The Effects of Conditioned Medium from Dental Stem Cells on Gene Expressions of Interleukin IL-1β Treated Chondrocytes

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Osteoarthritis (OA) is a degenerative joint disease and highly difficult to repair. It is the degeneration of articular cartilage and the underlying bone over time, most commonly affecting joints in hands, knees, hips and spines. Recent experiments have shown the potential of stem cell conditioned medium in the regeneration or the halting of further damage in osteoarthritis. The long-term goal of this research is to eventually cure the severe osteoarthritis that many elderly, athletes, and physically active individuals suffer from. This experiment aims to investigate the effect that conditioned medium (CM) from periodontal ligament (PDL) stem cells has on inflamed chondrocytes. The main goal is to reduce the expressions of inflammatory cytokines and catabolic enzymes in the chondrocytes by using the stem cell CM. It was hypothesized that if the PDL stem cell CM is used to treat chondrocytes cultured with Interleukin-1β, then the CM will reduce the expression of inflammatory cytokines and catabolic enzymes in chondrocytes. There were many methods that were needed in order to accomplish the goal of this experimentation, the methods implemented include Stem Cell Culturing, Chondrocyte Culturing, treating cells, Real-Time Polymerase Chain Reaction assessments, as well as the analyses of the encountered data. However, the results of this experiment suggest that stem cell derived CM could function as a treatment in regenerating injured articular cartilage. The real-life application of this experimentation would be to find a treatment that would aid in the eventual cure of the deadly and degenerative disease known as osteoarthritis.