

Each of our intestinal tracts harbours trillions of bacteria. The probiotic, or beneficial bacteria, concept was born when Russian scientist Elie Metchnikoff proposed that the health of certain rural Balkan populations was attributable to their consumption of large amounts fermented milk. Since then the many physiological functions of specific gut bacteria have been studied and the vital role of these organisms to health has become clear.

In the Western world chronic use of antibiotics and gastric acid inhibitors, combined with a low fibre, refined diet, can result in disrupted gut flora with a consequent decline in gut immunity and nutrient absorption. This may be one reason why an estimated 1 in 5 adults in the UK suffer from a gastrointestinal complaint at any one time, while around 1 million people each year are diagnosed with a gut disorder.

Probiotics

The WHO defines probiotics as: 'Live microorganisms which when administered in adequate amounts confer a health benefit on the host'. Lactic acid bacteria are the most commonly used in probiotic supplements; they have been used in the food industry for many years for their ability to convert sugars and other carbohydrates, including lactose, into lactic acid, a property which also contributes to their benefits to health.



The Functions of Probiotics

- **Pathogen protection.** The gut is home to many potentially pathogenic bacteria; probiotic bacteria compete for space and nutrients with these bacteria, they also secrete substances such as lactic acid, hydrogen peroxide and antibacterial substances called "bacteriocins", all of which prevent an overgrowth of pathogenic bacteria.
- **Digestion.** Probiotics secrete enzymes that aid digestion. The process is demonstrated in the manufacture of yoghurt from milk; most lactase deficient individuals can tolerate yoghurt due to the partial break-down of lactose by bacteria.
- **Short chain fatty acid (SCFA) production.** SCFA are vital by-products of the fermentation of fibre by intestinal bacteria, lactic acid being an example. SCFA provide 70% of the energy required by the epithelial (protective mucosal cells) of the intestine. SCFAs reduce faecal pH, facilitating the absorption of minerals and creating an acidic environment not conducive to pathogenic bacteria; higher faecal pH has been linked to a higher risk of colon cancer, one reason why a high fibre diet is thought to be protective
- **Immune enhancement.** Research has shown that probiotic organisms increase levels of circulating white blood cells, stimulate phagocytosis, elevate levels of antibodies and increase the production of cytokines.
- **Food allergy control.** The lining of the intestine prevents the movement of toxic material into the bloodstream. Gut dysbiosis is linked to intestinal permeability, or "leaky gut" syndrome; the passage of undigested food into the blood stream increases the risk of an allergic reaction developing. A landmark randomised placebo-controlled study observed significant improvements in 10 infants with food-allergy related dermatitis treated for one month with *Lactobacillus rhamnosus*.

Source of B-group vitamins and vitamin K. Intestinal bacterial B vitamin biosynthesis involves at least vitamin B1 (thiamine), vitamin B2 (riboflavin), vitamin B5 (pantothenic acid), vitamin B8 (biotin), vitamin B9 (folic acid), and vitamin B12 (cobalamin). Bacteria obtained from dairy, belonging to the genus *Propionibacterium* (also abundant in the human intestinal microflora), are extensively used for the biological production of cobalamin. Common bacteria can synthesise vitamin K.

Choosing a Probiotic

The effectiveness of probiotics is linked to their ability to survive the acid of the stomach and the alkaline conditions in the duodenum (the passage from stomach to small intestine), as well as their ability to adhere to the intestinal lining and colonize the colon.

Prebiotic foods such as artichokes, bananas, onions and garlic selectively provide food for probiotic bacteria and promote their growth; the listed foods contain a prebiotic

carbohydrate known as inulin.

Lactobacillus acidophilus is a probiotic strain available in food (milk, yoghurt), it dominates in the small intestine and has been extensively studied.

Lactobacillus plantarum 299v is a highly specialised probiotic strain; it has demonstrated superiority to placebo in reducing pain and flatulence and regulating bowel habits in irritable bowel (IBS) sufferers.



Probiotics

• • • Your 'at a glance' guide to staying healthy for life By Quest Vitamins • • •

Continued . . .

Bifidobacterium lactis: This strain resides mainly in the large intestine.

Applications of Probiotics

Immunity

In one example study increases in total, helper and activated T-lymphocytes and natural killer cells were observed in 30 elderly volunteers after consuming milk supplemented with *Bifidobacterium lactis*. Additionally research has documented an 80-90% inhibition against food borne pathogens under laboratory conditions. Exposure of human intestinal cells to *L.acidophilus* was found to reduce the adhesion of the pathogen enteroinvasive *Escherichia coli* while increasing resistance and enhancing the barrier function of intestinal epithelial (lining) cells. Furthermore *L. acidophilus* (isolated from the human GI tract) has been found to protect the gut from the lesions that can occur with *E.coli* infection.

Diarrhoeal illness

A recent systematic review has concluded that the evidence that *L. acidophilus* can help control traveller's diarrhoea is significant and that they may offer a "safe and effective method" of preventing this complaint. A systematic review in the *Lancet*, incorporating a variety of probiotic strains, concluded that "probiotics significantly reduced antibiotic-associated diarrhoea by 52%, reduced the risk of travellers' diarrhoea by 8%, and that of acute diarrhoea of diverse causes by 34%. Probiotics reduced the associated risk of acute diarrhoea among children by 57% , and by 26% among adults." Studies of *Lactobacillus Plantarum* have found significant improvements in the frequency and consistency of bowel movements among IBS patients experiencing diarrhoea.

Lactose intolerance

The positive effect of probiotics on the symptoms of lactose intolerance in some individuals has been attributed to the ability of lactic acid bacteria to serve as a source of lactase in the small intestine, thus supplying the body with the enzyme it cannot produce in sufficient quantities. This quality only applies to specific strains.

Small bowel bacteria overgrowth

Research has been done with kidney dialysis patients, whose condition results in an elevated level of bacterial growth in the bowel.

Key Probiotics

- *Lactobacillus acidophilus*
- *Lactobacillus plantarum 299v*
- *Bifidobacterium lactis*

Probiotics and Asthma

In a trial reported in *The Lancet* researchers administered a probiotic prenatally to mothers with a family history of atopic eczema, hayfever, or asthma, and postnatally for 6 months to their infants; the incidence of atopic eczema in the probiotic group was half that of the placebo group.

White blood cells called killer T-cells, a major part of the immune response, are divided in Th1 and Th2; many researchers regard allergy as a Th2 weighted imbalance. Babies tend to be born with Th2 biased immune responses; this imbalance is rapidly shifted postnatally under the influence of bacterial exposure. It is this situation that would appear to explain the apparent efficacy of probiotics, and the "hygiene hypothesis".

Probiotics are an important part of balanced nutrition; consuming a diet rich in natural, whole foods can help ensure a healthy gastrointestinal tract and balanced gut. However such a diet is difficult to achieve in the modern world, in addition many situations such as foreign travel put additional strain on the GI tract; this is where high quality probiotic supplementation confers its benefits.

Information created by Quest Vitamin's Nutritionist.

Questions and Comments please email us; nutritionists@questvitamins.co.uk

Quest Vitamins Limited · 8 Venture Way · Aston Science Park · Birmingham · B7 4AP · UK

Tel: 0121 359 0056 · Fax: 0121 359 0313 · E-mail: info@questvitamins.co.uk

Internet: www.questvitamins.co.uk · www.questhealthlibrary.com · www.lp299v.co.uk