

Original Paper

Mesenchymal stem cells proliferation exposed to hypoxia

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Abstract

Background and Objective: Some problems such as low viability and apoptosis after injection to the body because of exposure to toxic factors such as hypoxia, thermal stress, oxidative stress and food deprivation are encountered with stem cell application. It is suggested that preconditioning of the cells with cytotoxic factors before injection could enhance their efficiency. This study was done to determine the mesenchymal stem cell proliferation exposed to hypoxia by cobalt chloride.

Methods: In this experimental study, Mesenchymal stem cells were isolated from rat bone marrow and cultured at least for four times. The cells were cultured in 96 well plates and treated with different concentration (0, 5, 10, 20, 50, 70, 90, 100, 120, 150 and 200 μ M) of cobalt chloride for 6, 12, 24 and 46 hours. Cell proliferation was detected by MTT assay [3-(4,5-Dimethylthiazol-2-Yl)-2,5-Diphenyltetrazolium Bromide].

Results: The cells isolated from bone marrow were propagated easily in culture condition. The cells morphology was not altered after exposure to cobalt chloride. Preconditioning of mesenchymal stem cells with 120 μ M for 6 hours, 20 μ M for 12 and 24 hours and 5 μ M for 48 hours significantly improved cell proliferation after hypoxia in cell culture ($P<0.05$).

Conclusion: Hypoxia preconditioning increases proliferation of mesenchymal stem cell.

Keywords: Hypoxia, Cobalt chloride, Stem cells, Cell proliferation, Rat

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