Animal Reproduction

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Innovation and technology

A PROSPECTIVE THREE-DIMENSIONAL MICROENVIRONMENT DERIVED FROM PLACENTAL MICE ECM

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Resumo

Human placenta physiology is usually described using samples derived from human term and unsuccessful pregnancies, or from mice model. Which means that human placental physiology is not completely elucidated. Furthermore, new proposals are necessary to reconstruct placental fragments, by bioengineering strategies, given support to simulate placental physiology. Then, herein we aimed to valited by protein content the decellularized mice placental scaffold as a microenvironment able support and maintain cell culture. For this, control (n=3) and SDS-decellularized (n=3) 18.5-day old mice placenta were grouped by condition and washed, lysed, urea-reduced, acetone-precipitated, DTT-reduced, iodoacetamide-alkylated, trypsin digested, and C-18 column purified. At the end, 3 µg protein were loaded in Orbitrap Fusion Lumos spectrometer (ThermoScientific). Generated spectra were exported to MaxQuant software (v1.6.10.43) to produce the protein list of each sample, and the LFQ intensity were statistically analyzed by Inferno software (v.1.1.6970). A list of 2,317 proteins were detected and 118 (5.1%) proteins were filtered using extracellualr matrix (ECM) and cell junction-related ontologies. Control and decellularized conditions equally regulated 76 (64.4%) ECM (collagens, laminins, fibrillin, fibronectin, glycoproteins) and cell junction-related proteins. The enriched ontologies in cellular component domain were related to cell junction, collagen and lipoprotein particles; whereas in biological process domain, we found cell adhesion, vasculature, proteolysis and ECM organization; while in molecular function there were protein binding and activity and ECM resistance ontologies. From the enriched pathways, we could cluster them in cell adhesion and invasion, and labyrinthine vasculature regulation for placental nutrition. Furthermore, trophoblast cells do not survive for long periods in bidimensional in vitro culture models, then mimetize the adequate tridimensional placental microenvironment is critical to allow materno-fetal barrier assays. Finally, the maintenance of several collagen types associated with other fibrous and adhesive proteins on decellularized placenta can support the preservation of a stable tridimensional architecture shiftiness.

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