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Adult stem cell findings offer new hope for Parkinson's cure

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Research released today provides evidence that a cure for Parkinson's disease could lie just inside the nose of patients themselves.

The Griffith University study published today in the journal Stem Cells found that adult stem cells harvested from the noses of Parkinson's patients gave rise to dopamine-producing brain cells when transplanted into the brain of a rat.

The debilitating symptoms of Parkinson's such as loss of muscle control are caused by degeneration of cells that produce the essential chemical dopamine in the brain.

Current drug therapies replace dopamine in the brain, but these often become less effective after prolonged use.

The discovery is the work of the National Centre for Adult Stem Cell Research, part of Griffith's Eskitis Institute for Cell and Molecular Therapies.

Project leader Professor Alan Mackay-Sim said researchers simulated Parkinson's symptoms in rats by creating lesions on one side of the brain similar to the damage Parkinson's causes in the human brain.

"The lesions to one side of the brain made the rats run in circles," he said.

"When stem cells from the nose of Parkinson's patients were cultured and injected into the damaged area the rats re-aquired the ability to run in a straight line.

"All animals transplanted with the human cells had a dramatic reduction in the rate of rotation within just 3 weeks," he said.

"This provided evidence the cells had differentiated to give rise to dopamine-producing neurons influenced by being in the environment of the brain. In-vitro tests also revealed the presence of dopamine."

"Significantly, none of the transplants led to formation of tumours or teratomas in the host rats as has occurred after embryonic stem cell transplantation in a similar model.

He said like all stem cells, stem cells from the olfactory nerve in the nose are 'naïve' having not yet differentiated into which sort of cells they will give rise to.

"They can still be influenced by the environment they are put into. In this case we transplanted them into the brain, where they were directed to give rise to dopamine producing brain cells."

The advantage of using a patient's own cells is that, unlike stem cells from a foreign embryo, they are not rejected by the patient's immune system, so patients are free from a lifetime of potentially dangerous immuno-suppressant drug therapy.

This development follows Professor Mackay-Sim's 2006 development of a world-first technique that demonstrated that olfactory adult stem cells can give rise to heart, nerve, liver and brain cells.

Source: Research Australia