

Small Intestine Bacterial Overgrowth (SIBO): Causes, Diagnosis and Treatments

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SIBO is a disorder where large numbers of normal bacteria are found in the small intestines. Typically, the large intestine contains trillions of normal bacteria, but through back flushing across the ileocecal valve (the valve that separates the large and small intestine) into the small intestine, many of these normal bacteria take up residence in places normally not found and create problems.

The small intestine is made up the duodenum (first section), jejunum (middle section) and ileum (last section before entering the large intestine), and each has a unique function in digestion, nutrient absorption, and immune function. The small intestine is separated from the stomach by the pyloric sphincter and the large intestine by the ileocecal valve. Therefore, the digestive system is really separate compartments, each with its own unique biochemistry, immune regulation, and function in the process of food assimilation and toxin elimination. The small intestine plays an important role in digestive function, as it has a direct connection to the liver and pancreas through the biliary tree for bile acids (important for fat digestion and vitamin A, D, E, and K assimilation), and digestive enzymes necessary for nutrient absorption and waste elimination. The small intestine also contains the main area of digestive immune cell concentration located in the ileum region before entry into the large bowel. The large intestine is important as well for concentration of waste material in fecal matter and the reabsorption of water and electrolytes back into general circulation to maintain normal body hydration. Because of the compartmentalization of the digestive system, particularly the small intestine and large intestine, it is known that they both contain unique intestinal bacteria.

Symptoms of SIBO

The symptoms of SIBO can be much broader than common dysbiosis (aka bacterial and/or yeast imbalance that leads to bloating, gas, and indigestion), and include, but are not limited to the following:

- Heartburn/reflux/nausea
- Abdominal pain, including cramping
- Mixed bowel elimination patterns, i.e. alternating constipation and diarrhea
- Excessive flatulence
- Malabsorption problems, i.e. fat soluble vitamins, vitamin B12, iron
- Systemic complaints such as fatigue, body/joint pain, headaches, and skin disorders

For some people, their irritable bowel syndrome (IBS) diagnosis is actually an underlying SIBO problem. In fact, SIBO can be a cause of IBS and research has determined that approximately 80% or more of those with IBS have SIBO (1).

Causes of SIBO

The causes of SIBO are complex and multifaceted. For simplicity's sake, let's focus on the main avenues in which SIBO can manifest – *namely from post infectious irritable bowel syndrome (IBS)*:

- Various organisms can trigger dysfunction in the digestive system particularly in the region between the large and small intestine (aka. ileocecal valve region).
- Giardia lamblia is a known parasite trigger, as well as the bacteria, campylobacter (specifically C. jejuni), salmonella, shigella, and various viruses (2).
- Certain toxins are produced by these intestinal pathogens, which alter (inhibit normal peristaltic activity) the levels of normal intestinal cells which are responsible for moving bowel debris and opportunistic bacteria from the small intestine into the large bowel.
- This scenario creates an avenue for either overgrowth of opportunistic intestinal bacteria in the small intestine and/or migration of normal large bowel flora into the small bowel contributing to bacterial fermentation.
- The inflammatory triggers often set in place by these microenvironment shifts in the intestines further exacerbate a dysfunctional bowel and increases the bacterial colonies and subsequent fermentation of food stuff, leading to the development of SIBO.

The fermentation takes place because the overgrown small intestine bacteria feed off of dietary carbohydrates, and ferment them in the process. The main gases that are produced by this bacterial fermentation are hydrogen and methane. These gases then further exacerbate the problem by damaging cells within the small intestine.

Diagnosis of SIBO

SIBO is most commonly assessed using a breath test. This test involves collecting a baseline sample (after a 1 to 2 day preparatory diet), and then ingesting a lactulose or glucose solution. Lactulose is a synthetic sugar which acts as a substrate for bacterial fermentation. Glucose has a similar effect. As mentioned previously, the digestive bacteria in the small intestine act upon these sugars and through their metabolic processes produce methane and hydrogen gas, which are detected by a breath analyzer over a period of time with successive sample collections. These measurements are then analyzed by the lab against a baseline test to determine the likelihood of SIBO.

A marker called *4-hydroxyphenylacetic acid* was also often used in the past as an indicator of SIBO. In fact, a research study dating back to the 70's in the *Journal of Clinical Chemistry* showed that this marker is useful for Small Intestine Bacterial Overgrowth (3). ***4-hydroxyphenylacetic acid is one of the markers available from the Organic Acids Test from The Great Plains Laboratory – www.greatplainslaboratory.com.***

Options for SIBO Treatment

There are various treatment options for SIBO. Most commonly, SIBO treatment has involved antibiotics. The main antibiotic, Rifaximin, has been useful in certain cases of SIBO because of its effectiveness against various small intestine bacteria and the fact that it has poor intestinal absorption. Rifaximin is also beneficial because it is reported not to contribute to candida overgrowth. A typical dosing schedule for Rifaximin is 550 mg three times daily for 14 days. Flagyl and Neomycin are two additional antibiotics that can be used for SIBO treatment as well.

Diet plays a major role in SIBO intervention (4). The main diet used by many health practitioners for SIBO is called the Specific Carbohydrate Diet (SCD) as described by Elaine Gottschall in her books, “Food and the Gut Reaction” and “Breaking the Vicious Cycle (5).” The foundation of the SCD is the reduction of various disaccharide foods (aka complex sugars) which are known to trigger bowel inflammation and excessive mucus production, leading to maldigestion. Disaccharide foods include things like grains, starchy vegetables, and certain sweeteners, such as honey. These are exactly the foods that opportunistic bacteria feed off of to create fermentation byproducts of methane and hydrogen gas. There is also a SIBO Specific Diet which is helpful too, and may be preferred by some people. More information about each diet can be obtained from www.breakingtheviciouscycle.com and www.siboinfo.com, respectively.

In addition to antibiotics and dietary modification, there remains another option for SIBO intervention – *natural remedies*. Whether an individual is using antibiotic therapy or natural remedies, dietary modification with either the SCD or SIBO diet is highly recommended to prevent a return of SIBO.

Certain botanicals have been shown to be helpful for SIBO, including garlic (*Allium sativum*), oregano oil (*Origanum vulgare*), and grapefruit seed extract. In fact, the first three botanical remedies are found in a product by BioBotanical Research called Biocidin. Biocidin also contains a variety of other botanicals such as bilberry, goldenseal, tea tree oil, and black walnut, all known to assist in bacteria and yeast reduction/elimination.

Biocidin, as a proprietary blend, comes as either small capsules or liquid with various dosing options. For SIBO, a common dosing regimen would be 1 to 2 capsules three times daily for 4 to 6 weeks. Capsules are most appropriate for adults or older children who can swallow capsules. The liquid Biocidin is great for smaller children and 1 drop/10 lbs body weight, three times daily is a good starting point. Increasing dosages may be appropriate based on clinical response. Biocidin, and many of the other botanicals listed, such as oregano oil, grapefruit seed extract, goldenseal, and garlic (supplement called Allicin) are all individually available from New Beginnings Nutritionals at www.nbnus.com.

For more specifics about SIBO, make sure to view my recorded webinar, hosted in the Webinar Library on The Great Plains Laboratory web site, “*Small Intestine Bacterial Overgrowth (SIBO) – Causes, Treatments, and Using the Organic Acids Test as a Diagnostic Tool.*”

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