

KEYNOTE SPEAKER

Prevention of the infectious and autoimmune diseases by lactic acid bacteria

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Abstract

We study the beneficial effects of lactic acid bacteria on the prevention of infectious diseases and autoimmune diseases. Recently, we found that oral administration of *Lactobacillus gasseri* SBT2055 (LG2055), a probiotic lactic acid bacterium protected mice from the infection of influenza A virus. Virus titer and the amount of produced IL-6 in the lung tissue were significantly decreased by LG2055 administration. In addition, expression of Mx1 and Oas1a genes, critical for the viral clearance in the lung tissues was increased by LG2055. Furthermore, we found LG2055 induced IgA production by increasing the IgA(+) cell population in Peyer's patch and lamina propria of the mouse small intestine. By *in vitro* assay, LG2055 stimulated bone marrow-derived dendritic cells to promote the production of TGF- β , BAFF, IL-6, and IL-10, all critical for IgA production from B cells. Taken together, LG2055 is effective for prevention of influenza by inhibition of viral replication and also enhances IgA production in the intestine to eliminate pathogens or bacteria that preferentially drive intestinal diseases and to control the balance of bacterial communities required for intestinal homeostasis. In addition, we demonstrated that feeding with LG2055 is effective to extend lifespan in *C. elegans* by a strengthening of the resistance to oxidative stress and by stimulating the innate immune response signaling including p38MAPK signaling pathway.

On the other hand, *Lactobacillus helveticus* SBT2171 (LH2171) inhibited proliferation of LPS-stimulated mouse T and B cells, and human T and B cell lines, Jurkat and BJAB. Phosphorylation of JNK or c-Jun, expression of CDC2 and G2/M phase cell cycle progression were inhibited by LH2171 in BJAB cells. LH2171 might inhibit the aberrant proliferation of lymphocytes, characteristic of autoimmune diseases. In fact, intraperitoneal administration of LH2171 strongly alleviated symptoms of collagen-induced arthritis in mice.

Biography

Tadaaki Miyazaki completed his Ph. D. from Medical Department, Institute of Molecular and Cellular Biology, Osaka University. He is currently a Professor in the Department of Probiotics Immunology, Institute for Genetic Medicine, Hokkaido University.