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Radical new therapy for Parkinson's will use stem cell transplants

Lab-grown nerve cells will replace those destroyed by disease – scientists hope treatment may be available in five years

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Early next year, a radical new treatment for Parkinson's disease involving tissue transplants will receive its first trial with patients - including a group from the UK.

Stem cells grown in the laboratory and transformed into nerve cells will be used to replace those destroyed by the disease. It is hoped that these will stop the spread of debilitating symptoms.

"It has taken a long time to get to this stage but hopefully results from these trials will mean that, in a few years, we might be able to offer tissue transplants as standard treatments for Parkinson's," said Prof Roger Barker, of Cambridge University. "It is certainly a promising approach."

In the UK, about 145,000 people live with Parkinson's and about 18,000 new cases are diagnosed every year. The disease is triggered when nerve cells that supply dopamine to the brain start to die due to a combination of genetic and environmental factors.

Dopamine helps a person control movement. When supplies drop, the result is shaking, stiffness, depression and other symptoms that can end with patients using a wheelchair or being bed-ridden. The disease's progress can be slowed by the drug L-dopa, which replaces some of the lost function of dopamine cells. Treatments become less effective over the years. Scientists have been searching for years for new approaches.

One idea has been to replace dying dopamine cells with unaffected versions, which has been tried by several centres across the world. This initially involved using tissue from aborted foetuses that had been donated for medical research.

Foetal tissue contains dopamine-making cells that can supply the missing chemical, although at least six or seven foetuses are needed to provide sufficient material for one patient. In trials in Europe, these cells were injected into patients' brains with encouraging results. Other trials in the US found such treatments far less effective, however.

The use of tissue from aborted foetuses was opposed by many on religious grounds. It was also hard to source sufficient supplies for widely used treatments. However, Barker and his team at Cambridge - working in collaboration with scientists led by Prof Malin Parmar at Lund University in Sweden - have developed a technology that avoids these problems.

The new approach uses stem cells, from which all cells with specialised functions are generated in the human body. These stem cells can be grown in laboratory cultures. Even better, scientists have learned how to transform them into dopamine cells. These will form the core of the transplants that will be carried out next month.

"We now know that putting dopamine cells in the brain will work and the procedure is safe," said Barker. "There is no longer a problem about supply of sufficient tissue because we can manufacture these cells in large numbers in

sufficient tissue because we can manufacture these cells in large numbers in the laboratory. The cost is relatively low. A supply of dopamine cells - made out of stem cells - has become standardised product and we don't have any contaminating cells, which you can get with foetal tissue.

"That means that we are now at a point where we can use stem -cell transplants as treatments for Parkinson's patients, though it will take several years before we will know that these work and can be used as standard treatments for Parkinson's disease."

The trials will begin in the next few months and will continue over the next year. There will be four participants from Sweden and four participants from the UK. "The cells are in a freezer and ready to go in," said Barker. "The transplants will be done in Sweden because they have the instruments to carry this out. This will be followed up over the year with further trials."

Scientists expect that their trials will take at least two years to complete. They will be followed by careful scrutiny of the results and of any side-effects. Provided that these proceed satisfactorily, tissue transplants could be ready for wider use in about five years.

"Younger patients will benefit most from this therapy," said Barker. "It is going to be a one-off treatment, so that the complications that you get with chronic medications will not arise, while those advanced therapies involving deep-brain stimulation will not be needed so often."

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