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Effectiveness of Magnesium for Prevention of Death of Dopaminergic Neurons in the Substantia Nigra in Parkinson Disease Mice Model

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Summary

Parkinson disease (PD) is a neurodegenerative disease occurring in middle-aged and aged humans characterized by clinical symptoms including tremor and festination, and by neuropathological features involving the appearance of Lewy bodies in the substantia nigra and substantia innominata. After establishment of the disease as an entity, it has been clarified that dopaminergic neurons in the ventral tegmental area, noradrenergic neurons in the locus coeruleus and motor vagal nucleus, serotonergic neurons in the dorsal raphe nucleus, and neurons in the sympathetic ganglia and visceral autonomic nervous system are involved in the disease, showing neuronal loss and presence of Lewy bodies. For treatment of the disease, there have been no effective means to prevent the death of neurons in PD.

The present study was propelled based on the following studies preceded by the authors: 1. a significant loss of dopaminergic neurons was observed exclusively in the substantia nigra of 1-year-old rats after exposure to low Mg intake over generations (*Oyanagi et al., 2006*), and 2. effectiveness of Mg administration in a rat PD model involving culture of ventral mesencephalic-striatal cells with 1-methyl-4-phenylpyridinium (MPP^+) was elucidated (*Hashimoto, Oyanagi, et al., 2008*).

This is the first report to document a significant and striking effectiveness of Magnesium (Mg) in prevention of death of dopaminergic neurons in the substantia nigra in a PD mice model using MPTP (1-methyl-4-phenyl-1,2,3,6-tetrahydropyridine).