

# The development of Parkinson's in the brain



## Project information

Lead researcher	Dr Roger Barker
Location	University of Cambridge
Cost	£247,868 over 3 years
Start date	October 2010
Type of project	Project grant
Project code	G-1011

## Project background

The movement symptoms of Parkinson's develop when nerve cells in a tiny part of the brain, called the substantia nigra begin to die and stop making a chemical called dopamine. However, the death of the nerve cells continues very slowly and it is only when around 70% of these cells have died that the main movement symptoms of Parkinson's appear. As the condition progresses, it also spreads to affect other parts of the brain, which gives rise to other symptoms that people experience. These include memory problems, depression and sleep abnormalities. But we don't know why the death of nerve cells spreads from one part of the brain to another. This project will study how this happens and whether we may be able to develop ways to prevent it and halt the progression of Parkinson's.

- **Lewy bodies** are sticky clumps of protein that are found inside nerve cells in the brains of people with Parkinson's. The key protein is called alpha synuclein. They form inside nerve cells that produce the chemical dopamine and these cells then die some time after the Lewy bodies appear. So we can possibly use these to predict which cells are going to die.
- **Studies on the transplantation of brain tissue** to treat Parkinson's showed that Lewy bodies were actually found in the transplanted nerve cells. This suggested that they had in some way 'spread' from the brain into the transplanted nerves.

- **The pattern in which Parkinson's spreads within the areas of the brain is relatively well defined.** This is termed the Braak staging system. According to this, the death of nerve cells in one part of the brain spreads to kill nerve cells in another region that is in physical contact with the nerve cells that die. But some researchers propose that Lewy bodies may actually appear first in the part of the nervous system outside the brain that controls how the intestines work. The Lewy bodies may then be transmitted up into the brain in a domino-like manner to kill the nerve cells in Parkinson's.

### What the researchers are doing

Dr Barker and his team will carry out two key experiments. Firstly, they will modify the cells in the mouse intestine to generate more of the synuclein protein. They will then examine whether an excess of the protein can form Lewy bodies and if these can spread through the nerves in the gut up towards the brain. Secondly, they will transplant small pieces of brain from people with Parkinson's (which contain Lewy bodies) into mouse brains to see whether they can be spread to other parts of the brain, as happened in the human transplants. Some of these mice won't have any synuclein protein so this will tell us whether this is the culprit responsible for the spreading of the Lewy bodies and cell death.

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

This research will help us to pinpoint ways by which the death of nerve can spread throughout the brain in Parkinson's or whether it could even begin outside the brain. Armed with this knowledge, we may be able generate new treatment strategies that could prevent the progression and spread of Parkinson's and thus halt the condition in its tracks.

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

Call	<a href="tel:02079639313">020 7963 9313</a>
Email	<a href="mailto:research@parkinsons.org.uk">research@parkinsons.org.uk</a>
Write	Parkinson's UK, 215 Vauxhall Bridge Road, London SW1V 1EJ