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Immunocytochemical expression of neuroepithelial, neural and GABAergic-like neuron markers in transdifferentiated BMSCs using appropriate inducers in vitro

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Background and Objective: Bone marrow stromal cells (BMSCs) were shown to be a feasible option for cell therapy. There is increasing evidence that BMSCs have the potential of differentiation into GABAergic like neuron cells (GLNCs) in vitro under appropriate induction protocols. GABAergic dysfunction is implicated in several neurological disorders. The present study provides evidence for in vitro potential of BMSCs to transdifferentiate into GLNCs.

Materials & Methods: BMSCs were collected from long bones of adult Sprague–Dawley rats, following three passages of cell culture, BMSCs were preinduced using 1 mM β -mercaptoethanol (β ME) and 10 μ M retinoic acid (RA), then they were induced by creatine 5 mM in different days as an inducer. In preinduction and induction stages, the effects of these inducers on differentiation of BMSCs were evaluated by Immunohistochemistry and RT-PCR.

Results: Our results indicated after induction stage high percentage of GLNCs were expressed. According to GABAergic markers (GABA antibody), 5mM creatine and 10 μ M RA after 4 days had a prominent role on differentiation of BMSCs to GLNCs.

Conclusion: β ME, RA and creatine induce differentiation of BMSCs into GLNCs.

Key Words: Bone marrow stromal cell, GABAergic neuron-like cells, retinoic acid, creatine

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