

ческих (20% O₂) и гипоксических (3% O₂) условий культивирования показано, что клетки продуцируют ВКМ с более развитой структурой при пониженной концентрации кислорода. Отметим, что в условиях гипоксии фиколл 400 способствует депонированию ВКМ только при низком содержании сыворотки в ростовой среде. В контексте ЭМСК полученные результаты обладают новизной и расширяют представление о способах оптимизации депонирования ВКМ.

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В экспериментах животные и люди не участвовали.

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An Impact of Hypoxia and Macromolecular Crowders on Extracellular Matrix Deposition by Human Endometrial Mesenchymal Stromal Cells

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The last decades are characterized by intensive development of extracellular matrix (ECM) biology. ECM binds cells in an integral tissue and controls the cell functions – from proliferation and differentiation to migration and apoptosis. Bioactive properties of ECM provide the wide perspectives of using in bioengineering and regenerative medicine. In this context, the ECM production by decellularization of organs, tissues or cell cultures is a key technology. To date, a problem of a rapid and large-scale production of bioactive ECM by cultured cells remains very relevant. Optimization of the ECM deposition conditions by human endometrial mesenchymal stromal cells (MESC)s had not been studied yet. Here, we investigated an impact of macromolecular compounds (crowders) – ficoll and PEG on efficiency of crucial ECM proteins deposition depending on both concentration and molecular weight of crowders under normoxia and hypoxia. According to immunofluorescence analysis, among all studied crowders, ficoll 400 had a potent effect on the production of ECM core proteins – fibronectin, type IV collagen and, in a lower rate, type III collagen. The MESC)s incubation under hypoxia promoted the formation of a properly organized ECM structure as well as increase in efficiency of ECM protein deposition. Of note, in these conditions ficoll 400 accelerated the ECM production only in a low serum medium. Together, combination of ficoll 400, low serum medium and hypoxia provides the optimal conditions for ECM synthesis. The present work demonstrates for the first time the phenomenon of macromolecular crowding in the context of improving the conditions for deposition and organization of ECM by MESC)s.

Keywords: extracellular matrix, human endometrial mesenchymal stromal cells, hypoxia, macromolecular crowders