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## Pluripotent Gene Expression in Mesenchymal Stem Cells from Human Umbilical Cord Wharton's Jelly and Their Differentiation Potential to Neural-Like Cells

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Abstract

**Objective**: To explore the expression of pluripotent genes in Wharton's jelly derived MSCs (WJ-MSCs) and their neuronal differentiation potential.

**Material and Method**: Gelatinous connective tissues from umbilical cord Wharton's jelly were digested with trypsin and then cultured in Dulbecco's Modified Eagle's Medium. The expressions of typical MSC markers as well as pluripotent markers were examined by flow cytometry and reverse transcription PCR, respectively. MSCs at passage 3 and 5 were used for in vitro adipogenic, osteogenic and neuronal differentiation by incubation with specific induction media.

**Results**: WJ-MSCs could be easily expanded for more than 20 passages while maintaining their undifferentiated state and their marker expression profiles, being positive for typical MSC markers CD90, CD73, and CD105, and being negative for hematopoietic markers CD34 and CD45. Interestingly, the expression of several pluripotent marker genes including Oct4, Rex1, Sox2, and Nanog was detected in early passages of both cultured WJ-MSCs and BM-MSCs. WJ-MSCs were able to differentiate not only to mesodermal cells, such as adipocyte and osteoblast but also the neural-like cells as characterized by neuronal morphology and the expression of neuronal markers including MAP-2, GFAP, beta-tubulin III and Tau.

**Conclusion**: The present study demonstrates that WJ-MSCs can be readily obtained and expanded in culture while maintaining their typical MSC characteristics. WJ-MSCs and BM-MSCs also expressed several genes associated with pluripotency and exhibited their plasticity by differentiation toward neuronal-cell lineage. Umbilical cord Wharton's jelly might have potential to become an alternative source of MSC for treating nervous system disorders.

**Keywords**: Mesenchymal stem cells, Wharton's jelly, Pluripotency, Neural differentiation

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