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To Study Changes in Huntington Disease by Manipulating Gut Microbiota in Animal Model

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Abstract: *Huntington's Disease (HD) is a progressive neurodegenerative disorder characterized by motor, cognitive, and psychiatric disturbances. Emerging evidence suggests a role for the gut-brain axis in neurodegenerative diseases, including HD. This study investigated the potential of manipulating gut microbiota using probiotic endophytes isolated from Citrus aurantifolia to alleviate Huntington's-like symptoms in a 3-nitropropionic acid (3-NP) induced rat model. Rats were divided into four groups: vehicle control, 3-NP-induced HD (negative control), 3-NP-induced HD treated with Lactobacillus endophytes, and 3-NP-induced HD treated with Tetrabenazine (standard). Behavioral assessments using the Elevated Plus Maze, Morris Water Maze, and Rota-Rod apparatus were conducted at baseline, day 21, and day 42 post-3-NP induction. Histopathological analysis of brain tissue was performed at the end of the study. The 3-NP group exhibited significant anxiety-like behavior, impaired learning and memory, and motor dysfunction, along with neuronal degeneration in the brain. Treatment with Lactobacillus endophytes significantly improved these behavioral deficits and reduced neuronal damage, showing comparable or, in some aspects, superior effects to Tetrabenazine. These findings suggest that manipulating gut microbiota with probiotic endophytes holds promise as a therapeutic strategy for managing Huntington's Disease.*

Keywords: Huntington's Disease, Gut Microbiota, Probiotic Endophytes, *Citrus aurantifolia*, Animal Model, 3-Nitropropionic Acid, Behavioral Studies, Histopathology

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