



Transplantation of human umbilical cord mesenchymal stem cells (hUCMSCs) in SCI mice can promote the polarization of M2 macrophages by reducing the expression of IL-7 in the injured site, thereby weakening the inflammatory response at the injured site, promoting the repair of the injured site and improving the motor function.

Mesenchymal stromal cells (MSCs) can be obtained from autologous sources such as bone marrow and adipose tissues or from allogeneic placenta and umbilical cord.

Perez-Cruet et al., investigated the potential of nucleus pulposus (NP)-like cells (NPCs) derived from human umbilical cord mesenchymal stem cells (MSCs) to restore degenerated intervertebral discs (IVDs) using a rabbit Degenerative disc disease (DDD) model.

NPCs differentiated from MSCs were characterized using quantitative real-time polymerase chain reaction and immunocytochemical analysis. MSCs and NPCs were labeled with fluorescent dye, PKH26, and transplanted into degenerated IVDs of a rabbit model of DDD (n = 9 each). Magnetic resonance imaging of the IVDs was performed before and after IVD degeneration, and following cell transplantation. IVDs were extracted 8 wk post-transplantation and analyzed by various biochemical, immunohistological, and molecular techniques.

NPC derivatives of MSCs expressed known NP-specific genes, SOX9, ACAN, COL2, FOXF1, and KRT19. Transplanted cells survived, dispersed, and integrated into the degenerated IVDs. IVDs augmented with NPCs showed significant improvement in the histology, cellularity, sulfated glycosaminoglycan and water contents of the NP. In addition, expression of human genes, SOX9, ACAN, COL2, FOXF1, KRT19, PAX6, CA12, and COMP, as well as proteins, SOX9, ACAN, COL2, and FOXF1, suggest NP biosynthesis due to transplantation of NPCs. Based on these results, a molecular mechanism for NP regeneration was proposed.

The findings of this study demonstrating feasibility and efficacy of NPCs to regenerate NP should spur interest for clinical studies to treat DDD using cell therapy ¹⁾.

1)

Perez-Cruet M, Beeravolu N, McKee C, Brougham J, Khan I, Bakshi S, Chaudhry GR. Potential of Human Nucleus Pulposus-Like Cells Derived From Umbilical Cord to Treat Degenerative Disc Disease. Neurosurgery. 2019 Jan 1;84(1):272-283. doi: 10.1093/neuros/nyy012. PubMed PMID: 29490072;

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