

Effect of tension culture on the behavior of human dental pulp cells

박정극, 서영권*, 한미정, 윤희훈, 송계용¹
동국대학교; ¹중앙대학교
(bioseo2@empal.com*)

In this study we are willing to recognize the effect of the 2D and 3D mechanical tension on the proliferation and osteogenesis of human dental pulp stem cells (DPSCs). In the 2D tension system, we evaluated the proliferation and extracellular matrix (ECM) production of DPSCs using a flexwell system that imposed cyclic mechanical tension at 0.03 Hz with 0, 5, and 8 % strains. In the early stage (4 days), DPSCs at 5 and 8 % strains had a similar proliferation, which was higher than the control. However in the late stage (10 days), DPSCs at 8 % strain had a higher proliferation than the control and 5 % strains. RT-PCR analysis was shown that mechanical tension increased collagen and osteopontin expression. In the 3D tension system, we evaluated the osteogenesis of DPSCs on the silk scaffold using a bioreactor with 10% strain. The tension was applied with 0.2 Hz during 5 days and continuously applied during 10 days. Application of 10% tension culture reported in increases in collagen type I, fibronectin, osteoprotegerin, bone sialoprotein. These data suggest that mechanical stimulation can serve as a potent positive modulator of proliferation and promote osteogenesis of DPSCs.