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The effect of selegiline as an efficient and pre-inducer for neuronal differentiation of rat bone marrow stromal cells on gene expression of neurotrophins and their receptors

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Cell therapy is one of the approaches for the treatment of locomotive deficits in spinal cord injuries and neurodegenerative disorders. Neural stem cells derived from bone marrow stromal cell are considered as a feasible option for cell therapy. Epigenetic experts have reported that cell differentiation during the development process of BMSCs to NSCs is controlled by several factors including growth and environmental factors as well as regulation and induced effects. Several protocols are using different chemicals for inducing neuronal differentiation of BMSCs. In this study, we investigated the feasibility of using of selegiline as an efficient inducer for neuronal differentiation of rat BMSCs and its effect on gene expression of neurotrophins and their receptors. Based on our results, selegiline has multiple effects which make it a good candidate for inducing neuronal phenotype into BMSCs. Also it has ability to induce the expression of some genes like neurotrophic factors. Therefore, it can be considered as an alternative neuroprotective inducer for BMSCs where the induced cell can still be used for cell therapy. Moreover, the local expression of neurotrophin genes suggests a wide range of paracrine and or autocrine mode of action through their corresponding receptors within the bone marrow. For our experiments, after achieving the optimal concentration of selegiline the expression of antibodies Nestin, Neurofilament 68, Neurofilament 200, TH, Neu-N and GFAP was evaluated using immunocytochemistry. Furthermore, the expression profile of neurotrophins NGF, BDNF and NT-3 and their receptors (TrkA/B/C, p75NTR) was examined during neural differentiation by RT-PCR.

Biography

Atefeh Roein Tan has completed her Master's degree in Biotechnology from Payame Noor University of Tehran. She has worked as a Researcher and Lab Technician for more than four years in Shefa Neuroscience Research Center in Tehran, Iran. She has also worked on the project of creating and purifying neural cells and using in the treatment of amyotrophic lateral sclerosis as a Technician and this project has been patented in September of 2014.

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