Parkinson’s UK policy statement

Stem cell research

“I am interested in the stem cell research but understand that implanting dopamine stem cells has not proved successful, yet I hope that this area of research will continue as it appears to be a very important possibility for the future.”
Person with Parkinson’s, 2014

What we believe

Stem cell research has the potential to lead to new and better treatments for Parkinson’s. Therefore we firmly support the continuation of stem cell-based research within the rigorous ethical and regulatory framework in place in the UK.

We do understand the sensitive issues regarding certain areas of stem cell research, and respect others’ views. However, we believe that there is a need to continue with well-regulated research due to the potential benefit for the many thousands of people affected by conditions such as Parkinson’s.

Why we believe this

Promising area of research

Stem cells have the potential to develop into every kind of cell found in the body, such as brain and skin cells\(^1\). This means that stem cells could be used to treat a wide range of conditions, including Parkinson’s, where new cells could be used to repair and replace damaged tissue.

Scientists have been able to turn stem cells into dopamine-producing nerve cells – the type of brain cells affected in Parkinson’s.\(^2\) As we are able to generate and study these specialised nerve cells, research of this kind allows us to develop our understanding of Parkinson’s and how to treat it. Being able to transform stem cells into dopamine-producing cells gives us hope that one day these could be used to replace damaged cells in the brain.

Where do researchers get stem cells from?

Existing sources of stem cells

Currently, researchers can get stem cells from several sources, including embryos, blood cells taken from the umbilical cord at birth and bone marrow.\(^3\) Stem cells can also be found in adult tissue, and recently researchers have developed a way to convert adult cells into stem cells.

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**Embryonic stem cells**

In the UK, stem cells from human embryos can be collected from left-over embryos produced as part of in vitro fertilisation (IVF) programmes that would otherwise be destroyed. There are strict legal guidelines for using embryonic cells for research from the Human Fertilisation and Embryology Authority (HFEA). These guidelines are based on UK government legislation. The Human Fertilisation and Embryology Act 1990 states that only very early-stage embryos can be used in research – they cannot be more than 14 days old.4

Embryonic stem cells show great promise for helping to find a treatment for Parkinson’s but much more research is needed in order for scientists to understand how stem cells work. By understanding the biology of stem cells, we may be able to develop treatments for Parkinson’s and other medical conditions. However scientists don’t have enough human embryonic stem cells for their research projects.

**Adult stem cells**

Adult stem cells are found in small numbers in certain parts of the body - they are activated when tissue is damaged and make new cells to repair the tissue. Adult stem cells are less flexible than embryonic stem cells as they cannot turn into any cell in the body.5 For instance, liver stem cells can turn into a number of different cells found in the liver but they cannot turn into brain cells.

Whilst research using adult stem cells has produced promising results for a number of conditions, they present many challenges in Parkinson’s research. Adult stem cells that can turn into brain cells are only available in a few places in the body.6 This makes it difficult to collect the number of cells needed for research or therapy.

**A new way of getting stem cells**

**iPS cells**

Scientists have had problems finding enough stem cells for their research project and have been looking for alternative sources of these cells. At the end of 2007, researchers discovered a way of turning adult cells, such as skin cells, back into “blank” stem cells.7,8 They called these reprogrammed cells “iPS cells” and found that they behave in a very similar way to embryonic stem cells.9

iPS cells have the potential to turn into any type of cell in the adult body and have recently been turned into nerve cells. This could potentially reduce the symptoms of Parkinson’s.10 Animal models where these cells have been transplanted have shown decreased symptoms. We still need to know more about the long term effect of transplanting iPS cells, and also develop how we turn them into the dopamine-producing cells lost in Parkinson’s.

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However, iPS cells are not identical to embryonic stem cells and we still need to know more about these differences. Scientists don’t know if there are any long-term harmful effects that could be caused by the reprogramming of cells into iPS cells. We also still don’t know if iPS cells are stable over long periods of time as they may change into other types of cell.\(^{11,12}\) However, more recent research has found new ways to make iPS cells that scientists hope will be safer.\(^{13}\)

There are currently no specific legal restrictions on the use of adult stem cells or iPS cells although general legal restrictions on the use of human tissue may apply.\(^{14}\)

### What’s the evidence?

Continuous progress is being made towards cell replacement therapies for Parkinson’s.\(^{15,16}\) In work funded by Parkinson’s UK, iPS cells were created from a person with early onset Parkinson’s.\(^{17}\) iPS cells from people with Parkinson’s can be used to better understand how changes in DNA can affect dopamine producing nerve cells. Nerve cells made from iPS cells can also be used to test drugs and treatments.

### Backed by the majority

Public support for this type of research is strong. A 2003 MORI poll showed that around 70% of the British public support the use of human embryos for medical research, to find treatments for serious diseases and for fertility research.\(^{18}\) A further public consultation exercise conducted by the HFEA in 2007 showed that 79% of people support the use of human embryos for medical research to find treatments for conditions such as Parkinson’s.\(^{19}\) We also are aware of a high level of support for stem cell research from Parkinson’s UK members.\(^{20}\)

### What Parkinson’s UK is doing

We continue to campaign to ensure all avenues of research remain open within the UK’s strict regulatory framework.

### Acknowledgement

We are grateful for the advice and guidance of our Policy Panel and Research Support Network in shaping this position paper on patient data. The Policy Panel consists of people


\(^{15}\) Arenas E (2010) 'Towards stem cell replacement therapies for Parkinson’s disease.' *Biochemical and biophysical research communications* 396.1: 152-156.


\(^{20}\) Parkinson’s UK *Life with Parkinson’s today – room for improvement* (2008) http://www.parkinsons.org.uk/content/life-parkinsons-today-room-improvement
with experience of Parkinson's who meet on a regular basis to help guide the charity's position on a range of policy issues. The Research Support Network is a group of around 950 people with an interest in Parkinson's research.

Further information
Please contact the Policy and Service Improvement team on 020 7963 9394 or email campaigns@parkinsons.org.uk

Parkinson's UK: June 2014
Review date: May 2016