Replacing the cells lost in Parkinson disease

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Parkinson disease (PD) is caused by the progressive degeneration of brain cells known as dopamine (DA) cells. Replacing these cells is considered a promising therapeutic strategy. Although DA cell–replacement therapy by transplantation of human fetal mesencephalic tissue has shown promise in clinical trials, limited tissue availability means that other sources of these cells are needed.

Now, Ernest Arenas and colleagues at the Karolinska Institue, Sweden, have identified a new source for DA cells that provided marked benefit when transplanted into mice with a PD-like disease.

In the study, DA cells were derived from ventral midbrain (VM) neural stem cells/progenitors by culturing them in the presence of a number of factors — FGF2, sonic hedgehog, and FGF8 — and engineering them to express Wnt5a. This protocol generated 10-fold more DA cells than did conventional FGF2 treatment.

Further analysis revealed that these cells initiated substantial cellular and functional recovery when transplanted into mice with PD-like disease. Importantly, the mice did not develop tumors, a potential risk that has precluded the clinical development of embryonic stem cells as a source of DA cells. These data led the authors to suggest that Wnt5a-treated neural stem cells might be an efficient and safe source of DA cells for the treatment of individuals with PD.

Source: Journal of Clinical Investigation

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