

Stem cells from skin cells: towards a cure for Parkinson's



Maeve

Project information

Lead researcher	Dr Maeve Caldwell
Location	University of Bristol
Cost	£87,476 over 3 years
Start date	October 2010
Type of project	Studentship
Project code	H-1002

Project background

Stem cells hold great promise for people with Parkinson's. They're like 'blank' cells that are able to become any type of cell in the body, including nerve cells. As the major problem in Parkinson's is that dopamine-producing nerve cells in a particular part of the brain die, stem cells could one day be used to replace the dead cells. And in the meantime they can help us find out more about why the nerve cells die and to develop drugs that can stop Parkinson's in its tracks.

- **Induced pluripotent stem cells (or iPS cells) are at the cutting edge of stem cell research.** They're stem cells that have been generated from skin cells. The skin cells are 're-programmed' back to a blank state by inserting four key genes into the cells. The iPS cells can then be prompted to grow into dopamine-producing nerve cells in a lab dish with the right mix of chemicals.
- **iPS cells could be the key to successful nerve cell replacement therapy.** In the past, clinical trials to replace dopamine-producing nerve cells have had mixed results.

One problem is that stem cells taken from embryos have someone else's genes. This means that the immune system will reject the cells unless drugs are taken to suppress the immune system. But because iPS cells come from your own body, there shouldn't be a problem.

Before we can make full use of the iPS cells' potential, we need to be sure that they are able to become the specific type of dopamine-nerve cell that dies in Parkinson's. (Not all dopamine nerve cells are the same, as the chemical is used all over the brain to do different jobs.) We also need to know how well nerve cells grown from iPS cells can withstand

What the researchers are doing

A PhD student will spend this project working with Dr Caldwell and the research team to develop iPS cells from people with Parkinson's. They'll also generate the stem cells from people with variations in the genes for LRRK2 and Parkin – genes that are both linked to young onset Parkinson's – and from a control group of people without Parkinson's or the genetic variations. The team will compare how well iPS from the different groups can turn into dopamine-producing nerve cells. They'll also test how well each cells group fares when treated with the toxic chemicals 6OHDA and MPP+. Both chemicals are damaging to dopamine cells and produce Parkinson's-like symptoms in animals.

How the research will help people with Parkinson's

At the end of the project we should know whether or not dopamine-producing nerve cells grown from iPS cells are more sensitive in people with Parkinson's than cells from people without the condition. This will help to give us a reliable way of generating nerve cells for Parkinson's research from people who have the most common form of the condition. It could also pave the way for nerve cell replacement therapy that is more reliable and effective than the early attempts to get the treatment going. In other words, the study will help to bring a real cure for Parkinson's closer.

For more information, please talk to the Research Team

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