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DCF1, a gene that could potentially treat Parkinson's disease

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Parkinson's disease (PD) is a common neurodegenerative disease associated with the progressive loss of dopaminergic neurons in the substantia nigra. Proteinaceous depositions of alpha-synuclein (α-syn) and its mutations, A30P and A53T, are one important characteristic of PD. However, little is known about their aggregation and degradation mechanisms. Dendritic cell factor 1 (DCF1) is a membrane protein that plays important roles in nerve development in mouse. In this study, we aimed to show that DCF1 overexpression in a PD Drosophila model significantly ameliorates impaired locomotor behavior in third instar larvae and normalizes neuromuscular junction growth. Furthermore, climbing ability also significantly increased in adult PD Drosophila. More importantly, the lifespan dramatically extended by an average of approximately 23%, and surprisingly, DCF1 could prevent α-syn-induced dopaminergic neuron loss by aggregating α-syn in the dorsomedial region of Drosophila. Mechanistically, we confirmed that DCF1 could degrade α-syn both in vivo and in vitro. Our findings revealed an important role of DCF1 in PD process and may provide new potential strategies for developing drugs to treat neurodegenerative diseases.

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