

The Therapeutic Potential of Mesenchymal Stem Cell-Derived Exosomes in Treatment of Neurodegenerative Diseases

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Neurologic complications are commonly regarded as irreversible impairments that stem from limited potential of regeneration of the central nervous system (CNS). On the other side, the regenerative potential of stem cells has been evaluated in basic research, as well as in preclinical studies.

Mesenchymal stem cells (MSCs) have been regarded as candidate cell sources for therapeutic purposes of various neurological disorders, because of their self-renewal ability, plasticity in differentiation, neurotrophic characteristics, and immunomodulatory properties. Exosomes are extracellular vesicles which can deliver biological information over long distances and thereby influencing normal and abnormal processes in cells and tissues. The therapeutic capacity of exosomes relies on the type of cell, as well as on the physiological condition of a given cell.

Therefore, based on tissue type and physiological condition of CNS, exosomes may function as contributors or suppressors of pathological conditions in this tissue. When it comes to the therapeutic viewpoint, the most promising cellular source of exosomes is considered to be MSCs. The aim of this review article is to discuss the current knowledge around the potential of stem cells and MSC-derived exosomes in the treatment of neurodegenerative diseases. © 2019, Springer

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Central nervous system

Exosome

Neurodegenerative diseases

Neuroprotection

Regeneration

Stem cell

biogenesis

blood brain barrier

cell interaction

cell manipulation

cell regeneration

degenerative disease

exosome

human

mesenchymal stem cell

mesenchymal stem cell transplantation

nerve cell

nervous system inflammation

neuroprotection

nonhuman

Review

signal transduction

animal

degenerative disease

exosome

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Neurodegenerative Diseases