

Editorial

Probiotics

Probiotics are live microorganisms thought to be beneficial to the host organism. According to the currently adopted definition by FAO/WHO, Probiotics are: "Live microorganisms which when administered in adequate amounts confer a health benefit on the host". Lactic acid bacteria (LAB) and bifidobacteria are the most common types of microbes used as Probiotics; but certain yeasts and bacilli may also be helpful. Probiotics are commonly consumed as part of fermented foods with specially added active live cultures; such as in yogurt, soy yogurt, or as dietary supplements.

At the start of the 20th century, Probiotics were thought to beneficially affect the host by improving its intestinal microbial balance, thus inhibiting pathogens and toxin producing bacteria. Today, specific health effects are being investigated and documented including alleviation of chronic intestinal inflammatory diseases, prevention and treatment of pathogen-induced diarrhea, urogenital infections, and atopic diseases.

The original observation of the positive role played by certain bacteria was first introduced by Russian scientist and Nobel laureate Élie Metchnikoff, who in the beginning of the 20th century suggested that it would be possible to modify the gut flora and to replace harmful microbes with useful microbes. Metchnikoff, at that time a professor at the Pasteur Institute in Paris, produced the notion that the aging process results from the activity of putrefactive (proteolytic) microbes producing toxic substances in the large bowel. Proteolytic bacteria such as clostridia, which are part of the normal gut flora, produce toxic

substances including phenols, indols and ammonia from the digestion of proteins. According to Metchnikoff these compounds were responsible for what he called "intestinal auto-intoxication", which caused the physical changes associated with old age. It was at that time known that milk fermented with lactic-acid bacteria inhibits the growth of proteolytic bacteria because of the low pH produced by the fermentation of lactose. Metchnikoff had also observed that certain rural populations in Europe, for example in Bulgaria and the Russian steppes that who lived largely on milk fermented by lactic-acid bacteria were exceptionally long lived. Based on these facts, Metchnikoff proposed that consumption of fermented milk would "seed" the intestine with harmless lactic-acid bacteria and decrease the intestinal pH and that this would suppress the growth of proteolytic bacteria. Metchnikoff himself introduced in his diet sour milk fermented with the bacteria he called "Bulgarian Bacillus" and found his health benefited. Friends in Paris soon followed his example and physicians began prescribing the sour milk diet for their patients.

Diarrhea: Some probiotics have been shown in preliminary research to possibly treat various forms of gastroenteritis. They might reduce both the duration of illness and the frequency of stools. Fermented milk products (such as yogurt) also reduce the duration of symptoms. Lactose intolerance: As lactic acid bacteria actively convert lactose into lactic acid, ingestion of certain active strains may help lactose intolerant individuals tolerate more lactose than they would have otherwise.

Colon cancer: In laboratory investigations, some strains of LAB (*Lactobacillus*

bulgaricus) have demonstrated anti-mutagenic effects thought to be due to their ability to bind with heterocyclic amines, which are carcinogenic substances formed in cooked meat.

Cholesterol: Able to lower serum cholesterol levels, presumably by breaking down bile in the gut, thus inhibiting its reabsorption).

Blood pressure: consumption of milk fermented with various strains of LAB may result in modest reductions in blood pressure, an effect possibly related to the ACE inhibitor-like peptides produced during fermentation.

Immune function and infections: improve immune function by increasing the number of IgA-producing plasma cells, increasing or improving phagocytosis as well as increasing the proportion of T lymphocytes and Natural Killer cells. Irritable bowel syndrome and colitis: was found to improve some symptoms of irritable bowel syndrome in women in one study. Another probiotic bacterium, *Lactobacillus plantarum* 299v, was also found to be effective in reducing IBS symptoms. deemed too general for NHCR.

Bifidobacterium longum BB536 does not improve bowel regularity; does not resist cedar pollen allergens; does not decrease pathogens.

Bifidobacterium animalis ssp. *lactis* Bb-12 does not help maintain normal LDL-blood cholesterol; does not decrease pathogens or boost immunity.

Lactobacillus plantarum 299v does not reduce flatulence and bloating or protect DNA, proteins and lipids from oxidative damage.

Lactobacillus rhamnosus LB21 NCIMB 40564 does not help maintain individual intestinal microbiota in subjects receiving antibiotic treatment.

Multi-probiotic: Research is emerging on the potential health benefits of multiple probiotic strains as a health supplement as opposed to a single strain. The human gut is home to some 400-500 types of microbes. It is thought that this diverse environment may benefit from multiple probiotic strains; different strains populate different areas of the digestive tract, and studies are beginning to link different probiotic strains to specific health benefit.

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