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What is Probiotics?

Tetsuya Mine*

Division of Gastroenterology and Hepatology, Department of Internal Medicine, University of Tokai School of Medicine, Japan

***Corresponding author:** Tetsuya Mine, Division of Gastroenterology and Hepatology, Department of Internal Medicine, University of Tokai School of Medicine, Japan, Tel: +81 3-3467-2211; E-mail: mine.tetsuya@gmail.com

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Introduction

The intestinal tract consists of vast microbes and host environment including metabolism and immunology, which is good for health. If these factors are dramatically changed, it is capable that some kinds of diseases can develop and suffered host may be fatal. Injury to intestinal epithelial barrier function and innate immune bacterial killing function, due to uptake of vast food containing much bacteria and risky antigens, can lead hosts to develop fatal inflammatory responses.

There are three ways by which the intestinal microflora can be changed. One is administration of antibiotics, second is prebiotics (dietary components that promote the growth and metabolic activity of beneficial bacteria), and third is probiotics (beneficial bacteria) or fecal transplant (bacteriotherapy).

What is Probiotics?

General definition is as follows: Probiotics is a term of microorganisms that have beneficial properties for the host. Products are derived from foods, especially, cultured milk products. Such microorganisms for probiotics are increased and extended: strains of *Lactobacillus* and *Bifidobacterium* and nonpathogenic strain of *Escherichia coli*,*Clostridium butyricum.*

Mechanism to Induce Benefits of Probiotics

Mechanisms to induce benefits of probiotics are inadequately understood. However, in checking literatures, several mechanisms have been elucidated.

First, probiotics suppress the growth or epithelial binding/invasion by pathogenic bacteria. Second, probiotics improve and reinforce intestinal barrier function. Probiotics can modulate the immune system. Several probiotic species or their products induce protective cytokines, including IL-10 and TGF-beta, and suppress proinflammatory cytokines, such as TNF, in the mucosa of patients with pouchitis, ulcerative colitis, and Crohn's disease, in murine experimental colitis, and in isolated splenocytes. *Saccharomyces boulardii* limited the migration of helper T cells in inflamed colon tissue in mouse model of inflammatory bowel disease. Probiotics can modulate pain perception. *Lactobacillus* strains appear to induce expression of microopioid and cannabinoid receptors in intestinal epithelial cells and mediate analgesic functions in the gut in a similar manner to the effects of **morphine**.

Probiotics containing bacteria can secrete immunomodulators (such as interleukin 10, trefoil factors or defensins, altered surface protein such as lipoteichoic acid).

Interesting Observations Concerning Function of Probiotics

An interesting observation indicates that it may not be necessary to administer live organisms to achieve beneficial results. Secreted proteins and DNA of one probiotics except live organisms blocked cytokine activation and prevented apoptosis of epithelial cells. The effects depend upon the specific DNA from the different bacterial species that were components of the preparation. Furthermore, Non-methylated DNA as well as other randomly *selected E. coli* strains suppress experimental colitis in several animal models. These therapeutic effects are mediated through toll-like receptor 9 and with induction of type 1 interferons α/β. Defined molecular weight proteins from other probiotic species, including *Lactobacillus* GG, can also inhibit proinflammatory signalling and inflammatory cytokine-induced apoptosis in colonic epithelial cells, while secreted products from a variety of species can inhibit cytokine production. Some studies demonstrated that products of endogenous commensal microbiota can have beneficial effects, creating opportunities for therapeutic manipulation beyond the traditional *Lactobacillus* and *Bifidobacterium* species. For example, *Faecalibacterium prausnitzii*, which is decreased in Crohn's disease, secretes yet to be defined products that suppress experimental colitis and proinflammatory cytokines, and polysaccharide A of *Bacteroides fragilis* stimulates regulatory T cells in a TLR2, IL-10-dependent manner. *Clostridium* species comprising Groups IV and XIVA, which are selectively decreased in active IBD patients, can induce IL-10 producing immunosuppressive IL-10. This approach will likely be available for therapeutic use in the near future.