

## HOW TO BOOST THE BENEFICIAL BACTERIA IN THE GUT : PROBIOTICS AND PREBIOTICS ©2008

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Numerous studies show the marked and rapid improvement in bowel problems when prebiotics and probiotics are taken. (Gibson et al 2005, Bruzzese et al 2006, del Piano et al 2006, Astegiano et al 2006 )

- *“The use of IBS Activ [probiotic] led to a significant improvement in pain symptoms, abdominal distension and regulation of bowel movement in IBS patients”* (Astegiano et al 2006)
- *“Altering the intestinal flora with probiotics is an exciting approach to managing intestinal disorders and related conditions..... these products are safe, cheap, and easy to administer.”*(del Piano et al 2006)

**The major beneficial bacteria inhabiting your gut, should be: Bifidobacterium bifidum.** (Liu et al 2007, Astegiano 2006) These friendly bacteria inhabit the intestines, with a greater presence in the large bowel (the colon) than in the small intestine. They also live in the vagina. Their major roles are:

- preventing colonization by hostile micro-organisms (bacteria) by competing with them for attachment sites and nutrients
- preventing yeasts from colonizing the territories that they inhabit
- helping to maintain the right levels of acidity in the digestive tract (pH) to allow for good digestion
- preventing substances such as nitrates from being transformed into toxic nitrites in our intestines
- manufacturing some of the B vitamins
- helping detoxify the liver

**Streptococcus thermophilus.** (Rastall et al 2005) This is a transient (non-resident) bacterium of the human intestine which, together with Lactobacillus bulgaricus, is a yogurt culture, also found in some cheeses. It performs a number of useful roles, e.g.:

- Some strains produce natural antibiotic substances.
- They enhance the ability to digest milk and its products by producing the enzyme lactase, which is absent or deficient in almost half the adults on earth, and in many children, especially if they are of Asian, African or Mediterranean genetic stock.
- Because they produce lactic acid (this is the only streptococcus to produce lactic acid, which it makes in even greater quantities than

L. bulgaricus), they help to create an environment which encourages colonization by the bifidobacteria (they are therefore known as 'bifidogenic' bacteria) and L. acidophilus, as well as helping to prevent colonization by undesirable micro-organisms.

**Lactobacillus acidophilus** (Sinn et al 2008) . This major natural inhabitant of the gut, also lives in the mouth and vagina. Its main site of occupation is the small intestine. They:

- prevent colonization by hostile micro-organisms such as yeasts by competing with them for attachment sites and nutrients
- produce lactic acid (out of carbohydrates) which helps maintain the correct environment for digestion, by suppressing hostile organisms (other bacteria and yeasts)
- improve the digestion of lactose (milk sugar) by producing the enzyme lactase
- assist in digestion and absorption of essential nutrients from food
- destroy invading bacteria (not all strains of L. acidophilus can do this)
- slow down and control yeast invasions such as Candida albicans.

**Bifidobacterium longum.** (Rastall et al 2005) This is a natural inhabitant of the human intestines and vagina. It is found in larger numbers in the large intestine than in the small intestine. Together with other bifidobacteria, this is the dominant organism of breast-fed infants (making up 99% of the microflora in some babies). In adolescence and adult life the bifidobacteria are still the dominant organism of the large intestine (when health is good). Main benefits include:

- preventing colonization by hostile micro-organisms by competing with them for attachment sites and nutrients
- production of lactic and acetic acids which inhibit invading bacteria
- helping in weight gain in infants by retention of nitrogen
- preventing harmful nitrites being formed from nitrates in the digestive tract
- manufacturing B vitamins
- assisting in liver detoxification

**Bifidobacterium infantis.** (Gibson 2006) This is a natural inhabitant of the human infant's digestive tract (as well as the vagina, in small quantities). Its presence is far greater in the gut of breast-fed infants compared with bottle-fed infants.

Among its main benefits are:

- preventing colonization by hostile micro-organisms by competing with them for attachment sites and nutrients
- production of lactic and acetic acids which inhibit invading bacteria
- helping in weight gain in infants by retention of nitrogen
- preventing harmful nitrites being formed from nitrates in the digestive tract
- manufacturing B vitamins.

**Lactobacillus bulgaricus.** (Hickson et al 2007) This extremely useful friendly bacterium is not a resident of the human body, but a 'transient'. Once it enters the body through food (yogurt for example) it remains for several weeks before being passed, but while in the body it performs useful tasks. It performs a number of useful roles, for example:

- Some strains produce natural antibiotic substances.
- Some strains have been shown to have anti-cancer properties.
- These bacteria enhance the ability to digest milk and its products by producing the enzyme lactase which is absent or deficient in almost half the adults on earth, and in many children, especially if they are of Asian, African or Mediterranean genetic stock.
- Because they produce lactic acid (as do all bacteria which have as the first part of their name 'lactobacillus') they help to create an environment which encourages colonization by the bifidobacteria (they are therefore known as 'bifidogenic' bacteria) and *L. acidophilus*, as well as helping to prevent colonization by undesirable micro-organisms.

**Other lactobacilli.** Additional (useful) lactobacilli found in the digestive tract include:

- *L. casei* – a transient bacterium of the intestine
- *L. plantarum* – a transient bacterium of the intestine
- *L. brevis* – a transient bacterium of the intestine
- *L. salivarius* – a natural resident of the mouth and digestive tract
- *L. delbrueckii* – a transient bacterium of the intestine
- *L. caucasicus* (known as *L. kefir*).

**Saccharomyces boulardii.** This is an immune enhancing, anti-inflammatory probiotic yeast.

Two 500mg capsules daily of *S. boulardii* has been shown to maintain and restore the natural flora in the large and small intestine – producing a significant reduction in the symptoms of acute gastroenteritis in

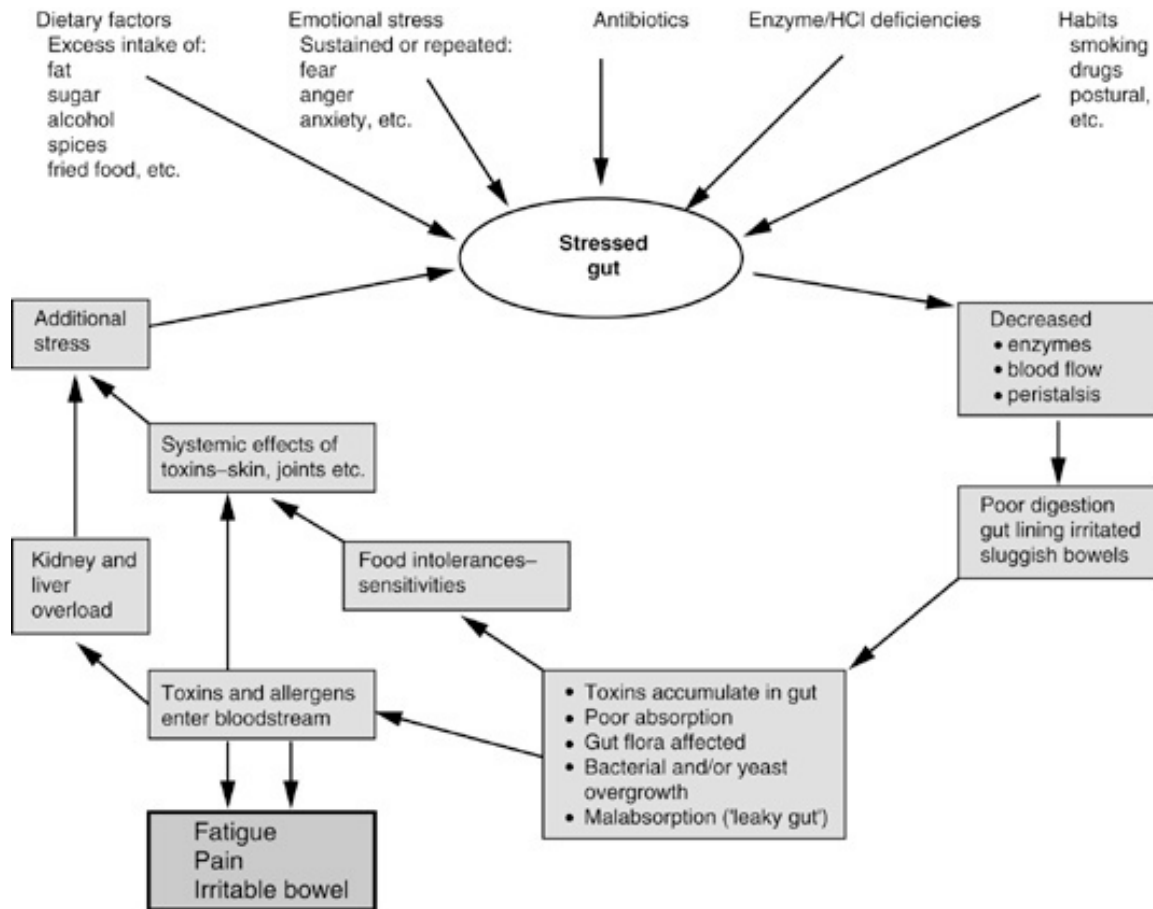
children, and in adult irritable (IBS) and inflammatory bowel disease. (Guslandi et al 2000, Hocher et al 1990)

### **List of benefits**

The list of benefits offered by friendly bacteria (and some yeasts such as *S. boulardii*) includes the following: (Bruzzese et al 2006, Del Piano et al 2006, Astegiano2006)

- They improve the ability to digest milk products by producing the enzyme lactase.
- They aid digestive function overall and improve the ability to digest and absorb nutrients from food.
- They improve bowel function. When they are not healthy, bowel transit time (how long it takes food to be processed and wastes eliminated) is far slower.
- Some strains (see individual characteristics above) can destroy invading bacteria by producing natural antibiotic products.
- Some strains have anti-tumour effects.
- By acting to detoxify the intestines (preventing amine formation for example) they help to prevent the formation of cancer-causing chemicals.
- They reduce the levels of cholesterol in the system, so reducing the dangers that excess cholesterol poses to the health of the heart and circulatory system.
- Some strains assist in recycling oestrogen which helps overall hormone balance, as well as reducing menopausal symptoms.
- They manufacture some of the B vitamins including B3, B6, folic acid and biotin.
- They maintain control over potentially hostile yeasts such as *Candida albicans*.
- They produce lactic acid which enhances the digestibility of foods, as well as improving the environment for themselves and making it hostile for invading organisms (for example they protect against most of the organisms that produce food poisoning).

These are the main benefits which the friendly bacteria offer when they are in good health. And we cannot live in a reasonable state of health ourselves unless the flora of the body – the friendly bacteria – are in good health. We therefore need to know what makes them healthy and what upsets them.



## Prebiotics

A prebiotic has been defined as a 'non-digestible food ingredient that beneficially affects the host by selectively stimulating the growth and/or activity of one or a limited number of bacteria in the colon, and thus improves host health.' (Gibson et al 2000)

Prebiotics assist the friendly bacteria, but do not nourish disease causing organisms. Despite being carbohydrate based, prebiotics are not digested and absorbed, and therefore cannot increase weight.

Among the best known of the prebiotics are fructo-oligosaccharides (FOS) and gluco-oligosaccharides (GOS), and lactosucrose, which have all been shown to be capable of improving the status of the intestinal flora (*Bifidobacteria* and *L acidophilus*) after only a short period (Gibson & Roberfroid 1995)

Many fruit and vegetables contain prebiotics such as FOS, including onion, garlic, banana, asparagus, leek, and Jerusalem artichoke. In order to have an intake of prebiotics, sufficient to make a difference to the bowel ecology, a great deal of such food would need to be eaten.

## **Prebiotic supplementation**

Gibson has shown that it is necessary to take approximately 8 grams daily of the powdered forms of FOS (heaped tablespoon) to assist bowel ecology. FOS is widely available through health food stores.

The term *synbiotics*, is used to describe an intervention where both probiotics and prebiotics are combined. This may offer the dual benefits of both approaches (Gibson et al 2000).

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