



# Causes of Parkinson's disease

We're not sure exactly why some people get Parkinson's disease. However, research has found that people with Parkinson's don't have enough of a chemical called dopamine in the brain, which helps control movement. We also know certain cells in the brain stop producing dopamine, although we don't know why. It could be down to a combination of factors that alter your chance of developing the disease. Learn more about what might cause Parkinson's disease.

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## What causes Parkinson's disease?

It's not yet clear why some people get Parkinson's disease (PD). Most people with PD have what's called idiopathic Parkinson's disease. This means that there is no known reason why it happens.



We do know that Parkinson's develops when certain nerve cells in the brain (called neurons) stop working properly and are lost over time.

These brain cells produce a chemical called dopamine. Dopamine plays a key role in many of our daily functions such as movement, mood, memory, and cognition. When these dopamine-producing cells are lost, parts of the brain are unable to work normally, causing the symptoms of Parkinson's to appear.

Exactly what causes these brain cells to stop working is unclear, but experts think it could be due to age, genetic, environmental factors, or a combination of these.

## Is Parkinson's disease hereditary?

Most cases of Parkinson's aren't passed through the family. It is possible (although very uncommon) for people to pass Parkinson's on to their children. However, specific genetic tests to predict this are not available at this time.

## Genetic Parkinson's disease

In very rare cases, Parkinson's is caused directly by changes to specific genes. These are called genetic mutations or genetic variants and aren't necessarily inherited. The genetic variant most clearly linked to Parkinson's is a change in the LRRK2 gene and this is more common among people with North African and Jewish heritage.

Young people diagnosed with Parkinson's are more likely to have a genetic variant than those diagnosed with late onset Parkinson's disease. But people with the LRRK2 variant may also develop the condition later in life.



As well as genetic variants that directly cause Parkinson's, there are also changes in genes that indirectly increase your risk of developing the condition. Having one of these variants means you are slightly more likely to develop Parkinson's. The most common of these is having a variant in the GBA gene.

Even though these genetic variations are rare, research is currently being carried out into gene therapy for Parkinson's.

It is important to note that a disproportionate amount of these genetic PD studies have been conducted in the West; and as a result, it is difficult to ascertain the extent to which these findings are applicable to Sub-Saharan African PD patients.

## Environmental causes of Parkinson's

It's thought that being exposed to environmental toxins (substances that negatively affect health) can increase your risk of developing Parkinson's. Experts believe toxins may affect the brain cells that produce dopamine.

Toxins linked to Parkinson's can be found both in rural areas and cities. In towns and cities, gases in traffic fumes or industrial chemicals in factories may increase the risk of developing the condition. And in the countryside, you may be at higher risk if you're exposed to the pesticides used in farming.

Exposure to some metals used in factories, such as copper, magnesium or lead can also increase your risk.

## Other risk factors for Parkinson's

There are various other factors that seem to be linked to an increased risk of developing the disease, although we don't know precisely why. These include:



## Age

While Parkinson's can affect people of any age, most people with the condition start to develop symptoms when they are over the age of 60.

## Sex

Men are twice as likely to develop Parkinson's than women. Experts believe this might be because the female hormone estrogen has protective benefits.

## Health

Certain health conditions have been linked to Parkinson's. For example, having a severe head injury, a metabolic syndrome (a combination of high blood pressure, diabetes and obesity), being overweight or having type 2 diabetes and having migraines with changes to vision (aura) in middle age. Nutrition, including a lack of vitamin D and a diet that's too rich in dairy products have also been identified as possible factors.

Depression and constipation are also linked but we need more research to know if these are early symptoms of the disease or risk factors.

## Research into Parkinson's disease

Parkinson's disease is the fastest growing neurological condition in the world, so there's a real drive to find out more about it. Research plays a vital role in helping us better understand how the disease can be managed and treated – and move closer to finding a cure.

Some scientists are looking at how Parkinson's develops. And one important area of current research is looking at changes in the brains of people with Parkinson's. These changes include deposits of a tiny protein called Lewy



bodies. Experts believe these Lewy bodies hold an important clue to Parkinson's disease.

Other studies are also being carried out into whether Parkinson's disease could start in the gut. Researchers have discovered that a protein called alpha-synuclein may travel from the gut to the brain during the early stages of Parkinson's. They are now looking into whether it's possible to stop this protein developing and prevent the disease before it starts.

While some scientists explore the causes of Parkinson's, others work on different areas of Parkinson's research.

Some are looking into new treatments. For example, there are multiple clinical trials of drugs that target LRRK2. And there is work to develop drug-like molecules that prevent or delay the complex brain cell activity that happens with Parkinson's.

And scientists are probing the external factors that may help prevent Parkinson's. For example, research has shown that people who consume caffeine may get Parkinson's disease less often than those who don't. But more work is needed to see whether caffeine actually protects against getting Parkinson's, or if there is an indirect link.

Beyond the science lab, there are also studies into the best care for people with the condition. This will help more people with PD access the right support and give them a better quality of life.

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