O2 - Enfermedades humanas

# Therapeutic potential of neural stem cell-derived small extracellular vesicles in Parkinson's Disease

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Parkinson's disease (PD) is a progressive neurodegenerative disorder characterized by both motor and non-motor symptoms, caused by the degeneration and loss of dopaminergic neurons in the substantia nigra. Current therapies are limited to symptom management, unable to prevent neuronal loss or halt the progression of the disease. A significant limitation to more effective treatments is the difficulty of crossing the blood-brain barrier. Extracellular vesicles (EVs) communication plays a crucial role in several physiological processes within the nervous system. Given the rising prevalence of PD, the need for therapies that prevent neuronal death and promote cell survival is urgent. This study explores the potential of neural stem cell-derived small extracellular vesicles (NSC-EVs) using *in vitro* and *in vivo* models of PD. Our findings demonstrate that *in vitro*, EVs purified from primary cultures of NSCs of mice, significantly enhance the survival of dopaminergic neurons by reducing apoptosis and showing strong neuroprotective effects. Notably, the extracellular vesicles used in this study are enriched with Catalase, a potent scavenger protein with antioxidant properties. This enrichment further strengthens their neuroprotective capacity, enabling them to mitigate oxidative stress and protect vulnerable neurons. The use of such naturally enriched extracellular vesicles represents a promising approach for developing innovative therapies to effectively combat Parkinson's disease.

Palabras clave: SMALL EXTRACELLULAR VESICLES - PARKINSON'S DISEASE