

PROTEOME ANALYSIS DURING A NEW CHONDROGENESIS MODEL FROM MESENCHYMAL STEM CELLS OF HUMAN UMBILICAL CORD STROMA

A. De La Fuente González⁽¹⁾, J. Mateos⁽¹⁾, I. Lesende⁽¹⁾, V. Calamia⁽¹⁾, I. Fuentes⁽¹⁾, J. De Toro⁽¹⁾, M.C. Arufe⁽¹⁾, F.J. Blanco⁽¹⁾.

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Mesenchymal stem cells (MSCs) were isolated from umbilical cord stromal tissues and differentiated towards chondrocyte-like cells through spheroids. RT-PCR, immunohistochemistry, flow cytometry, and secretome analysis were done to test this new model of chondrogenesis (Stem Cell & Dev. 2010). In this work we have studied proteome of this differentiation by DIGE analysis from 12 donors and 6 check points 4,7,14,28 and 46 days into chondrogenic medium. Protein identification was realized by MALDI-TOF/TOF mass spectrometry. 1370 spots were seen in the gel DIGE and 97 spots were modulated considering $p \leq 0.01$ statistically significant and were identified. 35 proteins were down-regulated and 62 were up-regulated in all time points studied compared with MSCs no differentiated. The modulated proteins were also classified in different groups according cellular function, the most of the proteins were involved in cell organization (45%) followed by redox and stress function (19%), metabolism (16%), protein synthesis (10%), signal transduction (7%) and proteolysis (3%).

Chondrocyte produces 98% of extracellular matrix to form cartilage. In this work were identified proteins related with the secretory activity, survival and resistance under stress conditions; also proteins involved with hypoxia and glucolysis, both characteristics of chondrocyte. Some proteins identified were involved in mineralization and turnover of the extracellular matrix as well as the transition between the cartilage and bone formation. In this chondrogenic model there are some important pathways modulated in this process as the invasion vascular, cell migration, cell proliferation, embryonic development, de-differentiation and differentiation.

All these results are indicating that chondrocyte-like cells raised with our chondrogenesis model are very similar to native chondrocytes producing extracellular matrix which could be used in a future cellular therapy to transplant cartilage in joint disease.

Analysis of the chondrogenic potential and secretome of mesenchymal stem cells derived from human umbilical cord stroma_ Arufe M, de la Fuente A, Mateos J, Fuentes-Boquete I, de Toro FJ, Blanco FJ. *Stem Cells Dev.* 2010 Oct 26. [Epub ahead of print] PMID: 20977334 [PubMed - as supplied by publisher]