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Oral Sessions

Midnolin promotes neurite outgrowth and expression of parkin ubiquitin ligase, and is associated with Parkinson's Disease.

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Parkinson's Disease (PD) is one of the most common neurodegenerative diseases, resulting from degeneration of dopaminergic neurons in substantia nigra. Although more than twenty causative genes have been identified to date, the majority is sporadic and the detailed pathological mechanism remains unclear. We identified a novel PD-associated gene, *Midnolin* (*MIDN*) by Yamagata cohort study. The copy number of *MIDN* was reduced in 10.5% of patients with sPD, whereas no copy number variation was found in healthy people. Therefore, we examined the pathophysiological roles of *MIDN* in this study. NGF caused gene expression of *MIDN* in a time- and concentration-dependent manner in PC12 cells. NGF-induced neurite outgrowth was completely inhibited in PC12 cells where *MIDN* gene was knocked out by genome-editing. Furthermore, we found that mRNA and protein expression of parkin E3 ubiquitin ligase was inhibited by *MIDN* knockout or siRNA targeting *MIDN* in PC12 cells and SH-SY5Y cells. These results suggest that the loss of *MIDN* gene causes inhibition of neurite outgrowth and parkin expression, which may result in the onset of PD.