

## Irritable Bowel Syndrome (IBS)

### The Definition

Irritable Bowel Syndrome (IBS) is an illness that interferes with the normal function of the colon (large intestine), characterized by abdominal pain or discomfort along with signs of bowel dysfunction, most commonly diarrhea and/or [constipation](#). Although healthy people commonly experience these same symptoms occasionally, in IBS these symptoms are more severe or are experienced more frequently. Current figures suggest that 10-20% of the population may suffer from the disease and it is the most common gastrointestinal illness diagnosed by doctors in the western world. Historically, IBS has not been thought to result from or lead to physical damage to the colon, like in Inflammatory Bowel Disease (IBD), or lead to development of other, possibly more serious diseases. Research in recent years however, has advanced the understanding of [IBS](#) greatly with the recognition that physical factors and damage to the lining of the bowel may indeed be involved. There is also evidence linking IBS to other illnesses, particularly those covered by The Environmental Illness Resource. All of this will be explored in greater detail below.

As with all of the syndromes on this website, there is no one lab test or imaging technique that can be used to diagnose IBS. Although certain tests and investigations may be carried out, a diagnosis is primarily given on consideration of history, presenting symptoms and by ruling out other gastrointestinal diseases.

Tests carried out on patients presenting with gastrointestinal symptoms may include the following:

**Blood Tests** - A complete blood count is often done to check for anemia and other abnormalities. Other tests may be performed, including an erythrocyte sedimentation rate (indicates if tissue damage or inflammation is present) and a [thyroid test](#).

**Stool Tests** - The most common fecal examinations check for an intestinal parasite or occult (hidden) blood in the stool.

**Sigmoidoscopy or Colonoscopy** - These direct visual examinations of the rectum and sigmoid portion of the large bowel (sigmoidoscopy) or the entire large bowel (colonoscopy) are performed with an endoscope. (See IFFGD Fact Sheet No. 114 for further information on these procedures.)

**Barium Enema** - This is a radiologic (x-ray) examination of the large bowel that is performed by taking x-ray pictures of the bowel after it has been distended with a barium-containing liquid and air. The amount of radiation involved is usually not worrisome, but women who are pregnant or unsure whether they are pregnant should tell their [physician](#), as this test should not be done in such cases.

In addition, testing for [lactose intolerance](#) by means of a breath test, and other miscellaneous procedures may be carried out.

### The Official 'Rome II' Diagnostic Criteria for IBS

At least 12 weeks or more, which need not be consecutive, in the preceding 12 months of abdominal discomfort or [pain](#) that is accompanied by at least two of the following features:

1. It is relieved with defecation, and/or
2. Onset is associated with a change in frequency of stool, and/or
3. Onset is associated with a change in form (appearance) of stool.

Other symptoms that are not essential but support the diagnosis of IBS:

- Abnormal stool frequency (greater than 3 bowel movements/day or less than 3 [bowel movements](#)/week)
- Abnormal stool form (lumpy/hard or loose/watery stool)
- Abnormal stool passage (straining, urgency, or feeling of incomplete evacuation)
- Passage of mucus
- [Bloating](#) or feeling of abdominal distension.

Although not included in the diagnostic criteria for IBS, [mental and emotional symptoms](#) are commonly present in patients with IBS. These may include depression, anxiety, panic attacks and insomnia. This should not be taken to mean that IBS is caused by psychiatric illness however, as not

everyone suffering from IBS has depression, for example, and not everyone with [depression](#) has any gastrointestinal symptoms. It is a similar situation as with all the other "Environmental Illness" syndromes you will find on this website. The common presence of psychiatric problems is a good indication that brain dysfunction is a common factor involved with the ongoing state of illness in patients with these syndromes. It is also interesting to know that there is a strong link between the gut and the brain as both use many of the same chemical messengers. With this in mind it's easy to see how a disturbance in function of one, would cause [symptoms](#) in the other. Recent research into the brain-gut axis has shed a lot of light on this matter and will be discussed below.

### **What Causes IBS?**

Although IBS is the most common diagnosis given by gastroenterologists (gut doctors), the causes of the illness aren't clear. In recent years however there has been an explosion of research into the causes of IBS and a number of distinct contributing factors have been identified as playing a major role in the syndrome. As a result of these findings many researchers are now proposing a "multicomponent disease model", meaning they suspect the illness is the result of a combination of factors acting together to bring about symptoms, rather than IBS having one single cause (1). The areas that have been identified through years of research as being involved with the illness are discussed below. Factors that may have a role in IBS include:

- Neurological Dysfunction (Brain-Gut Interaction)
- Stress
- [Leaky Gut Syndrome](#)
- [Food Sensitivities/Intolerance's](#)
- [Candida and Gut Dysbiosis](#)

### **Neurological Dysfunction and Brain-Gut Interaction**

A major development in the study of IBS and other gastrointestinal diseases in recent years has been the growing knowledge of the importance of the nervous system in the gut. The intestines are now known to have the highest concentration of nerve cells in the body, besides the brain. There is constant back and forth communication between the brain and gut, particularly through nerve cells using serotonin, a neurotransmitter that is also very important in the brain in the regulation of mood. Numerous studies have shown that serotonin exerts a wide range of effects on the intestines, most notably:

1. mediating intestinal motility
2. mediating intestinal secretion in the GI tract
3. modulating perception in the bowels.

Recent studies have found increased levels of metabolites from this neurotransmitter in IBS patients (2). Indeed, the same studies have also shown that giving test subjects serotonin-like substances may trigger IBS symptoms (2). Other studies have shown abnormalities in the way serotonin acts in those with IBS (3). These abnormalities in serotonin levels and function may directly cause abnormalities in gut function by acting in the ways listed above, or they may alter the way the patient perceives sensations in the gut due to the strong connection between gut and brain. As a result of these findings, many new therapies that specifically act to normalize serotonin function are currently being tested. Some drug treatments have shown promise with Tegaserod having good results in women with constipation predominant IBS and Alosetron performing well in women with diarrhea predominant IBS (3). Why these treatments only appear to be effective in women is so far unexplained.

### **Stress and Psychological Factors**

Stress and psychological trauma has long been thought to play a major role in IBS. The new knowledge of the brain-gut interaction discussed above provides further evidence for this link. With such a high concentration of nerve cells in the gut, any alteration of brain function due to stress is sure to have a strong impact on gut function. When the body goes into the stress response, blood is redirected from the gut to the muscles in preparation to either fight or run from danger. The "fight or flight" response.

In this situation the digestive system is effectively shut down until the danger passes. If someone is in a chronic state of stress then the digestive system is never able to function correctly which can lead to symptoms of IBS. For instance the muscles of the intestines can become chronically tensed which may lead to either constipation or diarrhea depending on the individual. Stress can also lead to other complicating problems such as [leaky gut syndrome](#) (4, 5, 6). Many studies have shown that stress increases colonic sensitivity which could account for the pain and other symptoms experienced by IBS patients. New research has found that this hypersensitivity is caused by increased intestinal permeability (leaky gut) as a result of stress (5, 6). Other research has shown that stress causes the release of inflammatory chemicals in the gut, such as substance P and can reactivate previous inflammation when experienced in conjunction with a small physical stimulus, such as the presence of certain foods or microbes and their metabolites (6). Further to this, studies across the world have consistently found that lifestyle has a significant impact on the incidence of IBS and that there are fewer cases of IBS amongst those who live a more stress free lifestyle (7).

### **Leaky Gut Syndrome**

As mentioned previously, increased intestinal permeability, or leaky gut syndrome as it is more widely known, has been increasingly shown to be involved in IBS and is now well established as part of the disease process. Stress has long been thought to be a major contributor to the development and chronic continuation of leaky gut syndrome but only recently has the reason why started to come to light. It is now known that stress causes the cells of the intestine to contract which results in larger gaps between cells than is normal (5). This results in intestinal inflammation and the symptoms of IBS, as well as the situation whereby larger than normal particles such as bacteria and food molecules can pass through the intestinal wall and into the rest of the body, paving the way for infection, allergies and autoimmune diseases, both in the gut itself and systemically (4, 5, 6, 8, 9). Factors other than stress also play a major role in causing increased intestinal permeability, leading to IBS. In one study of children with IBS it was demonstrated that certain foods when ingested triggered alterations in intestinal permeability with concurrent IBS symptoms (10). The researchers concluded that at least in some children with IBS, food allergies can lead to a leaky gut and the triggering of symptoms. Patients often develop IBS after an acute gastrointestinal infection, which has puzzled researchers until recently. Many now think that infections cause increased intestinal permeability which triggers a cycle of inflammation leading to IBS. A 2004 study found that a large number of people developed IBS after an outbreak of acute gastroenteritis in Walkerton and that this was associated with increased intestinal permeability in these people (11). Chronic gut infections are also thought to be involved with leaky gut syndrome and IBS and will be discussed in the [gut dysbiosis](#) section below.

### **Food Sensitivities and Intolerance's**

People suffering from IBS often feel their symptoms are triggered or exacerbated by eating certain foods. This has led to a large amount of research being conducted into the role of food sensitivities and Intolerance's in the illness. A 2004 Brazilian study found that IBS patients had a higher reactivity to food antigens as identified by skin prick test, compared to patients with functional dyspepsia and healthy controls (12). The researchers concluded that this was suggestive of increased intestinal permeability in the IBS patients, as allergic reactions are increased when increased intestinal permeability (leaky gut syndrome) is present. Indeed, it has been suggested that a vicious cycle is created in which increased intestinal permeability leads to more allergic reactions which in turn lead to inflammation and further increases in intestinal permeability (8, 13). There is evidence that measures to intervene in this cycle have positive effects. A relatively large study of 150 IBS patients carried out in the UK in 2004 aimed to find out if eliminating foods to which patients were found to be sensitive, would improve their condition. The patients were tested for IgG reactions (generally known as food sensitivity rather than a classic food allergy which involves IgE) to a range of foods using an ELISA test. One group of patients was then put on a diet that excluded foods to which they had tested positive and the remaining patients were given a diet where random foods were excluded. The researchers found that the true elimination diet resulted in a 10% greater reduction in symptom score than the fake diet. All other markers also favoured the true elimination diet (14).

### **Gut Dysbiosis**

Until recently IBS was thought to be an entirely functional disease, meaning it wasn't caused by any external or environmental factors. Further to evidence implicating leaky gut syndrome and increased

reactivity to foods, recent investigation has found that bacteria may be a cause of IBS, at least in a subset of patients. In recent years there has been an explosion of interest in the way the balance of microorganisms in the gut affects our health. Research has shown that IBS patients have low numbers of [lactobacilli](#) and [bifidobacteria](#), the "friendly bacteria" that have many health benefits, and an abnormally high number of facultative organisms which ferment food residues to produce gas and toxic waste products that can cause pain and bloating as well as other negative consequences for our health (15). Some researchers and doctors believe that the symptoms associated with certain foods (particularly those high in carbohydrate) are not necessarily the result of allergic reactions but could be due to the large amounts of gas produced by high levels of facultative bacteria. The name given to abnormally large amounts of facultative bacteria in the small intestine is [small intestinal bacterial overgrowth \(SIBO\)](#) and many studies have been published that show it is common amongst IBS patients. SIBO is usually tested for using breath testing to detect abnormally high levels of waste gasses from bacterial fermentation in the gut. A study published in the prestigious Journal of the American Medical Association (JAMA) in 2004 stated that 84% of IBS patients have abnormal lactulose breath test results, indicating the presence of SIBO (16). Further to this, 75% of those with abnormal breath tests showed significant improvement in IBS symptoms when the SIBO was treated. The authors conclude that the gastrointestinal and immune effects of SIBO could account for many of the symptoms presented by those suffering from IBS. Elsewhere, researchers on the Intestinal Research Programme at McMaster University, Hamilton, Canada, have found that in the absence of normal gut flora, mice "demonstrated gross morphological abnormalities and gut motor dysfunction" (17). They conclude that "shifts in commensal bacterial populations could play a role in the development of altered motility states including functional disorders of the gut" (such as IBS).

### **Celiac Disease**

As well as the above, a subset of IBS patients have been found to have mild/moderate [Celiac Disease](#). People with Celiac Disease cannot digest gluten due to damage to the intestinal wall and have to avoid gluten containing foods such as wheat, rye, barley, and sometimes oats. This damage is caused by their immune systems reacting to the proteins in gluten and causing damage to the intestine in the process. The symptoms of Celiac Disease can mimic those of IBS and a sensitivity to gluten can be detected with a simple blood test.

Other than gluten, people with IBS often find that the following things exacerbate their symptoms:

- Grains, especially those containing gluten
- Dairy products
- Spicy foods
- Alcohol
- Caffeine containing products - tea, coffee, soft drinks
- Medical drugs

### **Links Between IBS and Other Environmental Illnesses**

As discussed above, IBS is strongly connected to leaky gut syndrome and gut dysbiosis, in the form of small intestine bacterial overgrowth (SIBO). There are also connections between IBS and other environmental illnesses that we cover on this website. IBS is often diagnosed in people who have also been diagnosed with [chronic fatigue syndrome](#) (CFS), [fibromyalgia](#) (FMS), [Gulf war syndrome](#) (GWS) and [autism](#). As an example, 30-70% of fibromyalgia patients have concurrent IBS (18). Recent research has looked into this connection and started to discover possible reasons why IBS so often goes hand in hand with these other chronic illnesses.

One of the most well studied links is the involvement of SIBO in all of these illnesses, especially CFS and fibromyalgia. Just as SIBO has been found to be common in IBS patients, recent research has also found this to be the case with fibromyalgia and CFS (19, 20, 21). Researchers from the Burns and Allen Research Institute in Los Angeles published a study entitled "A link between irritable bowel syndrome and fibromyalgia may be related to findings on lactulose breath testing" (21). In it they describe their finding that SIBO is common in both IBS and fibromyalgia patients. Interestingly, they found that SIBO was more severe in fibromyalgia patients and the severity of the SIBO in individual patients correlated strongly with the severity of the pain they experienced. To speculate on this research, could

it be possible that if the SIBO of those with only IBS were to get worse, they too would experience fibromyalgic pain? Only further research can answer that question.

Other published material makes the connection between IBS, CFS, fibromyalgia and autism suggesting that all are the result of the brain showing abnormal responses to stimuli (22). Further to this, just as the gut-brain link is thought to be important in IBS, so too is research demonstrating its importance, and that of serotonin function, in autistic disorders (23).

In a study of almost 12,000 Gulf war veterans, they were found to have a much higher incidence of IBS, as well as chronic fatigue syndrome (CFS) and multiple chemical sensitivity (MCS), as diagnosed by their physicians, than the general population. Studies have also shown that those with Gulf war syndrome have "visceral hypersensitivity similar to patients with the irritable bowel syndrome", meaning their intestines are more sensitive to normal stimuli, just as those of IBS patients are (25).