Editorial

Novel Strategies for Gene Therapy—Recent Advances in the Use of Exosomes for Disease Treatment

Exosomes are extracellular vesicles ranging in diameter from 30 to 150 nm that contain miRNA, mRNA, protein, lipid and so on. Exosomes act as biological mediators that mediate different physiological and biological functions through cell–cell communication, such as participating in the immune response and facilitating antigen presentation. Exosomes play a pivotal role in the diseases of the nervous system, inflammatory diseases, nephropathy, metabolic bone diseases, tumorigenesis and so on.

Exosomes can deliver various agents, such as RNAs or proteins, from donor cells to target cells or tissue, contributing to various aspects of physiological functions and the pathogenesis of various diseases. Moreover, many methods have been introduced to load therapeutic agents into exosomes, especially using exosomes to transfer mRNA or protein. Recently, lots of interesting studies have evaluated natural nanoparticles as therapeutic strategies in treating cancer, cardiovascular disease, kidney disease, neurodegenerative disease and so on. Moreover, exosomes are also proposed to be disease biomarkers.

The thematic issue collected reviews from several high reputation experts in exosomes, exploring the current progress of exosomes in pre-clinical and clinical usage in sepsis, fibrotic diseases, Parkinson’s disease, musculoskeletal diseases and bone disease.

Dr. Kluszczyńska K et al. [1] outlined the generation, composition and biological function of exosomes. They also described and evaluated the various methods used for the isolation of small vesicles, and give the assessment of advantage and disadvantage of various methods. Then, the authors also compared the quality of exosomes based on different protocols.

Park EJ et al. [2] analyzed the role of exosomes in sepsis, which mediates communications between homeostasis and multiple organ failure. In particular, exosomes could act as nanocarriers for drug delivery in the treatment of patients with sepsis or inflammatory tissue injury.

Furthermore, Li M et al. [3] described that exosomes could carry the profibrotic signals involved in the pathogenesis of fibrotic diseases. Moreover, serving as the potential biomarkers, exosomes might be initially used for the treatment of fibrotic diseases.

In addition, Longoni B et al. [4] outlined the function of exosomes in the pathogenesis of Parkinson’s disease, providing the potential application of exosomes as biomarkers or drug delivery in Parkinson’s disease.

Besides, Tu C et al. [5] summarized the recent progress of exosome-derived from ncRNA in the musculoskeletal diseases including osteoarthritis, rheumatoid arthritis, osteoporosis, muscular dystrophies, osteosarcoma, and other diseases.

Finally, Shan SK et al. [6] summarized the pathophysiological mechanism, clinical significance, and therapeutic effects of exosomes in bone metabolism.

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REFERENCES


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