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Claire Henchcliffe

Weill Cornell Medical Center, USA

Regenerative treatments for Parkinson's disease: How far can stem cells take us?

Rapid advances in stem cell technology have resulted in promise for a neurorestorative approach for treating Parkinson's disease (PD), a disabling neurodegenerative movement disorder. Parthenogenetic neural progenitor cells are in early clinical testing and several groups, including ours, now seek to examine the effects of transplanting dopamine cells derived from either hESC or iPS cells. In light of these current efforts, it is important to understand outcomes of previous attempts at cell replacement. Previous transplant studies have most commonly focused upon human fetal tissue, although autologous adrenal tissue transplants and retinal pigmented epithelial cells have been tested and will be reviewed. Open label studies of human fetal tissue allotransplantation starting in Lund, Sweden in 1987 paved the way for multiple clinical trials, including two randomized, double blinded, sham surgery controlled clinical trials of bilateral tissue transplant in PD. However, despite this rich history, there is a dearth of data on very long term outcomes. We have therefore examined five surviving participants from the NIH-funded, randomized, double blinded, sham surgery controlled clinical trial of fetal ventral mesencephalic tissue transplant in advanced PD undertaken at the University of Colorado. These patients underwent surgery in 1997-1998 and were examined up to 36 years' PD duration. Video-recorded motor examinations and Parkinson's Kinetigraph™ accelerometry-based continuous monitoring demonstrated motor signs consistent with surviving graft tissue as measured by 11C-PE2i PET imaging. In particular, we observed an unexpectedly high level of motor function in two subjects at 28 years and 35 years PD duration. However, non-motor features and non-dopa responsive symptoms were prominent, including sleep disorders, dysautonomia and imbalance. In summary, at very long term follow up 17-18 years post-transplant, there is evidence of graft survival with clinical heterogeneity between subjects likely reflecting heterogeneous graft as well as underlying differences between PD patients.

Biography

Claire Henchcliffe serves as the Director for the Weill Cornell Parkinson's Disease & Movement Disorders Institute in New York, Vice Chair for Clinical Research and Associate Professor in Neurology, New York at Presbyterian Hospital/Weill Cornell Medical Center, New York, USA. She has completed her Doctorate degree at Oxford University, UK, followed by Post-doctoral Genetics and Neuroscience research at the University of Cambridge, UK and the University of California at Berkeley, USA. She has completed her Medical training at the College of Physicians and Surgeons of Columbia University in New York. She is a Fellow of the American Academy of Neurology and the American Neurological Association and a Member of the Movement Disorders Society and the Parkinson's Study Group. She has published and lectured widely on Parkinson's disease.

clh2007@med.cornell.edu

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