



Effect of Hydrostatic Pressure Amplitude on Chondrogenic Differentiation of Human Adipose Derived Mesenchymal Stem Cells

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In articular cartilage, chondrocytes are subjected to various mechanical signals among which, hydrostatic pressure (HP) has been suggested to improve the phenotype of chondrocytes and enhance the chondroinduction of stem cells. The objective of this work, was to compare the effect of applying 3 MPa and 5 MPa of intermittent hydrostatic pressure on chondrogenic differentiation of human adipose-derived mesenchymal stem cells (MSCs). MSCs were isolated from human abdominal fat tissue and examined for expression of MSC surface proteins and multilineage differentiation. In SC and GF groups, cells were incubated in routine culture medium and chondrogenic medium containing TGF- β 1 for 10 days, respectively. In 3 MPa- and 5 MPa-HP groups, cells were exposed to routine culture medium subjected to 3 MPa and 5 MPa of HP from the 4th day of culture for 7 days (4 hours/day). In 3 MPa- and 5 MPa-HP-GF groups cells were incubated in chondrogenic medium and subjected 3 MPa and 5 MPa of HP for 7 days (4 hours/day). Real-Time PCR method was used to examine the expression of collagen II, as a chondrogenic specific gene. The highest collagen II expression, close to that of the native cartilage tissue, was obtained in 5 MPa-HP-GF group, suggesting that combination of this loading regime with growth factor can be used as an effective tool in cartilage tissue engineering for directing stem cells toward chondrogenic differentiation.