

## Brain abnormalities in Parkinson's patients develop before symptoms occur

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Scientists who have identified brain networks damaged in Parkinson's disease have new evidence that these systems become abnormal a few years before symptoms appear. And what's more, parts of the network appear to respond in a last ditch attempt to rescue the brain.

"We were surprised," said Chris Tang, MD, PhD, a Parkinson's investigator at The Feinstein Institute for Medical Research in Manhasset, NY, and an author of the study, published this month in the *Journal of Neuroscience*. The Feinstein scientists have been following people with Parkinson's disease for decades. They have had a unique opportunity to take snapshots of the brain over the course of four years in 15 patients and an equal number of normal volunteers. The group initially identified two discrete abnormal networks, one that was involved in mediating the motor symptoms of Parkinson's disease, and the other that regulates the cognitive dysfunction that develops in many patients with this illness.

Symptoms of Parkinson's disease initially occur on one side of the body, which provided scientists with a unique opportunity to study the brain scans at multiple times and compare the symptoms to changes in the brain networks over time. The idea for the latest study was to watch the activity of the network on the side of the brain that controls the side of the body that's free of symptoms. As the disease progresses, both sides of the body ultimately become involved.

The motor network that governed the side of the body with initial



symptoms was the first to become abnormal. Scientists under the direction of David Eidelberg, MD, head of the Feinstein's Center for Neurosciences, found that the motor network on the other side of the brain was also abnormal, even though symptoms appeared only two years later. The brain network that governs cognition began showing abnormalities after two more years had passed, which was four years after their diagnosis. The average age of the patients in the study is 58 and no one has yet to develop cognition problems.

The brain scans measure glucose and dopamine, the chemical that is depleted during the disease process. By using these scans to understand what the <u>brain</u> is doing before symptoms emerge, investigators are characterizing new therapeutic targets to slow or actually prevent the onset of clinical disability in Parkinson's disease and related neurological illnesses.

## Provided by North Shore-Long Island Jewish Health System

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