

Can CDNF stop dopamine nerve cell death?



Project information

Lead researcher	Dr Maeve Caldwell
Location	University of Bristol
Cost	£216,686 over 3 years
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Type of project	Project Grant
Project code	G-0915

Project background

Levodopa is the main drug used to treat the symptoms of Parkinson's. It kick-starts the brain into making more of an important chemical called dopamine. Nerve cells in the substantia nigra – a part of the brain that helps control voluntary movement – use dopamine to communicate with each other. But although levodopa works well for a while it doesn't slow or stop the underlying problem, which is that dopamine-producing nerve cells in the substantia nigra die and are not replaced. So if we can find a way to stop the cells from dying, we might have a cure for Parkinson's. One really promising approach is to use what's known as gene therapy to protect the nerve cells.

- **Gene therapy is a way of 're-programming' cells with the DNA needed to do a specific job.** Genes are the instruction manuals that cells use to help them do jobs such as producing the right chemicals for nerve cells to survive.
- **Conserved dopamine neurotrophic factor, or CDNF, is a protein that helps nerve cells survive.** It's one of a family of 'growth factors' that the brain produces naturally.

Previous studies in animal models of Parkinson's have shown that growth factors have the potential to protect dopamine nerve cells. But CDFN could be a particularly good one for people with Parkinson's as it only works with a limited range of cells and so may have fewer side-effects than some other growth factors.

You can read more about gene therapy and clinical trials in the cover feature of the summer 2010 (issue 7) edition of our research magazine, *Progress*.

What the researchers are doing

In this project, Dr Caldwell and her team are trying to answer two main questions: Can CDFN prevent dopamine-producing nerve cells from dying, shortly after they've been exposed to a toxin that produces Parkinson's like symptoms in rats? And can it help restore nerve cells at a later point when many of them have already died?

They're doing this by getting the gene for CDFN inside dopamine nerve cells, piggy-backed on a virus. The virus is engineered so that it can't cause disease but keeps the ability to insert itself into the nerve cells' DNA, so that they can start producing more CDFN than they might be able to naturally. The team are studying the rats' ability to move around, the amount of dopamine in specific parts of the brain and the number of nerve cells making CDFN, to see what effect the gene therapy has.

How the research will help people with Parkinson's

When the project ends, the research team will know more about whether CDFN can restore or protect dead or dying dopamine-producing nerve cells safely and effectively. And if it does work, it may one day help to increase the survival rate of stem cells transplanted into the brains of people with Parkinson's to replace the nerve cells that have died. This would be a big step along the road to a cure.

For more information, please talk to the Research Team

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