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Effect of extracellular matrix and hypoxia on mesenchymal stromal cell differentiation

Andreia Marques Ribeiro, Lokesh Joshi and **Rhodri Ceredig**
National University of Ireland, Ireland

Extracellular matrix (ECM) plays an important role in the tumor microenvironment and in biologic processes such as hematopoiesis. ECM contributes to regulation of cell survival, proliferation and cell differentiation. The aims of this project were to study the quality, quantity and biological role of ECM produced by a cloned mouse mesenchymal stromal cell line (MS5) on cell differentiation and to study the role of hypoxia on cell differentiation. To carry out these studies, we have used two methods of producing ECM *in vitro*. In both methods ECM is produced in normoxia and hypoxia. In method 1, cells are lysed by osmotic shock with a Tris/EDTA buffer, the standard way of preparing ECM in many studies. In method 2, MS5 were transduced with a caspase 9 vector, allowing induction of apoptosis in the cells following ECM production. Balb/c bone marrow mesenchymal stromal cells (MSC) were then seeded either in uncoated plastic dishes or in dishes covered with ECM and differentiation assays were performed, again either in normoxia or hypoxia. Results show that the two methods produce qualitatively different ECM and that hypoxia plays a role in ECM composition. Moreover, compared with hypoxia, normoxia is a better condition for adipogenic differentiation of fresh MSC. In contracts, osteogenic differentiation is better on ECM in hypoxia. In conclusion, different methods of preparing ECM *in vitro* lead to different protein composition and different outcomes in cell differentiation. Hypoxia also makes a difference in ECM composition and cell differentiation.

Biography

Andreia Marques Ribeiro has completed her Biology Degree and Microbiology Master in Aveiro University in Portugal. Since 2010 she has been working as Research Assistant in Flow Cytometry and Immunology Groups in Portugal and in Ireland. In 2013, she has started her PhD in the DECIDE consortium and completed in 2016 from National University of Ireland, Galway.

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