

Probiotics: Don't let it bug you

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Introduction

The human body is a complex system, with the gastrointestinal tract (GIT) being one of the largest interfaces between the outside world and the internal system of the body. The GIT is also home to a large community of bacteria, also known as the intestinal flora. The intestinal bacteria within the GIT form a diverse ecosystem that provide many benefits to the optimal functioning of the body such as digestion, metabolism, regulation of the immune system and protection against harmful bacteria that cause disease (pathogens). In addition, the intestinal bacteria synthesise vitamins and may play a role in preventing diseases, such as colorectal cancer and inflammatory bowel disease. Therefore, any disturbance to the balance of the intestinal bacteria may lead to the production of toxins, disease or infection. Antibiotic use commonly causes disruption to the normal ecosystem in the gut, resulting in diarrhoea. Studies have shown that taking a probiotic with a prescribed antibiotic can reduce the extent to which the antibiotic alters the balance of the intestinal bacteria.

Probiotics: The bugs of life

Probiotics are described as the “good” bacteria because they benefit the body by contributing to the balance of the intestinal bacteria. Probiotics are live microorganisms (organisms that are microscopic in size) that provide a health benefit when taken in correct amounts. Probiotics used in dairy, *Streptococcus thermophilus* and *Lactobacillus bulgaricus*, were among the first to be studied. Common organisms used as dietary supplements for probiotics

include the *Lactobacillus* species, *Bifidobacterium* species and *Saccharomyces boulardii* (a nonpathogenic strain of yeast).

Studies have shown the potential benefits of probiotics in various gastrointestinal illnesses. Although there are a number of probiotics available, not all are effective when used to treat or prevent illness. This is because the dose needed varies according to the strain of probiotic, the intended use and the formulation (food, capsules or freeze-dried powder). As a result, there is no standard dosage for a probiotic. The recommended dose, therefore, should be based on human studies, using a particular probiotic at a particular dose that demonstrates a health benefit for a particular illness. The reality is that there are many products labelled as “probiotics” without having the supportive evidence from proper human studies. The pharmacist's assistant, therefore, has an important role in assisting patients to select probiotic products with proven efficacy and safety.

Clinical uses

The possible health benefits of probiotics include:

- The prevention and treatment of diarrhoea (traveller's diarrhoea and antibiotic-associated diarrhoea)
- Enhancement of the immune system
- Alleviation of lactose intolerance
- The prevention of vaginal infections
- Alleviation of allergic conditions

In general, the strongest support for probiotics relates to their use in improving gut health and stimulating immune function.

Probiotics have demonstrated benefits for the following conditions:

- *Antibiotic-related diarrhoea*: The use of probiotics (*Lactobacillus* and *S. boulardii* strains) with antibiotics may reduce the changes in bowel habits, limit the changes in stool consistency and the duration of loose stools associated with antibiotic use.
- *Clostridium difficile-associated diarrhoea (CDAD)*: A review article reported a 66% reduction in CDAD with

Table I. Indications of probiotics from clinical studies

Condition	Probiotic	Recommended dose
Treatment of acute infectious diarrhoea in children	<i>Lactobacillus rhamnosus</i> GG (e.g. in Culturelle®)	10 ¹⁰ to 10 ¹¹ colony-forming units twice daily
	<i>Lactobacillus reuteri</i> ATCC 55730 (e.g. Reuteri®)	10 ¹⁰ to 10 ¹¹ colony-forming units twice daily
	<i>Saccharomyces cerevisiae</i> (<i>boulardii</i>) (e.g. Inteflora®)	250 mg twice daily
Prevention of antibiotic-associated diarrhoea in children	<i>Saccharomyces cerevisiae</i> (<i>boulardii</i>) (e.g. Inteflora®)	250 mg twice daily
	<i>Lactobacillus rhamnosus</i> GG (e.g. in Culturelle®)	10 ¹⁰ to 10 ¹¹ colony-forming units once or twice daily
	<i>Enterococcus mundtii</i> <i>Lactobacillus plantarum</i> (e.g. Entiro®)	One capsule twice daily
Prevention of antibiotic-associated diarrhoea in adults	<i>Saccharomyces cerevisiae</i> (<i>boulardii</i>) (e.g. Inteflora®)	250 mg twice daily
	<i>Lactobacillus rhamnosus</i> GG (e.g. in Culturelle®)	10 ¹⁰ to 10 ¹¹ colony-forming units once twice daily
	<i>Enterococcus mundtii</i> <i>Lactobacillus plantarum</i> (e.g. Entiro®)	One capsule twice daily

probiotic use. The most useful probiotics for CDAD include *Lactobacillus* species at a dosage of at least 10 billion colony forming units (CFU) per day or the use of *S. boulardii*.

- **Treatment of diarrhoea in children:** The use of probiotics in the management of acute diarrhoea in children has the best-established benefit. The use of *Lactobacillus* GG or *Lactobacillus reuteri* during a diarrhoeal episode significantly reduced the duration of illness. In addition, *S. boulardii* was also found to assist with recovery. The use of probiotics shortened the course of the illness by one to three days, displaying greater efficacy in diarrhoea caused by a virus.
- **Prevention of diarrhoea in children:** The daily use of *Lactobacillus* GG reduced the incidence of diarrhoea in children.
- **Irritable bowel syndrome (IBS):** Probiotics may reduce symptoms and maintain better overall gastrointestinal function in patients with IBS.
- **Influence on the immune system:** *Lactobacillus*, *Bifidobacteria* and *S. boulardii* are the most investigated probiotics for their effect on the immune system. They have been shown to stimulate resistance to disease-causing organisms in the gut. Furthermore, probiotics may alleviate intestinal inflammation, normalise intestinal function and reduce allergic reactions.

Table I summarises a number of clinical conditions for which there is evidence from at least one well designed study that oral administration of a specific probiotic strain is effective and beneficial.

Conclusion

The intestinal flora are diverse and rich in healthy bacteria, which can be significantly affected by antibiotic use as well as other factors. Probiotics may act as a protective barrier from potential harmful bacteria. This, in turn, helps restore

and maintain the intestinal flora, allowing it to perform its functions and promote a healthy GIT.

Summary points

- Probiotics contribute to the balance of the intestinal flora.
- Probiotics with *Lactobacillus*, *Bifidobacteria* and *S. boulardii* strains are commonly found in available products.
- Strain-specific benefits cannot be generalised. Therefore, the evidence of clinical efficacy for a specific indication are important factors to consider.
- With the exception of *S. boulardii*, it is recommended that probiotics should not be given at the same time as antibiotics. The optimal timing of the probiotic is product-specific and the package insert should be checked carefully.

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