Many people suffer from joint cartilage damage or degeneration, which is a tissue that does not restore itself. The use of mesenchymal stem cells (MSCs) for cartilage repair has received a great deal of attention recently because the cells can be differentiated into a chondrogenic phenotype. We had performed many researches about MSC in cartilage repair. (1) We wrapped human fragment into fibrin glue with MSC and implanted on the back of nude mice. Results showed that the gene expression of type X collagen expression is reduced. Under the environment of collagen gel containing acellular cartilage matrix and growth factor, the synovium MSC can synthesis type II collagen, aggrecan, and reduce the gene expression of type X collagen. (2) TGF-beta inducedMSCs in type I collagen gel resulted in better chondrogenesis than pellet culture, the animal study and clinical trial had also been performed. (3) Considering the effect of growth factor, we conduct an animal study to determine the effect of intra-articular injection of platelet-rich plasma (PRP), hyaluronic acid with/without bone marrow MSC for osteoarthritis treatment. We find PRP combined with MSC possess longer effect in osteoarthritis (OA) treatment. (4) MSC also has immune modulation effect; we find the proliferation of PBMCs was significantly inhibited by fat pad MSCs at a 1:0.4 ratio. (5) In the aspect of MSC interaction with OA chondrocytes, we cultured MSC and chondrocyte in both direct or indirect contact and conditioned medium environment, results showed that MSC could reduce IL-1beta, IL-6, iNOS gene expression of chondrocyte and up-regulated aggrecan gene expression in both direct and indirect contact environment. Also, the 10 fold concentrated conditioned medium could decreasing the inflammatory response and assist chondrocyte to recover from inflammation. In conclusion, MSCs can be beneficial to cartilage injury, either through cell differentiation or through paracrine effect.