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Exploring the focal role of LRRK2 kinase in Parkinson's disease

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Abstract

The major breakthroughs in our knowledge of how biology plays a role in Parkinson's disease (PD) have opened up fresh avenues designed to know the pathogenesis of disease and identify possible therapeutic targets. Mitochondrial abnormal functioning is a key cellular feature in the pathogenesis of PD. An enzyme, leucine-rich repeat kinase 2 (LRRK2), involved in both the idiopathic and familial PD risk, is a therapeutic target. LRRK2 has a link to the endolysosomal activity. Enhanced activity of the LRRK2 kinase, endolysosomal abnormalities and aggregation of autophagic vesicles with imperfectly depleted substrates, such as α-synuclein, are all seen in the substantia nigra dopaminergic neurons in PD. Despite the fact that LRRK2 is involved in endolysosomal and autophagic activity, it is undefined if inhibiting LRRK2 kinase activity will prevent endolysosomal dysfunction or minimise the degeneration of dopaminergic neurons. The inhibitor's capability of LRRK2 kinase to inhibit endolysosomal and neuropathological alterations in human PD indicates that LRRK2 inhibitors could have significant therapeutic usefulness in PD. G2019S is perhaps the maximum common mutation in PD subjects. Even though LRRK2's well-defined structure has still not been established, numerous LRRK2 inhibitors have been discovered. This review summarises the role of LRRK2 kinase in Parkinson's disease.