

Stopping nerve cell over-activity: a new drug target for Parkinson's?



Project information

Lead researcher	Dr Susan Jones
Location	University of Cambridge, University College London
Cost	£91,455 over 3 years
Start date	October 2009
Type of project	Studentship
Project code	H-0902

Project background

Nerve cells in the brain use chemicals to send signals and communicate with each other. In Parkinson's, nerve cells that contain the chemical dopamine progressively die in a part of the brain that controls movement called the substantia nigra. We don't know why they die, but the loss of these cells results in the symptoms of tremor, rigidity and slowed movement. As these nerve cells die, the brain tries to compensate for their loss, and the remaining dopamine cells become over-active. But this over-activity can be toxic to cells and may lead to even more cell death. So researchers are looking for ways to stop the toxic cycle of over-activity as a potential new treatment for Parkinson's.

- **Glutamate can make nerve cells overactive.** It's another chemical used in the brain, and makes nerve cells more likely to send a signal. Nerve cells that receive lots of glutamate can become overactive. Too much glutamate is toxic to nerve cells.
- **NMDA 'receptors' are parts of nerve cells that respond to glutamate.** Preventing NMDA receptors from working could be a useful drug treatment for Parkinson's that might stop nerve cell over-activity. But recent research has shown that the dopamine-producing cells affected in Parkinson's have NMDA receptors may be different from ones found in other parts of the brain. So we need to understand more about which types of NMDA receptor are helpful, and which may be harmful.

What the researchers are doing

Dr Jones and her team to try to find out for certain whether NMDA receptors are involved in dopamine nerve-cell death. They're studying the different types of NMDA-receptors that are specific to the nerve cells affected in Parkinson's.

Progress so far

The PhD student who is carrying out this research, Angela Wild, started her research in October 2009 and has been trained in the sophisticated technical procedures required to carry out the project. The NMDA receptors have been assessed in the area of the brain affected in Parkinson's – the substantia nigra – as well as in another brain region. The results suggest that they may be different in some ways and may give us a clue as to how better to target drugs to specific parts of the brain. NMDA receptors play a key role in controlling the levels of calcium in the brain cells. If these increase or decrease significantly, the cells do not work properly. We know that the NMDA receptors influence calcium within the cell. Now Angela has shown that calcium can also change the levels of the NMDA receptor. She is currently studying this in more detail to find out how we can make use of this information to develop potential new therapies for Parkinson's. Angela has successfully completed her first year assessment at Cambridge and has presented her result at the Parkinson's UK research conference in November 2010.

How the research will help people with Parkinson's

The research team should know more, at the end of the project, about the effect that specific types of NMDA receptor have on the nerve cells that die in Parkinson's. This will make it easier to develop new drug treatments that prevent nerve cell death without unwelcome side-effects.

For more information, please talk to the Research Team

Call	020 7963 9313
Email	research@parkinsons.org.uk
Write	Parkinson's UK, 215 Vauxhall Bridge Road, London SW1V 1EJ