



Effects of pro-inflammatory cytokines on chondrogenesis of equine mesenchymal stromal cells derived from bone marrow or synovial fluid

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Abstract:

Mesenchymal stromal cells (MSCs) have the capacity to differentiate into cells of mesenchymal lineage, such as chondrocytes, and have potential for use in regeneration of equine articular cartilage. MSCs instilled intra-articularly would be exposed to the inflamed environment associated with equine osteoarthritis (OA), which may compromise their function and ability to heal a cartilaginous defect. The aim of this study was to assess the ability of equine adult MSCs to differentiate into chondrocytes when stimulated with pro-inflammatory cytokines. MSCs derived from equine bone marrow (BM) and from synovial fluid (SF) were cultured in chondrogenic induction medium containing transforming growth factor (TGF)- β 1. BM-derived MSCs (BMMSCs) and SF-derived MSCs (SFMSCs) were stimulated with 100 ng/mL interferon (IFN)- γ and 10 ng/mL tumor necrosis factor (TNF)- α . Chondrogenic differentiation was measured quantitatively with the glycosaminoglycan (GAG) assay and qualitatively by immunofluorescence (IF) for SOX-9, TGF- β 1, aggrecan and collagen II. The viability of equine MSCs was maintained in the presence of IFN- γ and TNF- α , but production of GAGs from both types of MSCs was decreased in stimulated medium. Exposure of BMMSCs to pro-inflammatory cytokines reduced the levels of SOX-9, TGF- β 1, aggrecan and collagen II, whereas exposure of SFMSCs to these cytokines reduced the levels of aggrecan only. These data suggest that pro-inflammatory cytokines do not affect proliferation of MSCs, but could inhibit chondrogenesis of MSCs.

Keywords:

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