

## Probiotics vs Prebiotics



The human gut serves as a home to over 100 to 1000 microbial species (George Kerry et al., 2018). According to FAO/WHO (2002), probiotics are defined as live microorganisms which upon ingestion in sufficient concentrations can exert health benefits to the host. They are known as the beneficial bacteria and often being associated predominantly with fermented food products such as yoghurt, cultured buttermilk, cheese and others (Ali & Nizar, 2018). Probiotics must be consumed alive for their benefits. They can be killed by heat, stomach acid, or simply die with time (Pareek & Narsimulu, 2019).

Among the abundant human gastrointestinal microbiota or gut microbiota, the genera *Lactobacillus* and *Bifidobacterium* have reported to be the beneficial probiotic bacterial strains. The health

benefits endorsed to probiotics are improvements of gastrointestinal microflora, enhancement of immune system, reduction of serum cholesterol, cancer prevention, treatment of irritable bowel-associated diarrhoea and antihypertensive effects (Lye et al., 2016).

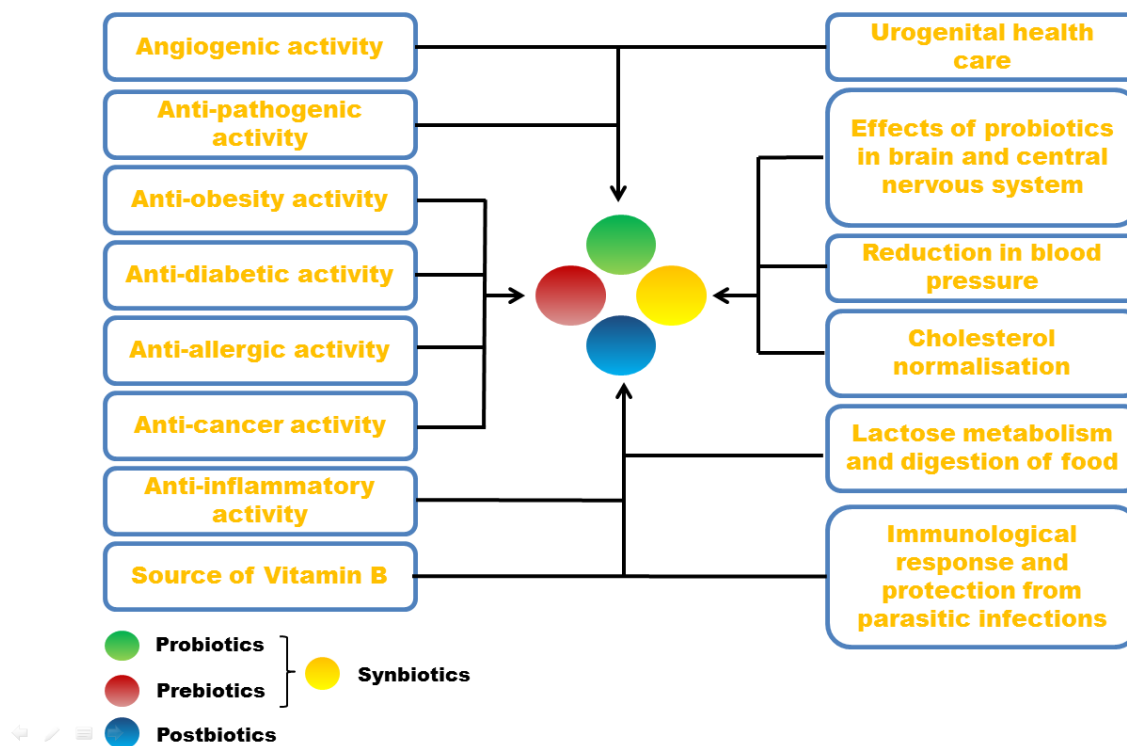
Prebiotics are short chain carbohydrates and non-digestible by human digestive enzymes. They are selectively elevating the activity of some groups of beneficial bacteria (Al-Sheraji et al., 2013). In other words, prebiotics nourish the good bacteria (probiotics) of the large gut in the human body (Pareek & Narsimulu, 2019).

FAO/WHO defines prebiotics as non-viable food components that confer health benefit(s) on the host associated with modulation of the microbiota (Pandey et al., 2015). Prebiotic fibre is non-digestible part of foods and naturally exist in various dietary food products, including asparagus, sugar beet, garlic, chicory, onion, Jerusalem artichoke and many more (Ali & Nizar, 2018). Compared to probiotics, prebiotic fibre is not affected by temperature, acid or time (Pareek & Narsimulu, 2019).

Prebiotics pass by the small intestine to the lower gut and become accessible for probiotic bacteria without being utilised by other intestinal bacteria. Lactulose, galacto-oligosaccharides (GOS), fructo-oligosaccharide (FOS), inulin and its hydrolysates, maltooligosaccharides and resistant starch are prebiotics that are normally used in the human diet (Al-Sheraji et al., 2013). Prebiotics have many other health benefits in the large intestine such as reducing the cancer risk and increasing the calcium and magnesium absorption (Al-Sheraji et al., 2013).

Postbiotics are also a rather new term in the '-biotics' field. They are regarded as non-viable bacterial products or metabolic by-products from probiotic microorganisms that have biologic activity in the host (George Kerry et al., 2018; Wegh et al., 2019). Short-chain fatty acids (SCFAs) are produced during fermentation of prebiotics by gut microbiota which includes lactic acid, butyric acid, and propionic acid. These essential end products are then released into blood circulation. Consequently, it benefits not only the gastrointestinal tracts but also other distant organs (Davani-Davari et al., 2019).

Probiotics are the good bacteria while prebiotics are the good bacteria promoters. They are working in synergy to keep our guts healthy. The advancement in microbial research has led to formation of synbiotics which is a fusion of probiotics and prebiotics products and helps in enhancing the survival and the implantation of live microbial dietary supplements in the gut. The synergistic benefits are more efficiently promoted when both the probiotic and prebiotic work together in the living system (George Kerry et al., 2018).



**Figure 1** Mode of action of probiotics, prebiotics, postbiotics and synbiotics.

(Adopted from: George Kerry et al., 2018)

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