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Systematic review: can induced pluripotent stem cells replace embryonic stem cells in Parkinson's disease treatment?

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Background

The growing concern and difficulty behind using embryonic stem cells in stem cell therapy has resulted in the shift to induced pluripotent stem cells (iPSC) in Parkinson's disease treatment. However, there has not been a systematic review comparing the efficacy of both these stem cell types and whether iPSCs can equate to embryonic stem cells in Parkinson's disease treatment.

Methods

To determine this, the effects of iPSCs and embryonic stem cells in 6-OHDA lesioned rodent models of Parkinson's disease over a 16-week period was systematically evaluated. The effect of the stem cells types was determined via amphetamine induced rotation behavioural analysis of rodent models of Parkinson's disease. The databases searched to obtain the data include PubMed and Cochrane. From this search, three animal research studies were identified for each respective stem cell type.

Results

Following quantitative analysis, the data indicated significant improvement in rotational behaviour in rodent models of Parkinson's disease before and after stem cell therapy for both stem cell types (Induced pluripotent stem cell p-value = 0.007; Embryonic stem cell p-value = 0.003). Finally, both stem cell types were compared using two-way ANOVA and indicated no significant difference between rotational behaviour in rodent models of Parkinson's disease (p-value = 0.777).

Key Messages

It may be concluded that iPSCs equate to embryonic stem cells in Parkinson's disease treatment and can act as a replacement. This is a promising result for the upcoming Japanese clinical research project, which is using iPSCs to replace dopaminergic neurones of Parkinson's disease sufferers.

