**SUSD2 Expression as a Specific Marker of Human Hyaline Articular Chondrocytes Cultures**

Ana Celeste Ximenes,¹ Ismael Ángel Rodríguez,¹,² Carlos Martínez,¹ Álvaro Morales,³ Antonio Campos,¹

Corresponding Author: acampos@ugr.es

¹Tissue Engineering Group, Department of Histology, University of Granada, Granada, Spain; ²Cátedra de Histología B, School of Dentistry, Universidad Nacional de Córdoba, Argentina; ³Division of Traumatology and Orthopedic Surgery, University Hospital Virgen de las Nieves, Granada, Spain

**Introduction**

Numerous severe conditions affecting the joint hyaline cartilage can be treated by surgical implantation of autologous chondrocyte cultures. Although technical advances allowed for the efficient isolation and culture of human chondrocytes, several studies reported phenotypic instability of cells kept in culture, which tended to lose their differentiative character after several cell subcultures.

Human hyaline chondrocytes are known to produce collagen II in culture. However, a few number of specific cell markers of hyaline chondrocytes have been described to date. In the present study, we carried out a genome-wide gene expression analysis in human hyaline chondrocytes and other cells of mesenchymal origin in order to identify a gene marker that is specific of human hyaline chondrocytes.

**Materials and Methods**

Primary cell cultures of human joint hyaline chondrocytes were established from small biopsies of articular cartilage using collagenase II. Primary cultures of human Wharton’s jelly stem cells, oral mucosa fibroblasts, corneal keratocytes and skin fibroblasts were generated using enzymatic digestion of tissue biopsies. Total RNA was extracted from each cell culture using a commercial kit and the RNA expression level of each gene was quantified by hybridizing labeled RNA with the Affymetrix Human Genome U133 plus 2.0 arrays. Genes overexpressed only by chondrocytes cultures but not by other types of human mesenchymal cells were selected as specific of these cells.

**Results**

Of the 54,675 genes or probe sets analyzed by microarray, chondrocytes cultures showed overexpression of the gene SUSD2, encoding for the sushi domain containing 2 protein. The average expression level of this gene was 484.4 Affymetrix fluorescent units for chondrocytes cultures, 4.4 for oral fibroblasts, 22.0 for corneal keratocytes, 2.8 for Wharton’s jelly stem cells and 10.7 for skin fibroblasts (Figure 1).

![Fig. 1. Average RNA expression levels of the gene SUSD2 for the different samples analyzed in this work using Affymetrix Human Genome U133 plus 2.0 microarray.](image)

**Discussion and Conclusions**

Analysis of primary cultures of human articular chondrocytes to determine the homogeneity of the cell culture is a key point of the quality control process before the cells can be used in cell therapy protocols. The results obtained in this work point out that the gene SUSD2 is strongly expressed by human chondrocytes kept in culture, but not by other types of human mesenchymal cells that may be present in the culture. For that reason, we suggest that SUSD2 could be used as a chondrocyte-specific marker to determine the purity of chondrocyte cultures.

**Acknowledgments**

This work was supported by P06-CTS-2191 from the Andalusian Consejería de Innovación Ciencia y Empresa (Proyectos de Excelencia).

**Disclosures**

Authors have nothing to disclose.