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Psychobiotic PS128 rescued motor deficits in MPTP-induced mice model

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Parkinson's disease (PD) is a common neurodegeneration disease caused by dopaminergic neuron degeneration in brain. The dopamine signaling collapsed and resulted in motor deficits like shaking, difficulty with walking and gait in PD patients. Recent studies have revealed that gut microbiota influence neurodevelopment, modulate behavior, and contribute to neurological disorders through microbiome-gut-brain axis (MGBA). Certain probiotics strain, or psychobiotics, even showed unique psychotropic effects in many animal studies and clinical trials. Lately, we found a special psychobiotic *Lactobacillus plantarum* PS128 which improved dopamine transmission in brain specific regions and modulated behaviors in different mice models, raising the possibility that that PS128 might show beneficial effect on host's CNS dopamine system through MGBA. In this study, we used 1-methyl-4-phenyl-1,2,3,6-tetrahydropyridine (MPTP) to establish a PD-like mice model to investigate whether PS128 also show neuroprotective effect on host's CNS dopamine system. PS128 was orally administered to mice for 4 weeks before 5-day MPTP injection. We found PS128 significantly improved the pole test, narrow beam test, and rotarod test performance, indicating that it rescued MPTP-induced motor deficits. Further brain tissue analyses showed that PS128 prevented MPTP-induced dopaminergic neuron loss in substantia nigra and rescued dopamine and noradrenaline total level in striatum. In conclusion, PS128 could prevent MPTP-induced motor deficits, dopaminergic neuron loss, and neurotransmitter signaling collapse. PS128 might show neuroprotective potential on host's CNS dopamine system leading to clinical application for treating and preventing PD or other dopamine-related neuropsychiatric disorders. Psychobiotic PS128: start with mental health, step forward to brain health.



Figure 1: The proposed pathways of Parkinson's disease (PD) & PD-like animal models and the possible mechanisms of PS128 neuroprotective effects on host's CNS dopamine system.

Biography

Ying-Chieh Tsai is a Professor at the Institute of Biochemistry and Molecular Biology at National Yang-Ming University since 1983 (Chairman of this Institute from 1997 to 2002). He received a BS from National Taiwan University and an MS & PhD in Microbiology from Tokyo University. He started his research career with structural & functional studies of industrial enzymes, scientific aromatherapy, and functional studies of essential oils from Chinese herbs. Since 2000, he started showing great interest in probiotics field and founded the Taiwan Association of Lactic Acid Bacteria where he served as President until 2007. He served concurrently as Vice-President of the Asian Federation of Societies for Lactic Acid Bacteria, after which he served as President until 2009. Currently, he specializes in psychobiotics and conducts ground-breaking research on the microbiota-gut brain axis where he explores its commercial and health benefits.

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