

Effect of mechanical strain on in vitro behavior of mesenchymal stem cells

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Mechanical stress is known to be one of the important factors in the regulation of ligament and tendon remodeling. The effects of mechanical stress on cells are dependent on the magnitude, duration, and frequency of mechanical stress.

Recently the in vitro reconstruction of anterior cruciate ligament (ACL) has been tried using tissue engineering, especially mesenchymal stem cell (MSC) is considered as a good cell source. In this study we tried to find the effect of mechanical stimulus on the differentiation of bone marrow-derived MSC into ACL fibroblast-like cell using a cell training bioreactor imposing cyclic mechanical tension whose parameters were 12 cycles/min, 0.2 Hz, various strain. And MTT assay, FASC analysis, morphology analysis and RT-PCR were performed. It is thought that mechanical cyclic tension induced the loss of stemness of MSC, therefore improved the differentiation into ACL fibroblast-like cell.