

Parkinson's Disease: Where it Starts - and Why That Matters

Typically, Parkinson's disease (PD) is thought of as one condition with many symptoms. But a new study concludes that it is actually two diseases — a theory that could ultimately alter treatment for the progressive neurodegenerative disease.

Researchers, who published their findings in the neurology journal *Brain*, used advanced scanning techniques to show that Parkinson's can be divided into two "variants" depending on where the disease started: in the brain or the gut.

Some neurologists, however, are taking a more conservative wait-and-see stance. After all, Parkinson's has been confounding clinicians and scientists for decades, and much is still unknown, including why symptoms can vary so much from patient to patient.

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We attain a new and better understanding."**

- Dr. Carlos Singer

"The findings are interesting, but it doesn't necessarily mean I agree with the conclusion," says Carlos Singer, M.D., a neurologist with the University of Miami

Health System. "Right now, it's a theory, not the consensus."

Nevertheless, Dr. Singer welcomes any study that adds to the growing body of information on Parkinson's. "Who knows? It could be a whole number of different diseases, and we're just starting to discover them," he adds.

An estimated 10 million people have been diagnosed with PD worldwide, with nearly one million in the United States alone, according to the Parkinson's Foundation. That's more than the combined number of people diagnosed with multiple sclerosis, muscular dystrophy, and Lou Gehrig's disease (or Amyotrophic Lateral Sclerosis). Parkinson's is the second most common neurodegenerative condition after Alzheimer's.

Approximately 60,000 Americans are diagnosed with PD each year.

That number is likely to increase in the coming years as the population ages. (Age is the number one risk factor for the brain condition.) By 2050, an estimated 16 million are expected to be living with the disease.

"There's certainly an urgency to know more about Parkinson's because the numbers actually seem to be increasing beyond what would be expected for the aging of the population," Dr. Singer says.

The cause of Parkinson's Disease is unknown, and there is no cure.

While several treatments have been developed over the years, their effectiveness varies from patient to patient because the disease presents itself so differently. For example, one patient may have problems with gait but display a few tremors or rigidity. Another one may suffer mostly from tremors.



Dr. Singer, who is the founding director of the University of Miami Health System's Parkinson's Foundation Center of Excellence, says patients share two traits regardless of physical symptoms: all have low levels of dopamine (a chemical that carries messages around your brain) and all have an abnormal area of the brain, called substantia nigra, where dopamine is produced and where clusters of a protein, called synuclein, act as a toxin that damages nerve cells).

If the disease starts in the intestines, it spreads from there to the brain through neural connections, according to the *Brain* journal study. If it starts in the brain, it spreads to the intestines and other organs, including the heart.

What is the gut bacteria connection?

Dr. Singer says the gut-brain connection has been a theory in Parkinson's research — as well as other diseases — for a while. (Multiple sclerosis, inflammatory bowel disease, and Alzheimer's disease have all been linked to gut bacteria.)

"The gut bacteria in Parkinson's patients is different, and we've all been asking, 'What does this mean?' But it comes down to a chicken and egg question," he says. "Does the change in the bacteria happen as a result of Parkinson's, or does this change in the gut go on to cause the disease?"

In the new *Brain* journal study, researchers used advanced PET and MRI imaging techniques to examine people with Parkinson's disease, which allowed them to see that some patients' dopamine system was damaged in the brain before the intestines. Other patients displayed the opposite, exhibiting damage to the nervous system of the intestines before the damage in the brain's dopamine system. Classifying the condition as either brain-first or gut-first could help in the development of personalized, targeted treatment, though Singer warns we're not close to that yet.

Currently, neurologists have what Dr. Singer calls "one size fits all" treatment: exercise to slow the progression of the disease and a number of medications that help with symptoms and the supply of dopamine in the brain. Sometimes surgery is also an option.

Dr. Singer calls Parkinson's a puzzle, but he remains optimistic that the steady discovery of the what, how, and why of the condition will eventually lead to a solution.

"Every time we have a study," he explains, "we peel off another layer, and we learn something new. We attain a new and better understanding."

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