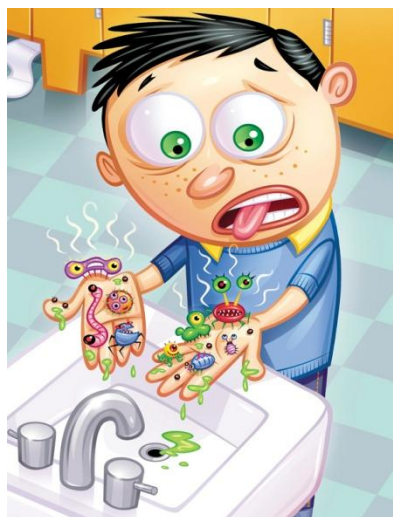


Friendly bacteria, probiotics and prebiotics – allies or fads?

Friendly Bacteria

The term 'friendly bacteria' is used to describe those bacteria that are desirable, as opposed to those that cause problems, in the digestive system (gut). In reality, 99.9% of bacteria are friendly; this information is very welcome when you appreciate that there are some 5×10^{30} bacteria on earth!



Bacteria are just about everywhere in the environment as well as in, and on, us. They live throughout the human gut but the greatest concentrations are in the large intestine (bowel) where up to 1000 species of bacteria, and 10^{15} individual bacteria, can be found.

The good, the bad and the ugly

The friendly gut bacteria are involved in the digestion and absorption of our food, the synthesis of certain vitamins, the digestion of fats and inhibition of harmful bacteria. They stimulate our immune system and improve the health of the lining of the gut. They are definitely all-round good guys; they include lactobacilli and bifidobacteria, plus some Clostridia, some streptococci and some E. coli species.

The harmful bacteria include *Helicobacter pylori* (which can live in the acid conditions that prevail in the stomach), staphylococci, *Clostridia difficile* (known as C. diff), *Clostridia perfringens*, some streptococci and some E. coli species.

That's a whole lot of bacteria with long names! The important aspect of understanding the roles and effects of different species is that we should aim to maintain a healthy balance of bacteria within the gut. This balance can be disturbed by a number of factors including antibiotics, stress, poor diet and living conditions, concurrent diseases and allergic reactions. Probiotics and prebiotics are agents employed in restoring the balance and/or protecting against disruption.

Probiotics

Probiotics are live bacteria that are added to the diet. The concept is simple – to reintroduce or increase the numbers of the friendly bacteria in the gut. The practicalities are less straightforward. The gut is designed to destroy bacteria in our food by subjecting them to a very hostile acid environment in the stomach and then, if any survive, to attack them further with bile and pancreatic secretions as they pass through the small intestine. These friendly bacteria need to be alive when they reach the large intestine in order to colonise successfully.

Lactobacilli and bifidobacteria are the bacteria most commonly employed as probiotics. There is good scientific evidence for the benefits of probiotics but care must be taken to ensure that any preparations that are used really do contain effective numbers of these desirable bacteria.

Prebiotics

Prebiotic is the term given to certain carbohydrates (known as NDO, non-digestible oligosaccharides) that are not digested elsewhere in the gut and which undergo fermentation when they reach the

large intestine. This fermentation is carried out by the friendly bacteria as the prebiotic provides their substrate or 'food'. Prebiotics encourage and support the growth and increase in numbers of friendly bacteria in the gut whilst not supporting growth of undesirable bacteria.

Prebiotics occur naturally and they are components of our diet. Prebiotics are found in human breast milk (a very important source for babies and critical in their development of a healthy gut) and in foods including asparagus, garlic, onion, artichoke, banana, leek and chicory). Manufactured forms of prebiotics are also available, including lactulose, inulin-type (known as fructans or FOS, fructo-oligosaccharides) and GOS (galacto-oligosaccharides). Commercially, inulin which is added to foods is most commonly extracted from chicory.

While there is no broad consensus on an ideal daily serving of prebiotics, recommendations typically range from 4 to 8g for the support of general gut health, and up to 15g or more for people with active digestive disorders.

Food	Amount of food required to achieve 6 g serving of prebiotics
Acacia gum	7 g (0.25 oz)
Raw chicory root	9.3 g (0.33 oz)
Raw Jerusalem artichoke	19 g (0.67 oz)
Raw dandelion greens	24.7 g (0.87 oz)
Raw garlic	34.3 g (1.21 oz)
Raw leek	51.3 g (1.81 oz)
Raw onion	69.8 g (2.46 oz)
Cooked onion	120 g (4.2 oz)
Raw asparagus	120 g (4.2 oz)
Raw wheat bran	120 g (4.2 oz)
Whole wheat flour, cooked	125 g (4.4 oz)
Raw banana	600 g (1.3 lb)

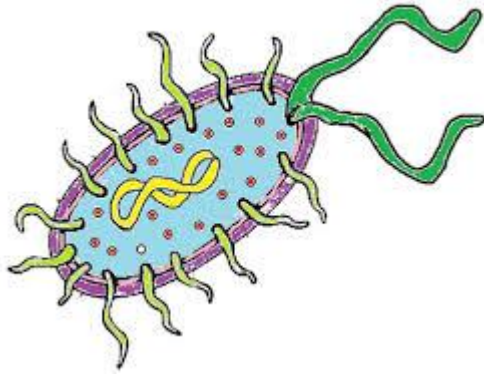
Source: Moshfegh AJ, Friday JE, Goldman JP, Ahuja JK (1999). Presence of inulin and oligofructose in the diets of Americans. *Journal of Nutrition* **129** (7 Suppl): 1407S–1411S.

Anyone wishing to ensure they are getting sufficient prebiotic intake should carefully consider the prebiotic content of their diet, as well as the nutritional and calorie load that comes with it; e.g. eating 600g (1.3lb) of bananas daily is likely to provide an excess of calories and sugars/carbohydrates in the diet.

It could take a large quantity of prebiotic-containing foods for their active constituents to deliver a useful prebiotic effect. A more realistic approach involves fortifying popular foodstuffs such as yogurts, cereals, breads, biscuits, nutrition bars and infant formulas with defined amounts of prebiotics to meet the minimum levels of prebiotics required for them to have the desired beneficial effect.

The pro's and con's of Probiotics and Prebiotics

Some health drinks and foods (most commonly yoghurts) marketed as probiotics have been found not to contain the friendly bacteria, or not enough of them to be beneficial. These products need to contain at least 10 million bacteria per bottle/serving and contain lactobacilli and/or bifido/bifidis bacteria. Brands made by Yakult, Danone, Müller or Nestlé are reliable. Tablets and powders are also available as supplements to add to the diet and the most reliable is the Multibionta tablet.



Probiotics are generally considered safe for healthy people of all ages. However, anyone whose immune system does not function properly may be at risk when taking a probiotic and they should seek specific advice from their doctor.

Prebiotics encourage and support friendly bacteria in the gut, whether or not probiotics are used. Large quantities of inulin-type prebiotics may cause bloating and flatulence due to the fermentation activity of the friendly bacteria, so it is recommended that inulin is introduced

gradually into the diet. In contrast, the GOS prebiotic has been shown to reduce bloating. GOS is marketed as BiMuno.

Why use Probiotics and/or Prebiotics?

There is an increasing amount of scientific evidence for the use of probiotics in a variety of situations, including the following that are recommended by the British Dietetic Association:

- **Antibiotics** - many probiotics will help protect people from getting diarrhoea when they take antibiotics; probiotics must be taken as soon as you start the antibiotics and continued for at least one week after the end of the course
- **Prevention of infection** - a probiotic containing *Lactobacillus casei* and *Lactobacillus bulgaricus* may prevent older people who are taking antibiotics from getting *C. diff* infections (*C. diff* causes serious diarrhoea)
- **Travelling abroad** - probiotics can reduce the chance of getting Travellers' Diarrhoea
- **Irritable Bowel Syndrome (IBS)** – although studies have produced inconsistent results it has been shown that probiotics may help to reduce symptoms of IBS, particularly bloating; a four week trial is recommended as they don't work for everyone
- **Inflammatory bowel disease** – some probiotics have been shown to be very useful for patients with ulcerative colitis however the results for Crohn's disease are less conclusive.

Probiotics and prebiotics are synergistic, they work together, so ideally the two types of supplement should be used together.

Suggested products

Good probiotics should be completely harmless however some preparations have been found to contain significant numbers of harmful bacteria and therefore it is vitally important to select reliable brands and manufacturers. Probiotic drinks and yoghurts can be purchased in the supermarket – look for products such as Activia, Immunitas, Digestivas, Yakult, Actimel and Vitality.

[Multibionta](#) probiotic tablets are available on the high street, as is the relatively new GOS prebiotic [BiMuno](#).

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