

# What genes make people more likely to develop Parkinson's?

## Project information

Lead researcher	Prof John Hardy
Location	Institute of Neurology, London
Cost	£ 163,668 over three years
Start date	October 2009
Type of project	Project grant
Project code	G-0907

## Project background

Parkinson's is caused by the loss of nerve cells in part of the brain called the substantia nigra. These cells are responsible for the production of dopamine, a molecule that is involved in the coordination of movement. The death of these cells with a decrease in the levels of dopamine results in the typical symptoms of Parkinson's. In order to find a cure for Parkinson's – to slow down, halt or reverse the death of the nerve cells – we need to understand why they die in the first place. This will allow us to develop new drugs that may protect the nerve cells. One way of looking at this is by examining the very core of what makes a cell work – its genes.

- **Genes determine which proteins are made within a cell using a specific coding system.** The genes can be divided into two sections. One part directly gives rise to the protein that is coded for by the gene. The remainder of the gene may then influence how active it is – it will determine how much of specific proteins are made from the gene. The genes that are active in cells are very specific to the type of cell – this is what makes all of the cells in our body so different.
- **Some forms of Parkinson's are directly inherited.** A number of genes have been identified that are associated with inherited forms of the condition. But these are unlikely to make up more than 5% of the number of the total number of cases of Parkinson's. However, there are many other genes that may increase a person's risk of getting the condition.
- **The Genome Wide Association Study (GWAS)** is a large international study that is being partially funded by Parkinson's UK. This study will examine a large number of points known to vary within peoples' DNA. Researchers look for changes in any of

these points that are more frequent in people with Parkinson's than people without the condition. Finding a difference would indicate that there is some genetic element that influences a person's risk of developing Parkinson's. This will provide information about individual genes that may make people more at risk of developing the condition. This study will be able to identify any risk genes which are present in greater than 10% of the people with Parkinson's. However, it doesn't tell us anything about how this may actually happen.

### What the researchers are doing

Prof Hardy's team will investigate the interaction between different genes in nerve cells within the particular part of the brain affected by Parkinson's. They will look at both those parts of the genes that give rise to proteins that are required for the cells to work, as well as the parts of the gene that control how active the gene is. By understanding how these interact, they will have a large amount of information on how genes work within the cell. Once they then obtain the information about the genetic changes in people with Parkinson's from the GWAS study, they will be very rapidly be able to identify how changes in the genes may actually cause the nerve cells to die.

### How the research will help people with Parkinson's

It is only when we understand why nerve cells die that we can actually target new treatments to halt or prevent this from happening. Understanding the genes involved is a vital part of the jigsaw. The researchers will make the database of how the genes work available to scientists throughout the world so that we can all work closely together and combine our information to ensure that a cure for Parkinson's becomes closer to a reality.

### For more information, please talk to the Research Team

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