



# IRRITABLE BOWEL SYNDROME

*Irritable Bowel Syndrome has become an umbrella term for any unexplained digestive disturbance. **Fleur Borrelli** reviews current contributory factors...*

**T**he term Irritable Bowel Syndrome (IBS) is synonymous with unexplained digestive disturbances, usually when other bowel conditions have been ruled out. IBS has become the term for any functional disorder of the gut of unknown etiology used when diagnostic testing has failed to come up with a structural or biochemical cause.

The American College of Gastroenterology Task Force in 2009 provided a more useful clinical definition, describing IBS as abdominal pain or discomfort that occurs simultaneously with altered bowel habits over a period

of at least three months. To further ease clinical treatment, IBS has been divided into three sub-categories: IBS with predominant constipation (IBS-C), IBS with predominant diarrhoea (IBS-D) and IBS with alternation between constipation and diarrhoea (IBS-M).

So what about the symptoms involved? IBS is characterised by a number of symptoms such as bloating, abdominal cramping, abdominal pain, diarrhoea, constipation or alternation between the two. The fact that these symptoms mirror the symptoms of lactose intolerance, for example, makes diagnosis more complicated as it is thought that the two conditions may overlap or coexist.

## EVOLUTIONARY THEORY OF DIGESTIVE DISTURBANCE

IBS has become increasingly prevalent and one theory for the increase in digestive disturbance is that modern diet could be the cause. Around 200,000 years ago modern hominids made a shift from a small brain and a large digestive tract to exactly the opposite. This would suggest that prior to that, early man decided to eat a more 'digestible' diet of meat and fish which would have contained high levels of the fatty acids such as arachidonic acid (AA), docosahexaenoic acid (DHA) and eicosapentaenoic acid (EPA). The higher calorific value and easy



yet now fructose appears in many of the foods we eat all year round. Since fructose does not affect the production of leptin and insulin (regulators of meal size and frequency), then issues of over-consumption of certain foods and meal sizes have become a real stressor for the modern-day digestive tract.

## REFINED CARBOHYDRATES

Dairy and grain intake has exactly the same evolutionary path. Due to the spread of agriculture through the Middle East these foods were only introduced into our diets around 10,000 years ago. Grains and pulses are known as 'resistant starch' because they cannot be broken down by amylase. This leaves them free to be fermented in the intestine and the high fibre content of these foods produces a higher volume of stool and increased intestinal bacteria activity and population. A number of people have adapted to the current high intake of cereal foods in the diet. However modern-day foods are high in refined carbohydrates which contain too much amylopectin (a polysaccharide broken down by amylase) that can trigger digestive disturbance in sensitive individuals. This is why the disadvantages of a diet high in refined carbohydrates tends to outweigh the advantages of resistant starches for this with IBS.

## LACTOSE INPUT

Lactose, the sugar found in milk, is normally broken down by lactase, an enzyme that is usually produced in the first few years of life to enable the digestion of the lactose present in breast milk. Soon after in infancy, once the body is accustomed to proper food, our levels of lactase naturally decline. However, dairy has become a predominant food group in our daily diet and this has caused the preservation of the expression of the lactase gene to continue later on in life. But for some individuals the expression of the lactase gene does not continue and these individuals are unable to tolerate foods containing lactose, a factor that should be taken into account when dealing with IBS.

## THE ROLE OF PROBIOTICS

Nutritional therapy has focused on improving the intestinal flora with the use of probiotics such as *lactobacillus* and *bifidobacterium* to reduce symptoms. Research has demonstrated that probiotics have several functions within the gut such as protection against pathogenic bacteria, improved intestinal immunity, improvements in bowel regularity and stool column. Research shows how the antagonistic actions of probiotics can destroy microbes and cure intestinal infections caused by harmful organisms. Beneficial bacteria also produce short chain fatty acids which improve the health and function of the intestinal epithelium. In the absence of adequate short chain fatty acids the intestinal epithelial cells fall short of providing a protective barrier. These short chain fatty acids such as lactic acid and butyric acid also lower the intestinal pH helping to prevent the growth of pathogenic microbes. In addition, these short chain fatty acids also help regulate intestinal muscular contractions of the colon wall, improving intestinal motility and reducing painful cramping.

Studies have also shown that probiotics produce protective nutrients such as arginine, glutamine and conjugated linoleic acid. L-arginine is the precursor to nitric oxide which is for the relaxation of the intestinal wall and for vasodilation in the intestinal circulation. Glutamine is vital for maintaining a healthy lining within the intestinal tract where cell turnover is rapid, it boosts cell volume and antioxidant status as well as providing the nutrition required for the synthesis of RNA and DNA so cells can multiply quickly. A deficiency of glutamine is a factor in intestinal permeability or 'leaky gut,' a condition frequently linked to IBS. Linoleic acid is converted by the beneficial bacteria into conjugated linoleic acid which may exert anti-inflammatory and anti-carcinogenic effects within the gut. Probiotics have also been found to enhance the immune system within the intestine mucosa through increasing levels of secretory IgA. Children with food

digestion allowed potentially for this shift to a larger brain and the smaller gastrointestinal tract needed less energy.

Despite its maligned past as a pro-inflammatory compound, AA initiates the inflammatory reaction and then produces the eicosanoid switch which begins the anti-inflammatory phase. Unfortunately, the prevalence of LA in vegetable oils and grain-fed rather than grass-fed meat means that instead of producing more AA the body actually produces less. This combined with a lack of EPA and DHA in the diet means that our bodies now tend to exist in a more pro-inflammatory state and inflammation is a major factor in IBS.

## FRUCTOSE FACTOR

Fructose intolerance has been linked with IBS and this fruit sugar was certainly never abundant in our ancestral diet,

allergies often display a lowered local IgA-immune response in the intestinal tract, another trigger for IBS.

### DIGESTIVE ENZYMES

There is a great deal of symptom relief to be gained with the supplementation of digestive enzymes for those with IBS. The stomach and the pancreas are innervated both sympathetically and parasympathetically which means in times of stress there may be a lack of digestive enzymes produced. Stress has now been identified as a major factor for many IBS sufferers. During a fight or flight in a danger situation all resources are directed towards muscles at the expense of the digestive system which becomes a 'disposable' organ. This allocation of resources away from the gut might explain why underproduction of stomach acid, although often misdiagnosed, is a very real contributory factor for IBS.

### THE GUT-BRAIN AXIS

In recent years, clinical research has focused on the link between the nervous system and the digestive system. Intestinal peristalsis is an autonomous process controlled by the enteric nervous system (ENS), the local nervous system within the digestive system, responsible for the contraction of the gut behind the stool and its relaxation in front. Normal stool movement activates the production of serotonin which in turn activates an interneuron to produce a signal to a motor neuron to contract using substance P (a peptide responsible for contraction of the gut muscles) and acetyl-choline. Motor neurons in front of the stool relax the muscles so food is transported rhythmically through the gut using adenosine triphosphate (ATP), nitric oxide (NO) and vasoactive intestinal peptide (VIP) – a peptide hormone.

The Rome Foundation, an organisation that provides support for research in the



diagnosis and treatment of functional gastrointestinal disorders, has provided a current working model for IBS, linking microbes and the ENS stating that; "abnormal microbiota activate mucosal innate immune responses which increase epithelial permeability, activate nociceptive sensory pathways and dysregulate the enteric nervous system". This is supported by the fact that IBS may develop in predisposed individuals after a bout of infectious gastroenteritis.

It is most likely that the ENS which can be stimulated to a faster rhythm by the sympathetic nervous system, is involved in IBS. The vagus nerve carries this sensory information from the gut about immune activity and the presence of neuroactive molecules to the brain. The combination of neurological mimicry and the transportation of inflammation inducing compounds through the circulation can affect our mood as well as our intestines. Anxiety syndrome, depression as well as neurodegenerative disorders can potentially result from digestive disorders such as IBS and vice versa. The term 'gut feeling' couldn't be more appropriate.

### NUTRITIONAL THERAPY

Nutritional therapy has a lot to offer when it comes to supporting clients with IBS with dietary support, supplements

and stress relief therapy all being highly appropriate. The first priority has always been to optimise digestive function and support the integrity of the intestinal barrier through the use of supplements such as probiotics, prebiotics, digestive enzymes, glutamine, L-arginine, and magnesium. Other important nutrients for barrier support are vitamin D and zinc.

With the benefit of current clinical research we may also shift back towards an anti-inflammatory, ancestral-style diet consisting of grass-fed meat, fish and poultry alongside plenty of soluble fibre in the form of vegetables and limited fruit.

A new additional tool in the pack is to support the ENS which may also serve to improve mental health. Where there is IBS-D, a problem with the metabolism of substance P might be at fault and 5-HTP should have a calming affect. With IBS-C and cramping, L-arginine and magnesium could provide useful support. ●

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