

Mesenchymal stem cell extracellular vesicles: potential use in regenerative medicine

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Complex biological systems are composed of great amount of cells with sophisticated mechanisms for information exchange, involving the molecular as well as the cellular level. Vesicle release results in a process highly conserved in prokaryotes as well as in eukaryotes, therefore representing an evolutionary link and suggesting that such a dynamic extracellular vesicular compartment may play a key role in remote organ and tissue regulation. Microparticles serve as a vehicle to transfer proteins and messenger RNA and microRNA (miRNA) to distant cells, which alters the gene expression, proliferation, and differentiation of the recipient cells. Microparticles released from mesenchymal stem cells have the potential to be exploited in novel therapeutic approaches in regenerative medicine to repair damaged tissues, as an alternative to stem cell-based therapy.