The development of new technology has brought a better understanding of the billions of bacteria living in the gut. These gut microbes (microbiota) and the human body (host) have a symbiotic relationship. This means that they have been shown to work together, to each other's benefit, affecting the state of health within the body. Gut microbiota are essential for human life.

Vital roles played by these gut microbiota include: increasing resistance to infection, regulating the immune system, aiding in the production of nutrients, (such as vitamins and short-chain fatty acids), as well as assisting in food digestion.

Studies have shown that selected probiotics may be effective in a few gastrointestinal diseases, including, amongst others, antibiotic-related diarrhoea. Many of these benefits, however, have not been proven conclusively and more rigorous trials are recommended.

What are probiotics?

Probiotics are defined by the World health Organization (WHO) and the Food and Agriculture Organization of the United Nations (FAO) as “live microorganisms, which when administered in adequate amounts, confer a health benefit to the host.” In other words, probiotics are live microorganisms that are beneficial to health.

For human use, products containing live microorganisms include:
- Fermented dairy and vegetable products, such as yoghurt and sauerkraut
- Dietary supplements in tablet, capsule or powder form that contain lyophilised (freeze-dried) bacteria

Which factors alter the gut microbiota?

The gut microbes play an important role in maintaining the stability and function of the intestinal tract. Their role in the gut includes aiding in the digestion of food, the production of vitamins and nutrients, the destruction of microorganisms that cause disease and maintaining the immune system.

The content of the gut microbiota is unique to each individual. Certain factors may cause a microbial imbalance in the gut environment which may lead to the development of certain illnesses, such as gastrointestinal tract infections, inflammatory bowel disease (IBD) and irritable bowel syndrome (IBS). This imbalance is known as dysbiosis.

A factor which may contribute to dysbiosis is the administration of antibiotics. Ageing, diet and health conditions are also factors which may influence this balance.

How do probiotics work?

The exact manner in which probiotics benefit humans has not been confirmed, but it is thought that they benefit the gut in the following ways:
- Compete with harmful microorganisms in the gut for nutrients, thereby preventing the harmful microorganisms from thriving
- Produce growth substrates or inhibitors
- Influence the intestinal immunity by stimulating the immune response

These factors all help to increase the performance and stability of the gastrointestinal tract.

Intestinal microbiota may also benefit from:
- Prebiotics (non-digestible food ingredients which are used as food by the beneficial intestinal microorganisms, thereby stimulating their growth and activity, which in turn benefits the host (human))
- Faecal transplant (bacteriotherapy)

What types of microorganisms are present in probiotics?

Many of the probiotic products available are identical or similar to the microorganisms that are naturally present in the gut.

While there are many different types of microorganisms that may be used as probiotics, the most commonly studied
microorganisms used as probiotics belong to 2 main groups, Lactobacillus and Bifidobacterium. A probiotic from yeast, Saccharomyces boulardii, is also commonly used.

How are probiotics classified?

Probiotics are classified according to genus, species and strain.

The bacteria are first grouped in a general manner according to common qualities:

- The genus Lactobacillus, the genus Bifidobacterium and the genus Bacillus, are lactic acid producers. The acidic environment produced by this group of bacteria has been shown to inhibit the growth of certain harmful bacteria.
- The genus Saccharomyces includes various yeasts

Next, they are classified into species, which have more specific characteristics in common.

This is further narrowed down to strain, which distinguishes the bacteria from others of the same species.

It is important to note that the efficacies of probiotics are strain-specific. If a particular probiotic strain has been scientifically proven to be effective for a specific condition, other strains in the same group will not necessarily also have the same efficacy, e.g. Lactobacillus rhamnosus GG was discovered to be effective in preventing viral gastroenteritis. One cannot assume that the other strains of L. rhamnosus will have the same effect.

What do probiotics require to be effective?

Probiotics require certain characteristics in order to have a beneficial or therapeutic effect. These characteristics include:

- Remaining stable in the presence of gastric acid and bile salts
- Ability to live and multiply within the intestinal tract without causing illness
- Ability to attach to the intestinal mucosa

In other words, in order for probiotic products to be therapeutically effective, they must contain live organisms in sufficient amounts. Far less bacteria are needed in dairy products than what is needed in freeze-dried supplements, to result in similar numbers of live bacteria in the lower intestine.

Possible uses for probiotics in gastrointestinal illnesses

Certain strains of probiotics have shown some efficacy in the prevention and/or treatment of:

- Antibiotic-associated diarrhea
- Acute diarrhea and traveller's diarrhea
- Inflammatory bowel diseases, such as IBS, ulcerative colitis and Crohn's disease

Saccharomyces boulardii has been shown to reduce the risk of Clostridium difficile disease. This strain of probiotic has also been shown to reduce the duration of diarrhea in children with acute diarrhea.

Studies have shown that gastroenteritis caused by rotavirus infection was reduced by 1 day when a specific strain of lactobacillus, Lactobacillus GG, was administered.

Combinations of probiotics, or probiotic “cocktails” are sometimes used in the treatment and prevention of gastrointestinal diseases.

Safety of probiotics

While adverse reactions to probiotics are not common in healthy people, there is no standardised reporting system for adverse events due to probiotic use. There has been evidence of probiotics causing infections in patients with organ failure, dysfunctional intestinal barrier mechanisms (“leaky gut”) and immunocompromised patients.

Patients who are immunosuppressed, or who have a serious illness should be cautioned on the use of probiotics. These patients should consult their doctors before using probiotics so that they may be properly monitored for any potential adverse effects.

While probiotics are considered safe to use in healthy individuals, it is important that the doctor weigh up the benefits versus the risks before recommending probiotics to severely ill people.

Conclusion

While many small studies have been done on the efficacy of probiotics in gastrointestinal diseases, larger studies are needed to confirm data. Not all probiotics have the same effect and the efficacy of the probiotic is strain-specific. It has been found that some of the products available on the market do not always contain the specific strain listed on its label.

Probiotics are generally safe and have very minor digestive side-effects, such as gas. People with serious underlying health conditions should consult with their doctor before using probiotics.

The use of probiotics should not replace regular prescribed treatments, nor should their use delay the patient consulting a doctor with any health problems.

References:


5. Gut Microbiota, Antibiotic Use And How Probiotics May Help. MedBriefCase Group Inc. ©2017


