

Administration of Lactobacillus plantarum PS128 Improves Animal Behavior and Monoamine Neurotransmission in Germ-Free Mice

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Abstract : Intestinal microflora play an important role in communication along the gut-brain axis. Probiotics, defined as live bacteria or bacterial products, confer a significant health benefit to the host. Here we administered Lactobacillus plantarum PS128 (PS128) to the germ-free (GF) mouse to investigate the impact of the gut-brain axis on emotional behavior. Administration of live PS128 significantly increased the total distance traveled in the open field test; it decreased the time spent in the closed arm and increased the time spent and total entries into the open arm in the elevated plus maze. In contrast, heat-killed PS128 caused no significant changes in the GF mice. Treatment with live PS128 significantly increased levels of both serotonin and dopamine in the striatum, but not in the prefrontal cortex or hippocampus. However, live PS128 did not alter pro- or anti-inflammatory cytokine production by mitogen-stimulated splenocytes. The above data indicate that the normalization of emotional behavior correlated with monoamine neurotransmission, but not with immune activity. Our findings suggest that daily intake of the probiotic PS128 could ameliorate neuropsychiatric disorders such as anxiety and excessive psychological stress.

Keywords : dopamine, hypothalamic-pituitary-adrenal axis, intestinal microflora, serotonin

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