Cell therapy for Parkinson's disease with induced pluripotent stem cells.

Asuka Morizane

The innovation of induced pluripotent stem cells (iPSCs) and previous embryonic stem cell (ESC) technologies are drawing attention to their application for regenerative medicine. Parkinson's disease is one of the most promising target diseases because of the history of fetal nigral transplantation in clinics. Although pharmacological treatments for PD, such as L-dopa, show good response in the early phase, patient outcomes over the long term are unsatisfactory. As an additional treatment, cell therapy with aborted fetal tissues has been performed since 1980's. Although it was successful generally, the limited supply of donor source and the unstable quality of the cells prevent this therapy from becoming standard. The technology of iPSCs offers a limitless and more advantageous donor source than aborted embryos. One of the advantages is possibility of preparing immunologically compatible donor cells from self-derived or allogeneic iPSCs. We are preparing a clinical trial that involves the transplantation of dopamine neural progenitors differentiated from iPSCs. We have successfully established a protocol for donor induction with clinically compatible grade and have transplanted these neurons into PD models of mice, rats, and cynomolgus monkeys as preclinical studies. The presentation will include the recent results of our research.

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