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Repair of articular cartilage defects using bone marrow derived mesenchymal stem cells in rabbits

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The study was performed to examine the effect of intra-articular injection of bone marrow mesenchymal stem cells (BM-MSCs) and chondrogenic differentiated mesenchymal stem cells (CD- MSCs) on the repair of articular cartilage defects in rabbits. Twenty-five adult Egyptian female baladi rabbits were used in this work. 5 rabbits were used for the preparation of bone marrow mesenchymal stem cells (BM-MSCs) and their left knees were not subjected for a surgical procedure and were used as a control group. The remaining twenty animals were subjected to surgically induced cartilage defects in their left knees through a small medial para-patellar incision using bone curette. In the next day, the rabbits were divided into four groups: groupI was not injected intraarticularly, groupII injected intraarticularly by a single dose of saline, groupIII injected intraarticularly by a single dose of BM-MSCs and groupIV injected intraarticularly by a single dose of CD- MSCs. After 8 weeks from the time of intraarticular injection, the rabbits were sacrificed and the treated knee joints were excised and examined. Group I and II showed marked degenerative changes in their articular cartilages. The cartilage defects were healed by fibrocartilage in group III, while in group IV the defects healed by hyaline cartilage. Treatment by CD-MSCs promotes a better healing effect on the articular cartilage defects of injured knee joints in rabbit's model and has a remarkable superiority of repairing effect than MSCs. So, CD-MSCs prevent the progress of cartilage defects into osteoarthritis which is a harmful disease.

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