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Image Article

Effect of Probiotics on Gut Microbiota

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COMMENTARY

The term microbiome is defined as the overall amount of microbial genes harbored by the microbiota that is the microbes inhabiting the human intestinal tract [1]. The human gut is composed of trillions of microbes interacting with the host.

The gut microbiota provides various useful properties such as the fermentation of non-digestible substrates like dietary fibres and endogenous intestinal mucus which in turn supports the growth of specialist microbes that produce Short Chain Fatty Acids (SCFAs) such as acetate, propionate, and butyrate and gases [2,3].

Studies have shown that changes in the gut microbiota can occur within days of changing diet; African Americans and rural Africans upon switching their diets for only two weeks showed remarkable differences [4]. Similar results were obtained in another study comparing extreme shifts between plant and animal protein based diets after only five days [5]. But healthy microbiota are resilient to temporal changes by dietary interventions, meaning that homeostatic reactions restore the original community composition, as recently shown in the case of bread [6].

Probiotics are live micro-organisms that, when administered in adequate amounts, confer a health benefit on the host [2]. Currently the main groups of probiotic bacteria used for human nourishments or supplements and/or animal feed or are *Lactobacilli, Streptococci*, and *Bifidobacteria* [7].

Probiotics is improve the human health by influencing the resident microbiota, either by briefly supplanting a missing aspect of the resident microbiota, or by enhancing the endogenous populace, or by animating (part of) the resident microbiota [7]. Certain probiotic strains which secrete antibiotic-like factors help to prevent the growth of potential competitors. Probiotic micro-organisms can also prevent growth of exogenous microbes and lower substrate availability for pathogens by efficiently using the niche and available sources of energy in the digestive tract to grow. The use of antibiotics is known to have long-term effects on the intestinal microbiota composition and thereby on health, thus probiotics are given in parallel with the antibiotics as certain studies that they lower the distortion of the gut microbiota [8-11].

Other potential beneficial functions of the probiotics include their ability to modulate the effect of the gut microbiota on the local immune and inflammatory systems, down-regulating over-stimulated inflammatory and/or immune responses either directly or indirectly [12,13]. A few probiotics can change the enzymatic exercises of the gut microbiota: for example the nitrogen digestion as reflected by urinary concentration of p-cresol, or the glucosidases, or the bile salt hydrolases, or azoreductase [14].

The cross-talk between the intestinal microbiota (that is an integral part of us) and host leads to life-long epigenetic programming. Along these lines, manipulating the microbiota, either by prebiotics, probiotics or fecal microbial transplantation, seems rational for the prevention and treatment of disease [7].

Probiotics due to their preventive and therapeutic measures have been proposed to restore the healthy composition and function of the gut microbiome. However, data from human microbiome studies may lead to identification of novel indigenous microbial species and tools to positively induce alterations in the gut microbial communities [15].

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