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The inspection of exosomes for targeting and treating neurodegenerative diseases

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We are currently living in the era of excessive RNA research which has proven to be effective in certain scientific venues. The versatility of this genetic molecule makes it largely applicable in various useful strategies but the dynamicity that it holds, accounts for its short lifespan and brief activity, if not preserved appropriately. This is where exosomes come into the picture; represented as extracellular vesicles with suitable carrier affinities. Exosomes were once considered as cellular waste, but now exosomes with their bilipid layer construction provide a comfortable internal medium for specific items. Their nanometric diameter allows them a considerable range of entrance in places where other materials are unable to enter, catapulting them to the peak of interest for many researchers. The presence of various RNA types in these vesicles, such as messenger RNAs (mRNA), microRNAs (miRNA) and small interfering RNAs (siRNA) act as potential identifiers for neurodegenerative activity. It also acts as a therapeutic weapon for the same. As per certain study references, the abundance of miRNAs in the exosomal space has a role in cell intercommunication. They find their usage in comparing and contrasting diseases with similar clinical manifestations, such as Alzheimer’s disease and Parkinson’s disease. They are also capable of modifying gene expression in the aforementioned diseases. All this was achieved with the proper and timely delivery by exosomes. The high affinity of exosomes is given importance due to their advantages like impeccable safety as they don’t proliferate uncontrollably and their aptitude to penetrate the blood-brain barrier and deliver genetic material to the specific target cells. In addition, they do not trigger an immune response and cause disturbance to the body’s homeostasis. Their nucleic material containing medium helps them to not be degraded without fulfilling their purpose. In an ideal prism, exosomes disclose useful tactics as biomarkers for neurodegenerative disease detection and act as fine therapeutic transporters with high specificity. Further studies to tackle technical limitations, such as miRNA purification and extraction will definitely prove helpful. Thus, the carrier practicality of exosomes is a venue that continues to raise interest amongst the scientific community.

Keywords: Exosomes, RNA, microRNA, Biomarker, Neurodegeneration

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