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Transdifferentiation of human umbilical cord-derived mesenchymal stem cells to dopaminergic neurons in three-dimensional culture

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Possible production of dopaminergic neurons from human umbilical cord-derived mesenchymal stem cells (HUC-MSCs) is a big promise for neural tissue engineering and clinical treatment of neurodegenerative diseases, such as Parkinson's disease. The main goal of the current study was to determine the differentiation potential of HUC-MSCs toward dopaminergic neuron-like cells. HUC-MSCs were isolated and cultured on Matrigel and induced with a cocktail of dopaminergic neuron differentiation factors. The capacity of HUC-MSCs for differentiation into dopaminergic neuron-like cells was assessed by real-time PCR, immunocytochemistry and high-performance liquid chromatography (HPLC) and compared to the cells differentiated in cell culture plate. The differentiation assessment at the level of mRNA and protein illustrated that Matrigel significantly increased the markers related to dopaminergic neurons compared to the culture plate. Taken together, the results suggest that HUC-MSCs can successfully differentiate into dopaminergic neuron-like cells on Matrigel and may have a promising potential for treatment of dopaminergic neuron-related diseases.

Biography

Hatef Ghasemi Hamidabadi has completed her Graduation at Tehran University of Medical Sciences in 2011. He is a Member of German Neurosciences and Immunogenetic Research Center. He has published more than 25 articles in the field of stem cells.

Notes:

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