder. In addition, the vagus nerve provides a direct link between the gut and brain neurons, potentially facilitating this interaction. To further investigate this, a team of European researchers used DNA sequencing to compare the microbiomes of early-stage Parkinson's patients with those of healthy participants. Consistent with recent findings, these two groups differed substantially in their microbial composition and also in their viral abundance. Thanks to genomic data, the research team was able to further characterize these differences by identifying many of the bacterial species involved. Interestingly, this shift in microbial composition was accompanied by differences in metabolic functions provided to the human host. The researchers call attention to the microbiome's role in immune regulation, intestinal barrier disruption, and inflammation as important aspects for future research to consider. Though much work needs to be done, the emerging link between gut microorganisms and the brain provides exciting possibilities for the future of understanding and treating disorders such as Parkinson's disease. By providing a detailed microbiome profile, this study furthers our understanding of the gut-brain axis and highlights the potential of using a microbial fingerprint to identify undiagnosed patients in the early stages of Parkinson's disease.