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Therapies Based on Mesenchymal Stem Cells (Mscs) to Treat Various Pathologies

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Introduction

Mesenchymal stem cells (MSCs) are a common cell type used in regenerative medicine. A large number of studies have shown that MSC-based therapies are effective in treating a variety of pathologies, including neurological disorders, cardiac ischemia, diabetes, and bone and cartilage diseases.

Osteoarthritis (OA) is an inflammatory condition for which there are currently no effective treatments. MSCs (mesenchymal stem/stromal cells) have been used successfully in pre-clinical models to resurface degenerated cartilage. Intra-articular (IA) administration of MSCs reduces pain and protects or heals cartilage in early-stage clinical trials. The consistent lack of engraftment, on the other hand, suggests that the observed effect is delivered via a "hit-and-run" mechanism, involving the temporal release of paracrine molecules. MSCs produce a number of chemokines and cytokines that aid in the repair of damaged tissue, the restoration of normal tissue metabolism, and, most importantly, the suppression of inflammation [1-3].

Description

Therapeutic factor secretion is increased in response to inflammatory signals or apoptosis induced by the host immune system. Trophic effectors are soluble molecules that are released or carried by extracellular vesicles (ECVs). MSCs have been used for many orthopaedic conditions, including osteoarthritis, as a paradigm for tissue regeneration (OA). The first successful treatment involved an anterior cruciate ligament transection combined with total medial meniscectomy in a caprine model of OA. MSCs rapidly disappear from the target tissue after administration, but they continue to have chondroprotective and immunomodulatory effects. Because their therapeutic efficacy appears to be independent of engraftment, it is now thought to be primarily paracrine-mediated.

Mesenchymal Stem Cells (MSCs) have been extensively researched for the treatment of a variety of retinal diseases. MSCs' therapeutic potential stems from their ability to differentiate into multiple lineages and secretomes rich in immunomodulatory, anti-angiogenic, and neurotrophic factors. Several studies have reported the role of MSCs in retinal repair and regeneration, with MSC-secreted factors preventing retinal degeneration and improving retinal morphology and function. MSCs also donate mitochondria to help retinal cells function, and exosomes secreted by MSCs have been shown to have anti-apoptotic and anti-inflammatory properties. Based on promising preclinical results, several clinical trials were launched to investigate the potential benefits of MSCs for the treatment of retinal diseases.

Mesenchymal stem cells (MSCs) were successfully isolated from a variety of tissue sources, including bone marrow, adipose tissue, dental pulp, umbilical cord blood, and amniotic membrane, and are thought to be promising candidates for therapy to regenerate and repair degenerated retinal cells in a variety of retinal degenerative disorders [4,5].

Conclusion

The important reasons for considering MSCs as a treatment option for retinal disorders are, first, paracrine signalling via neurotropic factor secretion for neuro-retinal cell repair, second, immunomodulatory properties that can dampen the pro-inflammatory microenvironment common to retinal degenerative diseases, and third, their ability to secrete anti-angiogenic factors to inhibit the pro-angiogenesis involved in the aetiology of the disease.

While traditional therapies such as surgery and ocular drugs can slow the progression of ocular diseases, novel approaches such as stem cell and gene therapy have the potential to regenerate the damaged retinal architecture.

Human mesenchymal stem cells (MSCs), also known as mesenchymal stromal cells or medicinal signalling cells, are important adult stem cells for regenerative medicine, owing to regenerative properties such as self-renewal, trophic factor secretion, and the ability to induce mesenchymal cell lineages. MSCs also have homing and trophic properties that influence the immune system, the microenvironment around damaged tissues, and tissue repair, providing a broad perspective in cell-based therapies. As a result, it is not surprising that MSCs are the most commonly used adult stem cells in clinical trials.

References

1. Wert, Guido de, and Christine Mummery. "Human embryonic stem cells: research, ethics and policy." *Human Reproduction* 18 (2003): 672-682.
2. Takahashi, Kazutoshi and Shinya Yamanaka. "Induction of pluripotent stem cells from mouse embryonic and adult fibroblast cultures by defined factors." *Cell* 126 (2006): 663-676.
3. Takahashi, Kazutoshi, Koji Tanabe, Mari Ohnuki and Megumi Narita, et al. "Induction of pluripotent stem cells from adult human fibroblasts by defined factors." *Cell* 131 (2007): 861-872.
4. Doss, Michael Xavier and Agapios Sachinidis. "Current challenges of iPSC-based disease modeling and therapeutic implications." *Cells* 8 (2019): 403.
5. Sharkis, Saul J., Richard J. Jones, Curt Civin and Yoon-Young Jang. "Pluripotent stem cell–based cancer therapy: Promise and challenges." *Sci Trans Med* 4 (2012): 127.

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