Opinion

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# Introduction to Probiotics

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## Opinion

Probiotic is a modern term that means life and is used to describe bacterial associations that have beneficial effects on human and animal health. Metchnikoff first defined probiotics in a scientific way in the early 1990's, describing them as a modification of floral/microbial diversity in human bodies that replaces harmful microbes with beneficial ones. The breakthrough, however, came thanks to the work of Henry Tissier, who discovered that the microbial abundance of a certain form of bacteria in stool samples from contaminated diarrhoea children was slightly lower than in healthy children. His recommendation that patients with diarrhoea (infantile diarrhoea) take live microbes (*bifidobacteria*) orally to help restore a stable intestinal flora was a first of its type. Havenaar and Huisint Veld proposed the current concept of probiotic as a viable mono or mixed culture of bacteria that, when introduced to an animal or a human, benefits the host by enhancing the properties of the native flora.

Following some setbacks, probiotic science has advanced significantly in the last two decades, with notable advancements in the collection and classification of various probiotic cultures, as well as significant health benefits when consumed. Understanding the importance of gut flora in human wellbeing, as well as the probiotic food principle, requires an evolutionary perspective. In the Gastrointestinal Tract (GIT), each individual has a distinctive signature of more than 100-1000 microbial organisms. Bacterial cells make up half of the wet weight of colonic products, and their numbers outnumber the number of tissue cells in the human body by a factor of ten. The stomach normally contains $10^3$ distinct bacterial species, and the colon's overall microbial population is about $10^{11}$-$10^{12}$ cfu/g. When newborns are first exposed to a non-sterile environment, bacterial invasion of the gut begins. It now changes and transitions over the course of a person's life, based on a nuanced and diverse interplay between the host's diet, genome, and environment, as well as antibiotic usage. In people over 60 years old, there is a reduction in the Bacteroidetes/*Firmicutes* ratio and a significant drop in *bifidobacteria*, which coincides with the onset of immune system decline. The structure of the central intestinal microflora, on the other hand, is thought to be essentially constant during adulthood.

The advantageous use of intestinal microflora, also known as colonization resistance or the barrier effect is a key mechanism through which indigenous (autochthonous) gut bacteria sustain their existence and impart niche defence against newly ingested microorganisms, such as pathogens. As a result, manipulating the intestinal microflora to increase the relative numbers of beneficial bacteria, which has many effects on immune function, absorption, metabolism, and brain-gut connectivity, may be believed. Because of the advent of antibiotic-resistant and tolerant pathogenic microbes, any changes in their diversity which results in a variety of disorders and diseases for which traditional medicines have very limited efficacy. Attempts to address this important problem by the medication distribution to target locations using nano-encapsulated multiplex supplements have been identified as a potential alternative, but such methods do not seem to be cost-effective or convenient for everyday use. As a result, in the modern age, finding an easy, low-cost, receptive, and intrinsic way to improve host wellbeing has become a critical concern. Probiotics act as a complement to the host microflora and offer immunity against a variety of enteric pathogens in this sense. Probiotics have also been shown to have positive benefits, such as increased intestinal barrier control, as well as the potential to compete with pathogenic microbiota for gut adhesion and colonization.

Probiotics also activate particular genes in localised host cells, which induce, modulate, and control the immune response of the host. As part of the gut-brain axis, they also modulate gastrointestinal hormone release and control brain activity through bidirectional neuronal signaling. Probiotics play an important role in inducing intestinal angiogenesis by Vascular Endothelial Growth Factor Receptor (VEGFR) signaling, which controls acute and chronic inflammation in the intestinal mucosa caused by Inflammatory Bowel Disease (IBD) progression. Probiotics have physiological roles that contribute to the host environment's wellbeing by controlling microbes and are also beneficial in the fight against obesity and overweight. While probiotics have a lot of promise in nutritional and clinical applications, more research is needed before they can be used to improve human health, diet, and the control of various abnormalities.