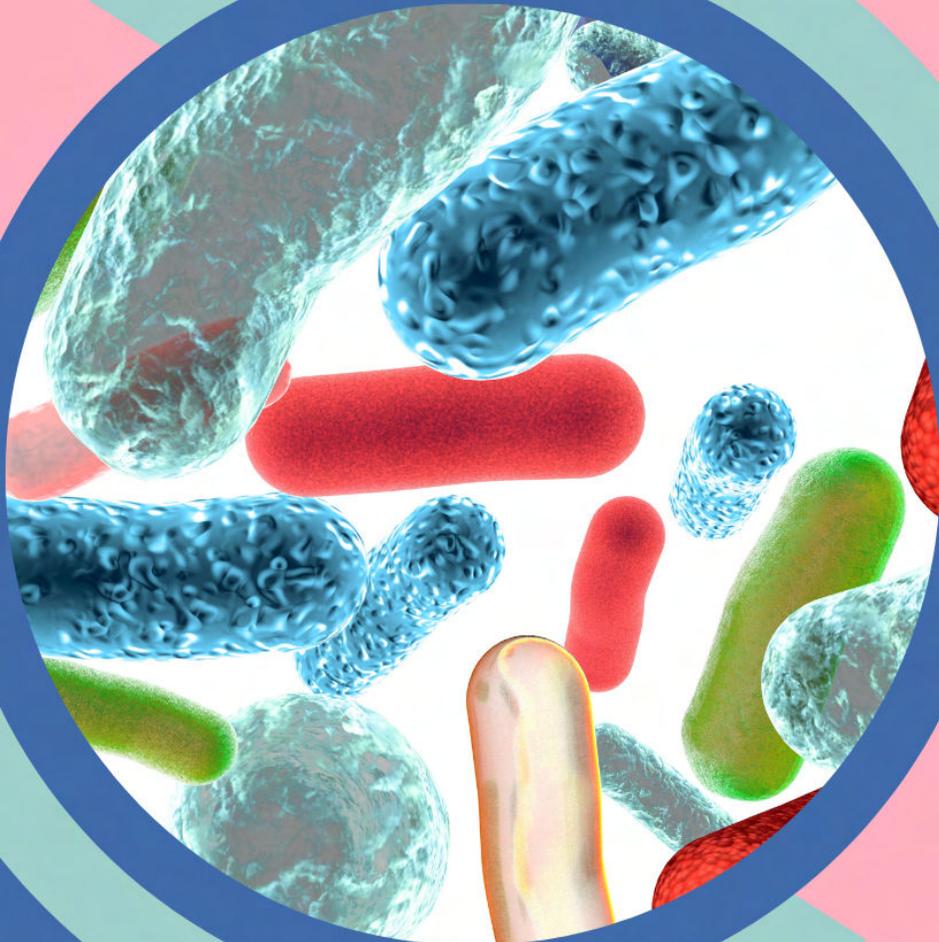


SIBO

SMALL INTESTINAL
BACTERIAL OVERGROWTH



What is SIBO,
how is it diagnosed,
and how can i treat it?

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Introduction

What is SIBO?



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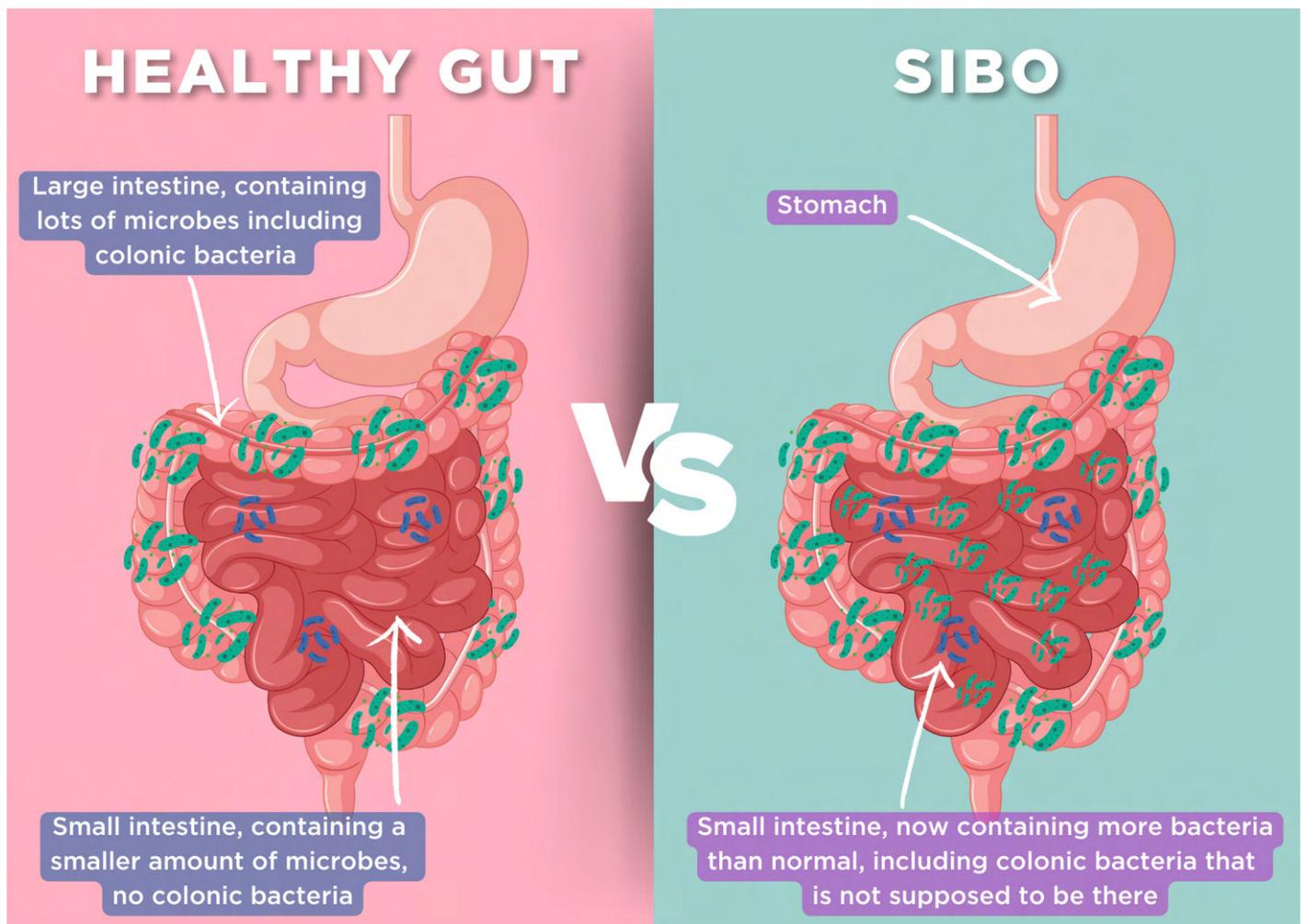
Introduction

The gut, otherwise known as the gastrointestinal (GI) tract, is part of the digestive system. This includes organs such as the stomach, small intestine, and large intestine. It interacts with material found in its environment (such as food) as well as the diverse community of microorganisms that it hosts. The food that we eat is in part broken down by the microorganisms that live in the GI tract, known as the microbiome, which forms a mutually beneficial relationship with the human body. The gut microbiome has been estimated to exceed more than one hundred trillion individual microorganisms, including bacteria, viruses, archaea, and fungi (1). Your gut microbiome is unique and can be as much as 80-90% different from someone else's (2). It is believed to exist from birth and change in response to events such as illness, antibiotic treatment, and diet.

The gut microbiome contributes to food breakdown, nutrient production, protection from invading bacteria, and immune system support. An imbalance in the gut microbiome, known as dysbiosis, is thought to contribute to a wide range of diseases. The relationship between dysbiosis and health works both ways - it is speculated that not only can the gut microbiome influence the body and cause illness, but diseases can also lead to changes in the microbiome through various mechanisms.

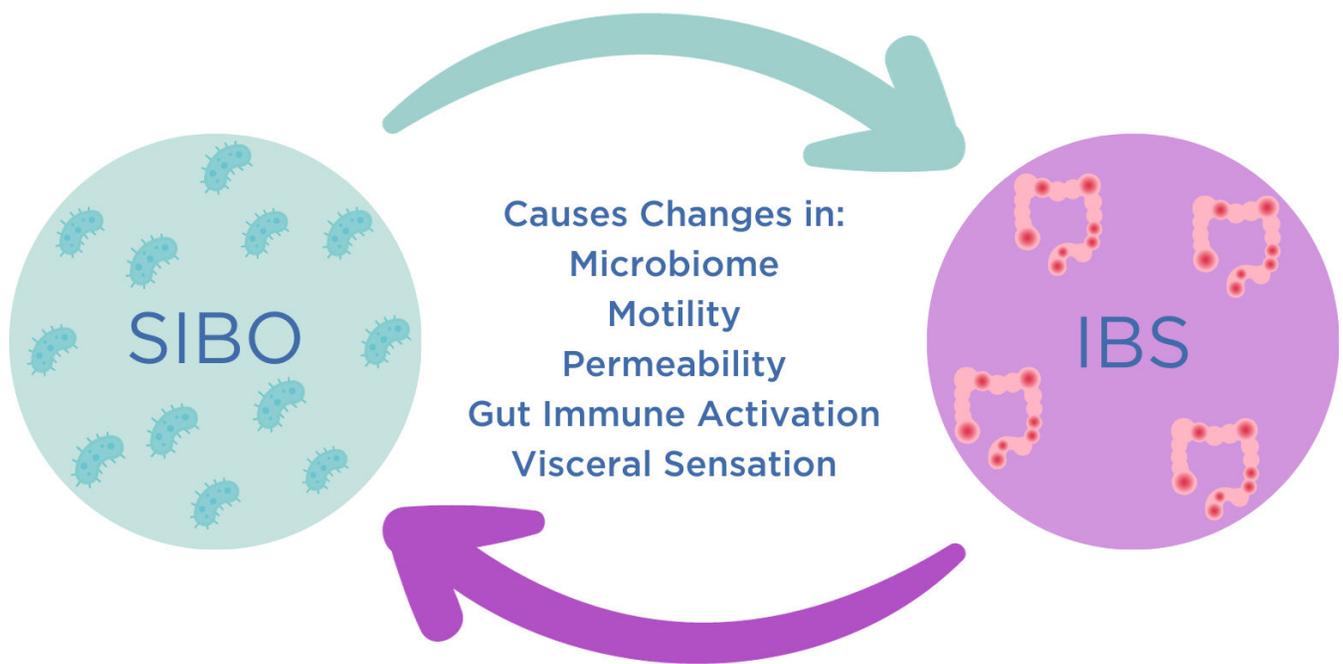
Small intestine dysbiosis occurs when there is a change in the composition, density, and function of the microorganisms present in the small intestine. Small intestinal bacterial overgrowth (SIBO) is a type of dysbiosis characterized by the overabundance of colonic (large intestine) and mouth/throat bacteria in the small intestine. When present in the colon, colonic bacteria are not harmful and are part of normal digestion in helping to break down fiber. However, the stomach and the small intestine normally contain relatively few bacteria and the composition of the microorganisms present is very different from that of the large intestine. Stomach acid and food movement through the GI tract (intestinal motility) limit the overgrowth of bacteria in the small intestine. Any impairment of these protective mechanisms can lead to SIBO.

The underlying causes of SIBO are complex and have been associated with several factors, including functional and motility disorders (i.e., irritable bowel syndrome and diabetes), raised gastric pH (i.e., long-term proton pump inhibitor (PPI) use - a medication often prescribed to relieve the symptoms of acid reflux) and complications of abdominal surgery (i.e., adhesions and strictures) causing stasis. GI stasis is the slowing of the passage of food through the GI tract and is also referred to as blind loop syndrome (3). The symptoms of SIBO are non-specific and include bloating, excess gas, abdominal distension, diarrhea, and abdominal pain (3).



The prevalence of SIBO is hard to determine, however, it may affect up to 1 in 7 of us and between 80-90% of IBS patients may also have SIBO (4). There is an overlap of symptoms seen between patients with IBS and patients with SIBO. What remains uncertain is whether SIBO acts as a cause or a consequence of IBS, or perhaps both, leading to a continuous cycle of chronic GI health problems (5). Clarity surrounding diagnosis could help in determining the root cause of the symptoms, meaning the appropriate treatment can be given. A standardized method, such as a breath test, can be used to diagnose SIBO and help patients gain control over their GI health.

There are three distinct variations of bacterial overgrowth: hydrogen-SIBO, intestinal methanogen overgrowth (IMO), and hydrogen sulfide-SIBO. Hydrogen-SIBO is caused by an overgrowth of bacteria that produce excess levels of hydrogen, which can be measured in breath. IMO is due to an overgrowth of microorganisms called archaea that can produce excess methane which is also measurable in breath (6). Hydrogen sulfide-SIBO occurs due to an overgrowth of hydrogen sulfide-producing bacteria in the small intestine and there is currently no available test to measure these levels.



SIBO is more prevalent in females and the elderly, and its risk increases with age (4). A common misconception is that SIBO affects only a limited number of patients, such as those with an abnormality in the upper GI tract, or those with a motility disorder. However, SIBO may be more prevalent than previously thought. This increase in prevalence is likely due to the improvement of readily available diagnostic tests (7).

As mentioned previously, SIBO causes non-specific GI symptoms which could also be associated with other GI conditions. Because of this, symptoms alone cannot be used to establish the diagnosis of SIBO, and further diagnostic testing is required. The use of non-invasive hydrogen and methane breath tests is becoming increasingly popular in clinical settings (8). Even though SIBO is not life-threatening, the symptoms can significantly affect the quality of life of patients. Once SIBO has been confidently identified,

there are treatments available to manage and treat the disease. Because the causes and symptoms of SIBO can vary from person to person, what works for someone else might not have the same effects on you. Everyone is different.

In this eBook, we will first cover the symptoms and causes of SIBO in more detail. Then we will focus on how SIBO can be diagnosed, followed by how it can be treated and prevented to achieve better GI health.

Did you know?

There are many other diseases that the gut microbiome plays a role in. Lets take a look:

- **Cardiovascular Disease.**
Choline is broken down and converted into TMA by the gut microbiome which is then converted into TMAO in the liver. TMAO is known to increase the risk of cardiovascular disease.
- **NAFLD (Non-alcoholic Fatty Liver Disease).**
Carbohydrates are broken down and converted into ethanol by the gut microbiome. High levels of ethanol in the blood increases the risk of NAFLD.

Small Intestinal Bacterial Overgrowth

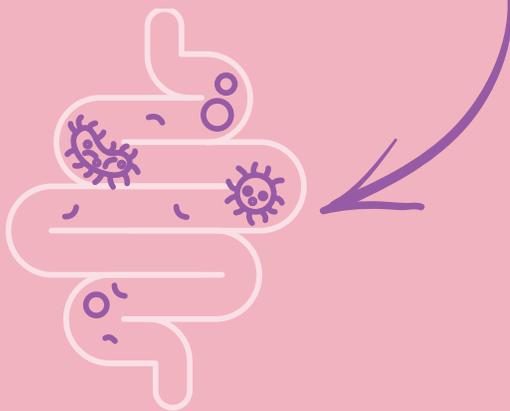


Symptoms are very similar to IBS and can cause confusion during diagnosis and treatment - in fact, **up to 80% of those with IBS may also have SIBO**

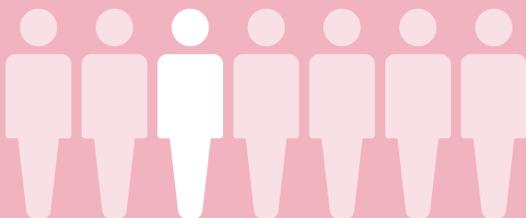
SIBO is caused by an abnormal increase in bacteria in the small intestine, particularly those normally found in the large intestine.

COMMON SYMPTOMS INCLUDE

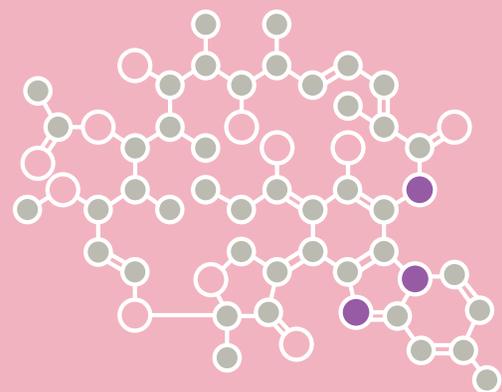
- ✓ Constipation
- ✓ Diarrhoea
- ✓ Bloating
- ✓ Increased flatulence



Breath testing is a common tool to gain insights into the levels of bacteria in the intestine



Thought to affect up to **one in seven of us**



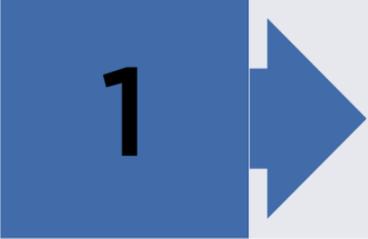
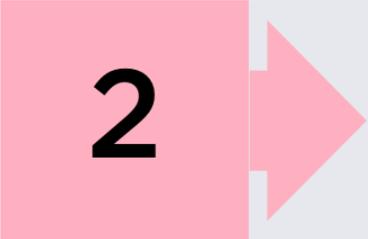
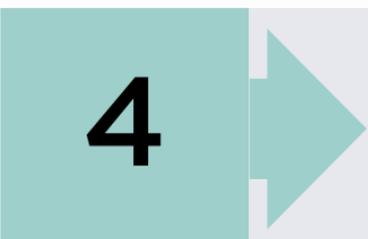
Rifaximin is the most common treatment for SIBO

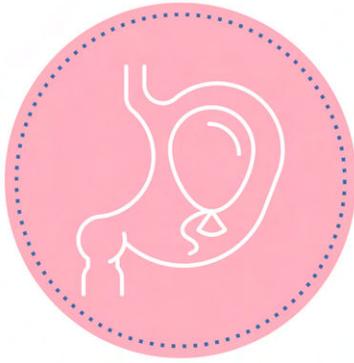
Symptoms and Causes

How can SIBO make us feel and what can cause it?

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SYMPTOMS OF SIBO

-  1 Bloating and Distension
-  2 Excess Gas
-  3 Diarrhea
-  4 Abdominal Pain and Cramps
-  5 Malabsorption and Weight Loss
-  6 Vitamin Deficiency



Bloating

Bloating is a frequently experienced symptom among individuals with gastrointestinal conditions, and it is particularly prevalent in those diagnosed with SIBO. Bloating feels like trapped gas, abdominal pressure, and the feeling of being ‘full-up’ even if food has not been consumed recently. During normal digestion, food mixes with digestive fluids in the stomach and small intestine and then moves to the large intestine to be digested further. When the movement of food through the small intestine slows down or becomes stagnant, bacteria from the large intestine can move upwards to feed on it. This can cause the bacteria from the large intestine to establish a community in the small intestine. Bacteria from the large intestine break down carbohydrates into gas. The more this type of bacteria is present in the small intestine, the more gas is produced. This increased volume of gas stretches the small intestine and causes bloating. Abdominal distension is when the bloating causes an increase in the size of the abdomen. This means that bloating and abdominal distension are often experienced together, however, it is possible only to experience one at a time (1).



Excess gas

The excess gas that causes bloating in SIBO can also cause flatulence (passing wind). This can be one of the more uncomfortable symptoms of SIBO. Swallowing too much air while eating can cause this excess gas to build up, however, in SIBO, the excess gas is more commonly caused by the bacteria overpopulating the small intestine. In patients without SIBO, excess gas can be caused by the gut microbiome becoming unbalanced. It can also be seen in individuals with food intolerances, where the microbiome has access to more carbohydrates to break down than normal, causing more gas to be produced. The breakdown of carbohydrates by bacteria in the small intestine produces hydrogen gas, which can feed the archaea also found in the GI tract. These then produce methane. So, when you have SIBO, you can have excess levels of hydrogen, methane, or both in your digestive system (9). You may also have excess hydrogen sulfide in your GI tract if you are suffering from hydrogen sulfide-SIBO – an overgrowth of hydrogen sulfide-producing bacteria.



Diarrhea

The link between SIBO and diarrhea lies in the effect that bacterial overgrowth has on the digestive process. In SIBO, the excess bacteria in the small intestine can interfere with the digestion of food. This disruption can result in impaired absorption of nutrients and an increased production of gas (10). The excess can put pressure on the intestinal walls, leading to loose stools.

The bacterial overgrowth can also cause an inflammatory response, further disrupting the digestive system and causing diarrhea. This is because the immune system recognizes the bacterial overgrowth as a threat to the body and releases inflammatory cells to fight it.



Abdominal pain and cramps

Abdominal pain can be a symptom of many conditions. It is a pain that occurs between the chest and the groin, and there are mainly three different types. The first is burning abdominal pain which is commonly caused by an ulcer or acid reflux. The second is abdominal stitches which are generally caused by excess gas or abdominal swelling. The third is colic abdominal pain, caused by

intestinal issues such as diarrhea, constipation, and menstrual problems (11). Colic abdominal pain is usually the type that people with SIBO commonly experience – physical pain caused by their other symptoms. Some people with SIBO will experience abdominal stitches due to the excess gas produced by the bacteria.



Malabsorption and weight loss

SIBO can disrupt the digestive process, leading to the inability to absorb certain nutrients. These include carbohydrates, proteins, and fats.

Carbohydrates: bacterial overgrowth can reduce the levels of enzymes found in the small intestine responsible for carbohydrate absorption (12). Also, many people suffering from SIBO follow low FODMAP (fermentable oligosaccharides, disaccharides, monosaccharides, and polyols) diets, which typically avoid most carbohydrates as they make them feel bloated. However, because carbohydrates are a major source of energy throughout the body, a carbohydrate deficiency can cause weight loss.

Proteins: SIBO can be caused by raised gastric pH due to low stomach acid production/secretion. Stomach acid is needed for the breakdown of

proteins. If proteins are not being broken down properly/enough, they cannot be absorbed. Poor absorption of proteins can cause weight loss.

Fats: bacterial overgrowth can disrupt bile (a fluid that helps with digestion). This leads to the formation of free bile acids, which can damage the lining of the intestine, and impair the absorption of fat-soluble nutrients such as vitamins A, D, E, and K (13). Fat malabsorption can lead to weight loss.

The bloating caused by SIBO can give a premature feeling of fullness, which may cause individuals to eat less and therefore lose weight.



Vitamin deficiency - fatigue and weakness

Fat malabsorption can stop the body from absorbing the fat-soluble vitamins – A, D, E, and K. Although bacteria in the small intestine can synthesize vitamin B-12, they also compete for its absorption. Vitamin B-12 is essential for the normal functioning of the nervous system, the production of blood cells, and the production of DNA. Malabsorption of B-12 in patients

with SIBO can result in weakness and fatigue, as well as tingling and numbness in your hands and feet (10).

The symptoms of SIBO are non-specific. This makes SIBO difficult to distinguish from other gastrointestinal conditions such as IBS and food intolerances. All these symptoms can also indicate more serious underlying gastrointestinal conditions, such as gastric cancer or IBD – especially if they are present long-term or appear to be getting worse. It is crucial that if you have been suffering from any of these symptoms for a long period, to seek advice from your healthcare provider, who can help rule out any serious causes. The frequency and severity of symptoms in people with SIBO are likely to reflect the degree of bacteria overgrowth. However, the symptoms experienced may also reflect the underlying cause of SIBO.

I don't think SIBO is a real condition.

**This is a myth:
SIBO is a well
researched
digestive condition**

Causes

SIBO occurs when the mechanisms that control bacterial populations in the small intestine are disrupted. The two processes that most commonly cause SIBO are decreased stomach acid secretion and decreased intestinal motility. However, other processes can also cause or increase the likelihood of developing SIBO, such as disturbances in immune function, and structural abnormalities caused by surgery. Let's dive in and see how these processes can cause SIBO.

Stomach acid

Stomach acid starts the process of breaking down the food we eat so that it can be absorbed. But it also helps to create a barrier, protecting the GI tract from the microorganisms that we ingest when we swallow and eat. Some of these microorganisms will be in or on our food, but our mouths and throats also contain many different organisms. Normally these are killed in the stomach via stomach acid, but in hypochlorhydria (low stomach acid production) these microorganisms can pass into our small intestine and cause SIBO. Hypochlorhydria can develop due to a lack of vitamins, surgery, a poor diet, or a *Helicobacter pylori* infection. The most common cause is due to anti-acid medication (PPIs) prescribed for acid reflux. Studies have shown that the balance of organisms in the gut microbiome is disturbed in patients taking PPIs, which reduce or neutralize stomach acid production (14). Also, if stomach acid levels are low, more undigested food will be present in the small intestine, which means bacteria have more nutrients to consume, potentially leading to bacterial overgrowth (15).

Intestinal motility

Normal intestinal motility involves a complex and coordinated series of processes designed to move food through the GI tract. For example, the migrating motor complex (MMC) is a pattern of electrical signals that control the muscle contractions along the GI tract. Every 90-120 minutes the signals sweep through the GI tract to remove residual food and unwanted microorganisms. Studies have demonstrated that abnormalities in the MMC may play a part in the development of SIBO (16). Intestinal motility disorders such as gastroparesis (paralysis of the stomach muscles) and IBS can also increase the risk of SIBO, as bacteria may not be effectively swept from the small bowel into the colon, and therefore can end up multiplying in the small intestine (17).



Structural abnormalities

Structural abnormalities in the GI tract provide an ideal environment for bacterial overgrowth (18). GI tract surgeries can create a 'blind loop' which can cause abnormal intestinal motility and ineffective clearance of food from the intestine, leading to SIBO (19).

Immune function

Intestinal immunity is important in maintaining the correct microbiome composition in the small intestine. Patients who have a certain autoimmune condition and immune deficiencies are at an increased risk of developing SIBO (19). The presence of invading bacteria may also affect the local immune system, hence disrupting normal gastrointestinal function (20).

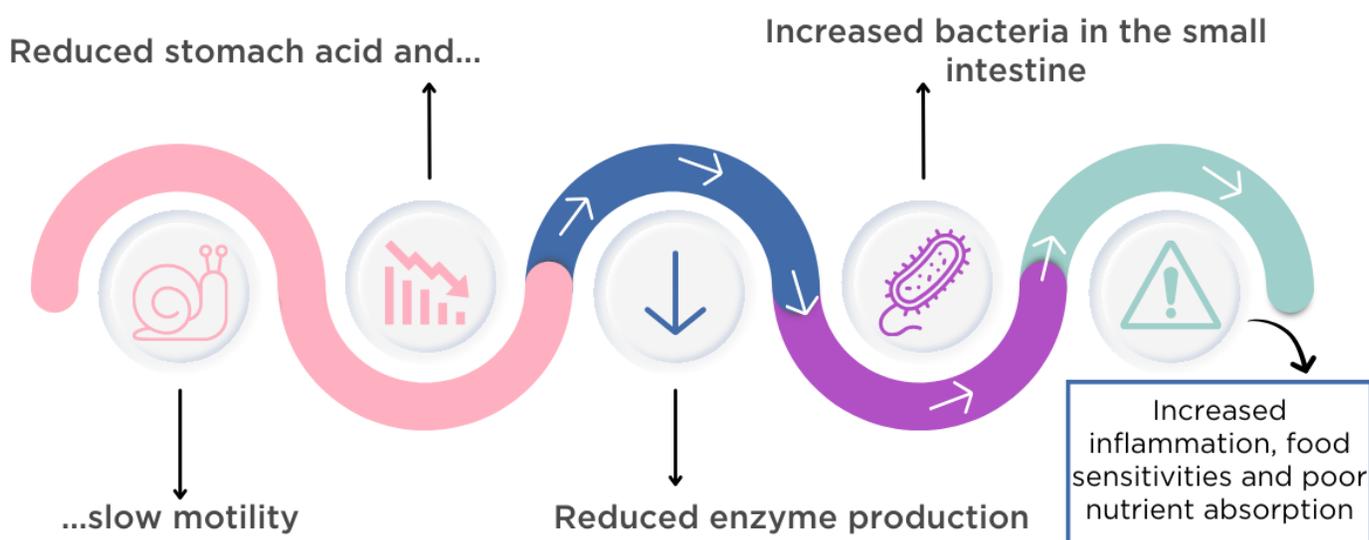
Systemic illness

There is an increased prevalence of SIBO in patients with other GI disorders, such as celiac diseases, IBD, chronic pancreatitis, IBS, and functional dyspepsia. SIBO has also been linked to non-GI disorders such as diabetes, hypothyroidism, chronic and end-stage liver disease, cystic fibrosis, and several others (21-23).

Now that we have covered what symptoms occur with SIBO and what can cause the condition, the next section of this eBook will focus on how SIBO can be diagnosed.



THE FLOW OF SIBO



Diagnosis

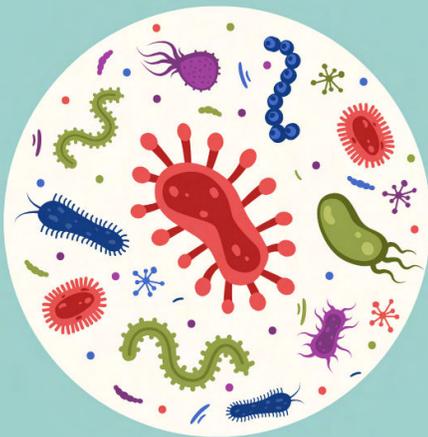
Tests to diagnose SIBO

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If you suspect that you may be suffering from SIBO, it is important that you first contact your doctor. They will be able to rule out other conditions that can mimic SIBO, such as IBS and IBD, as well as more serious conditions such as gastrointestinal cancers. Without consulting a doctor, you might find it challenging to identify the specific disease you're suffering from because many of the symptoms caused by SIBO often overlap with other conditions. Additionally, lacking a diagnosis from a healthcare professional makes gastrointestinal conditions difficult to manage effectively, leading to persistent symptoms over time.

In this section, we will outline the different methods that may be used to diagnose SIBO.

Myth: SIBO is a rare condition



Research has shown that SIBO may be found in up to 80-90% of IBS patients and affects around 1 in 7 healthy individuals. Not rare at all!

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Small intestine aspirate and culture

Small intestine aspirate and culture is a laboratory test to check for infection in the small intestine. This involves the use of an endoscope, which is a long thin tube with a small camera inside. The endoscope is passed through your mouth to the small intestine, and a sample of fluid from the small intestine is collected. The fluid is placed in a petri dish and is observed for the growth of bacteria or other organisms. This is called a culture. If the bacterial concentration is too high ($>10^3$ CFUs/mL) in the small intestine aspirate culture, this is diagnostic of SIBO (24). The most common bacteria identified include *Escherichia coli* and *Klebsiella* (25). Many other organisms have been observed (i.e., *Enterobacter*, *Bacteroides*, *Staphylococcus*, *Streptococcus*, *Enterococcus*, and *Lactobacillus*) (26).

Small intestine aspirate via endoscopy from the duodenum or jejunum is often considered the gold standard in diagnosing SIBO. However, this method does have its disadvantages mainly due to the invasiveness of the procedure (27). Patients are offered medicine known as sedation to relax them and make them feel drowsy due to the discomfort they are going to feel. Patients are also offered medicine to numb the throat. During the procedure, patients can feel sick and bloated, and those who have had sedation will need someone to stay with them at home for 24 hours. Time

consumption and cost are other disadvantages associated with endoscopy. In most cases, other tests, such as a breath test, are done first.

Breath testing

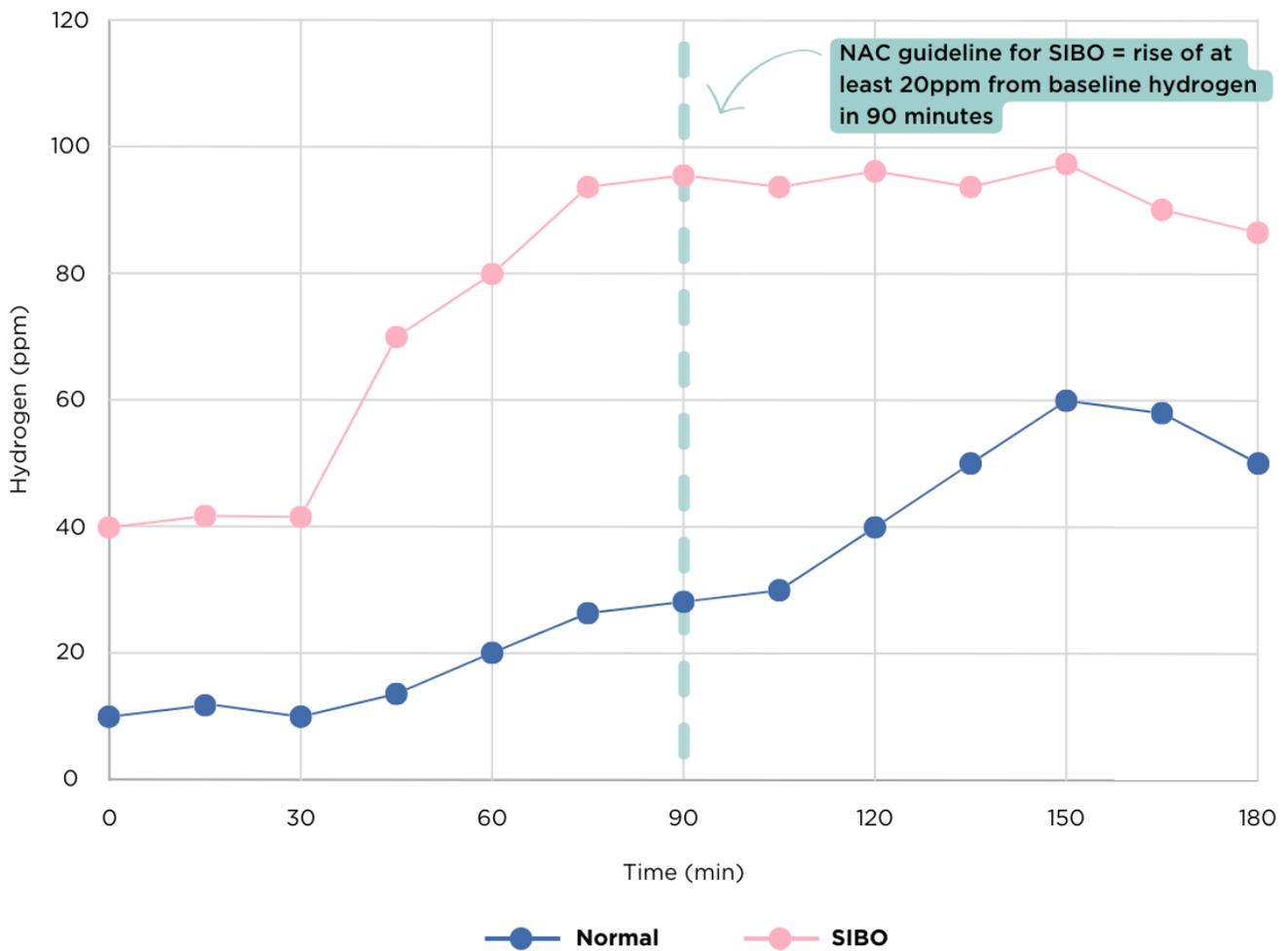
Breath tests are often the first line of investigation for SIBO as they are non-invasive, safe, and easy to perform, even more so as home testing kits are now available. Breath tests for SIBO work on the principle that the bacteria in the small intestine can be prompted to produce hydrogen or methane after patients drink a particular test substance. These key gases are then exhaled in the breath and can be measured for signs of SIBO.

The most common substrates used in breath tests for SIBO are carbohydrates such as lactulose and glucose. Lactulose is normally processed by GI tract bacteria in the large intestine leading to the production of hydrogen and/or methane. In individuals without SIBO, the administration of lactulose results in a peak in hydrogen/methane in breath, within 2-3 hours due to the metabolism in the large intestine (28). In patients with SIBO, administration of lactulose results in an earlier peak in breath hydrogen/methane levels due to the earlier metabolism by the overgrowth of bacteria in the small intestine. If you are allergic to lactulose or have altered GI tract anatomy from surgery, a glucose substrate can be used instead. In individuals without SIBO, glucose is rapidly absorbed from the small intestine, but when a glucose substrate is administered in the presence of SIBO, it is metabolized to hydrogen in the small intestine before it can be absorbed (28). Identifying which breath test you need to diagnose SIBO can be hard, which is why at OMED Health we have specialists in GI health to help find out what test is best for you. You can also discuss the options of breath testing with your doctor, who can provide you with advice on which test to choose. You can also head over to our FAQs page to get all your questions answered.



Myth: SIBO can not be cured

Fact: Many of the risk factors and causes of SIBO can be addressed, and even though reoccurrence does happen to some people, it is not a given!



Currently, there is no universally accepted diagnostic criteria for a positive breath test for SIBO. However, the North American consensus has proposed guidelines for lactulose breath tests, which are used by the UK Association of Gastrointestinal Physiologists (28).

The North American Consensus (NAC) Guidelines for Breath Testing.

Amount of substrate:

- 75g of glucose, 10g of lactulose, and 25g of fructose

Test results:

- A rise of ≥ 20 ppm from baseline hydrogen in 90 minutes should be considered a positive test for SIBO.
- A rise of ≥ 20 ppm from baseline hydrogen during the test should be considered positive for fructose (after 180 mins) and lactulose (after 90 mins) breath testing.
- A rise of ≥ 10 ppm from baseline methane should be considered positive for methane breath testing.

BREATH TESTS FOR SIBO



Do you have a suspicion that you may be suffering from Small Intestinal Bacterial Overgrowth (SIBO)?

Hydrogen and Methane Breath Tests could help you!

Using our at-home breath test kits, we can investigate the bacteria in your gut and highlight possible causes of your symptoms.

Find solutions to help manage your SIBO related symptoms with OMED Health



Other tests for SIBO

Blood tests

Blood testing for SIBO can be used to look for vitamin deficiency. They can also measure various markers in the blood that indicate the presence of bacterial overgrowth or inflammation in the small intestine. When there is an overgrowth of bacteria in the small intestine, it can lead to an immune response and inflammation in the body. This immune response triggers the release of markers into the blood that can be measured, including C-reactive protein (CRP) and anti-immunoglobulin antibodies. Elevated levels of these markers in the blood can be interpreted alongside symptoms and other tests to indicate the presence of SIBO, or other gastrointestinal conditions (29). Whilst these blood tests can provide valuable insights into the presence of bacterial overgrowth and inflammation, their accuracy as a standalone diagnostic tool is limited. Therefore, blood tests are more commonly used to rule out any further serious conditions rather than diagnose SIBO itself. Blood tests may also be used to identify potential underlying causes of SIBO.

Motility tests

Your doctor may order a motility test to help diagnose SIBO and develop an effective treatment plan that can address the cause and symptoms of your condition. A small bowel manometry is a motility test that can provide information regarding the muscle activity of the stomach and small intestine (30). This test can help determine what area of the GI tract is not working properly. In SIBO that is caused by low intestinal motility, this test will identify the small intestine as the issue.

Stool tests

Stool testing can be used to test for fat malabsorption that can be caused by SIBO but cannot be used to diagnose SIBO itself.

After the diagnosis of SIBO by your doctor, the next steps will be to treat the condition, as well as manage and reduce your symptoms. Our next section focuses on the different treatments available for SIBO.



Myth: SIBO is always easy to treat

SIBO can be challenging to treat! This is due to the many causes of SIBO, all of which need to be addressed and corrected to ensure that SIBO treatment is effective

Treatment and Prevention

How can we manage SIBO and prevent the
condition from returning?

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After a diagnosis of SIBO, patients typically are given a treatment plan tailored to their specific needs, usually focused on the root cause of the condition. These treatment plans may include dietary modifications, antibiotic therapy, and probiotic supplementation. The primary goal of SIBO treatment is to reduce bacteria in the small intestine to improve symptoms. Regular follow-up appointments with healthcare professionals are essential to monitor symptom improvement, assess treatment effectiveness, and make any necessary adjustments to achieve long-term management and prevent the recurrence of SIBO.

Antibiotics

Antibiotics are the most used method to treat SIBO, although some people are often wary of using them due to side effects such as diarrhea and nausea. The purpose of antibiotic therapy is not to completely remove the bacteria in the small intestine but to moderate the small intestinal microbiota in a way that leads to the improvement of SIBO symptoms. Several different types of antibiotics can be used to treat SIBO, but which is best for a specific individual and at what dosage is still not clearly understood (31).

The antibiotic of choice to treat SIBO is rifaximin, which is well-tolerated and the most effective. Rifaximin is poorly absorbed via the gastrointestinal tract, meaning it can pass through the intestines and act effectively on small intestinal bacteria. It also has antibacterial effects against many different types of bacteria (32,33). According to studies, rifaximin also protects the healthy intestinal microbiota and increases the number of beneficial bacterial strains (such as *Lactobacillus* and *Bifidobacterium*) (34).

However, SIBO can recur after antibiotic treatment, so this may need to be repeated (35). A study by Lauritano et al found SIBO symptom recurrence in 12.6% of patients three months after successful rifaximin treatment, 27.5% of patients six months after successful treatment, and 43.7% of patients nine months after successful treatment (36). Overall, approximately 45% of patients will have recurrent SIBO following the completion of antibiotic treatment (37). It should be taken into consideration that antibiotic re-treatment may be associated with an increased risk of antibiotic resistance, diarrhea, and gut microbiome dysbiosis.

Diet

Dietary strategies for the treatment of SIBO are based on the reduction of fermentable products available to the bacteria, to reduce inflammation and correct any nutritional deficiencies (38). A diet low in fermentable oligosaccharides, disaccharides, monosaccharides, and polyols, also known as the low FODMAP diet, deprives bacteria in the small intestine of their source of energy necessary for reproduction and growth. This can reduce

the levels of hydrogen seen in breath tests. However, it is not clear whether the improvements seen from dietary changes are the result of a modification and reduction of bacteria in the small intestine, or simply due to a reduction in fermentation and therefore gas production (39). Therefore, it is important to remember that diet changes do not cure SIBO, but they can alleviate symptoms.

F

Fermentable Sugars

When in contact with the gut microbiome, fermentation and gas production occurs

O

Oligosaccharides

A type of carbohydrate, including whole grains, some cruciferous vegetables, and some fruits

D

Disaccharides

Includes lactose in milk and other dairy products

M

Monosaccharides

These include fructose, galactose, and glucose

A

And...

P

Polyols

Small-chain carbohydrates that occur naturally in certain fruits and vegetables or as additives in packaged foods

The elemental diet is a liquid diet or powder mixed with water. It is often used by people who have trouble digesting food because they have compromised digestive systems. The diet gets its name because nutrients are introduced into the body as close to their primary (elemental) form as possible.

The elemental diet has been studied as a possible treatment for SIBO for the following reasons:

- Nutrients in the elemental diet are believed to be absorbed in the first part of the small intestine, which reduces the nutrients available to the bacteria growing deeper in the small intestine (40).
- The elemental diet may increase the amount of bile that gets released from the gallbladder, which could help ‘flush out’ the small intestine and reduce bacteria levels (41).

Although dietary modification is used in some clinical practices for patients with SIBO, its effectiveness has yet to be determined. No diet is proven to treat SIBO in every patient, but your healthcare provider may recommend a diet plan that can help keep symptoms at bay or stop the condition from coming back once it has been treated.



Can changing your diet be used to treat SIBO?

SIBO-specific diets aim to remove the preferred food source bacteria in the small intestine - however, bacteria can thrive on any form of nutrition. Diet alone cannot treat SIBO but could relieve symptoms temporarily

Probiotics

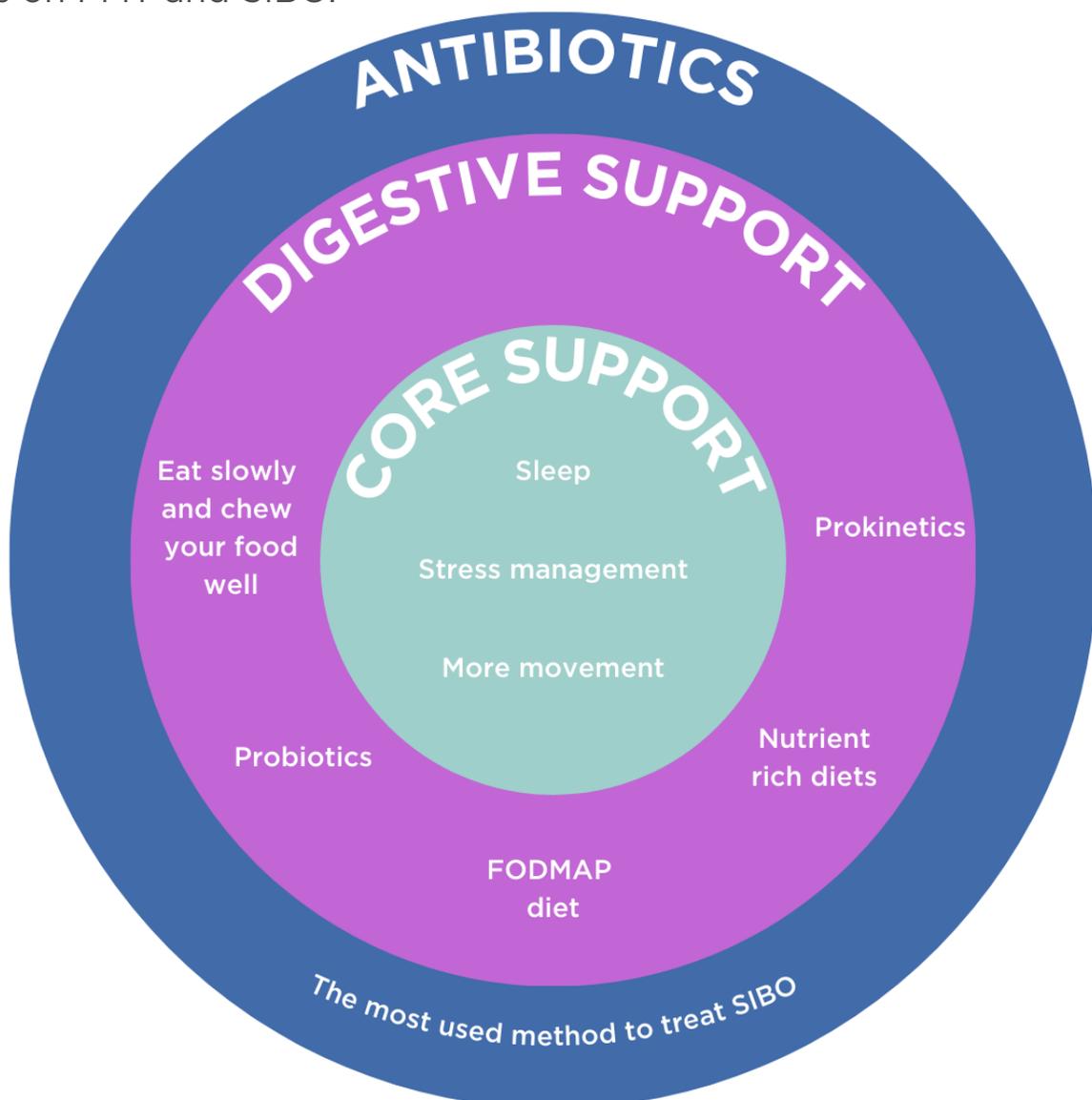
Probiotics are live microorganisms that, when administered to people at appropriate doses, have beneficial effects on health. In the case of SIBO, probiotics are deemed important due to their ability to balance the composition of the microbiome and protect the GI tract against harmful pathogens. Probiotics limit the growth and metabolism of harmful microorganisms, including bacteria in the small intestine - they do this by producing antimicrobial substances.

It is important to remember that the effects of probiotic therapy in SIBO are strongly dependent on the strain that is used and that not all probiotics are going to be effective in treating SIBO. For example, one study found that the use of probiotics in SIBO patients reduces the hydrogen measured in breath testing (42). Another study found that probiotic use in SIBO patients resulted in worsened bloating, flatulence, and ‘brain fog’, with these symptoms improving after the probiotic was stopped and antibiotics introduced (43). This highlights how everyone’s GI tract is different and may react in different ways to treatments. Something that works for one person,

may not work for the next. Probiotic therapy should be carefully considered for each patient, as it may either bring the expected improvement or make the existing condition worse. Further studies are needed to establish if there is a role for probiotics in the treatment and management of patients with SIBO (44,45).

Fecal microbiota transplantation

Fecal microbiota transplantation (FMT) in gastrointestinal diseases has been gaining attention from medical researchers over the past few years. FMT is a transplant of stool from a healthy donor to a recipient with a disease that is related to an unhealthy gut microbiome (46). FMT is already successfully used as an effective treatment for *Clostridium difficile* (*C. diff*) infections. It has now been proposed as an effective therapy to restore the gut microbiota barrier by transplanting functional gut microbiota from healthy donors to patients. An advantage of FMT is that it would not cause an immune response or rejection like other forms of organ transplants, however, it does involve an invasive procedure (47). FMT is not an FDA-approved treatment for SIBO, and although SIBO is associated with conditions that have been found to respond well to FMT, there is a lack of studies on FMT and SIBO.





All antibiotics can cure SIBO

This is a myth: Selecting antibiotics to treat SIBO must be done carefully to target the specific bacteria causing the overgrowth. Wrong antibiotic = bacteria continue growing

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Prevention

It is not always possible to prevent SIBO, but some steps can be taken to look after your GI health which may help to prevent a recurrence. This includes eating a nutritious and varied diet and appropriately managing any other GI conditions that may lead to SIBO if left untreated.

Medications that decrease intestinal motility (i.e., opioids and benzodiazepines) and cause low stomach acid production (i.e., proton pump inhibitors) should be avoided whenever possible.

Prokinetics are a group of prescription medications that work by promoting the movement of food through the GI tract and are useful in patients with intestinal dysmotility by reducing the risk of bacterial overgrowth (48). There are also natural prokinetics, such as ginger root, artichoke leaf, and peppermint leaf, which could lead to some benefits. However, it is important to discuss with your doctor before adding any natural prokinetic to your diet, as they may interact with other medications.

In selected patients who experience multiple documented episodes of SIBO per year and have risk factors for recurrent SIBO, prevention using a rotating antibiotic prophylaxis plan has shown to be more effective than # treatment with a single course of antibiotics (49).

If you have been successfully treated for SIBO in the past, there are many things you can do to try and stay healthy and prevent a recurrence. It is important to remember that just like SIBO treatments, these preventive methods may not work for everyone.

Let's see what we can do to prevent a SIBO recurrence:

- **More movement** - one way to support healthy motility is through movement, especially moving periodically throughout the day, not just one jog and then sitting at a desk for the rest of the day. Some people may also benefit from post-meal walks to help with GI motility.
- **No eating before bedtime** - when it comes to eating, the rule for improving motility is to stop eating at least three hours before bed. This allows the MMC to clear the food debris from your small intestine whilst you sleep.
- **Avoid snacking** - another way to help the MMC do its thing is to avoid snacking between meals (50). It is best to work with a dietician when making any changes to your diet.
- **Plant-heavy diet** - a low-quality, highly processed diet may lead to constipation, which slows motility and therefore increases the risk of SIBO relapse. You want to eat a varied, plant-heavy, nutrient-rich diet with plenty of fiber and probiotic-rich foods.
- **Manage your stress levels** - stress can cause the release of hormones which can slow down digestion and promote stasis. Exercise, meditation, and deep breathing can help alleviate stress-induced motility issues and reduce the risk of SIBO recurrence.
- **Intestinal massages (yes, they are a thing!)** - in some patients, the decrease in GI motility is due to adhesions and scar tissue. Visceral manipulation therapists are trained to break up this scar tissue and massage the lower stomach area to improve motility and digestion (51).

6 tips to stop SIBO recurrence.

It is important to remember that just like SIBO treatments, these methods of prevention may not work for everyone.



At-home breath tests provide an easy and quick way to diagnose SIBO. Longitudinal monitoring is important in the management of the disease, to be able to keep track of whether treatments are working and to monitor any signs of SIBO recurrence. Therefore, a breath testing device that can carry out longitudinal monitoring could help decrease SIBO recurrence rates. We might have just the thing...

Further resources

<https://omedhealth.com/>

<https://omedhealth.com/insights-hub/sibo-and-ibs-chicken-or-the-egg/>

<https://omedhealth.com/insights-hub/sibo-treatments/>

<https://omedhealth.com/insights-hub/small-intestinal-bacterial-overgrowth/>

<https://www.cuh.nhs.uk/patient-information/hydrogen-breath-test-for-small-bowel-bacterial-overgrowth/>

<https://my.clevelandclinic.org/health/diseases/21820-small-intestinal-bacterial-overgrowth-sibo>

OMED Health

OMED Health is a dedicated, patient-centric brand developed by Owlstone Medical, the global leader in Breath Biopsy®. OMED Health utilizes Owlstone's expertise in analyzing exhaled breath and offers patients and clinicians access to breath-based diagnostic tests, point-of-care (PoC) devices, and support resources for a range of conditions. Our initial focus is helping those with digestive issues have an improved quality of life by enabling better, and faster, understanding and management of their conditions. In digestive health, breath testing is emerging as an effective way for patients to monitor and manage symptoms. We have a dedicated Advisory Group to offer informed perspectives and advice, allowing us to deliver appropriate products and services to our customers.

OMED Health's GI health tests detect small amounts (up to parts per million) of hydrogen and methane gases in the breath, which can be collected at home or in the clinic. These gases can be key indicators of GI health and can signal the presence of certain conditions and diseases, such as SIBO as described in this eBook. We also offer tests for food intolerances. Some people can be intolerant to certain sugars such as lactose, which

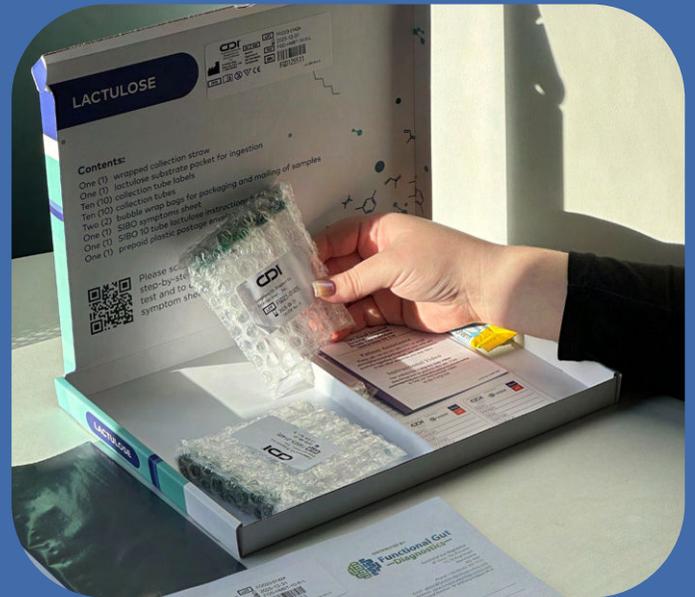
"People living with digestive health issues currently feel let down. They are waiting years to get a diagnosis and have little choice but to live their daily lives in discomfort, with many turning to fad diets, supplements, apps, and devices that have little to no scientific basis. Through OMED Health, we are developing our breath analysis technology, developed with the support of GI health experts, to provide people with a solution they can trust. Our aim is simple – helping the billions of people globally with digestive health issues live normal lives."

**Billy Boyle - CEO of
OMED Health and
Owlstone Medical**



won't get absorbed as efficiently by your body. This means there are excessive amounts of sugar available for the bacteria in the large intestine to convert into hydrogen and methane, resulting in uncomfortable symptoms such as bloating and abdominal pain.

We can currently offer clinically validated at-home breath testing kits, and our at-home device for analyzing levels of hydrogen and methane anytime anywhere will launch soon, with a waitlist for priority access available. For our breath testing kits, patients provide an initial breath sample by blowing into a test tube through a straw. This gives us your baseline reading. Then, you will drink water containing a carbohydrate



(different ones depending on the test). Breath samples then need to be taken at regular intervals over two hours for the SIBO test, or three hours and twenty minutes for the food intolerance tests. Once finished, the GI testing kit needs to be posted back to us in the pre-paid envelope provided. Following analysis, test results alongside our interpretation are provided to help diagnose these conditions, with results received in a report in just five working days. Breath tests are a simple and safe way to collect these gases from your breath to start understanding your symptoms. This forms part of the information that a specialist doctor can use to help you take better control of your GI health.



Our portable breath analyzer that can monitor GI health over time by measuring hydrogen and methane levels in the breath is soon to launch, and you can register your interest in the device via our waitlist, to ensure you gain priority access. The device will be accompanied by our mobile app that allows you to view your hydrogen and methane results, as well as track symptoms and lifestyle factors, such as diet, exercise, and sleep. The device itself cannot be

used for diagnostic purposes. The information provided by the device is insufficient to make a diagnosis and is only intended to be used in support of a general recommendation to seek further advice from your doctor.

SIBO and food intolerances are common causes of digestive discomfort, the former can be treated with antibiotics, and the latter with targeted dietary changes. By using the data from our breath tests and combining it with expert support, personalized healthcare plans can be generated for the ongoing management of your GI health.

Our breath testing kits are already in use by multiple NHS trusts across the UK. The OMED Health website provides a platform for the sale of our clinical tests, as well as offering access to news, articles, events, and other content. For more information about OMED Health and the digestive health breath tests we offer, visit our website at <https://omedhealth.com/>.

We can help you to take control of your gut health!

At-home tests

Device and App

Expert support



Join the waitlist now for first access to the OMED Health Breath Analyzer device and App, or purchase a kit to start your digestive health journey today!

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OMED Health
183 Cambridge Science Park
Milton Road
Cambridge
CB4 0GJ

[omedhealth.com](https://www.omedhealth.com)



@omedhealth

info@omedhealth.com

