

Healthy Gut

UNDERSTANDING THE BASICS OF *Gut Health*



Hello and Welcome!

Congratulations! You have just taken the first step toward having a better, healthier gut. No matter what issues you may be experiencing, improving the function of your digestive and intestinal system will help. By following this program, you will be supplying your body and your gut with some much-needed support. You will be amazed by how much better you will feel and the new energy and vitality you will discover.

Striving to achieve health and well-being is a process that can include improvements and sometimes minor setbacks. The body needs time to adjust its settings, clear out waste materials and build new tissues in order to perform more effectively.

I hope that you find this resource of great benefit to you on your health journey.



Medical Disclaimer

All information contained in the 'Understanding the Basics of Gut Health' program is for informational purposes only. It is not intended to diagnose, treat, cure or prevent health problems. For all serious health issues, please contact a medical or nutrition practitioner. The information provided in this program is based on the best knowledge of the author at the time of writing and we do not assume liability for the information within this program, be it direct or indirect, consequentially, special exemplary or other damages. In all circumstance, it is always wise to consult your physician before changing your diet, taking supplements or starting any exercise or health program.

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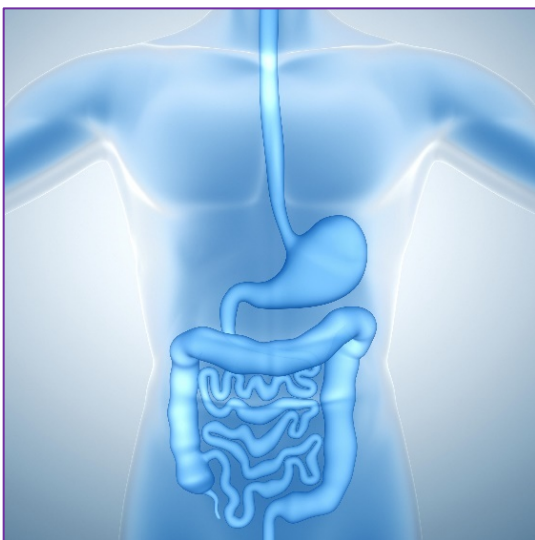
Gut Health Basics

Would it surprise you to know that you are more bacteria than you are human cells? You have anywhere from 1.3 to 10 times more bacteria than cells in your body. Having a range like that may seem confusing, but that is just the way it is. We are in the frontier days when it comes to knowledge about the bacteria in our body and what it does for us.

Most people are afraid of bacteria, not knowing that the majority of it is called “good bacteria,” playing many beneficial roles in and on our body to keep us healthy.

There are, of course, bad bacteria, but 85 percent of the bacteria in a healthy body is the good kind. They keep the bad guys in check and, in turn, the bad guys give the good bacteria a workout. It is important that we have a diverse group of good and bad bacteria in and on our body, because the more diversity there is, the healthier we will be.

All health issues have been linked to the quality and quantity of good bacteria in our systems and the function of the “gut” – heart disease, obesity, cancer, osteoporosis, allergies, autoimmune diseases, arthritis, depression, anxiety, brain function and all conditions related to the brain and nervous system, acne, liver disease and of course, all digestive and intestinal conditions.



How and why all these conditions are linked to gut health is cause for thousands of annual research studies. While there is plenty more to learn in years to come, one thing is certain: our good gut bacteria play a huge role in regulating many functions in the body. When we do not have enough, we do not function properly and health issues develop.

So, the question is not when you should do gut health work, but why you aren't always doing gut health work.

The following information has been designed to help you understand how to support and maintain a healthy gut, and it all starts with food. Your healthcare practitioner can help you with any issues that need more intensive gut health work, but learning about the key foods that will support your efforts is the best place to start.

Understanding Good Gut Health

There are two categories of beneficial bacteria – residential and transient:

Residential Bacteria:

This is the bacteria that is native to you. It is affected by what you eat, your environment, stress, drugs (especially antibiotics), excess alcohol, too much or too little exercise, x-rays, surgeries, air travel and genetics. Other factors include whether you were breastfed or delivered by caesarean section as a baby.

Even the conditions of your mother's gut while pregnant and breastfeeding affects how well you developed your residential bacteria as an infant. Health issues that you have today could be linked to what happened when you were a baby.

One of the key elements to gut health is promoting and maintaining residential bacteria, both the quantity and the diversity of the strains.

Transient Bacteria:

Beneficial bacteria found in probiotics and fermented foods are considered transient. What does this mean? Our residential bacteria will colonize in our body, which is how and why they can maintain our health. Transient bacteria cannot colonize because they do not stay in our body. However, they can perform many of the same functions as our residential bacteria while they are present. Much of the research we have regarding the function of gut bacteria comes from studies looking at probiotic strains with the goal of creating supplements.



Transient bacteria are very valuable, especially in the short-term. They may be needed long-term, depending on the circumstances and health condition of the individual in question, but the best goal is to support and build the quantity and diversity of the residential bacteria.

Locations of Protective Bacteria:

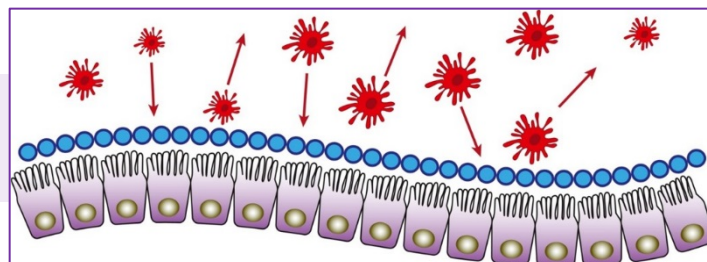
Mouth, nose, skin, stomach (small amount), small intestines, large intestines (colon), bladder, and vaginal canal.

Good bacteria function is dependent on both quantity and quality of strains.

Main Functions of Good Gut Bacteria

- ✓ Helps with digestion of all foods – having food allergies, sensitivities and intolerances are directly caused by a lack of good bacteria. Don't blame the food – fix the gut.
- ✓ Helps eliminate waste materials, preventing both constipation and diarrhea.
- ✓ Works synergistically with fibre and phytochemicals in foods to ensure proper absorption of nutrients.
- ✓ Protects the intestinal gut lining and defends against bad bacteria and other pathogens.
- ✓ Regulates inflammation.
- ✓ Helps with mood disorders such as depression and anxiety.
- ✓ Helps regulate weight and prevent obesity.
- ✓ Boosts immune system function.
- ✓ Communicates directly with the brain as part of the brain-gut connection and produces important neurotransmitters.
- ✓ Helps regulate blood sugar, insulin levels, blood pressure and cholesterol.
- ✓ Supports the function of the liver and kidneys.
- ✓ Prevents infections throughout the body.
- ✓ Potentiates phytochemicals in foods to be more powerful or deactivates any potentially harmful chemicals found in food.
- ✓ Helps detox out heavy metals and other toxins before they enter the body, saving the liver some work.

We still do not know which strains are responsible for each task or how many strains we need or have. Some strains have been studied quite extensively, but not the ones that are unique to us as individuals. We may have similar strains but no one knows for sure. We are a long way from being able to map all the bacteria in a person's body and know what they have and what they do. However, we do know that when we do not have enough strains, we do not function properly. We also know there is benefit to adding strains to our system and feeding our own strains properly.



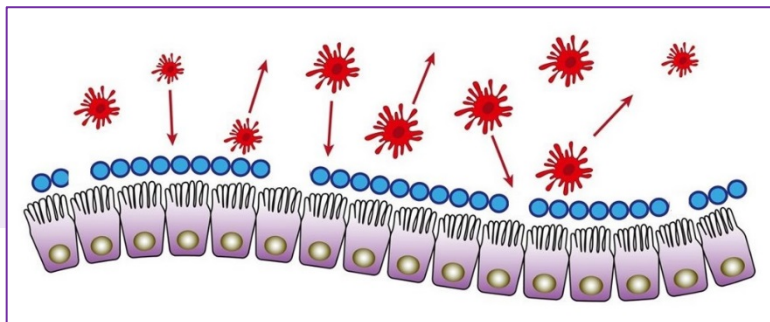
What is Dysbiosis and Candidiasis?

When there are insufficient good gut bacteria, pathogens that exist naturally in us such as E. coli and salmonella have the opportunity to proliferate. The body tries to fight this and many of the symptoms that we consider to be an “illness” such as sneezing, vomiting, fever and diarrhea are all attempts by the immune system to get the pathogens out of the body. Having sufficient good bacteria can prevent proliferation.

To be healthy, 85% of all organisms in and on our body, should be good bacteria. Issues develop as the levels of our good bacteria drop. Dysbiosis occurs when we do not have the ideal level of good bacteria, allowing bad bacteria and other pathogens to cause us symptoms and issues.

Candidiasis is a condition where naturally occurring yeast in the intestinal system, the mouth and in the vagina, gets out of control. The good bacteria create an environment where this cannot occur. It keeps yeast and pathogens at low levels by producing lactic acid. This lowers the pH of the environment that they inhabit to make it less hospitable for yeast and bad bacteria, and more hospitable for good bacteria.

Many strains of yeast are beneficial but one strain, known as Candidia Albican, is quite nasty. If it overgrows, it can produce symptoms including gas, bloating, food sensitivities, constipation and diarrhea. The yeast can also become fungal in nature and produce toxins that can affect many areas of the body, causing symptoms such as headaches, muscle and joint pain, brain fog, acne and other skin issues, to name a few. People who have Candidiasis may also suffer from other types of fungal issues such as ringworm, nail fungus or yeast infections (which occur in both males and females).



How do Dysbiosis and Candidiasis Develop?

Antibiotics: They kill good and bad bacteria which gives yeast a chance to grow. Interestingly, bad bacteria will recover faster from a round of antibiotics than good bacteria. Studies show that taking probiotics while taking antibiotics, plus an additional two weeks of probiotics, help the good bacteria levels in the body stay at their normal levels. Research also shows that taking probiotics with antibiotics speeds healing.



Processed Refined Foods and Junk Food: They do not contain the prebiotic fibre that feeds our residential bacteria. They also may contain preservatives and additives which do not help, and they lack important vitamins, minerals and phytonutrients which help the gut function.

Lack of Diversity in the Diet: To support a variety of species in our gut, we have to consume a variety of foods to feed all the strains of good bacteria and keep the quantity at the right levels. Most of us seldom eat more than 15 different foods per week. For good gut health, we need different varieties of prebiotic foods, which feed our residential bacteria. This includes fruits, vegetables, grains, legumes, nuts, seeds and dairy products.

Stress: Cortisol is a hormone produced by our adrenals gland. An excess of cortisol can deplete our good gut bacteria levels and increase the bad, in addition to several other health issues.

Excess or Too Little Exercise: Regular exercise is good for the gut but too much or too little can cause health issues. It can interfere with how the gut functions and lower good bacteria levels.

We Are Too Clean: The more our gut bacteria must defend against pathogens, the stronger and more resilient they become. If we do not expose ourselves to elements that are bad for us, our gut bacteria and immune system will weaken. This means that we are more likely to be susceptible to pathogens when we are exposed because our gut bacteria have not been able to learn how to defend us.

Early Childhood Factors: If a baby is not breastfed or is delivered by caesarian section, then he/she will need to catch up to babies who are breastfed and were delivered vaginally. They are more at risk for developing infections and therefore, are more likely to be prescribed antibiotics, which would set them back even more. There are strategies that can be employed to counter this but this is a rare occurrence, so children in these circumstances do not get the right start. The condition of the mother's gut is also a factor.



Lack of Sleep: Our microbes help us sleep. They interact with our adrenals and help limit cortisol levels, which can prevent us from falling asleep. Our good gut bacteria also help regulate inflammation which has been shown to disrupt sleep. We go to bed with one set of microbes and wake up with another. Just one night of poor sleep can alter good gut bacteria levels. Gut bacteria also regulate our circadian rhythms.

Other Stressors: X-rays, airline travel, exposure to radiation, medications such as corticosteroids and chemotherapy drugs, surgeries, and alcohol all can have a negative effect.

What is “Leaky Gut”?

Good bacteria line up against your gut lining and protect it. There are gap junctions between the cells of the intestinal lining, which can open and close. There are good reasons for this. The antibodies in a mother’s breast milk go through the open gap junctions to help protect the baby during the first three months of life. They can also open to allow fluids to flood the intestines and flush out pathogens (this can manifest as diarrhea). This is how you want your gut to function.

However, when there are not enough good gut bacteria, the lining becomes damaged from pathogens like bad bacteria, yeast, drugs, alcohol, and other harsh man-made and natural chemicals. This causes the gap junctions to stay open and allows pathogens and undigested food particles to get into the blood stream and force the immune system to attack them, causing inflammation and other symptoms. This is called “leaky gut.” Not everyone who has dysbiosis or Candidiasis has leaky gut, but all people who have “leaky gut” have dysbiosis. A gut health strategy may need to include improving good bacteria levels as well as the nutrients needed for a healthy gut lining.

Foods to Support Gut Health

Fermented Foods

Fermentation is an ancient preservation technique that turns simple foods into superfoods. Fermented foods are antimicrobial, anti-inflammatory, help stabilize blood sugar and support immune function. They are loaded with good bacteria which help the gastrointestinal system function properly. The bacteria are transient but are very helpful. Most fermented foods also contain prebiotic fibre that help feed our residential bacteria.



All fermented foods have an acid pH somewhere between 3.5 and 5, depending on the type and how long it has been fermented. Vinegars that are properly fermented, like apple cider and aged balsamic, have an even lower pH, around 2.5. All fermented foods aid digestion.

To Start: If you are not sure how your body will react to a fermented food, start slow with a tablespoon and work up to the suggested serving size.

It is rare for people to have a fermented food intolerance. Those who do may find it to be due to the histamine levels in the fermented foods. Histamine plays an important role in helping us digest our foods but too much can cause unwanted reactions. Good bacteria produce an enzyme called diamine oxidase which breaks down histamine in the gut. This would include the histamine in fermented food. It is a bit of a catch-22. You would like to consume fermented foods to help fix your gut but because your gut is an issue, you cannot consume the fermented foods.

If you find that you have a negative reaction to fermented foods, you can try taking a diamine oxidase enzyme supplement, because fermented foods do play an important role in the restoration of a healthy gut.



Milk Kefir: Make sure any kefir you buy is made from kefir grains. Not all kefirs are made from kefir grains, so you must choose carefully. Other kefirs are still good for you but they do not contain the 32 strains of good bacteria and yeast that kefir from kefir grains has. The quantity of bacteria in kefir can rival a probiotic supplement if you consume 1/4-1/2 cup. It can also contain GOS, an important prebiotic. Milk kefir is often studied and research has found several benefits. It inhibits *Candida Albicans*, regulates inflammation, helps with acne and eczema, lowers triglycerides and cholesterol, stabilizes blood sugar, is antimicrobial, supports the immune system and has anti-

tumour properties. There really is no fermented food like it.

The grains can be used in cow, goat and sheep milk or with special consideration, can be made with coconut milk (see page 21). It is the easiest fermented food to make. Many people who are lactose intolerant do well with kefir because it has very little lactose. The good bacteria love to eat lactose and break it down. Kefir can be purchased in health food and grocery stores – just make sure it is made from kefir grains. Serving size: 1/4-1/2 cup.

Water Kefir: Like milk kefir grains, water kefir grains are a unique combination of good bacteria and yeast, but it only has 9 strains. Water kefir grains cannot be used in milk and visa versa. Water kefir is only available if you make it yourself, but it is simple. Serving size: 4oz or 112ml – 8oz or 224ml.



Kombucha: This is a traditional beverage, often called a tea and made with a scoby that feeds on tea and sugar. The scoby is a rubbery mass that is a combination of good bacteria and yeast strains. Scoby stands for "symbiotic culture of bacteria and yeast": Technically, milk and water kefir grains are also scobies, but the name is usually only applied to the kombucha scoby. Kombucha can be flavoured and is easily found in health food and grocery stores. Be sure to purchase it from a refrigerator because anything found on a store shelf has been pasteurized.

Kombucha has numerous anecdotal benefits but there is not a lot of research about it. However, there is some research regarding the phytochemicals in kombucha. It has a significant number of antioxidants, helps stabilize blood sugar and may aid wound healing. One study found that it has anti-cancer properties. Serving size: 4oz or 112ml – 8oz or 224ml.

Sauerkraut: Sauerkraut is made with cabbage and is fermented in a brine made of salt and cabbage juice and must be made without oxygen. It can be purchased from a health food or grocery store and again, should be purchased from a refrigerator case and not the store shelf. Phytochemicals in cabbage are more bioavailable and may protect against carcinogens. Enzymes found in sauerkraut may help with ulcers. Sauerkraut is also a good source of vitamin C, which is found in every cell of the body. Serving size: 1/4-1/2 cup.

Kimchi: Originating from Korea, kimchi is made from cabbage, daikon radish, onions, carrots, ginger, and garlic. Sometimes, fish powder and/or red pepper powder are added. It is made in a salt-water brine without oxygen. Kimchi is the subject of a lot of research. Certain strains in kimchi have been shown to aid the detoxification of heavy metals and Bisphenol-A, found in plastic, from the gastrointestinal tract, preventing them from entering the body. It also helps protect against heart disease, aids weight loss and boosts the immune system. Kimchi is available in



health food or grocery stores and again, should be from a refrigerator case and not the store shelf.

Yogurt: It is traditionally found anywhere animals are raised for their milk and can be made from cow, goat or sheep milk. It is important to make sure that the yogurt you eat is natural. It should contain only milk ingredients and bacteria culture. There should be no gums, emulsifiers or added sugar. Commercial yogurts may only be fermented for an hour, whereas natural yogurt is fermented for about six hours. This means it has more good bacteria and is far more digestible. Organic yogurts are always traditionally made and natural.

When yogurt is made, good bacteria break down lactose as part of the fermentation process. Many people who are lactose intolerant can tolerate yogurt. It also contains the prebiotic GOS to feed our good bacteria. Yogurt contains 2-4 strains of good bacteria. It aids the immune system, helps with ulcers and supports the detoxification of cancer-causing substances.



Sourdough: Sourdough starter is a way to naturally ferment grain to produce yeast to leaven a bread. By fermenting the grain, the protein and the carbohydrates are partially broken down, making it much more digestible. Many people who have issues with wheat have no trouble digesting sourdough. Most sourdough breads do not have fully fermented flour. When the flour is fully fermented, the gluten in wheat is fully broken down and studies show that people with celiac disease can digest it.

Sourdough, even when it is made with white flour, lowers insulin release and does not spike blood sugar. Once the sourdough is baked, it still helps support immune system response even though the bacteria and yeast are dead. Many bakeries make traditional sourdough bread in urban areas. It can also be ordered online.

Beer and Wine: Both are traditional fermented beverages. Beer must be unpasteurized to have the benefits of the good bacteria and yeast. It is known to be an anti-inflammatory and can help cognitive function. Although red wine is more well-known for its health properties, studies are finding that white wine has positive benefits as well. Wine may protect against heart disease and cancer and is high in antioxidants. Both wine and beer were designed to be consumed in small amounts with a meal to aid digestion. When purchasing wine, avoid wine with sulfites. Organic wine will have the most phytonutrients and is always sulfite-free.

Apple Cider Vinegar: Apples can be fermented into vinegar but it is important to buy real apple cider vinegar. It should have a brown sediment at the bottom of the bottle which is the remnants of the fermented apple. This is known as the “mother,” which is often stated on the label. Apple cider vinegar aids



digestion, especially protein and fat. It also contains malic acid, which can help stimulate hydrochloric acid production in the stomach.

Aged-Balsamic Vinegar: It is made from specific types of grapes and can be aged for 3 to 25 years. The longer it is aged, the more expensive it is. So, as you probably guessed, a three-year old vinegar is the most economical. If it does not state that it was aged for at least three years, then it is not a properly fermented product and will not have the same health benefits. Aged balsamic vinegar is high in antioxidants and aids digestion.

Honourable Mentions

These are not easily found in stores but if you learn to ferment your own food, these are well-worth making.

Beet Kvass: This is a beverage made from beets fermented in a salt-water brine in the same process as kimchi. Fermenting beets converts naturally occurring nitrates and nitrites to nitric oxide, which is very beneficial for blood vessels and cognitive function. The phytonutrients in the beets are also made more bioavailable and have numerous benefits including aiding liver and kidney function. Beets also contain tryptophan, which converts to serotonin which is our anti-depression neurotransmitter. A recipe can be found on page 22.



Cultured Vegetables: Any vegetable can be fermented with the same salt brine process as kimchi, even legumes. This means that they can all be more digestible and as always, fermenting makes all the vitamins, minerals and phytonutrients more bio-available and potent. A recipe for fermenting legume is on page 22.

To Add Fermented Foods To Your Diet:

- ✓ Pick one - start with a small amount and work up to a level that works for you.
- ✓ Add them to recipes that you like – don't heat if you want the live good bacteria. But, you can add them to a warm dish when serving.
- ✓ Try to eat three different types per week at a total of five servings (not of each type).
- ✓ You may find one or two a day works well for you.
- ✓ Fermented foods work well in smoothies, especially cultured vegetables, kefir, yogurt and sauerkraut – balance out the taste with a contrasting flavour.

Prebiotic Foods: Feed Residential Bacteria

FOS and Inulin: These are found in Jerusalem artichokes, chicory, garlic, onions, dandelion greens, asparagus, bananas, tomatoes, blueberries, almonds, broccoli, cabbage, kale, cauliflower, radish, chia, flax, and tomatoes. They feed residential bacteria in the small and large intestines. Some people have issues with FOS and inulin, making it another catch-22. They have the issue because they do not have enough of the right strains of good bacteria to feed on them and break them down, yet they need them to help.



GOS: Another prebiotic found in dairy products and legumes. It is the best prebiotic for helping babies who have been bottle-fed and delivered by caesarian section build bacteria levels in their colon to catch-up to breast-fed and vaginally delivered babies. One study also found that it helped improve mental attitude in participants and it did so better than FOS. Although GOS is found in legumes, it is much higher in dairy products.



Resistant Starch: There are several different types and they are found in wheat, rye, spelt, kamut, barley, oats, corn, brown rice (and cooled white rice), potatoes, sourdough, quinoa, sweet potatoes, pasta, legumes, lentils and to a lesser degree, nuts and seeds. One type of resistant starch increases after being heated and then cooled. If that food is then re-heated, it increases even more. This may explain the traditional technique of cooking rice and pasta ahead of time and reheating before serving.

Resistant Starch: It feeds the bifidus bacteria in the colon which then produces short chain fatty acids (SCFA) such as butyrate, propionate and acetate. They help the function of the gut and have various roles throughout the body. Butyrate has been studied the most. It helps regulate inflammation and immune tolerance, which play a key role in preventing allergies and autoimmune conditions. It also may help boost immune function, stabilize blood sugar,

prevent heart disease, improve brain function and prevent cancer cells from spreading. Butyrate is also found in butter.

Bone Broth: Bone broth is made from simmering bones in water for 14-24 hours. This extracts the collagen, amino acids and minerals from the bones. This includes amino acids, especially glutamine, and all the minerals listed below, creating a liquid that is perfect for the gut.

A vegetarian broth can be made by placing vegetables in a stock pot and simmering them for 12 hours. Fermented vegan glutamine powder can be added along with agar agar, which is a seaweed that contains minerals and is a good prebiotic.

Because both broths have good quality nutrients for the gut, they make a great base for soup recipes or can be seasoned and consumed as a beverage.



Culinary Herbs and Spices: Oregano, basil, cumin, coriander, cayenne, fennel, dill, parsley, thyme, savory, rosemary, sage, ginger, cinnamon, cloves, nutmeg, allspice, peppermint and many others have been used for generations to flavour food. However, the real reason they have been added to food is that they have properties that aid digestive and intestinal health. They also have benefits for the rest of the body, too. Use herbs and spices liberally to help the gut and deliver amazing flavour to the food.

Nutrients For The Gut

There are several nutrients that help the gut function. They will either have a relationship with the good gut bacteria or they will be important for the function of the intestinal wall lining. All these vitamins and minerals can be found in whole foods. So, those who eat processed refined foods are going to have less of these nutrients.

When discussing the concept of deficiency as it relates to gut health, it does not mean that the levels of the deficiency are the same as those set by government standards. When it comes to gut bacteria, even a small decrease in nutrient levels is enough to cause changes and therefore trigger symptoms. Consuming a whole food diet ensures that there are sufficient levels of these nutrients.

Sometimes more is needed to build the gut and body back up to ideal levels. Supplements can be helpful for this, especially a good multi-vitamin/mineral formula.

Glutamine: This is the most abundant amino acid in the body and is best known for its ability to help us build muscles. This would include muscles that line the gastrointestinal tract, which are essential to its function. It has anti-inflammatory properties, can reduce pain and helps

repair the gut lining. It has been found that dysbiosis and yeast are more likely to be present when glutamine levels are low.

Glutamine can be taken as a supplement but it is also found in meats, fish, eggs and dairy products. Many vegetables have glutamic acid which can be converted to glutamine in the gut by good gut bacteria.

Essential Fatty Acids (EFAs): There are two fats we must get in our diet as we cannot make them. Omega 3 and Omega 6 are found in both plant and animal sources. The form found in plants must be converted in order for us to be able to use them but the form found in animal products is the same as what we need. In order to convert plants, we need vitamins and minerals which aid in the conversion.



Research is showing that EFAs aid gut health in a number of ways. Omega 6 helps promote healthy cell membranes and can help regulate inflammation in the gut and body. Omega 3 can counter inflammation in the gut and body. EFAs aid in gut health repair, improve bowel function and play a role in protecting the gut lining. They also help repair the gut from the effects of colitis and other gastrointestinal issues. There also appears to be some communication between gut bacteria and EFAs to the benefit of the good gut bacteria and the immune system.

EFA-Rich Foods: There are many whole foods that contains EFAs. It is important that they be good sources. EFAs are highly prone to rancidity when exposed to air, light or heat. Some EFAs have more protection from rancidity because the foods also contain saturated fats which protects them and/or they have antioxidants in the foods which can also prevent them from going rancid. Avoid hydrogenated or highly processed oils which are usually made of soy, corn or cottonseed.

- ✓ Plant Foods: Omega 3 – flaxseeds, chia seeds, hemp seeds, sacha inchi nuts, walnuts. Omega 6 – All nuts and seeds, legumes, corn and other grains.
- ✓ Animal Foods: Contain both Omega 6 and 3 in animal form and include cold-water fish such salmon, tuna, herring, sardines, anchovies, halibut, and cod, butter, egg yolks. Most animal meats contain small amounts. The liver is always the highest source found in the animal.

Vitamins

Vitamin D: There are cell receptors in the gut for vitamin D and researchers believe that it communicates with our gut bacteria, and may even play a regulatory role. It also helps reduce inflammation

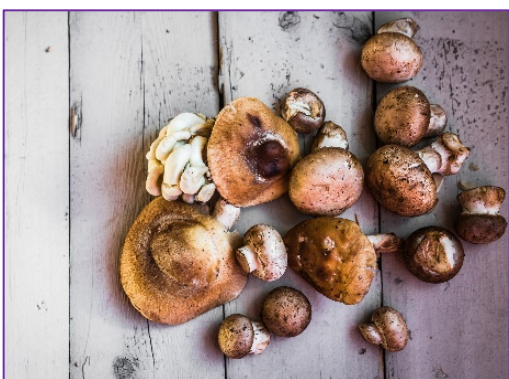


and repair the gut lining. Vitamin D promotes good bacteria levels, especially when combined with B vitamins.

Sunlight is a great source of vitamin D.

Vitamin A: Immune tolerance is given to substances like food and body tissue to prevent the immune system from attacking. Vitamin A helps maintain said tolerance, which is regulated by gut bacteria. This means it helps with allergies and autoimmune conditions. It also has an ability to help the gut lining function.

Beta-carotene is the plant form of vitamin A and we must convert it to the vitamin A form we need as animals. It is poorly absorbed, so consume beta-carotene foods with fat for maximum absorption.



Vitamin D and A Rich Foods: Egg yolks, butter, dairy products, fatty fish such as salmon, tuna, herring, sardines and cod (especially the cod liver) and of course, cod liver oil which is probably the best source. Mushrooms have a small amount of D. Oranges and red vegetables contain substantial amounts of beta-carotene.

Note: Vitamin A and D work together along with vitamin K. Seventy-five percent of the vitamin K in the body is made by our good gut bacteria, so a vitamin K deficiency can occur when dysbiosis is present. This may affect how Vitamin A and D work in the body. Vitamin K is also found in most of the same foods as A and D.

B-Vitamins: The B-vitamin family consists of vitamins 1, 2, 3, 5, 6, 12, folic acid, biotin, choline and inositol. They have different functions but work together. Their relationship with the gut is complicated because the good gut bacteria make B vitamins. In return, the B-vitamins help regulate several aspects of gastrointestinal function.

Fermented foods also make B vitamins and small amounts are found in several other foods, many of which are also prebiotics:

- ✓ Whole Grains: whole wheat (especially the wheat germ), rye, spelt, kamut, and corn
- ✓ Nuts and Seeds: chia, hemp, pumpkin seeds, sunflower seeds, almonds, brazil nuts, pecans, pistachios, chestnuts, sesame seeds, tahini, walnuts, and cashews
- ✓ Legumes and Lentils: peanuts, all types of beans such as adzuki, cannellini, green, yellow, kidney, fava, lima, black, pinto, soybean (including edamame, miso, tempeh), chickpeas



(garbanzo beans), turtle, all types of lentils, all types of peas including green and black-eyed

- ✓ Fruits: bananas, papaya, prunes, avocado, oranges, and blueberries (most fruits contain small amounts of B except for B12)

Vegetables: asparagus, broccoli, Brussels sprouts, potatoes, sweet potatoes, squash, spinach, mushrooms (Portobello, brown, white, cremini) artichokes, escarole, endive, and okra



Vitamin C: This is found in every cell of the body and it is a major antioxidant. When toxins are ingested into the gastrointestinal system, they produce free radicals that can cause damage to the intestinal wall lining. They can also damage good gut bacteria. Vitamin C counters the free radicals, helps reduce intestinal inflammation and repairs the damage to the gut lining.

It has always been believed that we cannot produce vitamin C. While we can't, new research shows that our good gut bacteria can.

Red and green bell peppers, chili peppers, kale, broccoli, cabbage, Brussels sprouts, cauliflower, tomatoes, papaya, strawberries, pineapples, mango, cantaloupe, oranges, lemon, and grapefruits

Vitamin E: Like vitamin C, vitamin E helps protect against free-radical damage. It can also help balance histamine in the intestines and the body.

Almond, hazelnut, pine nuts, pumpkin seeds, sunflower seeds, sesame seeds, hemp seeds, olives, Swiss chard, mustard greens, turnip greens, spinach, kale, avocado, papaya, broccoli, parsley, and wheat germ

Minerals

Calcium and Magnesium: Calcium studies for the gut are relatively new but so far, it appears that calcium may play a role in helping our good gut bacteria survive. It also contributes to how well lactobacillus strains of good bacteria do their job.

Studies show that a deficiency in magnesium lowers bifidobacteria in the colon and is also connected to symptoms of depression and anxiety, which may be due to the gut-brain connection. A lack of magnesium is also connected to higher levels of intestinal inflammation.

Calcium and magnesium work together for intestinal health. They aid muscle contraction in the gastrointestinal system, and help create a smooth transition of foods from one end to the other. They are usually found in foods together.



Calcium and Magnesium-Rich Foods: Collard greens, figs (fresh or dried), flax seeds, kale, molasses, mustard greens, papaya, potato (with skin), pumpkin seeds, pecans, cashews, almonds, walnuts, sesame seeds, cinnamon, cumin, basil, oregano, parsley, black pepper, spinach (cooked), sunflower seeds, and Swiss chard

Manganese: Although toxic in high levels, low amounts of manganese are important for several functions in the body. Researchers believe that manganese is needed to help several strains of good bacteria grow.

Manganese-Rich Foods: Whole grains, beans, nuts, seeds, and sea

foods

Zinc: A zinc deficiency may result in several gastrointestinal issues. Too little zinc can alter the quality and quantity of good bacteria. Zinc also regulates the gap junctions in the gut lining and helps prevent them from opening up. Zinc is also essential for producing stomach acid, which aids the digestion of protein.

Zinc-Rich Foods: beef, lamb, seafood, oysters, pork, chicken, turkey, spinach and other green leafy vegetables, endive, radicchio, chia seeds, flaxseeds, pumpkin seeds, squash seeds, sunflower seeds, hemp seeds, cashews, pecans, almonds, pine nuts, peanuts, walnuts, hazelnuts, legumes, cocoa, chocolate, and mushrooms



Selenium: This is essential for gut health as it regulates inflammation, prevents free radical damage and helps prevent damage to the gut lining. Selenium increases the diversity of bacteria strains and in turn, the good gut bacteria, help to improve the availability of selenium in the body.

Selenium-Rich Foods: Brazil nuts, cashews, walnuts, macadamia, seafood, tuna, salmon, mackerel, tilapia, pork, beef, lamb, chicken, turkey, whole wheat, rye, barley, brown rice, quinoa, oats, mushrooms, sunflower seeds, chia seeds, flaxseeds, pumpkin seeds, and squash seeds

Sulfur: Some strains of good bacteria produce sulfur, which helps other strains grow. It makes for another complicated relationship between our good gut bacteria and our nutrients. Studies have shown that the sulfur compounds produced by gut bacteria can influence the flavour of food. Sulfur is an important mineral that helps maintain hair, skin cartilage and tissue. It also helps keep enzymes active and makes vitamin D from the sun more available to the body. Sulfur benefits glucose metabolism and a deficiency of the mineral has been noted in



those with Alzheimer's. Dysbiosis has been linked with sulfur deficiency as strains of bad bacteria can reduce sulfur levels, making it unavailable to the body.

Sulfur-Rich Foods: Garlic, onions, egg yolks, dairy, beef, poultry, seafood, turnips, kale, seaweed, raspberries, and nuts

Do You Want to Try Fermenting?

Here are three easy ways to get more digestibility from all your food. The key information to know is that all these recipes require a method of preventing bad bacteria from growing. For the kefir, this is accomplished with the kefir grains. For the beet kvass, it is the salt brine that inhibits bad bacteria while the good bacteria grow and for the fermented legume recipe, it is a combination of salt and apple cider vinegar. The other important tip is to make sure the lid of the jar is screwed on tight. This creates an anaerobic environment inside the jar that is essential to prevent mold growth. All fermentation occurs at room temperature so do not put the jars in the refrigerator until after they have fermented.

How To Make Milk Kefir:

- 1-2 tbsp kefir grains
- 2 cups whole milk, preferably organic (cow, goat, sheep or coconut milk)
- 1 tsp date (if making coconut milk kefir)

Place the milk and the kefir grains in a 1-quart or 1-litre mason jar. Screw on the lid and let it sit at room temperature for 24-48 hours. Use a nylon sieve to strain out the grains and only use plastic or wooden utensils to stir. The organisms in the grains do not like metal sieves or utensils and may be damaged by them. Refrigerate.

If using plain coconut milk, the grains must be returned to cow or goat milk every three batches. There are not enough carbohydrates in coconut milk to feed the grains and they will die. Another option is to use date paste. Cook some dates with a small amount of water. Mash or puree the dates and add 1 tsp for every 2 cups of coconut milk. Only ferment coconut kefir for 24 hours.



Storing The Grains:

Grains are best stored in cow, goat or sheep milk. Will keep for several weeks in a small jar with some milk. If this is not an option, store them in coconut milk with some date paste.

To Purchase The Grains:

These sites can help you source the grains. I highly recommend the live cultures from Kombucha Kamp, especially for milk kefir grains. I find they work far better than the dehydrated version.

Live Cultures:

Kombucha Kamp: kombucha scoby, milk and water kefir grains – Ships anywhere:
<http://www.kombuchakamp.com/11269.html>

Dehydrated Cultures:

Culture for Health: Starters for everything: <http://www.culturesforhealth.com/>

For Canada/US:

Use the Cultures for Health Retail Locator:
<http://www.culturesforhealth.com/ustorelocator/location/map>

How To Make Beet Kvass

- 1-2 medium beets, coarsely chopped
- 1 tbsp sea salt*
- 2-3 cups spring water
- 1-quart or 1-litre mason jar with lid



Mix the water and sea salt in a measuring cup to make the brine. Chop the beets into small cubes. Do not grate. Fill 1/3 of the jar with beets. Pour in the brine water, leaving one inch of space from the top of the jar. Place the lid on top and screw it on tightly. Let it ferment for 7-14 days. Turn the jar upside down every day to keep the beets covered until the gas builds up inside of the jar. This takes about 4-5 days.

*To Use Less Salt: Use only 1 tsp sea salt and 1/4 cup whey drained from yogurt or sauerkraut juice.

Tip: Add citrus peels, vegetables like cabbage, carrots or onions, herbs and spices like ginger root. Use your imagination and create the kvass you like best.

Fermenting Legumes

If you have trouble digesting legumes, try this.

- 1 can cooked legumes, salt free, drained and rinsed, such as chickpeas, black beans, kidney beans or any other beans
- 1 tsp sea salt
- 2-3 tbsp apple cider vinegar
- 2 cups spring water
- 1-litre or 1-quart Mason jar with lid

Place the chickpeas in the mason jar and add enough water to completely submerge them. Be sure to leave at least one inch of space at the top of the jar. Add the apple cider vinegar and sea salt. Mix with a plastic spatula or wooden spoon. Place the lid on the jar and screw on tightly so air cannot get in. Let the chickpeas ferment for two weeks. Once they are fermented, drain and rinse. They can now be used in recipes as you would normally use them.

Note: Legumes do not have to be fermented for long to be more digestible. Usually 24 hours is all that's needed. However, the longer they ferment, the more beneficial bacteria will be present and the more the nutrients will be bioavailable.

