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ABOUT COVER

Peer Review of *World Journal of Stem Cells*, Asmaa Mohammed Shamseldeen, MD, Assistant Professor, Department of Physiology, Cairo University, Cairo 30411, Egypt. asmaa82shamseldeen@gmail.com

AIMS AND SCOPE

The primary aim of *World Journal of Stem Cells* (*WJSC*, *World J Stem Cells*) is to provide scholars and readers from various fields of stem cells with a platform to publish high-quality basic and clinical research articles and communicate their research findings online. *WJSC* publishes articles reporting research results obtained in the field of stem cell biology and regenerative medicine, related to the wide range of stem cells including embryonic stem cells, germline stem cells, tissue-specific stem cells, adult stem cells, mesenchymal stromal cells, induced pluripotent stem cells, embryonal carcinoma stem cells, hemangioblasts, lymphoid progenitor cells, *etc*.

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EDITORIAL

Additional comments on extracellular vesicles derived from mesenchymal stem cells mediate extracellular matrix remodeling in osteoarthritis

Hang Pei, Yi Zhang, Chao Wang, Bang-Jian He

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Abstract

Recently, we read an article published by the Yang *et al*. The results of this study indicated that engineered exosomes loaded with microRNA-29a (miR-29a) alleviate knee inflammation and maintain extracellular matrix stability in Sprague Dawley rats. The study's results provide useful information for treating knee osteoarthritis (KOA). This letter, shares our perspectives on treating KOA using engineered exosomes for miR-29a.

Key Words: Exosomes; Intra-articular injection; Mesenchymal stem cells; MicroRNA-29a; Osteoarthritis

Core Tip: We recently reviewed a study that treated knee osteoarthritis using engineered exosomes. The authors found that this novel treatment approach is more effective than standard exosomes at symptom alleviation. This letter summarizes the advantages and limitations of this therapy and clarifies aspects of the original article.

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INTRODUCTION

We recently read an article titled "Extracellular vesicles derived from mesenchymal stem cells mediate extracellular matrix remodeling in osteoarthritis through the transport of microRNA-29a". In this study, Yang *et al*[1] used engineered exosomes loaded with microRNA-29a (miR-29a) to treat early knee osteoarthritis (KOA) in rats. The study demonstrated superior pain reduction and joint improvement compared to standard exosomes. It provided a glimmer of hope for novel and exciting approach for treating KOA without side effects. We hope this piques your curiosity and encourages further exploration of this fascinating topic.

MSCS IN OSTEOARTHRITIS

OA is a severe degenerative joint disease characterized by articular cartilage degeneration due to the loss of extracellular matrix, extensive fibrosis, and fissure formation, ultimately leading to the complete loss of the cartilage surface[2]; current first-line drugs for the treatment of OA improve symptoms by suppressing inflammation (using nonsteroidal anti-inflammatory drugs) and lubricating and nourishing the cartilage (using hyaluronic acid); however, these treatments are ineffective at halting cartilage degeneration.

In recent years, the mergence of biologics has provided new insights into the treatment of OA. Our previous studies have identified the excellent potential of platelet-rich plasma and fat microfragments for treating OA[3,4]. Mesenchymal stem cells (MSCs) have garnered significant attention as a promising therapy for delaying or controlling arthritis due to their ability to differentiate into various cell types and their impact on tissue repair and immunomodulation[5]. The paracrine regulatory function of MSCs plays a crucial role in promoting cartilage repair. Jia *et al*[6] discovered that undifferentiated MSCs were more effective in regenerating hyaline cartilage than *in vitro* preformed chondrogenic differentiated MSCs. Exosomes, which are secreted by MSCs, have been widely studied for their role in paracrine regulation. Qian *et al*[7] found that exosomal miR-26b-5p can transform pro-inflammatory M1 macrophages into anti-inflammatory M2 types by targeting the toll-like receptor 3 signaling pathway to alleviate OA. Additionally, Qiu *et al*[8] found that exosomal miR-485-3p can alleviate cartilage damage in OA by targeting the NRP1-mediated PI3K/Akt pathway. Furthermore, researchers integrated the less commonly used miR-29a into exosomes, presenting a new approach for treating OA.

CONCLUSION

The use of stem cell exosome miR-29a has produced promising results in reducing the symptoms of OA and promoting cartilage repair and joint function recovery. However, like any new treatment, certain limitations need to be addressed. For example, the mechanism of action of miR-29a requires further research. Similarly, stem cell exosome preparation and application methods need to be optimized. This highlights the importance of additional research to confirm and build upon the results of the discussed study.

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FOOTNOTES

Author contributions: Pei H and Zhang Y contributed to this manuscript equally. Pei H was responsible for the conception and design of the editorial; Zhang Y and Wang C contributed to the drafting and revising of the manuscript; He BJ provided critical revisions and gave final approval of the version to be published. All authors read and approved the final manuscript.

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