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HYPOXIA CONDITIONS DIFFERENTIALLY MODULATE NORMAL AND OSTEOARTHRITIC CHONDROCYTE PROTEOMES

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Osteoarthritis (OA) is a degenerative disease characterized by the degradation of articular cartilage. This tissue is avascular, and it is characterized by the low oxygen tension and poor nutrient availability for its cells, the chondrocytes. Hypoxia conditions have been reported to stimulate chondrogenesis and synthesis of extracellular matrix components. Therefore, we pursued to examine the effect of hypoxia on normal and osteoarthritic cartilage cells.

Chondrocytes obtained from healthy and osteoarthritic donors were subjected to hypoxia conditions during 96 hours. Whole cell proteins were then isolated and resolved by 2-D electrophoresis. Gels were stained with SYPRORuby, and image analysis was performed using PDQuest software. Proteins of interest were identified by MALDI-TOF/TOF mass spectrometry.

We examined a mean of 500 protein spots that were present in each gel. Both qualitative and quantitative changes in protein expression patterns were studied. 32 protein forms were found to be modulated by hypoxia in normal cells and 16 in osteoarthritic cells when compared to control. We also identified 44 protein forms that were altered in normal cells under hypoxia compared to osteoarthritic chondrocytes. We observed a decrease in many metabolism-related proteins. The biggest difference between normal and OA chondrocytes was found in the proteins involved in glycolosis.

In conclusion, hypoxia induces different modifications in the proteome profile of human articular chondrocytes. OA and normal chondrocytes have different capacity of response to hypoxia.