Inflammation has been associated with early degenerative changes of articular cartilage in osteoarthritis (OA) and immune responses are key factors influencing normal tissue regeneration and repair in the joint. Although mesenchymal stem/stromal cells (MSCs) have shown potential for the repair and/or protection of damaged articular cartilage, tissue engineering strategies to date using these cells have not been entirely successful, often producing terminal rather than stable chondrocytes. Intra-articular delivery of MSCs (whether bone marrow-derived or adipose tissue-derived MSCs (ASCs)) has been shown to prevent cartilage degradation in a variety of pre-clinical models of OA as well as in early clinical trials. A large body of data is accumulating to suggest that the ability of MSCs to modulate development of OA and other diseases may be associated with immune modulation. Early cell death through apoptosis may be the primary therapeutic mechanism in systemically introduced cells but mechanisms associated with local delivery have not been defined. We have investigated the role of MSC apoptosis on immune modulation in vitro and characterised in vitro effects of surviving, engrafted MSCs retrieved from the joint. The molecular profile of these in vivo licensed therapeutic cells was also established.

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