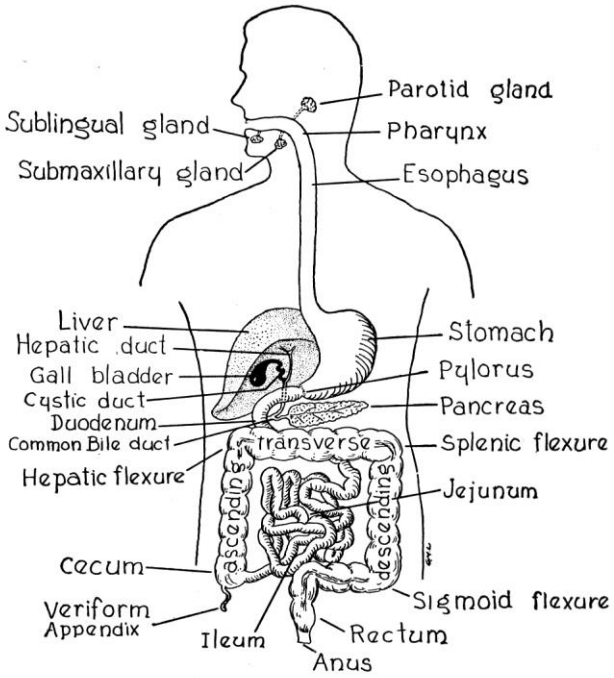

Figure 28.—The Digestive System.

DIGESTION

A North to South Process

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Welcome to the Digestion Ebook! It is your guide to how the digestive system works, natural ways to support your digestive system, and what to do when you are confronted by digestive issues. Here are the topics covered in the book:

1. The Mouth
2. The Importance of Enzymes
3. The Esophagus
4. The Stomach and The Importance of HCl
5. The Small Intestines
6. The Liver, Gallbladder and Pancreas
7. The Large Intestine and the Importance of Probiotics
8. What to do: Self Help
9. All About the Gut and Gut Repair
10. Probiotics – Do We Need Them?
11. Getting Rid of Unwanted "Guests"
12. Corn Sensitivities

The Mouth

The "physical" aspects of digestion begin in the mouth. Please consider what goes in our mouth is generally a volunteer action! For the most part we choose what we eat, how many times we chew our food, and the pace (fast/slow) of the eating experience.

Some may argue that digestion begins before we eat as the smells, sounds, and overall environment affect us. To some extent we agree with this. It is a biological fact that if we are stressed our digestion is adversely impacted. No reason to digest if you're running away from a lion or tiger, right? And, if we are in a pleasant environment, calm and relaxed, this will aid our digestion. Nothing like the smell of grandma's cooking to get the digestive juices flowing. But, at the end of the day if we gulp down poor-quality food, we're going to have digestive issues.

In our mouth we have our teeth and the salivary glands (of which the parotid is the largest). Our teeth are very important as they are the first stage in breaking up our food so we can process it. The more we chew and break up the food, the more surface area there is to be acted upon by digestive enzymes.

Saliva contains mucus, lysozymes, and amylase. Believe it or not, we make 1-2 quarts of saliva per day! Saliva should be alkaline with a pH of 7.4, although it can vary throughout the day. If you would like to test your saliva you can purchase pH paper. The most accurate reading is in the morning after waking up. If saliva is acidic ($pH < 7$) it will interrupt digestion of carbohydrates in mouth. The saliva pH is indicative of general health of the liver.

Mucus is important because it lubricates the food to help it pass through the esophagus.

Lysozymes poke holes in the walls of bacteria which weaken them so they can be taken care of (eliminated) by the stomach.

Amylase is an enzyme and it begins the digestion of carbohydrates. Ever notice how if you have a piece of bread in your mouth for a while it starts to taste sweet? This is the carbohydrate breaking down into sugars. It appears the body was designed to handle carbohydrates first.

So, what we do in the mouth is very important. If we do not chew our food sufficiently more work has to be done in the stomach to break the food down. Remember – this is a "north to south" process. How many times to chew? We have heard anywhere from 20-40 chews per mouthful. The 40 seems a bit stretching it, but 20 seem reasonable. The more we chew the more saliva is produced and mixed with the food providing the mucus, lysozymes, and amylase required. Not enough mucus and the food has a harder time getting to the stomach. Too few lysozymes and it is more likely for harmful bacteria to survive. Short on amylase and carbohydrates do not get broken down and begin to ferment in the stomach since their next chance for activity is in the small intestine. We are sure you can see how each step has an impact on what takes place next. If the initial job is not done correctly the next step needs to catch up or make an adjustment.

The Importance of Enzymes

We cannot overstate the importance of enzymes to the digestion process. Simply put, enzymes make stuff happen in the body- basically they keep you alive! They are proteins that enhance and accelerate chemical reactions in the body. Since there are many different reactions there are many different enzymes. The human body has more than 55,000 different enzymes! With respect to digestion there are two types that are significant. There are enzymes that are found naturally in real food (food enzymes) and there are enzymes that our body makes to help break down the food we eat (digestive enzymes).

All real food of plant and animal origin contains enzymes. Each raw, uncooked fruit, vegetable, or meat contains enzymes that will digest the food in which they are contained. For example, what we commonly consider as "bruising" on fruits is enzymes in action eating up the fruit. There is one small problem with food enzymes. They are easily destroyed by cooking and processing – generally at temperatures above 115°. Since most of the food we eat is cooked or processed that means we have become dependent upon our body to produce enough enzymes to digest our food.

While in general we should have enough enzymes, there are times we may not. For example, lactose (milk sugar) intolerance is widespread throughout the population. This is because not all humans make or have enough amounts of the enzyme lactase required for digesting lactose. Or sometimes we just plain over-eat, and our body is not able to produce all the enzymes required within the time allotted.

The main enzymes made by the body are proteases, amylases, disaccharidases, and lipases. Another important enzyme is cellulase which the human body does not manufacture. As you'll notice, all enzymes end with "ase."

Proteases digest proteins. They begin their work in the stomach. A protease deficiency can lead to a compromised immune system, fluid retention, constipation, excessive alkaline reserves, and

calcium metabolism problems. As I have written previously, one of the dangers of soy protein is that it contains protease inhibitors. So, while it is sold and marketed as a protein, which it technically is, the body struggles to digest and utilize it due to the fact it cannot be digested. (Note that fermented soy products such as tempeh and miso are digestible because the protease inhibitor has been broken down by the fermentation process.) Soy mixed with other proteins will also inhibit their digestion. When we discuss the stomach there will be additional information relating to the consequences of insufficient protein digestion.

Amylases digest carbohydrates (starches and sugars) and break them down into disaccharides (sucrose, lactose, and maltose). The disaccharidases further digest these sugars into their simple components called monosaccharides (glucose and fructose). Carbohydrate digestion begins in the mouth and then resumes in the small intestines. Excessive consumption of carbohydrates (sugars) can produce a deficiency of disaccharidases.

Some examples of amylase and disaccharidases deficiency include lactose intolerance causing diarrhea; maltose and sucrose intolerance causing diarrhea and/or constipation; general sugar intolerance leading to asthma and sleep issues. In addition, a variety of mental and emotional imbalances such as depression, mood swings, aggressive behavior, panic attacks, and hyperactivity have been linked with deficiencies of these enzymes.

Of course, in reviewing this list one must discern whether it is the actual lack of the enzyme (such as with lactose intolerance) or the overconsumption of carbohydrates/sugars with a resulting supply shortage of enzymes. Sugar and fructose block Vitamin B metabolism and lack of Vitamin B is also related to the above described mental and emotional issues.

Lipases break down fats. Fat digestion occurs in the small intestine after the gall bladder secretes bile into the small intestines. High cholesterol, high triglycerides, high blood pressure, difficulty losing weight, varicose veins, and diabetes may be signs of lipase deficiency.

Cellulase digests soluble fiber such as cellulose found in vegetables. Ever notice how some raw vegetables may give you gas? While the raw vegetables do contain some cellulase, it may not be enough for your body to digest them.

Digestive enzymes are available as supplements and we encourage our clients to utilize them for three reasons: 1. Enzymes are critical for proper digestion; 2. Most of the food we eat is cooked and processed; and 3. Most people eat too much and out of balance. We like to call them “life savers” or insurance for your digestive system.

The Esophagus

We return to our north to south tour of the digestive system. Next stop after the mouth is the esophagus. The esophagus is more like a transit point. We do not want anything to stop there! The esophagus is the passageway from the mouth to the stomach.

It has upper and lower valves. The upper valve ensures that food goes into the esophagus and not the trachea (which is used for moving the air we breathe into our lungs). The lower esophageal

valve prevents food from coming back up. This valve can become incompetent and not stay completely shut. When this occurs, you may experience “acid reflux” – the “back up” of “stomach acid.”

Several factors contribute to the lower esophageal valve becoming incompetent including a nervous system reaction, hormonal control, and pressure from the stomach. Eating too much food (filling the stomach beyond a reasonable capacity) can press the valve back up. The capacity of the average stomach is just one liter (approximately four cups).

Nicotine, caffeine, sugar, and alcohol have also been shown to make the lower valve incompetent. Once the valve has become incompetent you become more susceptible to experiencing acid reflux on a regular basis. We will discuss acid reflux in much more detail later.

The Stomach

The stomach is where some serious digestion is supposed to start. As mentioned, it can hold one liter (four cups) comfortably. It will stretch to hold more but may struggle to process all of it properly. The stomach makes hydrochloric acid (HCl) to facilitate the digestion process. As the stomach stretches to accommodate food, this signals the body to make HCl. The stomach concentrates the acid to lower its pH below 3.0, ideally getting down to 1.0 to 2.0.

Here is a critical point. HCl does not digest food; it only serves to get the stomach acidic. Once the stomach is acidic pepsinogen is released. This makes pepsin which begins protein digestion.

The stomach also makes what is called intrinsic factor to digest Vitamin B12 and lipase to digest fats. Also note there is no carbohydrate digestion in the stomach. If the stomach is not acidic enough pepsinogen will not make pepsin and lipase will not be released. This means digestion is not occurring!

The acidic nature (and thus HCl production) of the stomach is critical for several other reasons. Of prime importance is to purify our foods. HCl will de-activate plant, animal and synthetic hormones and antibiotics from animals.

Stomach acid kills bacteria and viruses so they cannot get to other parts of our body. The bacteria H. Pylori turns off the stomach’s ability to make HCl. It has been recognized as the root cause of stomach ulcers. This bacterium eats away the stomach’s lining. Without HCl the body cannot kill the bacteria without additional support.

HCl is necessary for protein, B12, iron, and calcium absorption. Protein is the structural basis for our body – our muscles, ligaments, tendons, organs, glands, nails, hair, vital fluids (blood, hormones, neurotransmitters), and enzymes are all protein based. It builds and repairs all these tissues and cells.

Vitamin B12 is important for many functions. It is a cofactor for two important enzymes. One used for the metabolism of methionine, an essential amino acid. The other aids the production of energy from proteins and fats. Overall Vitamin B12 supports the nervous system, promotes the

maturation of red blood cells (hence the tie to anemia when deficient in B12), and supports bone and joint health.

Iron is critical for the health of our blood. One-third of our 100 trillion cells are red blood cells! Iron aids in hemoglobin production, which is critical in the transportation of oxygen around the body. Oxygen fuels the body and hemoglobin helps get it around! Iron also supports enzyme formation and function and is part of the enzyme system that produces DNA – the blueprint of the body – so it is critical in growth, reproduction, healing, and immune function.

Iron is tricky as too little can cause anemia—but too much can lead to atherosclerosis and other cardiovascular problems. Unlike other minerals, excess iron is not excreted from the body. Instead, it's stored in the tissues, accelerating iron overload indefinitely.

Calcium is one of the most talked about minerals and for good reason. It supports strong bone structure, teeth, and muscle tissue, aids in blood clotting function, supports cardiovascular and nerve functions, and helps in normal functioning of many enzymes. We repeat, without HCl we cannot effectively absorb calcium. So, if you are taking both antacids and calcium supplements what do you think is happening (or not happening)?

If all is going well, the stomach has begun the process of breaking down the proteins and fats and some key vitamins and minerals are being absorbed. Next stop is the small intestines. But before we get there, we'll explore how digestion can be compromised in the stomach, which of course has significant impact as we continue down the north to south path.

Here's a quick three question true or false quiz for you:

1. The cause of gastric/acid reflux is too much stomach acid.

2. When we are stressed, we produce extra stomach acid.

3. Antacids stop acid reflux.

What are your answers? If you are like most Americans, you probably answered true to all three. Over the course of our lifetime you have most likely heard endless advertisements telling you so. Well, sorry. These are all false! They are common misconceptions.

Acid indigestion is a misdiagnosed and misunderstood condition. Here's two important points you need to understand. First, acid reflux or GERD does not necessarily mean that there is too much stomach acid or HCl, which is a common belief. The actual truth is that many people diagnosed with acid reflux (too much stomach acid) produce too little.

Second, there are other acids in the stomach besides HCl. These are the true acids of acid reflux. So, where do they come from? Food enters the upper part of stomach where it can sit for up to an hour waiting for the body to produce enough acidity to activate its enzymes for protein digestion.

In a young, healthy person it takes approximately 45 minutes for the stomach to reach the pH that releases pepsin. During this time the salivary enzymes continue to work. If we ate some raw foods, we would also have those enzymes assisting in digestion. However, if we eat mostly cooked food and overeat it, something else is happening – it is decaying rather than being digested. Decaying food produces organic acids of putrefaction and fermentation – these are the acids of indigestion. HCl does not destroy the mucosal lining of the stomach as it is natural there. It is these organic acids that eat away the lining.

In addition, people who suffer from indigestion are often stressed, and eat in a rush, on the run, or while upset. We have been told stress makes our stomach pump out too much acid, causing heartburn and ulcers. But here's the truth about stress and digestion.

The fact is that stress engages the sympathetic nervous system. This suppresses digestion, and thus HCl production. Think about it. Our sympathetic response is also called "fight or flight." Back in the good old days if you saw a tiger (that would be a stress) you would want to run as fast as possible to get away. The alternative of fighting it would be a losing proposition. If you are running from a tiger your body is not worried about digestion. The same thing occurs when we eat while stressed. The body does not worry about making enzymes, so the food sits longer in the stomach.

Producing insufficient HCl is called hypochloridria. A sympathetic nervous system response is one factor. There are others. As we age, we make less HCl. In fact, by age 65 we make about 15% of the HCl we produced at age 25. Ever notice how more of the elderly seem to have acid reflux and other digestive issues?

Other causes include excessive use of antacids, a salt-free diet, chronic illness, and an increased metabolic demand (such as sports). Hydrochloric acid is made from hydrogen and chloride. Salt, better known as sodium chloride, is a source of chloride. Zinc is a key mineral required in the body's process of making HCl. Chronic illness can deplete zinc. It is also rather ironic that zinc requires an acidic environment in the stomach to be absorbed. This requires HCl. So, HCl requires zinc and zinc requires HCl. An increased metabolic demand also burns up the minerals needed to make HCl.

How do you know if you are hypochloridric? Symptoms include burping, bloating, bad breath, indigestion. Gas is the first sign that food is not digesting – it is rotting. As we said before fats go rancid, proteins putrefy, and carbohydrates ferment producing the "organic acids" of acid reflux.

At the root of acid reflux is poor diet – The Standard American Diet (or appropriately abbreviated as SAD). This is a diet high in processed foods, carbohydrates, starches and sugars, heavy in meat and particularly processed meat, and low in fiber. Don't get us wrong, there is nothing wrong with meat, it is just the quantity with respect to other foods and the overall quality that most Americans eat that is problematic. At the same time the diet is low in nutritious foods such as vegetables and healthy meats. Poor digestion occurs from the combination of poor food quality and lack of good bacteria and sufficient enzymes.

Other triggers for acid reflux include: hiatal hernia, tight fitting clothes, lying down too soon after eating, eating large meals, and specific foods that irritate (such as tomatoes, citrus fruit, dairy, meat, alcohol, coffee, high-fat foods, fried foods, spicy foods, onions, and chocolate).

While acid stopping medications and antacids can make the resulting symptoms better in the short term but make the original problem worse! Here's why. We are essentially turning off digestion at the stomach and attempting to resume it in the small intestines.

We know this is not a good idea! As we learned we need an acidic stomach to digest proteins and specific key nutrients (calcium, iron, zinc, and Vitamin B12). Without these we can become malnourished and lacking key nutrients. This can lead to protein deficiency problems, B12 deficiencies, nail problems, iron anemia, allergies, and osteoporosis.

As mentioned earlier HCl kills bacteria and parasites. Without it, we are more susceptible to them. They too are linked to a wide variety of illnesses. Rotting food also contributes to degeneration of the gastric mucosa, increasing the likelihood of a gastric ulcer.

And perhaps most important – digestion is a north to south process. If we get behind in the stomach this places extra burden on the downstream organs.

The Small Intestines

The action now moves into the small intestines. Since digestion is a north to south process whatever happened in the stomach will impact the small intestines. Did we digest our food, or did it ferment? Are we taking antacids for acid reflux?

As the food or "chyme" as it is now technically called moves into the small intestines the stomach sends a signal to the pancreas informing it of the amount of carbohydrate, fat, and protein coming its way. The pancreas then prepares the required enzymes. Not to overstate the obvious, but the more work the stomach has done, the less the pancreas and the small intestines will have to do.

As you remember, the pH environment of the stomach is supposed to be acidic. However, the pancreatic enzymes only work in an alkaline environment. Secretions from the pancreas and bile from the gall bladder alkalinize the small intestine. The pH of small intestine should be 8.3. Without enough bile, the small intestines do not reach this pH.

Normally, food stays in the small intestine for 3-10 hours. During that time approximately seven liters of enzymes are produced – amylase, protease, and lipase. Ninety five percent of all digestion and absorption occurs in the small intestines. If the pH is not correct this will be compromised, and transit time may be shorter (diarrhea) or longer (constipation). During this process 5.5 liters of the fluid is reabsorbed.

When working properly the digested molecules from the food we ate will be absorbed into the blood stream in the small intestines. Once in the blood it will fuel the body. The undigested material is passed on to the large intestine – our next stop.

What happens when food is not adequately digested and absorbed in the small intestines? There are two scenarios. First, food particles not digested well enough to pass across the gut wall pass down the alimentary canal, where they putrefy and form toxins that will be absorbed into the blood. Undigested carbohydrates feed the "bad" bacteria that we will meet later in the large intestines.

Or, the food particles are digested well enough to pass through the gut wall and into the blood but are not reduced to particles small enough to be utilized by the body. This causes the intestinal mucosa to become inflamed which makes it more permeable. These are typically proteins. If you look at the major food sensitivities, intolerances, allergies, or whatever you want to call them, they are generally related to proteins: gluten from grains; casein from dairy, soy, and eggs.

What else contributes to an inflamed mucosal barrier? Studies show three major factors: therapy with prostaglandin inhibitors (NSAIDs, steroids, prednisone, and cortisone); antacids that decrease the acidity of the stomach, limiting the ability to digest proteins which leads to particles that get into blood leading to immune system reaction; and antibiotics that disrupt the normal balance of bacterial micro flora in the gut as well as the mouth, skin, and vagina leading to an overgrowth of bad bacteria and yeasts. NSAIDs are non-steroidal anti-inflammatory drugs including ibuprofen, aspirin, and naproxen.

As poor digestion (dysbiosis) becomes your "normal" your intestinal permeability continues to increase and is then referred to as "leaky gut syndrome." Healthy intestinal lining only allows properly digested foods to pass through into the bloodstream and be assimilated. It also keeps out bacteria and other foreign substances.

If the gut leaks these "things" get into the body a wide variety of symptoms and health problems are associated, including: abdominal pain, gas, indigestion, bloating, constipation, diarrhea, asthma, chronic joint pain, chronic muscle pain, confusion, fuzzy thinking, poor memory, mood swings, nervousness, aggressive behavior, anxiety, poor exercise tolerance, poor immunity, recurrent vaginal infections, skin rashes, bed wetting, recurrent bladder infections, fevers of unknown origin, shortness of breath, primary biliary cirrhosis, and general fatigue and malaise.

The Liver, Gallbladder and Pancreas

When we think of digestion we usually think of the stomach, small intestines, and large intestines – often collectively referred to as "the gut." Playing a key role behind the scenes are the liver, gallbladder, and pancreas.

The liver is one of the most critical organs in the body. Once the liver shuts down the body is pretty much finished. Among its hundreds or perhaps thousands of jobs are cleaning/purifying the blood and removing toxins, fat metabolism, building proteins/amino acid synthesis, and for purposes of digestion – manufacturing bile. After being made in the liver bile is stored and concentrated in the gall bladder.

The acidic food passing from the stomach to the small intestine stimulates the pancreas and gall bladder. Foods high in fat must be emulsified. This is what bile does. It is a "degreaser". If the oil is not degreased, the enzymes cannot get to the food.

The body makes 1-6 cups of bile per day. Bile has pH of 7.8 which is slightly alkaline. Gall bladder contractions send bile into the small intestines. Bile that stays in the gall bladder gets reconstituted and thickens and can eventually form stones. This thickening is referred to as biliary stasis which prevents the bile from flowing to the small intestines. One of the problems in eating a low-fat diet is by consuming less fat there is less need for bile. This increases the likelihood of biliary stasis.

Bile influences the color of stools. Light colored stools indicate liver and gall bladder need help. Stools should be brown. Any other color is suspect.

The pancreas secretes hormones (insulin and glucagon) and enzymes thus it is often overworked. We have previously discussed the key role that pancreatic enzymes play in the small intestines. We will later discuss the importance of insulin and glucagon.

The Large Intestine and the Importance of Probiotics

The last internal stop of our process is the large intestine or colon. The small intestines pass the remaining undigested material to the large intestine. Here it is stored and concentrated by absorbing water. Most of our micro flora are also here – both beneficial and detrimental. Micro flora is also found in the small intestines and stomach.

Once again, the internal environment changes as the colon is slightly acidic at 6.8. The large intestine is where sodium, potassium, other vitamins and minerals, and water are absorbed. Of that original seven liters of enzymes the remaining 1.5 liters is absorbed in the colon. Feces made here which are one third matter and two thirds water. A major part of the feces is dead bacteria. There are several pounds of flora in the bowel. The beneficial flora produces B Vitamins, Vitamin K, and will digest proteins.

We have 400 to 500 types of bacteria in our digestive system. This is often simplified as the "good" and the "bad" bacteria. To keep it simple the "good" bacteria are those that live on some of the undigested material and their waste products are vitamins that we can use. The "good" bacteria are called probiotics. The most prominent are: Lactobacilli (Lactobacillus acidophilus, Lactobacillus bulgaricus), Bifidobacterium, and Saccharomyces boulardi.

On the other hand the "bad" bacteria are those who live on other undigested material, mostly the sugar and other carbohydrates, and produce waste that is toxic to our system causing bloating, gas, and many of the other digestive disorders that we previously spoke of.

When we discuss our micro flora or bacteria think of it as continuous war with many battles. All the varieties are battling to survive. When you take an antibiotic (anti-life) it kills all the bacteria – both the good and the bad, but not yeast such as candida which takes over. Therefore, often have yeast infection after round of antibiotics.

There are a variety of food sources for the good bacteria. These include the cultured or fermented foods such as: yogurt, kefir, raw sauerkraut, kimchi, miso, tamari, and tempeh. Another source is probiotic supplements.

What to do: Self Help

Here are some recommendations to reduce symptoms of acid reflux. Drinking eight ounces of water about 30 minutes prior to a meal supplies fluid to form enough amounts of gastric juices. Once you begin the meal drink no more than a cup of additional fluid. If you can, it is best not to drink at all. By drinking liquids, even water, you are reducing the acidity of the stomach, so it needs to work harder. My grandmother never drank with her meals and now I understand why!

Another home remedy is to drink organic raw apple cider vinegar prior to eating. The vinegar does not actually digest anything; it just aids the stomach in becoming acidic so that pepsin will be released.

To further heal the body, it is recommended to wean off acid stopping medications (with doctor's permission and assistance). Begin to eat healthy foods and in smaller meals. Do not lie down within four hours of a meal. Lying on your left side can help relieve heartburn and aid digestion. It keeps the stomach below the esophagus.

How do you know if you are making enough HCl or pancreatic enzymes? You can perform a self-check using a couple of easily accessible reflex points.

The HCl reflex point: To check for low stomach acid or hypochloridria follow this procedure. Lie on your back with your knees bent. Begin with the second and third fingers of your right hand at your Xiphoid process (the point at the bottom of your rib cage). Move your fingers down approximately 1" below the Xiphoid process and then move the fingers to the left edge of the rib cage. Come in at about a 45° angle with the fingertips. The point is on the edge of the rib cage. You will want to poke around an area about the size of a quarter as the placement of the point can vary somewhat. If the point is tender this indicates a need for HCl until the tenderness goes away. Sometimes people are confused whether it is tender or just the poking. The best was to tell is to poke your rib cage nearby with the same pressure. You should be able to determine the difference between a poke and a tender spot.

The Enzyme reflex point: To check the pancreatic enzyme output follow the procedure above except use the left hand and slide the two fingers to the edge of the rib cage on your right side. The Enzyme point is directly across from the HCl point.

Pancreas Point: There are two other ways to check the pancreas. The first involves applying slight pressure to see if it is tender. The pancreas is deep in the abdomen. To find it place your hands just below the left side of the bottom of the rib cage. If you press in at 45° angle with both hands you will be on the head of the pancreas. Note whether it is tender. The second way to check the pancreas is from a reflex point on your right thumb pad muscle. Find this location and squeeze and palpate. Again, if there is tenderness, there is stress in the pancreas.

Gall bladder – acute: This test is called Murphy's Sign and is for acute gall bladder problems. There are two parts to the test. First take a deep breath in and out and put your fingers under the right rib cage. Next, take another breath in. This pushes the gall bladder and liver against the fingers. Notice if there is tenderness. This can be done at both the upper and lower quadrants of the liver.

Gall bladder – chronic: This point is found on the right hand. Where the thumb and forefinger come together (fleshy point, not muscle) use a pinching, rolling motion to look for tenderness and nodulation. Use the index finger for support with the thumb on top. Then, pinch and roll. The tenderness will go away before the nodulation. The nodule is a physical response. Sometimes pain is subjective, and pain goes away first. The nodule goes away slower over time.

You can also do a self-test for yeast. First thing in the morning pour a glass of water and spit into it before put anything in your mouth. Check the water every 15 minutes. If you see things floating down, the spit grows legs or it gets cloudy, the saliva is carrying fungal overgrowth. If saliva is still floating after one hour, you are likely okay.

A few other notes of interest:

Lower bowel gas is never good. It is a sign something is not digesting. In general, an earthy smell comes from the large intestines, while foul smells come from liver or gall bladder issues.

If you have burning sensations in your stomach that eating relieves there is the potential for an ulcer that should be checked.

In order to eat meat, you must have HCl. Often, when people lose the taste for meat that is the body being smart since they are unable to adequately digest it and their body encourages them to avoid it.

If you suffer discomfort after eating here are some reference points. If it hurts at the bottom of breastbone this may be the esophagus. Pain in the left rib cage is associated with the stomach. If the left shoulder hurts after eating, you likely ate too much. Your stomach is so full that it is pressing against your diaphragm. This refers to the left shoulder. If your right shoulder blade hurts it is likely your liver or gall bladder is inflamed. When the pain is in between the shoulder blades it is the stomach.

If you feel it all through the abdomen both front and back check the pancreas. If the pain is above the belly button it is originating from the stomach. If it is around the bell button it is from the small intestines. And, if below the belly button it is coming from the large intestines.

All About the Gut and Gut Repair

Among the latest and greatest breakthroughs of modern medicine is the mapping of the human genome with its vast potential for gene-based therapies. I find this work extremely interesting

although I'm not exactly sure where it will lead. What's even more interesting is the work being done to explore the genome of what is living in our gut that is not human. This is referred to as our microbiome. It is the trillions of bacteria and other microscopic living organisms that are an integral part of us. They are found on our skin, in our mouth, throughout the inside of our body, and most famously in our gut (our stomach, small intestines, and large intestines).

Our microbiome is a large, diverse and dynamic population of micro-organisms. During birth and the first two years of life we acquire our "native bacteria." This comes primarily from our mother from our birth and (hopefully) subsequent breast feeding. Thus, mom's health and her microbiome are of extreme importance to baby and instrumental in shaping the future health of the child. After this "transient bacteria" is constantly ingested into our body from food, water, air, and if we choose probiotics.

These organisms are counted in CFUs (colony-forming unit) of live organisms. In your gut they are specifically measured as CFU/g or colony-forming units per gram of solid material. Here's where it gets interesting! While a CFU is not specifically a "cell" it is a close approximation. The stomach and the duodenum (first part of small intestines) have the smallest number of organisms around 10^3 (1,000) CFU/g. In the rest of the small intestines (the jejunum and ileum) the number increases from 10^4 to 10^7 (ten million) CFU/g. And by the time we get to the colon (large intestine) things are really cooking! There are now 10^{12} CFU/g. For you math majors that is one trillion – 1,000,000,000,000 – and that is per gram!

It is believed that the entire human body consists of 10^{14} cells of which only 10^{13} are of human origin, the remaining 90% are bacteria. That is why you will hear statements to the affect that we have more bacteria cells than human!

Across the human population it is estimated that there are 40,000 unique bacteria species. Every person has a unique profile of predominant and subdominant species. Scientists have even found that some bacteria strains are only found in one person!

So, what does this all mean? Human genome research has identified approximately 20,000 unique human genes. Your gut microbiome has up to 3.3 million unique genes, 150 times more than its human host. This means that the gut microbiome may perform functions not encoded in the human genome. In English – it means that your personal bacteria have significant influence on your health. Current research suggests that tendencies for obesity, diabetes, and heart disease may be more related to your gut genes than your own human genes! Are we inheriting "bad" genes or is it actually "bad" guts?

What do they do? Why has this evolved as part of the human? The "good" bacteria have beneficial effects, so we've allowed them to settle in. They ferment the non-digestible carbohydrates that we consume (for example certain types of fiber) which they feed on to survive and produce short chain fatty acids (SCFA). SCFAs support our immune system (by being anti-microbial – killing bad bacteria and yeast) and fire our metabolism which aids in weight loss or the maintenance of a healthy body weight. The beneficial bacteria aid in our absorption of calcium, magnesium, and iron; manufacture Vitamins B5, B7, B9, B12, and K; synthesize amino

acids; and keep the pH of the colon properly acidic. At the same time, they provide a barrier lining the gut to keep out potential pathogens.

What about when things aren't quite right? Dysbiosis is used to describe when bad bacteria take control of an area. This can occur in the mouth (bad breath, periodontitis and gum disease); in the stomach (the bacteria Helicobacter pylori had been linked to ulcers); and in the small and large intestines. Common causes of dysbiosis include: sub-optimal mother's gut microbiota, birth, and neonatal nutrition; antibiotics; stress; an unhealthy diet such as the Standard American Diet heavy on processed and refined foods and sugar, while low in vegetables; a decreased immune status (low secretory IgA); decreased gut motility; low hydrochloric acid production; altered intestinal pH (generally the colon is not acidic enough to create a hostile environment for bad bacteria and yeast/fungus); and an intestinal infection or infestation.

Many challenges have been linked to dysbiosis including autoimmune diseases, other digestive problems, and other general health issues.

Autoimmune diseases linked to dysbiosis include Crohn's disease; ulcerative colitis; rheumatoid arthritis; Ankylosing Spondylitis; Graves' disease; chronic active hepatitis; and Type 1 diabetes.

Other digestive problems linked to dysbiosis include irritable bowel syndrome (IBS); bad gas; food sensitivities; chronic diarrhea and constipation; general poor digestion; diverticulitis; and gastrointestinal infections and intestinal overgrowth.

Other general poor health issues linked to dysbiosis include: lack of well-being, low energy, and fatigue; poor immunity, allergies, and chronic skin disorders; breast and colon cancer; metabolic syndrome, insulin resistance, and obesity; Type 2 diabetes; depression and anxiety; chronic pain syndromes; and possibly autism.

Gut balancing programs will include supplements to support the elimination of bad bacteria and the healthy re-population of your gut with beneficial bacteria. They contain herbal formulas that are antimicrobial (attacks bacteria, fungi and protozoa that should not be there), cleanse the intestines, and stimulate digestion. Pluls a prebiotic to feed the good bacteria and support their population growth. Prebiotics are food ingredients that humans cannot digest which provide health benefits to the good bacteria in our gut. These include non-digestible carbohydrates, glucans, galactans, resistant starch, pectins, hemicellulose, arabinoxylans, inulin-type fructans, and galacto-oligosaccharides. And, it includes a probiotic. Quite the complete package!

The program is designed in the short term to promote a healthy and balanced intestinal flora, cleanse the lower gastrointestinal tract, and maintain a healthy GI environment. In the long term this supports healthy digestion, improves nutrient absorption, and supports a healthy immune system.

Probiotics – Do We Need Them?

Many of our clients suffer from a variety of digestive issues: from gas, bloating, and occasional heart burn; to constipation, diarrhea, and acid reflux; and then on to IBS, Crohn's, colitis, Celiac, and diverticulitis. In Bernie's late teens, through college, and into his mid-thirties he too suffered with digestive issues. He was diagnosed with IBS and the "solution" was to eat more fiber. That did not really work. As he began to learn more about healthy eating it turned out to be a relatively simple fix – stop eating bagels and cereals for breakfast – and soon his digestion was vastly improved, and his seasonal asthma was gone!

To say we are only as good as our digestion may be an understatement. You can eat the healthiest of foods, but if you are not digesting them, you are not getting the nutrients that your body requires for long term health.

It is likely you are familiar with the three classes of foods that need to be digested – protein, carbohydrates, and fats. However, it is less likely you are familiar with the "triad of digestion" or the three essential substances produced in your body necessary for strong digestion – hydrochloric acid, lactic acid, and bile. Hydrochloric acid and lactic acid are as their names indicate – acids, while bile is an alkaline substance.

Hydrochloric acid is produced in the stomach and primarily responsible for protein digestion. Bile is produced in the liver, concentrated and stored in the gall bladder, and released into the duodenum (small intestine) to enable fat digestion. Lactic acid is made in the colon (large intestine) and finishes up carbohydrate digestion.

The digestion process starts in the stomach as hydrochloric acid sterilizes and breaks food down into liquid. It kills potential pathogens such as bacteria and parasites; prepares calcium, zinc, and Vitamin B12 to be properly utilized; and begins the digestion of proteins. Digestive issues will start when the body does not make or does not have adequate levels of hydrochloric acid. Supplements that contain Betaine Hydrochloride can increase acidity in the stomach when the body does not make enough hydrochloric acid.

While the environment in the stomach needs to be acidic, for the small intestines to do their job, the environment must be slightly alkaline. The gall bladder sends bile into the small intestines where it will help to alkalize the environment by neutralizing the hydrochloric acid coming in from the stomach and it will emulsify fats and oils so they can be properly digested. If the body is not providing enough bile there are obvious consequences. There are a variety of supplements from that support proper liver and gall bladder function.

The last stop on the digestion train is the colon. The natural state of the colon is acidic and lactic acid is the key. The "good" in "good bacteria" is their ability to convert carbohydrates into lactic acid. Lactic acid protects the body from pathogenic bacteria, yeast, and fungus and lines the colon, vaginal tract, and skin to protect against overgrowth. When our gut bacteria are mostly of the "bad" bacteria, this does not occur, resulting in gas and bloating, vaginal yeast infections, and skin problems.

This is where the discussion of probiotics comes into play. Our microbiome is a large, diverse and dynamic population of micro-organisms. During birth and the first two years of life we acquire our "native bacteria." This comes primarily from our mother from our birth and (hopefully) subsequent breast feeding. Thus, mom's health and her microbiome are of extreme importance to baby and instrumental in shaping the future health of the child. After this "transient bacteria" is constantly ingested into our body from food, water, air, and if we choose probiotics.

This means that any Probiotic you are taking is essentially "transient." This means for it to be effective you need to keep taking it. It is not populating your gut. If you stop, it is likely that the "bad" bacteria, yeast, and fungus will then take over the environment. Perhaps there is another way to address the issue.

There are three main yeasts that we come across in our diet. Baker's yeast converts carbohydrates into carbon dioxide (gas); Brewer's yeast converts carbohydrates into alcohol (fermentation); and Mycelium yeast converts carbohydrates into lactic acid. By increasing our consumption of this type of yeast we can increase the lactic acid in our colon which helps prevent the growth of pathogenic bacteria, reduces the risk of colon cancer, and crowds out other yeast and fungus while protecting the lining of our colon.

Therefore, we can conclude, that taking supplements will be beneficial and will reduce the "bad" bacteria, yeast, and fungus while creating the natural environment for your own "good" native bacteria to rule the environment.

Getting Rid of Unwanted "Guests"

Sometimes our digestion does not seem quite right as we may have been exposed to and host all sorts of unwanted "guests" within our own bodies. Oftentimes when the doctor cannot determine what is wrong with you or they tell you it is in your head, it may likely be these unwanted "guests" – parasites, yeast/fungi/mold, viruses, or bacteria that are taking over your body and creating a variety of symptoms.

Typical symptoms include: Allergies, anemia, asthma, bloating, chronic fatigue, constipation, Crohn's disease, diarrhea, enlarged liver or spleen, flu-like symptoms that persist, gas, headaches, immune problems, irritable bowel, unexplained joint and muscle aches, skin problems, sleep disturbances, and teeth grinding can signal parasites, which masquerade so easily as other disorders. Some people will experience secondary gluten and/or lactose intolerance, so add food sensitivities to the list above.

This is all fine and good, but several questions remain. First, how do I know if a "guest" is the underlying cause of the symptoms? Second, what type of "guest" is it? And third, how do I get rid of it? All these are critical questions.

It is important to be aware of other causes of digestive distress which fall into three categories: food allergies/sensitivities, structural issues in the digestive tract, and ongoing emotional stress.

We will use the terms “allergies” and “sensitivities” interchangeably. They are technically not the same, yet they are each specific descriptions of an immune system response. The most common food sensitivities are wheat, gluten, dairy, corn, soy, eggs, nuts, and sugar. Then there are less common ones such as oats, other grains, the nightshade family of vegetables, other fruits, etc. We have seen all kinds of food sensitivities in my clients. And yes, you can be sensitive to a “healthy” food!

There are a variety of testing options to identify food issues: blood tests, saliva tests, and of course muscle testing. Once the underlying cause is identified the solution is simple – avoid the foods that are causing the problem.

Second, there could be structural issues in the digestive tract: insufficient hydrochloric acid, insufficient bile, lack of a gall bladder, acid/alkaline imbalance in the small or large intestines, lack of digestive enzymes.

Blood testing, saliva testing, and muscle testing can also be used here to identify the underlying issue. Once the cause is identified there are a variety of nutritional support products such as enzymes, probiotics, acid/alkaline balancers, and digestive tract healers.

Third, there can be excessive emotional stress. Too much stress keeps our body in a sympathetic nervous system response which is a problem as digestion is optimized as a parasympathetic nervous system function.

This can be identified through saliva testing of hormones or muscle testing or simply an awareness of current stressors in one’s life. It can be helpful to learn stress reduction techniques such as breathing and meditation to help alleviate some stress and to break the constant sympathetic nervous system response.

The next question is what type of “guest” are we dealing with. Testing options include muscle testing, stool testing, saliva testing, and blood testing. We have found muscle testing to be most helpful and the most cost effective. We previously used stool and saliva testing more frequently, but find we get similar results from muscle testing, and verification from blood testing. Most recently we have been very please using a stool test – the GI MAP which provides DNA analysis of stool contents. The GI-MAP (Microbial Assay Plus) is unique in the field of comprehensive stool testing. It relies exclusively on quantitative polymerase chain reaction (qPCR) technology to detect parasites, bacteria, fungi, and more by targeting the specific DNA of the organisms tested.

Stool and saliva testing can identify parasites, yeast, fungus, and bacterial infections, along with inflammatory markers in the small and large intestines, pancreatic enzyme activity levels, and blood in the stool. Blood testing can identify chronic and acute infections from bacteria, parasites, and viruses, and suggest hydrochloric acid levels in the stomach. Often, we are told that our blood tests are “normal.” It is critical to remember that “normal” does not mean “optimal” or “healthy”. When we look at the details of the total white blood cell count and the differential, we can observe patterns that suggest chronic and/or acute infection patterns.

Once we know what we are dealing then we use the proper remedies. Each type of issue requires its own protocol. The remedies we use include herbs, homeopathics, and nutritional products that are antimicrobial. Depending on the "guest" there are anti-virals, anti-fungals, anti-yeast, anti-mold, anti-parasites, and anti-bacterial varieties. There are also enzymes, probiotics, and other gut healers to support the digestive tract. To determine the specific protocol for each person we use muscle testing. We have many different products in the office, and we use the muscle testing to identify the specific supplement(s) for each individual.

Corn Sensitivities

When you hear that someone has a food allergy or sensitivity what comes first to your mind? If you are like most people it is gluten, wheat, or perhaps dairy. Yet to many people, corn is equally problematic for two reasons – first, it is less known so not considered, and second, it generally acts more subtly.

This client testimonial pretty much sums it up:

"Nobody knows anything about this corn allergy, so I don't really tell normal people who aren't that educated in health and wellness/nutrition. My mom's husband is a doctor (general practitioner) and he never had any clue as to what was wrong with me. Everyone just said it must be my anxiety which made me more anxious [but] I knew it was something else!

I have to be so careful and can't even eat anywhere but home since corn is in everything. I'm just so grateful that I understand what is happening with my body. That was super scary at times.

Thanks again 😊"

We have several clients with corn sensitivities, and it is always a similar story – strange symptoms which no one can figure out, which go away when corn is completely removed from the diet. However, completely removing corn is a major challenge. Our client correctly states that "corn is in everything." Not only food and drinks, but consumer items such as toothpaste and deodorant.

We have a list that we provide for my clients of products that contain corn. Including: corn starch, corn syrup, corn meal, glucose, fructose, high fructose corn syrup, maltose, dextrins, cyclodextrins, maltodextrin, emulsifiers, lecithin, citric acid, lactic acid, sorbitol, mannitol, xantham gum, modified and unmodified starches, MSG, ethanol, and organic acids used in plastic.

Recently we have learned some more places where corn is hidden thanks to this recent correspondence from a client with a corn sensitivity:

"I just had a full circle/ ah HA moment and wanted to share with you… with the help of your guidance and knowledge (and internet) I came to realize Tito's vodka, is 100% made

of corn. I had 2 drinks this past weekend with Tito's vodka, and have had some face issues. Nothing major just wasn't as good as it was.

Maybe a stupid email with just me ranting but wanted to share the fun facts that Tito's is 100%… awful corn based. Shaking my head."

This same client also discovered the hard way that some beers also have corn derivatives in them. She had some Blue Moon and her face broke out!

These stories have inspired additional research into beers and vodkas that contain corn. Not that we are encouraging any one to consume alcohol, but it is a reality, and it is important to know this information. Most of us assume that beer is a wheat product and vodka is made from wheat, rye, or potato.

Vodka will be advertised as "gluten free" which is your first clue it may have corn. Among the most popular brands made from corn include the previously mentioned Tito's, along with Deep Eddy and Smirnoff. Gluten free vodka may also be made from potatoes. For a complete list of gluten free vodkas click here: https://urbantastebud.com/gluten-free-vodka-list/.

Now let us look at beer. You will find "gluten free" beer advertised as well for those with gluten sensitivities, but no mention of "corn free". In recent advertising you may have noticed Bud Light attacking MillerCoors for using corn syrup. Although Bud Light does not use corn syrup, they do use Dextrose which is a corn derivative! Nothing like advertising!!

Beer companies are not required to list all the ingredients on the label, so until a few years ago much of this was not publicly known. In response to a food activist creating an online petition and publicizing the ingredient controversy, Anheuser-Busch and MillerCoors began to publish their ingredients online revealing that some beers contain corn syrup (GMO), high fructose corn syrup, sucrose (sugar), caramel color, artificial flavors, natural flavors, preservatives, sweeteners, and other additives.

Here are some of the corn derivatives found in specific brands:

- High Fructose Corn Syrup (Guinness – unable to provide an affidavit for non-GMO proof)
- Corn syrup (Miller Light, Coors, Corona, Fosters, Pabst Blue Ribbon, Red Stripe)
- Dextrose (Budweiser, Bud Light, Busch Light, Michelob Ultra)
- Corn (Red Stripe, Miller Coors Brand, Anheuser-Busch Brands)

For the full article *Why Ingredients in Beer Matter – And What Beer Companies Aren't Telling You* go to: https://foodbabe.com/why-ingredients-in-beer-matter-and-what-beer-companies-arent-telling-you/.

To learn more about corn and some of the other ingredients you may not appreciate being in your beer go to: https://foodbabe.com/the-shocking-ingredients-in-beer/. One of these ingredients is a caramel coloring used in Newcastle (a UK brand) that has found to be carcinogenic.

Disclaimer

This eBook is designed to educate people about diet, a lifestyle approach to health and well-being, natural remedies, options, and dietary supplements. None of this should be construed as a substitute for medical attention. Rather, individuals with specific medical concerns or symptoms should seek advice from a physician.

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