

Mesenchymal Stem/stromal cells as therapeutic tools and vehicles for gene and drug delivery

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Mesenchymal stem/stromal cells (MSCs) are multipotent, self-renewing precursor cells that can differentiate into cell types of mesodermal origin, such as adipocytes, osteocytes, and chondrocytes. They can be easily isolated from a variety of tissues including the bone marrow, adipose tissue and umbilical cord among others. These properties, i.e. relative ease of isolation and multipotency along with their immunomodulatory effects, their ability to rapidly expand in vitro and finally their homing to damaged tissues have rendered MSCs an attractive tool for cellular therapies/regenerative medicine and as vehicles for gene and drug delivery.

Indeed, in the clinical setting, the therapeutic potential of MSCs is being explored in various disorders, including orthopedic injuries, graft versus host disease following bone marrow transplantation, cardiovascular diseases, autoimmune diseases etc. Furthermore, genetic modification of MSCs to overexpress antitumor genes has provided prospects for clinical use as anticancer therapy. In my talk I will highlight reported uses of MSCs in regenerative medicine, as immunomodulatory/anti-inflammatory agents, and as vehicles for transferring both therapeutic genes in genetic disease and genes designed to destroy malignant cells.