

Cell-based therapy in the treatment of musculoskeletal diseases

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Introduction

A limited number of tissues can spontaneously regenerate following injury, and even fewer can regenerate to a state comparable to mature, healthy adult tissue. Mesenchymal stem cells (MSCs) are derived from periosteum, fat, and muscle and have the immunoregulatory and regenerative properties, which result from crosstalk with their microenvironment and components of the innate immune system. Collectively, these properties make MSCs potentially attractive for various therapeutic purposes. MSCs offer potential in sports medicine, aiding in muscle recovery, meniscal tears, and tendon and ligament injuries. In joint disease, MSCs have the potential for chondrogenesis and reversing the effects of osteoarthritis. MSCs have also demonstrated potential application to the treatment of degenerative disc disease of the cervical, thoracic, and lumbar spine.

Methodology

The researchers conducted a comprehensive literature review using databases such as PubMed and Data.gov. They focused on randomized controlled trials (RCTs) conducted since 2017, with preference given to more recent studies. The review also included animal and preclinical studies to demonstrate the biological rationale and potential mechanisms underlying MSC use.

Findings

Potential Applications of MSCs:

- Sports Medicine: MSCs show promise in aiding muscle recovery, treating meniscal tears, and addressing tendon and ligament injuries.
- Joint Disease: MSCs demonstrate potential for chondrogenesis and reversing the effects of osteoarthritis.
- Spine Treatment: MSCs have shown potential application in treating degenerative disc disease of the cervical, thoracic, and lumbar spine.

Unique Properties of MSCs

-The study highlights the regenerative potential of MSCs in various tissues, particularly their promise for bone and cartilage repair. This is attributed to their unique immune-modulatory and anti-inflammatory properties.

Significance

This review is particularly valuable as it provides an up-to-date overview of the clinical evidence supporting MSC use in the field of orthopedics. It covers a wide range of musculoskeletal conditions, making it a comprehensive resource for understanding the current state and future potential of cell-based therapies in this field.

Conclusion

The paper concludes that the therapeutic use of stem cells, particularly MSCs, has the potential to revolutionize regenerative medicine in the treatment of musculoskeletal conditions. This review offers a concise yet comprehensive summary of the current evidence, making it an excellent resource for clinicians and researchers interested in the latest developments in regenerative medicine for musculoskeletal disorders.