

Researchers find gene that contributes to two common neurological movement disorders

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Researchers at the Mayo Clinic campus in Florida and their collaborators worldwide have discovered that a single gene promotes development of essential tremor in some patients and Parkinson's disease in others. These are two common but distinct neurological disorders. Notably, patients with essential tremor shake when they move, and Parkinson's disease patients shake when they are at rest.

In the September issue of *Parkinsonism & Related Disorders*, the researchers' report that a variant in LINGO1, a gene involved in neuronal survival, is the first proven evidence of a common genetic component in the development of both disorders.

Based on the findings, mutations in this gene are potentially responsible for five percent of patients with Parkinson's disease, as well as five percent of patients with essential tremor, says the study's lead investigator, Carles Vilariño-Güell, Ph.D., of Mayo Clinic.

"There is a mutation in the gene that must be causing or contributing to Parkinson's disease in some people and essential tremor in others," he says. That does not mean, however, that people who have essential tremor have an increased risk of developing Parkinson's disease.

Essential tremor is the most common movement disorder, affecting four percent of the population over age 40, or about five million people in the United States. Parkinson's disease is not as common. Parkinson's is diagnosed in two percent of people over age 65, and more than half a million patients in this country have the disorder.

An overlap between the two disorders has long been noted, the researchers say. In certain patients, early stages of Parkinson's disease are

often misdiagnosed as essential tremor. Both disorders share the same brain protein buildup in some cases. In families where one person has Parkinson's disease, the likelihood of another family member developing essential tremor is fourfold higher than in families with no history of Parkinson's, Dr. Vilariño-Güell says.

The findings are intriguing, because "although essential tremor and Parkinson's disease are considered to be different diseases, researchers have been arguing for a long time about whether essential tremor is a milder, preliminary form of Parkinson's disease, and they have been looking for the genetic connection between these disorders," he says. "Now we know LINGO1 is the first gene identified."

In this study, researchers sought to validate an earlier finding from scientists in Iceland that a genetic variant in LINGO1 was linked to an increased risk of developing essential tremor. Scientists led by Mayo Clinic researchers did this by studying several groups of patients who were not associated with the initial finding in Iceland. Those groups included 356 North American patients with essential tremor, 426 Parkinson's disease patients in North America, and 618 Parkinson's disease patients from Norway. The scientists also included a control group of 428 North Americans and 602 Norwegians - who did not have neurological disease.

They found a significant association between the LINGO1 gene variant identified in Iceland to essential tremor patients in the U.S. "This variant is five percent more likely to be present in essential tremor patients than controls," Dr. Vilariño-Güell says. The researchers then found similar results in the Parkinson's disease patients in North America, and an even stronger association in Norwegian

patients, compared to the control populations.

The scientists have not yet identified the specific mutation or mutations on LINGO1 responsible for either disorder. "The easiest explanation is that there are two separate and clearly distinct mutations in the gene contributing to the disorders. But because this gene doubles the risk of developing either disease and it is found at the same frequency in both diseases, it is possibly the same mutation," Dr. Vilariño-Güell says. "Both diseases are also affected by environmental factors, and that may influence which disorder a person would be more likely to develop."

Source: Mayo Clinic ([news](#) : [web](#))

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