

# Genetics and Parkinson's



**The cause of Parkinson's disease (PD) is unknown, but scientists believe that a combination of genetic and environmental factors are the cause. The extent to which each factor is involved varies from person to person. Regardless of how a person gets Parkinson's — through genetics or environment or a combination of both — every person with PD experiences a loss of dopamine in the brain, along with symptoms and a progression of their disease that is unique to them.**

## Understanding Genetics

Genetics is the field of science that examines how traits are passed down, or inherited, from parents to children through genes. The study of genetics begins with our DNA. Think of our DNA as a cookbook that contains about 23,000 genes, or recipes, that make us who we are. A gene is like a recipe used to build a protein (that help our bodies perform different jobs to function normally). Changes, known as mutations, in our genes can change the recipe — altering the shape and normal function of proteins in our body. Changes in our genes are mostly harmless, but in some cases, they can affect our risk of getting a disease.

In addition to genetics, environmental factors and lifestyle choices strongly determine if Parkinson's will develop. Understanding the role of genes and PD can help pave the way to understanding the biological causes of disease and develop novel therapies to treat Parkinson's.

Understanding the connection between Parkinson's and genetics can help us understand how the disease develops and ultimately how it can be treated or cured.

## Parkinson's Genes

Parkinson's is rarely hereditary. Genetics cause about 10% to 15% of all Parkinson's. If a person tests positive for a certain gene mutation associated with Parkinson's — such as a mutation in LRRK2, GBA and SNCA genes — their risk may

increase, but they may never develop Parkinson's. In some families, changes (or mutations) in certain genes are inherited or passed down from generation to generation. A handful of ethnic groups, like the Ashkenazi Jews and North African Arab Berbers, more commonly carry genes linked to PD and researchers are still trying to understand why. Over the years, scientists have studied DNA from people with Parkinson's, comparing their genes. They discovered dozens of gene mutations linked to Parkinson's. These genes are now being researched and studied for what role they play in Parkinson's.

There are ongoing clinical trials testing therapies to treat people who have Parkinson's and carry certain gene mutations, proving that it can be important to know which gene mutation you carry. Consult with your doctor when considering a genetic test to determine if you are eligible to participate in gene-based clinical trials.

## PD GENERation: Mapping the Future of Parkinson's Disease

This flagship study aims to provide free genetic testing and genetic counselling that will empower people with PD and their care team, improve Parkinson's care and research and accelerate enrollment in clinical trials.

Through PD GENERation, we hope to ultimately offer free genetic testing and genetic counseling to 15,000 people with PD in the U.S., beginning

with our goal of enrolling 600 participants during the pilot period.

PD GENERation is available to people with a confirmed diagnosis of PD, regardless of age, through participating Centers of Excellence and Parkinson Study Group sites. To find out if your Center or site is participating, visit [Parkinson.org/PDGENERation](http://Parkinson.org/PDGENERation).

For more information about genetics, visit [Parkinson.org/Genetics](http://Parkinson.org/Genetics) or call our Helpline at 1-800-4PD-INFO (473-4636).