

Microbiota-Gut-Brain Axis and Psychobiotics: *Lactobacillus plantarum* PS128 as an example

Ying-Chieh Tsai

Institute of Biochemistry and Molecular Biology, National Yang-Ming University, Taiwan

E-mail: tsaiyc@ym.edu.tw

Abstract

Recent advances in research indicate that gut microbiota influence the brain development and behavior of the host through the gut–brain axis, a bidirectional communication system that integrates neural, hormonal, and immunological signaling between the gut and the brain. This extended communication system, or “microbiota-gut-brain axis” may be modulated by a class of probiotics called psychobiotics to treat a broad spectrum of complex central nervous system diseases. In this study, a potential psychobiotic, *Lactobacillus plantarum* PS128, was identified and found to increase locomotor activity, normalize depression-like behaviors and altered brain neurotransmitter levels when orally administered to early life-stressed mice. Similar effects of PS128 on specific-pathogen-free and germ-free mice were observed. Furthermore, in a rat model of IBS, PS128 administration significantly reduced the 5-HTP-induced visceral hypersensitivity, and alleviated the problem of alteration of the stress-related neuromodulator repertoire, including SP, BDNF, CGRP and NGF in dorsal root ganglia and the spinal cord, dopamine and serotonin in the prefrontal cortex, glucocorticoid receptor and mineralocorticoid receptor in the amygdala, and corticosterone in the serum. As such, the above results suggest that PS128 could be a potent alternative for neuropsychiatric disorder.

Biography

Ying-Chieh Tsai obtained his Ph. D at the Tokyo University, Japan in 1982. He is interested in various research areas including probiotics, gut-brain-axis, microbe-host interactions, and Chinese herb aromatherapy. Ying-Chieh Tsai is currently the professor of the Institute of Biochemistry and Molecular Biology and the direct of probiotic research center of National Yang-Ming University, and the fellow of the Asian Federation of Societies for Lactic Acid Bacteria.