

P-24 **Differentiation of Dopaminergic Neuron from Human Wharton's Jelly Derived Mesenchymal Stem Cells**

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Object: Mesenchymal cells from the human Wharton's jelly of the umbilical cord possess stem cell properties. We studied transdifferentiation-promoting conditions and dopaminergic neuron induction of human Wharton's jelly cells. Also We studied the survival and neural projection of grafted human Wharton's jelly cells with the middle cerebral artery occlusion (MCAO) rat model and pup brain organotypic slice cultures.

Method: We confirmed mesenchymal stem cell properties by inducing neuronal differentiation of cells, dimethyl sulphoxide (DMSO) and butylated hydroxyanisole (BHA) in N2 medium and N2 supplement were treated. Differentiation of cells to dopaminergic neuron was induced by basic fibroblast growth factor (bFGF), fibroblast growth factor 8 (FGF8) and sonic hedgehog (Shh). And PKH26 labeled human Wharton's jelly cells were seeded onto the MCAO rat model and pup brain organotypic slice cultures. Combined cultures were maintained for 7 days in vitro. To confirm the neuro-glial characteristics of differentiated cells, immunocytochemistry stain for β -tubulin III, GFAP, GalC and TH was performed. RT-PCR was performed for detecting NeuroD1, GFAP and MBP mRNA. Neurite outgrowth from grafted cells onto slice culture was visualized using immunohistochemistry.

Result: We showed in this experiment that neuro-glia markers (β -tubulin III, GFAP and GalC) were expressed. The rate was about 40% as Neuron, 15% as Astrocyte, 12% as Oligodendrocyte. Human Wharton's jelly cells treated bFGF, SHH and FGF8 were differentiated into dopaminergic neurons (36% of the population) that were immunopositive for TH antibody. In organotypic brain slice culture, transplanted mesenchymal cells were found to survive and to extend their fiber.

Conclusion: These results suggest that human Wharton's jelly derived cells may be potential sources of treatment for neurodegenerative diseases such as Parkinson's disease.

Key Words: Wharton's jelly cells, Dopaminergic neuron differentiation, Organotypic slice cultures, Ischemia