CHARACTERIZATION OF THE CYTOTOXIC EFFECT OF DMSO AND SDS ON MSC CULTURE USING MTT ASSAY

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In this work presents the results relating to determine the dose-response relationship in the culture of MSCs under the influence of chemical factors such as DMSO and SDS and the optimal regimens for the experimental effect using MTT assay.

Keywords: mesenchymal stem cells, cell culture, DMSO, SDS, MTT assay, cytotoxic effect.

There are different changes in cell morphology, cell growth rate, death time and degree of disintegration during the influence of various chemical agents. Therefore, it is necessary to evaluate the harmful effect of each potential damaging substance on cell survival [1].

As a test components were chosen dimethyl sulfoxide (DMSO) and sodium dodecyl sulfate (SDS). DMSO is one of main component of cell medium during the freezing [2]. SDS is an effective agent for tissue decellularization for the production of cell-free scaffolds [3]. A quantitative assessment of the cytotoxicity associated with these substances was performed using MTT assay [4].

It was found that DMSO has a suppressive effect on the cell growth after increasing the concentration in the medium above 2,5 % and induces suppression of cell viability at a concentration of 10 % in the medium by almost 50 %. In turn, SDS demonstrates a pronounced cytotoxic effect. With increasing concentration of this compound in the medium to 0,1 % was observed intensive cell lysis and decreasing of metabolic activity of MSCs to zero. At the same time, the concentration causing a 50 % reduction in cell viability was 0,012 %.

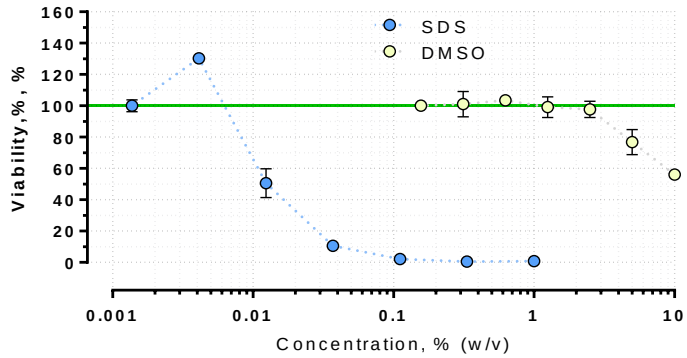

Figure 1 – The cytotoxic effect of DMSO and SDS on hMSC culture

Thus, according to the data obtained using the MTT assay indicated that the substances under study have a negative effect on human MSCs. Consequently, DMSO shows the *cell-damaging effect* in concentrations similar to those used for cryopreservation. It is points to the need for minimizing the time of action and the concentration of the cryopreservatives during defrosting procedures. For example, by diluting the contents of the vial with the cell culture with a higher volume of culture medium immediately after defrosting. Furthermore, it is necessary to minimize the DMSO content in the medium after completion of the cultivation process of MSCs.

As for SDS, it also shows a cytotoxic effect on MSC culture and even low concentrations of this substance leads to cell death. So using SDS in tissue decellularization processes for the production of cell-free scaffolds requires careful monitoring of residual concentrations.

BIBLIOGRAPHY

1. *Haack-Sorensen, M., Bindslev, L., Mortensen, S., Friis, T., Kastrup, J.* The influence of freezing and storage on the characteristics and functions of human mesenchymal stromal cells isolated for clinical use / M. Haack-Sorensen.

2. *Syme, R., Bewick, M., Stewart, D.* [et al.]. The role of depletion of dimethyl sulfoxide before autografting: on hematologic recovery, side effects, and toxicity / R. Syme [et al.] // Blood Marrow Transplant. – 2004. – № 10(2). – P. 135–141.

3. *Linke, D.* Detergents: an overview / D. Linke. – Methods Enzymol. – 2009. – P. 463–603.

4. *Phinney, D. J.* CK BO: Biology and Methods of Analysis / D. J. Phinney. – Humana Press. – 2011. – P. 37–51.