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Small Intestine Bacterial Overgrowth (SIBO)

What is SIBO?

Small intestine bacterial overgrowth or SIBO refers to an overgrowth of beneficial bacteria in the small intestine. Our body naturally hosts trillions of bacteria or flora, which is referred to as the microbiome. These bacteria are present on our skin and gastrointestinal tract and when in balance, often maintain a beneficial relationship with the body. The gut microbiome is involved in many of the body's processes and is beneficial for nutrient absorption, fatty acid metabolism, fiber digestion, immune activation, brain health, and so much more.

Although there are some bacteria in the small intestine, the large intestine houses the largest amount of bacterial flora. On average, the human body houses 4 pounds of bacteria, with the majority in the large intestine! In addition to the functions above, the gut bacteria in our large intestine also digest specific types of carbohydrates for energy. This digestion process is called **fermentation** and results in a release of gases, such as hydrogen and methane gas, into the large intestine. Given the short length of the large intestine, the gas released as a byproduct of fermentation can be passed easily.

SIBO and its related symptoms *occur when there is an increase or overgrowth of flora in the small intestine*. This is problematic because fermentation, which should occur in the large intestine, will then occur in the wrong place, leading to trapped gas and cellular damage. Causes of SIBO vary but include low stomach acid, chronic use of PPIs, increased age, motility disorders, autoimmune diseases, food poisoning, and medication use (i.e. opioids, acid blocking agents, antibiotics, anti-diarrheal agents, steroids, etc).

Common symptoms of SIBO include gas, bloating, abdominal pain, nausea, diarrhea, constipation, nutrient malabsorption, indigestion, and heartburn. Some cases may be asymptomatic, however the gases can cause damage to the intestinal lining, leading to inflammation. It is believed that 70% of IBS cases are caused by SIBO.

How is SIBO diagnosed?

The gold standard to diagnose SIBO is a jejunal aspirate (sample of small intestinal fluid); however, this is rarely performed due to its invasive nature. Currently, the least invasive test available is the lactulose breath test. The breath test involves drinking a solution of lactulose and then collecting breath samples for 3 hours. Our gut bacteria ferment lactulose, which will lead to production of hydrogen and methane gas. These gases are absorbed by blood vessels surrounding the intestines, which are then brought to the lungs and exhaled. When there is an overgrowth of small intestinal bacteria, the bacteria will readily ferment the lactulose solution and create hydrogen and/or methane gas. The breath test measures the amounts of these gases and provides evidence for a diagnosis. An increase in hydrogen and/or methane gas within 90 minutes indicates a positive test for SIBO.

How is SIBO treated?

There are several different approaches to treating SIBO. The most common approach involves using pharmaceutical medications or botanical medicines and adhering to a strict diet, called the low FODMAP diet. Botanical and prescribed medications are often anti-bacterial and work to kill the bacteria in the small intestine. The anti-microbials used are usually localized to the small intestine and do not have an impact on the other flora in the body. The diet is used to starve the bacteria (but feed the person) and prevent further bacterial growth. If decreased motility (i.e. constipation) is a factor, a motility agent and/or fasting can also be used to promote normal intestinal motility.

What is a low FODMAP diet?

The term FODMAP is an acronym that refers to fermentable oligosaccharides, disaccharides, monosaccharides, and polyols. These are types of short chain carbohydrates or sugars that are poorly absorbed and/or fermented (consumed as food) by the intestinal bacteria. Some of these sugars are known as “pre-biotics” because they feed our intestinal bacteria. See the table below for a full description of each fermentable sugar. When these sugars are not absorbed, they draw water into the gut, leading to diarrhea, abdominal pain, and inflammation. When these sugars are fermented, hydrogen and methane gas are produced, leading to gas, bloating, distension, changes in motility, and abdominal pain. Studies have shown that up to 75% of those with IBS benefit from following a low FODMAP diet.

The diet is separated into two parts: the elimination phase and the reintroduction phase. In the elimination phase, all high FODMAP foods are eliminated from the diet. This phase typically lasts 2-6 weeks, depending on symptoms. During this phase, a notable relief in symptoms should occur. Once adequate symptom relief is achieved, the reintroduction phase may begin. During this phase, high FODMAP foods are gradually reintroduced back into the diet. If the food group causes no symptoms, then it may be included in the diet going forward. If there are symptoms, then that food or food group may be removed from the diet altogether. Once you have figured out the food or food groups you do/do not tolerate, you can expand your diet.

Please note that a low FODMAP diet is used short term to improve symptoms and is not meant to be followed long term.

The FODMAP Sugars	
Sugar	Notes
Fermentable	Refers to certain sugars that are eaten by the gut microbiome, which produce gas.
Oligosaccharides	A group of sugars that can be further classified into fructooligosaccharides (FOS), fructans, and galactooligosaccharides (GOS). Foods high in GOS are legumes. Common fructans or foods high in FOS include wheat, rye, garlic, onion, leeks, and some vegetables. Of note, wheat is omitted from the diet due to its fructan (carbohydrate) content, not its gluten (protein) content.
Disaccharides	Lactose or “milk sugar” found in milk and other dairy products.
Monosaccharides	Fructose found in high-fructose corn syrup, some varieties of honey, fruits, and veggies.
	and
Polyols	Sugar alcohols (end in -ol). Examples include xylitol, erythritol, mannitol, sorbitol, and isomalt. These are normally found in marketed “sugar-free” foods/candies and keto products. Polyols are poorly absorbed and cause side effects in all people.

Explanation of FODMAP fermentable sugars. Resource: Integrative Medicine by Dr. David Raket.

Please note: The diet used at the Institute for Peak Health to treat SIBO incorporates elements from the low FODMAP diet **and** the specific carbohydrate diet (SCD). It is called the **SIBO Specific Diet**.

Resources:

- Gottschall, Elaine. *Breaking the Vicious Cycle*. The Kirkton Press. Ontario, Canada. 1994.
- Raket, David. *Integrative Medicine*. Elsevier. Philadelphia, PA. 2012. 882-885.

What is the SCD diet?

The specific carbohydrate diet (SCD) is a grain-free diet that restricts difficult-to-digest carbohydrates, specifically polysaccharides. The SCD has been studied to be effective in reducing inflammation in those with inflammatory bowel disease (IBD) and certain behavioral disorders. The SCD focuses on consuming easy-to-digest carbohydrates, which reduces stress and inflammation in the gut. “By using a diet which contains ‘pre-digested’ carbohydrates, the individual with an intestinal problem can be maximally nourished without over-stimulation of the intestinal microbial population” (Gottschall). We have combined the low FODMAP diet with elements from the SCD to enhance the healing process.

Helpful Resources

- **Monash University of Australia** is the leader of FODMAP research, specially relating to irritable bowel syndrome (IBS) and endometriosis. Monash has created a smartphone app, called the Monash University Low FODMAP app. Although it costs a few dollars, the app is extremely helpful in helping identify the FODMAP or fermentability content of foods. The app presents a traffic light system: green for low FODMAP, yellow for moderate FODMAP, and red for high FODMAP. In addition to the app, Monash University has also developed a low FODMAP certification stamp. Certification is given to those brands or foods who have undergone rigorous testing for FODMAP content. Unless a product bears the low FODMAP certification stamp, it cannot be guaranteed it is a low FODMAP food.



Please note: Although foods may be certified low FODMAP by Monash or be labeled as a “green” food on the Monash low FODMAP app, it may not be permitted in your diet. The reason for this that the food is not permitted on the SCD diet, which we blend with the low FODMAP diet. Notably, grains such as rice and quinoa along with corn, potatoes, sweet potatoes, and table sugar (sucrose) are actually low FODMAP, but are **not** permitted on the SCD.

- **FODMAP Everyday** is an online website dedicated to all things low FODMAP, providing hundreds of recipes, shopping lists, and resources for those who follow a low FODMAP diet.
- **FODMAP Friendly** is another Australian resource that is much like Monash University, in which they also have a smartphone app and a low FODMAP certification stamp. Their website, fodmapfriendly.com, is a great resource for general information and recipes.



- **Kate Scarlata**, MPH, RDN provides a wealth of low FODMAP information on her website, katescarlata.com. She is also the author of several cookbooks and often collaborates with many other cookbook authors and low FODMAP practitioners.
- **Allie Siebecker**, ND is a naturopathic doctor who specializes in SIBO. She is the creator of the SIBO Specific Diet (the diet you will be following). Her website, siboinfo.com is a great recourse.

Tips and Advice

FODMAP Stacking

What you eat throughout the day adds up in your gut. Stacking refers to the additive effect of FODMAPs. Stacking occurs when two or more foods with the same FODMAP sugar are consumed at the same time. You can think of your gut like a suitcase that you are packing things into all day. As you continue to pack, the suitcase will become stuffed, making it difficult to close. Your gut is the same way. If you keep eating the same foods or the same FODMAPs throughout the day, you may be loading your gut with FODMAPs, which may produce symptoms. Often times we think of a reaction coming from a food we just ate; however, symptoms can develop from a meal you consumed earlier in the day.

This is the reason why **keeping a food journal** is imperative. Not only will it help with reintroduction, but it will also help trouble shoot if the diet is not providing relief.

Reading Food Labels

If purchasing a processed food, reading food labels is a must, as it can help you stay away from high FODMAP foods. FODMAPs love to lurk and hide in our foods likes gums, beverages, thickeners, and spices. Often they seem like trivial ingredients, but don't be fooled. Note that ingredients are listed in order of weight. So the first ingredient listed on the label is the highest quantity and the last ingredient listed is the lowest quantity.

See below for a list of the most common high FODMAP additives.

High FODMAP Food Additives				
Agave	Dried fruits	Glycerin/Glycerol	Lactulose	Sorbitol
Amaranth	Erythritol	Golden syrup	Malitol	Soybeans
Barley	Fructo-oligosaccharides	High fructose corn syrup	Mannitol	Soy butter
Chicken salt	Fructose	Honey	Milk solid	Soy protein
Chickpea flour	Fructose-glucose syrup	Hydrogenated starch hydrolysates	Molasses	Spice mixtures (may contain onion/garlic)
Chicory root	Fructans	Inulin	Natural flavors	Sugar-free mints
Coconut treacle	Fruit juice concentrate	Isoglucose	Onion powder	Xylitol
Crystalline fructose	Garlic powder	Isomalt	Onion extract	Yacon syrup
Dehydrated veggies (onion/garlic)	Galacto-oligosaccharides	Kamut	Polydextrose	
Dry milk solids	Glucose-fructose syrup	Lactitol	Rye	

Common additives that are **low FODMAPs** include: baking powder, baking soda, carrageenan, cellulose, citric acid, gellan gum, guar gum, locust bean gum, malt extract, maltose, maple syrup, pectin, resistant starch, stevia, soy lethicin, and xanthan gum. *These are all safe to eat.*

General rule of thumb: if you can't pronounce it, have never heard of it, or having trouble finding out what it is-then you probably shouldn't eat it!

Tips for Eating Out on a Low FODMAP Diet

- Look at online menus to find restaurants with suitable low FODMAP options
- Choose protein-based meals such as chicken, fish, or red meat with a side or two of vegetables such as a salad (hold the onion and croutons) or roasted/steamed vegetables
- Ask for condiments on the side, as these commonly contain onions and garlic
- Avoid heavily sauced or rich dishes (like curries), since they are hard to modify and probably contain onions and garlic
- Avoid dishes made with stock, as they often contain onions and garlic
- Ask for recommendations regarding dishes that do not contain onions or garlic
- Be familiar with your trigger foods, and ask if these can be omitted from your dish
- Salad or vegetable buffets (such as at Whole Foods or Central Market) are good options, as you can pick your selection. These places usually present ingredient lists as well.

FODMAP Substitutions

High FODMAP Ingredient	Low FODMAP Ingredient
Onion, leek	Green portion of green onion /leek
Garlic	Garlic-infused oil, asafoetida powder, scape powder
Stock	Homemade stocks using low FODMAP ingredients
Dried fruit	Dried cranberries
Beans	Canned, rinsed, and drained lentils or chickpeas
Cashews or pistachios	Macadamia nuts, pecans, walnuts
Cow's milk or yogurt	Almond milk or coconut milk

Increasing Fiber Intake

Constipation can be a main issue for a lot of people, the low FODMAP diet is notoriously low in fiber, which is crucial for healthy bowel movements. If you are constipated, be sure to incorporate these foods and tips into your diet on a daily basis.

- Snack on low FODMAP fruits like raspberries, kiwi, mandarin oranges, strawberries, rhubarb, and other oranges.
- Include low FODMAP vegetables with meals such as carrots (with skin on), green beans, eggplant, and Swiss chard stems.
- Add canned lentils or chickpeas to salads, casseroles, or soups. Try chickpea and lentil pasta!
- Snack on low FODMAP nuts and seeds.

Low FODMAP Fiber Sources	
Fruit and Vegetables	Legumes and Cereals
Fruit: banana, pomegranate, currants, raisins, raspberries, strawberries, oranges, kiwi	Legumes: red or green lentils (canned), canned chickpeas, lima beans
Vegetables: beet, butternut squash, cabbage, green beans, carrots, Swiss chard, collards	Nuts: almonds, hazelnuts, walnuts, pecans

Frequently Asked Questions

Q: How quickly will I notice improvement in symptoms?

A: Some people experience relief in as little as 48 hours. However, for some, it may take 2-4 weeks.

Q: Do I need to stay on a low FODMAP diet forever?

A: No! The goal is to have you eating as normally as possible after you finish both phases of the diet. Again, the low FODMAP diet is not sustainable long term. The duration of the diet will depend on your symptoms. For some, the diet is a breeze, but others may find themselves on the diet for several months. Of course, you want to remember the eating principles taught by Peak and modify your diet based on any identified food sensitivities. For example, if during the reintroduction process you notice you are experiencing a negative reaction to one of your favorite foods, you may need to omit that food and consider an alternative.

Q: Should I take a probiotic or pre-biotic supplement?

A: Although probiotics and pre-biotics are beneficial for most people, they should be omitted or limited in those suffering with SIBO for a brief amount of time for symptom control. You will be recommended a specific SIBO-safe probiotic as a part of your program.

Q: Can I have a cheat day or a cheat meal?

A: Honestly, it is best to avoid cheats if all possible. To experience the benefits of a low FODMAP diet and resolve SIBO, the diet must be strictly followed during the elimination phase. Your dedication will pay off! If you deviate from the diet, please note your symptoms, if any, that occur.

Q: Why is there a portion size listed next to a food? Or why are some foods considered both low and high FODMAP?

A: Portion is key here. Some foods, such as almonds, are low in FODMAPs and are safe to eat in small amounts. For example, while one serving size of a food may be low FODMAP, a second serving of the same food can result in a high FODMAP portion. Be sure that you stick to the recommended portion sizes so that you don't trigger symptoms.

Q: Why is garlic not allowed, but garlic-infused oil allowed?

A: All carbohydrates, and thus, FODMAPs are water soluble, meaning that they are pulled out in water. That means that garlic or any FODMAP food will leave FODMAPs behind when placed in water or broth, even if the food is removed. This does not happen in an oil base, such as olive oil, because carbohydrates cannot be pulled out in fat. In the case of garlic, the flavor of oil stays behind, but not the FODMAPs.

Q: Can I eat dairy products?

A: This is a tricky question, yes and no, depending on the lactose level. Some dairy products, such as aged cheeses, ghee, and butter are low in lactose, therefore low FODMAP. Other dairy products, like milk and ice cream are high in lactose and not permitted. Please be sure to check with your Peak provider to see if you should consume dairy.

Q: How do I know if a food is low FODMAP?

A: Please refer to the handouts given to you and utilize the low FODMAP apps. If you have a question about a particular food or product, do not hesitate to ask Dr. Cat at ceichman@vitalifewellness.com.

Low FODMAP Approved Products

Online Stores:

- **Casa de Sante Products:**
 - Online shop that carries a variety of spices, sauces, and vinaigrettes. **GREAT RESOURCE!**
 - <https://casadesante.com/>
- **FODMAPPED for You!**
 - Online store and resource that carries their own brand of simmer sauces, stocks, soups.
- **AIP Shop**
 - Online database and store full of low FODMAP and AIP-compliant foods.
 - www.shopaip.com/

Pre-Made Meal and Meal Planning:

- **Modify Health:** Meal delivery service designed specifically for people on low FODMAP diets. They do use rice and quinoa in their dishes, so they may not be right for you unless you consume grains.
- **Epicured:** This is another meal delivery service that caters to people who eat low FODMAP and gluten-free diets. Additional filters can be made for those with severe gut symptoms. This is labeled as “extra sensitive for IBD and IBS symptoms”. Popular offerings include Turkey Meatballs with Basil Pomodoro Sauce, Chicken or Tofu Tikka Masala with Basmati Rice, and Tacos Especiales.
- **Real Plans + FODMAP Everyday:** A subscription-based online meal planning service. Visit realplans.com/fodmap-everyday for more information. Plans range from \$20 to \$141.

Fody Low FODMAP Foods Products:

- Tomato basil sauce
- Marinara sauce
- Arrabbiata sauce
- Mild salsa
- Medium salsa
- Spices: taco seasoning, lemon and herb, steak seasoning
- Garlic infused olive oil and shallot infused olive oil

***Fody has many other great products, but most of them contain cane sugar, tamari, arrowroot starch, and other ingredients that should be avoided or consumed in moderation. These products are fine if you are following a traditional low FODMAP diet (speak with Dr. Cat about this).*

***Can be found at Central Market, Whole Foods, some HEBs, and online.*

Helpful Products:

- Alternative Milks:
 - Let's Do...Organic! Organic Heavy Coconut Cream
 - Simply Products Simply Unsweetened Almond Milk
 - Malk Almond Milk (*Whole Foods and HEB*)
 - Native Forrest Unsweetened Organic Coconut Milk
 - Coco Yo Coconut Yogurt or HEB Unsweetened Coconut Yogurt
 - Kite Hill Unsweetened Greek Yogurt
 - Green Valley Creamery: lactose-free yogurt and soft cheeses (*contains dairy*)
- Cooking Oil:
 - Garlic Gold Oil or FODY garlic infused extra virgin olive oil
 - HEB Garlic and Herb Sunflower oil
- Spices/Condiments:
 - Coconut Secret Coconut Aminos
 - Primal Kitchens Mayonnaise or Sir Kensington Mayo (avocado oil, no onions or garlic)
 - Casa de Sante spice mixes (*online*)
 - Low FODMAP Paleo Powder spice (*online*)
 - FODY spice mixes, dressings, salsas, and tomato sauces
 - Rao's Sensitive Marinara Sauce
 - Prego Traditional Sensitive Recipe sauce
- Protein Powders:
 - Vital Proteins Collagen Peptides (unflavored), Marine Collagen Peptides (unflavored), and beef gelatin (unflavored)
 - Bulletproof unflavored collagen powder (avoid flavors)
 - Designs for Health Pure Paleo Powder (vanilla, unflavored)- *Peak office only*
 - NOW Egg White Protein (unflavored)
 - Ancient Nutrition Multi Collagen Protein (unflavored),
 - Ancient Nutrition bone broth protein (pure, turmeric), keto collagen (unflavored)
 - Hum Vegan Vanilla Protein
 - TruVani Vegan Vanilla Protein
 - Owyn Protein shakes (*online- contains sugar and grains, only for traditional FODMAP*)
- Snacks/Bars:
 - Epic Bars: Lamb currant mint, hickory smoked bacon bites, bacon and pork bar
 - Rise Bars: Almond honey and Snickerdoodle (uses whey, eat occasionally)- *found online*
 - Marigold Bars: Lemon pie- *found online*
 - Rachel Paul's Happy Jerky (rachelpaulsfood.com)
- Pasta and Wraps:
 - Nuco Organic Coconut Wraps
 - Lentil and chickpea pasta (Barilla, Banza, and Tolerant Organic Brands) *watch portion size*
 - Palm noodle pasta: Natural Heaven, Palmini, Whole Foods Brand
 - Jovial grain-free pasta
 - Siete almond or cassava flour wraps and Siete tortilla chips
 - If eating grains: Tinyada pasta, quinoa, quinoa pasta
- Stevia: Sweet Leaf Stevia, Mayan Sweet stevia powder, or HEB 365 Stevia drops