Basics of Digestion

Balance Your Gut, Heal Your Body

It’s called “the gut,” also known as the gastrointestinal (GI) tract or the digestive tract. It is essentially a long tube made up of layers of muscle lined by cells and glands imbedded in a mucous lining. The job of the gut is to ingest food, digest it, absorb nutrients, and to excrete waste products. The digestive system works hard. It is pressed into service every time we eat. In fact, over the course of a lifetime, it will digest some 23,000 pounds of solid food.¹

There are numerous organs involved in the digestive process: mouth, esophagus, stomach, small and large intestines, anus, gallbladder, liver and pancreas. These last three organs are located outside the digestive tube or tract, but still play an important role in digestion. Should something go wrong with any of the digestive organs, the process of digestion becomes impaired. Nutritional status and overall health are then adversely affected. This happens more often than we might suspect. More people are hospitalized for GI disorders than for any other,² and more than 100 million Americans are reported to have digestive disorders.

The health of the digestive system impacts the health of the rest of the body. When digestion is not optimal, whether from a recognized digestive disorder, inadequate diet, or even a silent digestive imbalance, the rest of the body not only misses out on vital nutrients, but it also receives toxins and other unwanted particles that can adversely affect many different areas of the body. The many gut connections to overall health highlighted in this book illustrate just how important digestive health is.

In the process of digestion, food is converted into fuel, or energy, to run the body. Large pieces of food are broken down physically (through chewing) and chemically (through enzyme activity) into microscopic particles, so that they are small enough to cross the cell membranes of the gut and enter the bloodstream. Any glitch in the digestive conversion process short-circuits the body’s energy supply, and can have far-reaching effects on health.

Before looking at what can go wrong in the process, let’s look at what a properly functioning system does and how it works.
Peristalsis
From the time food is put into the mouth until its waste products are excreted, it is propelled through the body by a series of muscular contractions known as peristalsis.

In the mouth, food is pushed by the process of deglutition (swallowing), a voluntary action, which moves the food bolus into the upper esophagus, then, the involuntary contractions (peristalsis) of the esophagus deliver the food into the stomach. When the food reaches the stomach, the lower esophageal sphincter high pressure zone (LES-HPZ), created by the diaphragm and esophagus, normally prevents reflux of food into the esophagus.

The LES-HPZ is normally closed, but, as food approaches, the surrounding muscles relax allowing a temporary opening through which food may enter the stomach. As the LES-HPZ opens, the muscle of the upper part of the stomach relaxes permitting large volumes of food to enter. Here food is stored and broken down. The stomach acts like a large blender, churning and mixing food and liquid with its own digestive juices.

Finally, the stomach empties its contents into the small intestine. By the time food enters the first section of the small intestine (the duodenum), it has already changed significantly. What enters the duodenum is called chyme, which is a mixture of food, hydrochloric acid (HCl), gastric enzymes and mucus. It is here in the duodenum that the pancreas releases its enzymes and bicarbonate to neutralize the acid, and the liver adds bile at the same time. The food bolus then enters the major part of the small intestine (jejunum and ileum), which also secretes digestive juices and mucus that act upon and dissolve the food.

The next step is the absorption of digested nutrients through the wall of the small intestine into the bloodstream. The part of the food that is not digestible (fiber), along with worn out cells shed from the mucosa (mucus lining of the GI tract), and some unabsorbed toxins constitute waste products. These products are propelled by peristalsis into the large intestine (colon) where they are dehydrated, turned into stool, mixed with trillions of bacteria and expelled from the body in the form of a bowel movement.

In this sequence of events, we see the importance of peristalsis. The muscles in the GI tract work in harmony with hormones and nerves to control motility (spontaneous movement) throughout the digestive system. Most GI problems are functional, rather than structural, and involve defects in motility, absorption or secretion.

Beneficial Bacteria
Trillions of bacteria, yeasts, parasites and other microbes live in the digestive tract, primarily in the colon. In a healthy person, the bulk of intestinal bacteria will be of the commensal (neutral) or beneficial variety—primarily many species of Lactobacillus and Bifidobacterium—with a minority being potentially pathogenic (disease-causing).
sugars. These same glands produce hormones that assist in controlling the digestive process. These secretions begin in the mouth where saliva is produced by the salivary glands. These glands contain the enzyme amylase, which begins to break down starch (carbohydrates).

Thus, the digestive process begins in the mouth, before food even enters the mouth. The term “mouth watering” refers to a very real physiological reaction, because the very thought of food is sufficient to trigger salivary gland activity.

Beneficial bacteria in the GI tract serve many vital functions. In the colon, they produce certain B vitamins, including B12 and biotin, as well as vitamin K. They also control the growth of harmful microorganisms, break down toxins and stimulate the immune system. Additionally, bacteria ferment dietary fiber into short-chain fatty acids, like butyrate, which is a primary fuel for the colon as well as protecting the colon against cancer.

**Secretion**

Glands in the GI tract produce digestive juices that break food down into its component parts—fat into fatty acids, protein into amino acids and carbohydrates into simple sugars. These glands produce hormones that assist in controlling the digestive process. These secretions begin in the mouth where saliva is produced by the salivary glands. These glands contain the enzyme amylase, which begins to break down starch (carbohydrates).

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Glands in the stomach lining produce hydrochloric acid (HCl) and the enzyme pepsin. Both of these secretions increase when food enters the stomach, and are essential for protein digestion. Pepsin functions to break down proteins. HCl works to denature proteins, making them easier to digest. HCl also plays an important role in killing infectious microorganisms (bacteria, parasites, fungi) that are ingested with food. This is one reason that the stomach is so acidic.

Secretions from the pancreas and the liver act upon ingested food once it enters the duodenal portion of the small intestine. Pancreatic juice contains enzymes
that break down fats (the enzyme lipase), carbohydrates (amylase) and proteins (protease). Also the small intestine itself secretes enzymes: lactase (breaks down milk sugar), DDP IV (dipeptidyl peptidase IV breaks down peptides), disaccharidases (break down starches and sugars) to assist in the digestive process. The pancreas also contains sodium bicarbonate to neutralize stomach acid. The liver produces bile, a digestive secretion that is stored in the gallbladder. When food is eaten, the bile is released from the gallbladder into the small intestine (via bile ducts) where it emulsifies or dissolves fat. The fat is then digested by pancreatic lipases and enzymes that line the intestine. Bile also contains toxins and hormones that are carried out with feces.

Absorption

Absorption takes place in the small intestine. Here macronutrients (fats, carbohydrates and protein) are broken down into smaller units and absorbed through the wall of the small intestine, and then carried throughout the body along with micronutrients (water, vitamins and minerals) via the bloodstream. These materials will either be stored for later use, or undergo further chemical change for use in the many different processes of the body.

The surface of the duodenum, the first section of the small intestine, is smooth for the first few inches, but quickly changes to a surface with many folds and small, fingerlike projections called villi and microvilli. These threadlike projections cover the surface of the mucous membrane lining the small intestine, and serve as the site of absorption of fluids and nutrients, actually sucking up small particles of digested food. The villi and microvilli greatly increase the surface area of the small intestine maximizing nutrient absorption capabilities.

The walls of the small intestine consist of four layers of muscle. Inside both the small intestine, as well as the
entire digestive and respiratory tracts, is a layer of mucous known as the mucosal layer, or mucosa. This mucous lining serves two vital functions: It allows nutrients of the proper size to pass through and to enter the bloodstream, and it blocks the passage of undigested food particles, pathogens and toxins into the bloodstream. The surface of the mucosa is thick and slippery. Much of the mucus here consists of the amino sugar N-acetyl-glucosamine (NAG), which the body makes from L-glutamine, one of its most abundant amino acids. An adequate amount of glutamine must be present in the body to manufacture NAG (N-acetyl-glucosamine), which is vital to the health of the mucosa.

The mucosa is normally shed and rebuilt every three to five days. In the presence of some inflammatory bowel conditions, however, it appears to be sloughed off at a higher rate possibly due to an inability of the body to convert L-glutamine to NAG or due to the inflammation itself.

Gut Immunity

The immune system is a complex, multi-level defense system that protects the body from foreign invaders. The digestive system plays a major role in the body's immunity. More than 70 percent of the immune system is located in the gut. This is in reference to the gut-associated lymphoid tissue (GALT) that resides in the gut. The digestive tract is constantly in contact with foreign invaders, also known as antigens. The job of the immune system is to determine which antigens are potentially pathogenic and which are harmless. (For example, food should be seen as harmless.)

Once the immune system determines that an antigen is a potential pathogen or invader, the innate immune system, which is the first part of the immune system to respond, mounts an inflammatory reaction against the invader. It also begins to send messages to the adaptive immune system. This more sophisticated branch of the immune system remembers specific antigens, so that the next time they are encountered, the body is better equipped to respond.

In addition, the fact that the digestive tract itself is a physical barrier separating the rest of the body from the bloodstream makes it an effective blockade against invaders as well. The protective mucous layer makes it difficult for pathogens to come in contact with the epithelial cells that line the intestinal wall. Additionally, the mucosa creates a safe haven for beneficial bacteria, immune cells and other beneficial molecules, which all work together to shield the body from invasion.

Hormones

Hormones within the digestive system control its functions by regulating secretions and movement of digestive organs. Cells within the mucosa of the stomach and small intestine produce and release the major hormones that control GI activity. Some examples of these hormones and their functions are:6

Gastrin—released by the antral cells in the stomach:
- Strongly stimulates the stomach to produce HCl (regulates its release from parietal cells in the stomach)
- Strongly stimulates the stomach to produce pepsin
- Weakly stimulates the secretion of pancreatic enzymes
- Weakly stimulates the gallbladder contraction
- Stimulates secretion of histamine by special cells (ECL cells) in the stomach lining
- Controls gastric motility

Secretin—secreted by mucosa in the upper two-thirds of the small intestine in response to the presence of acid chyme:
- Stimulates the secretion of bicarbonate-containing pancreatic juice
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- Stimulates, to a lesser extent, bile and intestinal secretion

Cholecystokinin (CCK)—secreted by the small intestine:
- Creates a feeling of fullness by acting directly on the satiety centers in the brain
- Stimulates gallbladder contraction
- Stimulates secretion of pancreatic enzymes

The Two Nervous Systems

While the digestive process is under the control of the hormonal system, hormone release is under the control of the nervous system. The central nervous system (CNS), is made up of the brain and spinal column. Not as familiar is the enteric nervous system (ENS). The word “enteric” means pertaining to the small intestine. **Half of the body’s nerve cells are located in the gut.**

The central nervous system and the enteric nervous system connect directly through the vagus nerve, which is the longest of the cranial nerves. This connection allows for direct communication between the gut and the brain. It is said that the gut has a mind of its own. The ENS is the gut’s brain, and it runs the length of the GI tract.

In the 1960s, it was discovered that the neurotransmitter serotonin was produced in and targeting to the ENS.

**Today it is known that there is more serotonin in the gut than in the brain.** A neurotransmitter is a chemical substance that facilitates communication among nerve cells, as well as from nerves to muscles, glands and vessels.

It has since been verified that, not only is serotonin found in the ENS, but that every class of neurotransmitter found in the brain is also found in the ENS. All this new information about the gut-brain connection is profoundly altering the understanding of how the digestive system works.

There are two types of nerves that control all activity in the digestive system. They are extrinsic and intrinsic nerves. The extrinsic nerves enter the digestive organs from the outside, from the spinal cord or from the brain, while the intrinsic nerves are embedded in the walls of the digestive organs, and so are inherent within the ENS. The extrinsic nerves release the neurotransmitters acetylcholine and adrenaline that cause the muscles of the digestive organs to contract and relax respectively (peristalsis). The intrinsic nerves go into action when food enters the digestive organs. They release a variety of substances to regulate the speed with which food moves through the system, and the production of digestive juices.

**The Gut-Brain Connection**

As stated, it is known today that there is a brain, or inherent nervous system, in the bowel. This nervous system is able to mediate reflexes in the digestive system without input from the brain or spinal cord. As a result,

**Did You Know**

The surface area of the small intestine is greater than 200 square meters. That’s about the size of a tennis court. The surface area of the entire digestive tract would cover an area about the size of two football fields!
In my work as a colon hydrotherapist with thousands of clients over the years, I found many with emotional/gut issues. It was quite common for people to come for colon therapy, and not be at all in touch with their “gut feelings.” After having a few sessions of colon therapy, many would begin to process unpleasant experiences or emotions.

In the following case studies, we’ll look at two specific instances of emotional distress impacting digestive health. These represent only a small fraction of the patients I’ve seen over the years.

John came into the clinic one day to “experience cleansing.” He had heard about it, but had never had the opportunity to undergo colon therapy. John wrote on the intake form that he had irritable bowel. As we began the first therapy session, he had a lot of spasms as water was leaving the colon. It was uncomfortable, but he was enthusiastic about coming back for a second treatment. During the second session, John began to talk about his mother. His mother had committed suicide. This had no doubt hurt John immensely, and as he talked during this session and subsequent sessions, he realized that he felt responsible for her actions, and had actually taken on a lot of guilt over the situation. As John went through this cleansing process, the colon therapy treatment ceased to be uncomfortable, and he realized his irritable bowel was due to his emotional state surrounding his mother’s suicide. Imagine the breakthrough and healing John experienced by unpacking the emotional baggage that was the cause of most of his bowel problems!

Jill was in her 30s. She had suffered from constipation most of her life. She had a very good job, one that put her on the road a good deal of the time. But Jill could not have a bowel movement unless she was at home. This meant she went for days, and sometimes a week at a time without bowel movements. Jill came in for colon therapy because of her constipation. Over a period of a few months, Jill became more comfortable, and started to talk a lot about her childhood during her sessions. As it unfolded, Jill’s mother had an obsession with cleanliness. During Jill’s childhood, when the family traveled and stopped to use the restroom at a service station or rest stop, her mother would line the floors and toilet with paper towels. Jill became terrified of germs and, as a result, developed constipation that carried over into adulthood.

Over and over again, I saw real healing take place as people looked beyond diet and supplementation to handle their digestive problems. The truth is, if you are experiencing any of the conditions we address in this book, you must discover the underlying emotional, psychological or spiritual issues. The following affirmations, written by one of my teachers, Bernard Jensen, can help in this regard:

- We are living in a world of cause and effect. I myself set up the causes, by thinking good or bad, for the things that happen to me. The result is that I live in cause and not effect.
- Through negative thinking, I force the power within to work against me; therefore, I will think positively.
- In each different situation, I look for new, positive ideas, constructive possibilities, people who can be helpful and enterprises with new vistas.
- Success, health and happiness lie within me; they do not come from the outside.
- In each situation, I will search for positive thoughts as I would search for the pearls of a broken necklace.
- From now on, I take one step at a time.
- To all difficulties, I respond with impartiality, courage and self-confidence.
- My life is what my thoughts make it.
- When I am kind to others, I am the best to myself.
- I nurture my mind with great thoughts because to believe in the heroic makes heroes.
- I will be true to myself that others may know me just as I am, and know all that it is possible for me to be.
- To love others as myself is to accept them as they are, to receive them without resentment, and to so live in such a way that all my actions reflect harmony, happiness, joy and serenity—in my own body and in everyone I meet.
the so called “nervous system in the gut” is able to accomplish some very important jobs without conscious thought. One such job is sending a warning when the digestive system is in trouble. Most people know something is wrong in the gut when they experience such symptoms as pain, heartburn, gas or diarrhea; these are the gut’s way of signaling that something is amiss.

As many studies have shown, stress, anger and fear have a profound effect upon the digestive tract—even a greater effect, in fact, than food. It is important to get in touch with these gut feelings, and sort these feelings out as part of the process of healing. If there are unresolved conflicts with relationships, enduring sorrow from loss of loved ones, residual effects of childhood traumas, or an excess of daily stressful situations, these hidden issues can have a negative effect on digestion and, indeed, on the health of the rest of the body.

Conversely, digestive function has an impact on the brain. Digestive imbalance occurs for a number of reasons such as toxin exposure, medications, poor diet, enzyme deficiency and food sensitivities. Dysbiosis creates inflammation in the gut which damages the protective intestinal lining. Toxins, undigested food particles, and potentially pathogenic microorganisms enter the bloodstream triggering yet more inflammation. All this inflammation travels throughout the bloodstream, as well as via the vagus nerve, resulting in negative effects on brain function.

Many people turn to traditional medicine when they begin to experience digestive problems. Unfortunately, traditional medicine is split into specialties. Unlike most holistic practitioners, specialists often do not treat the body as a whole. It is necessary to look at the whole person when dealing with health conditions; this includes consideration of the emotional and mental state of the individual. Many doctors address patients’ gut problems by prescribing drugs. Often, these drugs create more problems than they solve. Drugs can serve a constructive purpose when there is an acute problem, but most GI problems are chronic in nature, and can be best solved with a non-drug approach.

In summary, the responsibility resides within each of us to find the right balance and work through our issues, past and present, so that we may experience good health. This requires getting in touch with ourselves, and developing awareness about how stress affects us and how to begin to effectively handle it rather than letting it handle us. We will then listen to our “gut feelings” as a positive guide to lead us through life’s many trials and tribulations.

**What Can Go Wrong?**

With aging there is a tendency for the metabolism to slow down, meaning that food is converted to energy more slowly. Enzyme production decreases with age. So does HCl production. This leads to a decrease in digestive efficiency and nutrient absorption, resulting in sluggish body functions, including digestion and elimination.

Apart from the aging process, digestion can become impaired as a result of such factors as stress, processed food consumption (which leads to nutritional deficiency), inadequate chewing, intake of fluids with meals (which dilutes digestive juices), and over-eating. When gut
bacteria act upon undigested food that reaches the end of the intestine and colon, toxic chemicals and gases are produced. These internally produced toxins (endotoxins) can damage the mucosal lining, increasing its permeability. Consequently, the gut will leak permitting toxins and undigested food particles to enter the bloodstream. These toxins trigger an inflammatory reaction of the immune system, which settles in organs of greatest weakness, which cause disease. Intestinal toxins also produce renegade chemical fragments known as “free radicals.” These molecules containing unpaired electrons can get the upper hand and cause toxic damage if the body is lacking in sufficient antioxidants to buffer them.

The major antioxidant nutrients, vitamins A, C and E, and the minerals selenium and zinc, serve as free radical scavengers. A steady diet of processed foods will create a deficiency of antioxidant (and other) nutrients. Such a diet will also provide inadequate fiber needed by the body to absorb toxins, reduce cholesterol, increase short-chain fatty acid production, and combat constipation by reducing bowel transit time (the amount of time it takes for food to pass through the body).

A toxic environment in the bowel makes it difficult for beneficial bacteria to survive. Dysbiosis sets in when the pathogenic bacteria and other microorganisms gain the upper hand. With this condition, the stage is set for the development of parasite problems and/or proliferation of normally harmless organisms such as the yeast Candida albicans. In its fungal state, Candida grows long roots, known as rhizoids, which can actually puncture the mucous lining of the intestine increasing the leakiness of the gut. A build up of toxicity results in a decrease of enzyme production by the pancreas and intestine, which in turn further impairs digestion. A vicious cycle sets in where toxicity leads to overgrowth of pathogens, and enhances the absorption of yeast toxins, which further increase the leakiness of the gut.

As the body burden of toxins builds up, an increased load is placed on the organs of elimination—the liver, colon, kidneys, lungs and skin. The problem is made worse when processed foods, junk food, alcohol, prescription drugs and over-the-counter medications are ingested, and when exposure to environmental toxins (exotoxins), such as chemicals and heavy metals, is high. Many commonly used household and personal-care items have a high degree of toxicity and will add to the problem.

The bottom line is that many of us unknowingly lead a toxic lifestyle, which makes it very difficult to recover from digestive (and other) disorders that invariably have a strong toxic component to them. Toxicity, from the natural healing perspective, is the basic cause of disease. It makes sense, therefore, that the first step toward wellness is detoxification.

**Symptoms of Digestive Dysfunction**

It is a tribute to the strength and resiliency of the human body that it can often endure years of toxic abuse before breaking down. Many who consider themselves to be in good health are, in fact, accidents waiting to happen. The deterioration of the digestive system can occur silently for some years, producing no symptoms or only minor, non-specific ones. Headaches, reduced energy, lowered resistance to infections, gas, bloating, constipation and indigestion—these can be a prelude to the onset of chronic degenerative disease, which has its roots in the toxicity produced by digestive dysfunction.

As this dysfunction progresses and the GI tract continues to deteriorate, more serious problems may appear—anything from allergies to cancer. Chronic digestive problems can take the form of irritable bowel syndrome or the more serious inflammatory bowel diseases Crohn’s disease and ulcerative colitis. Since the skin is a major organ of elimination, chronic skin conditions like psoriasis
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and eczema can result from faulty GI function. In fact, virtually any chronic disease can have its roots in poor digestion and absorption of nutrients, increased intestinal permeability and dysbiosis, the hallmarks of digestive dysfunction. That is the whole premise of this book—to highlight the gut connections that are inherent in so many of today’s illnesses.

“Virtually any chronic disease can have its roots in poor digestion and absorption of nutrients, increased intestinal permeability and dysbiosis, the hallmarks of digestive dysfunction.”

Restoration of Normal Function

Subsequent chapters will describe specific gastrointestinal disorders in addition to many of today’s common health conditions. Natural solutions will be offered at the end of each condition. What is good for one person with one disorder may not be good for another person with another (or even the same) disorder. While it is important to tailor a health regimen to individual needs, there is some degree of generalization possible with regard to digestive health. What follows are some general guidelines for keeping the GI tract in good health or restoring it to good health:

• Eat a well-balanced diet of whole, natural, unprocessed food, preferably organic (grown without chemical fertilizers and pesticides), 80 to 90 percent plant-based, and 10 to 20 percent animal products; some will do well either with vegetarian or vegan diets if done properly.

• Avoid large meals.

• Avoid eating two to three hours before going to bed.

• Identify and eliminate foods to which you’re allergic (See the Appendix for information on sources for allergy testing.)

• Exercise on a regular basis.

• Minimize (or eliminate) use of alcohol and caffeine.

• Take prescription drugs only as directed by your physician. Do not discontinue them without his or her consent and supervision.

• Use over-the-counter drugs with care, if at all.

• Chew thoroughly.

• Avoid drinking beverages with meals.

• Avoid carbonated drinks.

• Avoid icy cold beverages. Room temperature water is preferred.

• Avoid eating starchy carbohydrates (like bread and pasta) at the same meal with proteins (like meat and eggs).

• Do not eat fruit at the same time that other foods are eaten.

• Avoid the use of sugar and artificial sweeteners.

• Rest after meals whenever possible (to aid absorption).

• Get adequate rest at night, preferably eight hours of sleep.

• Do not eat when upset.

• Minimize stress.

• Drink 1/2 oz. of water for every pound of body weight. (Divide weight in half, and drink that many ounces of water daily.)

• Use appropriate herbal formulas to cleanse and support digestive organs.

• Take digestive enzymes (and HCl, if stomach acid is low) with each meal to improve digestion.

• For most digestive problems, follow the Candida Diet (see the Appendix) for a minimum of one to three months.

• Reduce or eliminate exposure to environmental toxins.
Dr. Smith’s Comments

Virtually every illness in the body has some psycho-emotional elements. This certainly includes the intestinal tract, ranging from swallowing difficulties, psychogenic vomiting and abdominal pain, to IBS, diarrhea and hemorrhoids. The treatment for stress of the GI tract is basically the same as for the entire body. It requires employing some new strategies, and having a major shift in how we perceive our world.

One of the past presidents of the American Medical Association, in a speech years ago, stated a fundamentally important question for humankind to consider, “Is the Universe a friendly place for us to be or not?” He went on to point out that humans need not have only purpose in life, but a sense of peace, security and order to deal with the challenges and stress of life. Another physician pointed out that time urgency may well be the basis of most, if not all, illnesses.

Living by the clock, meeting deadlines (this word says it all), running out of hours before the tasks are done: these are major causes of underlying chronic stress that ultimately can cause physiologic derangement and earn one a label (disease) that takes him or her into the “healthcare” system. It would be more appropriate to call it a “sickness care” system. Few would question that we have the best sickness care system in the world. However, it is now time for professions dealing with health to learn more about lifestyle changes, diet and nutrition, and stress reduction, and share these concepts with their patients. This is not new. At the turn of the century, Dr. Charles Mayo stated that the physicians’ real purpose was to educate their patients about health and how to eliminate the need for doctors!

STRESS

Since stress seems to be the central theme to illness, it is worth pointing out some of the methods of managing it:
• Time management and learning to say “no”
• Eight to nine hours of sleep most nights and catch up on the weekends, if needed
We will mention here some of the salient features found in different meditation programs:

• Sit comfortably in a chair, with your back erect, legs uncrossed and feet flat on the floor. This tends to prevent falling asleep. It is not bad if you fall asleep; we would call that a nap. Attempting to meditate is the major diagnostic test for sleep deprivation. After the nap, if there is time, attempt again to meditate.

• Breathe slowly in through your nostrils into your abdomen (if need be, place your hands over your abdomen to see if it is expanding on inhalation). Take about four seconds to breathe in; hold it for one to two seconds, and let it out for another four seconds; hold it out for one to two seconds, and then start the cycle over. Each in/out cycle takes about 10-12 seconds; this drops your normal unconscious breathing from 12-18 breaths/minute to five to six breaths/minute. Your brain tends to entrain, or fall into step with your slow deep breathing. It shifts from an outward-oriented thinking form of consciousness known as a beta rhythm, which is 13-30 cycles per second (cps), to an inner, still, feeling form of consciousness which is alpha (7-12 cps). In alpha, you can be in the present moment with minimal (if any) thoughts, just observing your breathing pattern.

• Since stopping thought is a challenge, some recommend visualizing light or divine energy coming in on the in breath, and allowing any accumulated negative energy to leave on the out breath. Alternatively, if thinking comes up, choose to focus on an “attitude of gratitude” for all of your blessings in life.

• As you watch the breath (and/or light) going in and out, become aware of the entire inner energy field of the body. Feel it; don’t think about it. This will help reclaim conscious awareness from the always thinking mind. This technique is beautifully described in Eckhart Tolle’s book “Practicing the Power of Now,” pages 61-64. I highly recommend this to anyone.

• At times, and with practice, as you go deeper into a state of stillness, thought stops, and the perception of time changes radically. You may think you have been sitting still for 20 minutes only to find you have been there for over an hour! Yet, you did not sleep. This is considered by many to be the true state of meditation; you are neither sleeping, dreaming, or thinking. (Some traditions call it Turiya, the fourth state of consciousness.) It is the state of present moment, choiceless awareness, or being. Isn’t it strange we call ourselves human beings, and yet spend so little time just being? Often feelings of peace, joy, or even bliss arise from this state of expanded consciousness.

For those who are interested, this type of meditation works well with the Heart Math programs. (See Biofeedback in the Appendix.) It is a nice way to monitor the inner body awareness that arises from this practice. Regularity is the key. With time, most stress-related conditions in the body, including IBS, may improve.

**Beneficial Bacteria**

Most people, including healthcare practitioners, are not aware of how critical it is to manage the bacteria living in your intestinal ecosystem. This is definitely not a new concept. Ancient records from Iraq, from 3200 years ago, indicated that fermented milk and cheese were used in the human diet. Dr. Eli Metchnikoff, who won a Nobel Prize in 1908, postulated in 1904 that friendly bacteria may be essential to human health and longevity. Over 100 years later, modern-day research is proving him correct. Throughout the cultures of the world, fermented foods, such as dairy, vegetables
and meat, have been a mainstay of the diet. This has largely changed due to refrigeration. Before refrigeration, managing bacteria was a matter of life and death—either put the safe bacteria in the food, or the disease-producing ones could kill you. I actually think this is still true today despite our improved hygiene and refrigeration.

There are major negative effects of not-so-friendly bacteria in the human intestinal tract, which have far-reaching consequences. These effects are largely due to high enzyme activity of the bacteria, 90 percent of which live without much oxygen (anaerobic). Here are some things that parasitic, un-friendly, (or pathogenic), bacteria do:

• Deactivate enzymes made in the pancreas, like trypsin and chymotrypsin, (needed to digest protein)
• Consume many of the B vitamins that are in our diet
• Produce ammonia, increasing the work on the liver and kidneys
• Inactivate intestinal brush border enzymes, such as disaccharidases, (that digest sugars)
• Inactivate dietary antioxidants such as flavonoids
• Destroy essential fatty acids and make them free radicals, so an essential food now becomes a poison
• Degrade the protective mucus of the intestinal lining
• Produce carcinogens (cancer-producing chemicals) from ingested food
• Consume nutrients, and then produce toxins that damage the lining and cause it to leak, which creates immune imbalance leading to autoimmune diseases like lupus and arthritis
• Produce enzymes that affect normal metabolism of hormones like estrogen; this allows estrogen, which was packaged and ready to leave the body, to be resorbed and to create high estrogen levels that can lead to fibrocystic disease and cancer.
• Enter the circulation from the GI tract and travel via the blood to areas that are damaged, such as wounds and injuries; in addition, the bacteria can take up residence in the lungs, urogenital tract and vagina, and cause infections there as well.

These are a just some of the problems created by bad bacteria. Actually, most of this can be prevented by regular use of fermented foods with live cultures of various strains of Lactobacilli and Bifidobacteria.

The following is the HOPE we can give people to keep their digestive systems well-functioning. This is recommended as a maintenance protocol for everyone:

**High Fiber**

**Omega-3 Oils**

**Probiotics**

**Enzymes**