Abstract Information

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Title :	Targeting Ion Channels in Parkinson's Disease: Insights from iPSC-Derived Dopaminergic Neurons

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Abstract :

Title: Targeting Ion Channels in Parkinson's Disease: Insights from iPSC-Derived Dopaminergic Neurons

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Abstract:

Parkinson?s Disease (PD) is a widespread neurodegenerative disorder affecting over 10 million individuals worldwide, leading to significant disability. Current treatments alleviate symptoms but do not address disease progression or target underlying mechanisms like protein misfolding. Indeed, a hallmark of PD is the accumulation of ?-synuclein (?-syn) aggregates and Lewy bodies, which contribute to neuronal dysfunction and degeneration,

highlighting ?-syn as a key therapeutic target. Building on evidence suggesting the toxic nature of extracellular ?-syn aggregates binding to cell surface receptors, this study explores the role of ion channels, specifically the potassium channel Kv1.3, in the formation of pathological ?-syn aggregates. Kv1.3 is upregulated in experimental PD models and post-mortem PD brain tissue, making it a promising therapeutic target. We investigated the impact of a selective Kv1.3 blocker, the chemical compound PAP-1, on ?-syn aggregation. Utilizing a novel PD cell model with light-induced ?-syn aggregation, we demonstrated, via confocal microscopy, that these compounds significantly reduced ?-syn aggregates in both neuron-like N2A cells and induced pluripotent stem cell (iPSC)-derived dopaminergic neurons (iDA). Although additional studies are needed to confirm these results, our findings highlight Kv1.3 blockade as a potential strategy for targeting ?-syn aggregation in PD. This approach may pave the way for novel therapies that address the underlying pathology of PD and improve patient outcomes.

Keywords: Parkinson?s Disease, ?-synuclein, protein aggregation, ion channels, iPSC-Derived Dopaminergic Neurons.