

Comparison between herbal preconditioning and pretreating of mesenchymal stem cells to protect them against oxidative stress

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Abstract

Numerous studies have been conducted to the mesenchymal stem cell (MSC) survival following transplantation. Among them, two strategies applied to MSC protection against different stresses, are preconditioning with cytotoxic conditions and pretreating with cytoprotective factors. We aimed to compare these two strategies by using the cytotoxic and cytoprotective doses of *Origanum vulgare* (OV)-derived extract. Following MSCs isolation from rat's bone marrow, they were characterized by flowcytometry. Moreover, MSCs were preconditioned with 0.625-80 mg/ml of aqueous extract of OV's leaves for one hour followed by two days' recovery period. Simultaneously, MSCs were pretreated with 0-3.2 mg/ml of OV extract for 2 days. Then, both preconditioned and pretreated MSCs were incubated with IC₅₀ dose of H₂O₂ for 4 hours. After 2 days' recovery, the survival analysis was done by MTT assay. The IC₅₀ dose of hydrogen peroxide was determined to be 0.55 mM. MSCs preconditioning with 2.5 mg/ml of OV increased their survival rate from 46% to 74% as compared with the control (p < 0.05). In contrast, their pretreating with 25 ug/ml improved their survival from 54% to 64%(p < 0.05). Herbal preconditioning of MSC significantly protected them against oxidative stress, more than the herbal pretreating. Therefore, this study opens new way in cell survival following future cell therapy by using natural materials.

Keywords: *Origanum Vulgare*, Preconditioning, Pretreating, Mesenchymal Stem Cell, Oxidative Stress

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