

Pluripotent stem cell-derived neurons may be a viable Parkinson's disease treatment

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A team of researchers from Rush University, Yale University, the University of Colorado and the St. Kitts Biomedical Research Foundation transplanted human embryonic stem cells into primate laboratory animals modeled with Parkinson's disease and found "robust survival" of the cells after six weeks and indications that the cells were "well integrated" into the host animals. The study appears as an early e-publication for the journal *Cell Transplantation*.

"Parkinson's disease was one of the first neurological disorders to be studied for potential replacement of lost neurons," said Dr. D. Eugene Redmond of Yale University School of Medicine. "Since the 1970s there has been significant progress with learning the required gene expression, growth factors and culture conditions for differentiating cells into apparent dopamine neurons."

However, the researchers noted that transplanted dopamine neurons have not produced "long-lasting midbrain specific neurons when transplanted into rodents or monkeys" and there have only been pilot reports of functional improvement.

According to the study authors, their study tested the long-term survival and functional benefit of apparent dopamine neurons in monkeys modeled with Parkinson's disease. As with other studies, their results found that the gene expression of the rate limiting [synthetic enzyme](#) for dopamine production, tyrosine hydroxylase (TH), was "transient" after transplantation, raising questions about the optimal cell stage and culture

environment that favor [graft survival](#) and the factors that could impact [cell transplantation](#). Once more, a more robust immunosuppression regimen than employed in other primate studies resulted in better cell survival.

"Our results demonstrate that pluripotent stem cell line-derived neurons retain the capacity to robustly survive and respond to cues in the [primate brain](#)," they wrote. "The absence of TH expression indicates that other methods may be necessary to produce and maintain the proper midbrain dopaminergic form of the cells in vivo."

While their study demonstrated robust survival of the cells, the researchers said that longer term studies are required to better understand what factors may impact long-term function replacement and whether they demonstrate significant reversal of parkinsonism, tumor formation or dyskinesias, the latter being a side effect of current treatments for Parkinson's Disease.

More information: *Cell Transplantation.*

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