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N-palmitoylethanolamide Prevents Parkinsonian Phenotypes in Aged Mice

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Abstract

Parkinson's disease (PD) is a neurodegenerative disease characterized by degeneration of dopaminergic neurons. Aging is a major risk factor for idiopathic PD. Several prior studies examined the neuroprotective effects of palmitoylethanolamide (PEA), alone or combined with antioxidants, in a model of PD induced by the dopaminergic toxin 1-methyl-4-phenyl-1,2,3,6-tetrahydropyridine (MPTP). Here, we analyzed the pretreatment effect of micronized PEA (PEAm) on neuroinflammation and neuronal cell death in the MPTP model. Male CD mice (21 months of age) were pre-treated for 60 days with PEAm. After this time, they received four intraperitoneal injections of MPTP over a 24-h period and were killed 7 days later. On the 8th day, brains were processed. Pretreatment with PEAm ameliorated behavioral deficits and the reductions in expression of tyrosine hydroxylase and dopamine transporter, while blunting the upregulation of α-synuclein and β3-tubulin in the substantia nigra after MPTP induction. Moreover, PEAm reduced proinflammatory cytokine expression and showed a pro-neurogenic effect in hippocampus. These findings propose this strategy as a valid approach to prevent neurodegenerative diseases associated with old age.

Keywords: Age; Mice; Neuroinflammation; Palmitoylethanolamide; Parkinson's disease.

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