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## REVIEW

# Role of Probiotics in health improvement, infection control and disease treatment and management



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**Abstract** Research which concerns the usefulness of Probiotics show increasing interest based on the rise of their publications, products and the awareness of the public of their benefits. There is increasing interest concerning Probiotics from the public, researchers, governmental organizations (such as the WHO/FAO) and medicinal and food companies. Probiotics means “let good microbes work for you in different fields get their benefits and take a rest”. Such work will include, food digestion, production of useful products to destroy the bad microbes, complement the functions of the missed digestive enzymes (due to missed or defective genes), and to maintain the digestive system’s pH, and so on. Probiotics will augment the efficiency of our biological fermentors, the digestive system. Many authors have described the history and the progress of Probiotics and their different applications. In this review, we will focus mainly on three points, health improvement, infection control and disease management, which could be eliminated by the use of different types of direct uses of Probiotics or by the use of foods containing Probiotics.

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## 1. Introduction

It became clear that intestinal microflora had metabolic functions, such as fermenting indigestible dietary residues and endogenous mucus, saving of energy, production of vitamin K, and absorption of ions (O'Sullivan et al., 1992). Probiotics have roles in epithelial cell proliferation and differentiation, and the development and the homeostasis of the immune system (Camarota et al., 2009). Probiotics are not an invention but existed in our traditional foods such as beverages, salty fishes, yogurt, different types of cheeses and so on since olden times (Amara, 2012). Such food structures contain different types of useful bacteria. It might be that the first real use of food containing Probiotics was fermented milk (Hosono, 1992). Humans learned that fermented milk has a good taste. Later they learned how to convert it into cheese, yogurt and so on (Metchnikoff and Mitchell, 1910; Metchnikoff, 2004; Amara, 2012). Before the discovery of the microscope, humans knew how to prepare different types of milk products with different tastes and structures (Amara, 2012). This is a result of the action of different microbial reactions induced by different microbes (Bourdichon et al., 2012). The public, globally transfer such information for producing such foods from generation to generation till today. We really did not know the starting point for the first use of food containing Probiotics particularly for medicinal applications. However, by one way or the other Probiotics collectively are a part of the fermented food if the active microbes are useful and able to colonize the digestive system. Fermentation using microbes is known from ancient times. One could see the fungi growing in the food by the naked eye. The public knew how to produce Bakery and alcoholic products from times immemorial. They knew how to maintain the product quality and testing by maintaining a seed culture from the most successful fermentation processes to use in the next process (Amara, 2012). However, scientists were interested to give such honor to Van Leeuwenhoek and Hooke in 1665 (Gest, 2004). For more details about the fermented foods, refer to Bourdichon et al. (2012) and the references within.

It might be that Probiotics have been discovered by the first human who used milk products, or, might be with substances other than milk! such as the other different types of the fermented foods. However, climatic conditions, for sure, favored traditional sour milk or cultured dairy products such as Kefir,

Koumiss, Leben and Dahi as claimed by Hosono (1992). Public distribute stories about the origin of some types of Probiotics and that some have religious origin, such as the origin of Kefir. Amara, 2012, describe some of the Probiotics used by the Pharaonic civilization, which the Egyptians still use nowadays. They include milk, seeds, fish and some other products. However, it might be that Ilya Ilyich Metchnikoff, the Nobel Prize winner in Medicine in 1908, at the Pasteur Institute was the first who spotted the effect of what is called now Probiotic. He linked the health and longevity to the ingestion of bacteria present in yogurt (Metchnikoff and Mitchell, 1910; Metchnikoff, 2004). In 1907, he postulated that bacteria were involved in yogurt fermentation, *Lactobacillus bulgaricus* and *Streptococcus thermophilus*, suppress the putrefactive-type fermentations of the intestinal flora and that consumption of these yogurts was important in maintaining health. He correlated the long life of Bulgarian peasants and their good health to yogurt intake which contained the *Lactobacillus species* and he simplified his conclusions to the public that, Probiotics could do an extra-job by digesting unusual components exactly like what happens in the ruminant animals which eat rough food composed of bulky vegetables. In Japan, in the early 1930s, Shirota succeeded in isolating strains existing in healthy individuals' intestinal bacteria. Such strains are able to survive and to passage through the gut. He has used such strains to develop fermented milk and test such milk effects on patients. He introduced his first products into the market, which have been given the name Shirota (later named *Lactobacillus casei* Shirota). The producer company's name was the Yakult Honsha Company. Probiotics can be defined as living microorganisms administered in an adequate number that continue to exist in the intestinal bionetwork, to perform a health positive effect (Gismondo et al., 1999). Probiotics as a term was first used by Lilly and Stillwell (1965) to describe the 'substances secreted by one microorganism that stimulate the growth of another'. Parker (1974), proposed that Probiotics are 'organisms and substances which contribute to intestinal microbial balance'. Food and Agriculture Organization of the United Nations/World Health Organization (FAO/WHO, 2001) endorsed by the International Scientific Association for Probiotics and Prebiotics (Reid et al., 2003), defined Probiotics as 'Live microorganisms which, when administered in adequate amounts, confer a health benefit on the host'.

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