

Recent Advances in Mesenchymal Stem Cell Therapy for Bone and Cartilage Regeneration

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Perspective

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DESCRIPTION

Mesenchymal Stem Cells (MSCs) have emerged as a promising tool for regenerative medicine, particularly in the field of bone and cartilage repair. These multipotent cells, typically isolated from various tissues such as bone marrow, adipose tissue and umbilical cord, have the ability to differentiate into osteoblasts, chondrocytes and other connective tissue cell types, making them highly valuable for the regeneration of skeletal tissues. Recent advances in MSC therapy have expanded the potential applications in treating bone and cartilage defects, addressing critical challenges such as tissue degeneration, trauma and congenital disorders. This article discusses the progress in MSC-based therapies, focusing on bone and cartilage regeneration, and explores the current strategies, challenges and future directions in this promising field.

MSCs possess several characteristics that make them ideal candidates for bone and cartilage regeneration. First, they exhibit self-renewal properties, allowing for the expansion of cell populations in vitro. Second, they have the ability to differentiate into osteogenic and chondrogenic lineages under appropriate conditions. This ability to differentiate into bone and cartilage cells is important for the repair of skeletal tissues, which often suffer from degenerative diseases such as Osteoarthritis (OA), osteoporosis and fractures. The regenerative potential of MSCs is also attributed to their immunomodulatory effects, which allow them to promote healing while minimizing the risk of immune rejection, making them suitable for allogeneic transplantations.

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