Original Paper

Assessment of neurotrophic factors expression and cell proliferation in the coculture of neural and mesenchymal stem cells

Falsafinia Gh (MSc)[1], Ghorbanian MT (PhD)*[2]
Lashkarbolouki T (PhD)[2], Elahdadi Salmani M (PhD)[2]

[1]MSc in Developmental Cell Biology, Department of Cellular and Molecular Biology, School of Biology, Damghan University, Damghan, Iran. [2]Assistant Professor, Department of Cellular and Molecular Biology, School of Biology and Institute of Biological Sciences, Damghan University, Damghan, Iran.

Abstract

Background and Objective: Neurotrophic factors are diffusible polypeptides that have critical roles in survival, proliferation and differentiation of stem cells. This study was done to assess the role of neurotrophic factors (CNTF, BDNF, GDNF, NT-3) expression and proliferation rate of neural stem cells (NSCs) in coculture with mesenchymal stem cells (MSCs).

Materials and Methods: In this experimental study, NSCs and MSCs were isolated from adult Wistar rat. Initially, NSCs was harvested from temporal lobe after mechanical digestion by a sterile flamed Pasteur pipette and enzymatic digestion with trypsin and Dnase. The cell suspension was cultivated in a flask with DMEM/F12 medium supplemented with 10% FBS 100U/ml Penicillin and 100 mg/ml Streptomycin. To obtain MSCs, bone marrow of femur and tibia bones were flashed out and cultured. MSCs and NSCs cocultured by transwell system in DMEM/F12 medium supplemented with 10% FBS 100U/ml Penicillin and 100 mg/ml Streptomycin. Haemocytometer, immunocytochemistry and RT-PCR methods were performed to identify and evaluate cell proliferation, purity levels and neurotrophic factors expression.

Results: There is no differences in NTFs profile of neurotrophic factors expression between coculture group and control NSCs, but interactions between MSCs and NSCs significantly promoted NSCs proliferation ($P<0.05$).

Conclusion: This study showed that coculture of NSCs with MSCs might be prfered in cell-therapy than NSCs.

Keywords: Stem cell, Neural cell, Mesenchymal cell, Coculture, CNTF, BDNF, GDNF, NT-3

*** Corresponding Author: Ghorbanian MT (PhD), E-mail: ghorbanian@du.ac.ir**

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