

## Digestive Disorders

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It is estimated that some form of digestive disorder affects more than 100 million people in America. That is more than half of the U.S. population.

For some people, digestive disorders are a source of irritation and discomfort that may cause them to drastically limit their lifestyles and to frequently miss work. For others, the disorders may be extremely crippling and even fatal.

### THE GASTROINTESTINAL TRACT

The gastrointestinal tract (GIT) is a long muscular tube that functions as the food processor for the human body. The digestive system includes the following organs: mouth and salivary glands, stomach, small and large intestines, colon, liver and pancreas, and the gallbladder.

Irritations or inflammation of the various sections of the GIT are identified as gastritis (stomach), colitis (colon), ileitis (ileum or small intestines), hepatitis (liver), and cholecystitis (gallbladder).

The GIT is not a passive system. Rather, it has the capability to sense and react to the materials that are passed through it. For a healthy digestive system, every person requires different food selections that match their GIT capacity.

### THE DIGESTIVE PROCESS

The GIT breaks down foods by first using mechanical means such as chewing and then by the application of a host of complex chemical processes. These chemical processes include everything from saliva to colon microbes. Since the GIT is the point of entry for the human body, everything eaten has an impact on the body. The food eaten and passed through the GIT contains nutrients as well as toxins. Toxins can be anything from food additives and pesticides to specific foods that induce a reaction from the GIT.

The process of digestion is accomplished via the surface of the GIT using secretions from accessory glands. The two glands providing the majority of digestive chemicals utilized by the GIT are the liver and the pancreas. The function of the liver is to control the food supply for the rest of the body by further processing the food molecules absorbed through the intestines. The liver does this by dispensing those food molecules in a controlled manner and by filtering out toxins that may have passed through the GIT wall.

Another very important function of the GIT is as a sensory organ. By rejecting foods through objectionable taste, vomiting, and diarrhea, or any combination of these symptoms, the sensing capacity of the GIT can protect the body. The surface of the GIT has a complex system of nerves and other cells of the immune system. The surface of the GIT, or mucosa, is part of a complex sensing system called the MALT (mucosa-associated lymphatic tissue). The immune sensors in MALT trigger responses such as nausea, vomiting, pain, and swelling. Vomiting and diarrhea are abrupt defensive responses by MALT when it senses foods with a strong allergic or toxic component. This kind of food intolerance is responsible for many digestive problems. The GIT is "hard-wired" to the brain via hormonal, neurotransmitter-mediator chemical communication.

The GIT is a muscular tube that contracts in a controlled rhythm to move food through the different sections (peristalsis). Strength and timing variations in the contractions can cause cramping (very strong contractions) and diarrhea (contractions are very frequent). When the contractions are slow and irregular, constipation may occur. Motility disorder is the general term used to

describe problems with peristalsis.

Food allergy is sometimes the primary cause of GIT problems. Chronic diseases can have their origin in food allergies. The dysfunction, discomfort, and disease associated with GIT can be the result of local immune responses to food selections or combinations of foods. Food selections are a result of personal tastes, social fads, ethnic culture, religion, and, to a larger degree, local or seasonal availability. The food selections made in modern affluent society are based on a developed taste for a rich diet centered on meats and dairy products that are loaded with fats, high concentrations of proteins, and fat-soluble toxins. Advertising and misinformation about healthy diets have overshadowed human nutritional needs.

Chewing, swallowing, and peristalsis comprise mechanical digestion, in which food is broken down into tiny particles, mixed with digestive juices, and moved through the digestive tract. Digestive enzymes break down large food molecules into small molecules that can be absorbed into the blood or lymph in the process of chemical digestion. (Anatomical Chart Company® 2002, Lippincott Williams & Wilkins.)

## **DIETARY SHIFTS AND DIGESTIVE DISORDERS**

Human evolutionary history clearly shows that we are primarily herbivores. Human saliva contains alpha-amylase, an enzyme specifically designed to break down complex carbohydrates into sugar compounds. Our teeth are designed to cut vegetable matter and to grind grains. The so-called canine teeth of humans bear no resemblance to the canines of even a domestic house cat. The human digestive system is long, and the food is processed slowly to extract all the nutrients from plant material. Conversely, carnivores have short digestive tracts that digest flesh very quickly. The digestive systems of carnivores are able to eliminate the large amount of cholesterol consumed in their diets, and carnivores do not have alpha-amylase present in their saliva.

The effect of the shift in our diets during the past 100 years has resulted in 44% of Americans and Canadians being afflicted with heartburn, 5% of the population suffering from peptic ulcer disease, and 20-40% of Americans plagued with nonulcer dyspepsia. Over-the-counter medications for these ailments are a multibillion-dollar industry. Nearly every hour on television, there is at least one commercial selling an antacid or similar product.

## **GASTROINTESTINAL SYMPTOMS**

- Nausea and Vomiting
- Bloating
- Constipation
- Diarrhea
- Abdominal Pain

There are five basic symptoms indicating a GIT problem. These symptoms are generally associated with dietary problems or specific food allergies. It is critical that anyone suffering from serious GIT problems work closely with a physician to test for the more developed and serious GIT diseases. The physician should also be experienced in working with dietary factors and food allergies.

### **Nausea and Vomiting**

Nausea and vomiting can vary from an unsettled feeling in the stomach to the violent action of immediate vomiting. Patients with nausea and vomiting symptoms should assume the ingestion of a reactive food (i.e., food containing toxins) or poisoning with a pathogen such as salmonella. Vomiting immediately after eating is usually preceded by excessive watery salivation. Some chronic low-intensity nausea can occur for a protracted time due to sustained low-level food allergies or problems with food combinations. Patients with low-level nausea usually have their symptoms disappear with diet revision. Nausea and vomiting are also linked with migraines caused by food allergies (see the Migraine protocol).

### **Bloating**

Bloating can result from excessive gas in the digestive system, failure of the digestive tract to sustain youthful peristaltic contractions, or a lack of sufficient quantities of digestive enzymes and bile acids to rapidly break down food. Intestinal gas results from food fermentation and from swallowing air while eating. The bloating from intestinal gas is different from that which occurs in the colon.

### **Constipation**

Constipation is the decreased frequency, or slowing, of peristalsis, resulting in harder stools. When the GIT is slowed down, feces can accumulate in the colon with attending pain and toxic reactions. A spastic colon results when the colon contracts out of rhythm in painful spasms blocking movement of the stool. Some patients experience painful days of constipation followed by forceful diarrhea and watery stool, often accompanied with abdominal cramps.

## **Diarrhea**

Diarrhea is the increased frequency of bowel movements that is also loose or watery. If diarrhea increases, the possibility of celiac disease is considered. Celiac disease is a serious disease that allows certain macromolecules to pass through the intestinal wall. If blood appears in the stool, ulcerative colitis is likely. Protracted bouts with diarrhea can result in nutritional deficiencies due to the poor absorption of essential nutrients.

## **Abdominal Pain**

Abdominal pain appears in different patterns and with varying intensities. Cramping occurs because of muscle spasms in the abdominal organs. Severe cramping pain, often called colic, usually occurs from problems with strong allergic response to food. Abdominal cramping near the navel is typically from the small intestine, and near the sides, top, and bottom of the lower abdomen, the pain is associated with the colon.

Diseases associated with central GIT disorders and diagnoses include depression, migraine, asthma, sinusitis, and fibromyalgia. These diseases have been identified with specific patterns of food allergy response. All of these diseases also have links to Irritable Bowel Syndrome (IBS) (see the IBS protocol). (IBS is more accurately referred to as RBS--reactive bowel syndrome.)

## **STEPS TO A HEALTHIER DIGESTIVE SYSTEM**

- Enzymes
- Artichoke
- Digest RC

Elimination diets are a good method of determining what foods cause an allergic reaction in the GIT lining in a patient. Planning and following such diets are a safe starting point for anyone desiring to track their GIT response to food. Interview physicians to learn who may be most qualified to assist in planning an elimination diet. A very good indicator of a healthy GIT is a regular transit time for complete food digestion. Patients who are regular are usually in optimum health.

Aging causes many people to experience problems with digestion. It is estimated that after age 40 there is an approximate decrease in the body's ability to produce enzymes by 20-30%. The use of specific enzymes can help to improve the efficiency of digestion. Enzymes can be used to enhance the proper breakdown of foods in order to more properly digest, absorb, and utilize nutrients.

## **Enzymes Are a Vital Component of the Digestive Process**

Enzymes are essential to the body's absorption and full use of food. The capacity of the living organism to make enzymes diminishes with age, and some scientists believe that humans could live longer and be healthier by guarding against the loss of our precious enzymes.

Enzymes are responsible for every activity of life. Even thinking requires enzyme activity. There are two primary classes of enzymes responsible for maintaining life functions: digestive and metabolic. The primary digestive enzymes are proteases (to digest proteins), amylases (to digest carbohydrates), and lipases (to digest fats). These enzymes function as a biological catalyst to help break down food. Raw foods also provide enzymes that naturally break down food for proper absorption. Metabolic enzymes are responsible for the structuring, repairing, and remodeling of every cell, and the body is under a great daily burden to supply sufficient enzymes for optimal health. Metabolic enzymes operate in every cell, every organ, and every tissue, and they need constant replenishment.

Digestion of food takes a high priority and has a high demand for enzymes. When we eat, enzymatic activity begins in the mouth, where salivary amylase, lingual lipase, and ptyalin initiate starch and fat digestion. In the stomach, hydrochloric acid activates pepsinogen to pepsin, which breaks down protein, and gastric lipase begins the hydrolysis of fats. Without proper enzyme production, the body has a difficult time digesting food, often resulting in a variety of chronic disorders.

Poor eating habits, including inadequate chewing and eating on the run, may result in inadequate enzyme production and, hence, malabsorption of food, which is exacerbated by aging because this is a time of decreased hydrochloric acid production, as well as a

general decline in digestive enzyme secretion.

Saliva is rich in amylase, while gastric juice contains protease. The pancreas secretes digestive juices containing high concentrations of amylase and protease, as well as a smaller concentration of lipase. It also secretes a small concentration of maltase, which reduces to dextrose. Animals eating raw food often have no enzymes at all in saliva, unlike humans. However, dogs fed a high carbohydrate, heat-treated diet have been found to develop enzymes in their saliva within a week in response to enzyme-depleting foods.

One of America's pioneering biochemists and nutrition researchers, Dr. Edward Howell (1986), cites numerous animal studies showing that animals fed diets that are deficient in enzymes have an enlargement of the pancreas, as huge amounts of pancreatic enzymes are squandered in digesting foods that are devoid of natural enzymes. The result of this wasteful outpouring of pancreatic digestive enzymes is a decrease in the supply of crucial metabolic enzymes and impaired health.

How significant is an enzyme deficiency to overall health? For starters, organs that are overworked will enlarge in order to perform the increased workload. Those with congestive heart failure or aortic valvular disease often suffer from an enlarged heart, an unhealthy condition. When the pancreas enlarges in order to produce more digestive enzymes, there results a deficiency in the production of life-sustaining metabolic enzymes, as available enzyme-producing capacity is used in digesting food instead of supporting cellular enzymatic functions. The tremendous impact that the wastage of pancreatic enzymes can have on health, and even life itself, has been established in animal studies. The critical question is how this applies to human health.

For much of the 20th century, European oncologists have included enzyme therapy as a natural, nontoxic therapy against cancer, and almost all leading alternative cancer specialists treating Americans prescribe both food enzymes and concentrated enzyme supplements as primary or adjuvant cancer therapies. A New York City cancer specialist, Nicholas Gonzalez, M.D., uses very high doses of supplemental pancreatic enzymes as a primary antitumor therapy. His clinical successes have led conventional drug companies to seek to duplicate these natural therapies and offer them as adjuvant drug therapies. If pancreatic enzymes are effective in treating existing cancers, one might assume that maintaining a large pool of these enzymes in the body should help to prevent cancer from developing. Studies have shown that persons who eat fresh fruits and vegetables with high levels of natural enzymes have significantly reduced levels of cancer and other diseases. It has not been proven that the high enzyme content of these foods is partially responsible for their anticancer effect, but the evidence is compelling.

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## Digestive Disorders

The pancreas and liver are digestive organs that produce most of the body's digestive enzymes. The remainder should come from uncooked foods, such as fresh fruits and vegetables, raw sprouted grains, seeds and nuts, unpasteurized dairy products, and enzyme supplements.

Food in its natural, unprocessed state is vital to the maintenance of good health. The lack of it in the modern diet is thought to be responsible for degenerative diseases. Cooking food, particularly for long periods of time and at more than 118°F, destroys enzymes in food and leaves what is often consumed in today's enzyme-less diet. This is one reason why, by middle age, we may become metabolically depleted of enzymes. Our glands and major organs suffer most from this deficiency. The brain may actually shrink as a result of an overcooked, overly refined diet that is devoid of enzymes desperately needed by the body. In an effort to meet the deficiency, the pancreas may swell. Laboratory mice fed heat-processed, enzyme-less foods develop a pancreas two or three times heavier than that of wild mice eating an enzyme-containing natural diet of raw food.

When food is consumed uncooked, fewer digestive enzymes are required to perform the digestive function. The body will adapt to the plentiful, external supply by secreting fewer of its own enzymes, preserving them to assist in vital cellular metabolic functions. One of the worst cooking methods is frying, since frying results in much higher temperatures than boiling. Frying damages protein as well as destroying enzymes.

Enzymes can also be wasted by lifestyle factors. Enzymes work harder with increasing temperatures and are used up faster. A fever, for example, induces faster enzyme action and is therefore unfavorable for bacterial activity. Enzymes can be found in urine after a fever and also may be found after strenuous athletic activity.

A natural behavior of animals is to harness the power of enzymes in food by burying or covering their food, allowing enzyme activity to start predigesting the food. By this natural behavior, animals instinctively preserve their own enzyme supply. Similarly, people of some native cultures also preserve their enzyme supply and prevent disease through efficient use of enzymes. Whales have up to 6 inches of fat to keep them warm, but their arteries are not clogged. Eskimos, who frequently consume large quantities of fat, are often not obese. Both of these groups eat the fat-digesting enzyme lipase in the form of raw foods.

Studies (both in vitro and controlled in vivo) using internal and parenteral routes have examined the effectiveness of many different types and sources of plant enzymes in several conditions, including poor digestion, poor absorption, pancreatic insufficiency, steatorrhea, lactose intolerance, celiac disease, obstruction of arteries, and thrombotic disease.

Enzymes from the *Aspergillus oryzae* fungus were subjected to numerous studies, evaluating their role in supporting healthy digestion. Additionally, human studies suggest the proteolytic enzymes derived from *A. oryzae* fungus may play a role in anti-inflammatory and fibrinolytic therapies. The enzymes appear to be relatively stable in heat, and they are also active throughout a wide pH range. This is important because most enzymes are deactivated in stomach acid. These enzymes are synthesized from fungus but contain no fungal residue even though that is their derivation. Modern filtration techniques and technology enable these fungal enzymes to be well suited for human consumption.

According to Dr. Mark Percival (1985), the oral supplementation of digestive enzymes taken just before or at mealtime can assist digestion. Even though most supplemental enzymes are labile and will deactivate when exposed to stomach acid, Dr. Percival believes some of the enzymes will remain active if they are taken with a meal or just before. Percival says, "The enzymes are physically protected" by the meal and allow some enzymatic activity to occur in the stomach. The enzymes that get through to the small intestine may help with digestion there as well. pH plays a major role in enzymatic activity, therefore, the enzymes derived from *Aspergillus* "may be highly useful as they appear to be remarkably stable, even when subjected to an acidic environment." Dr. Edward Howell (1986) adds that he chews an enzyme capsule with his food in order to start the digestive process as soon as the food is consumed since enzyme activity has been shown to begin even before the food is swallowed.

As early as 1947, Dr. Arnold Renshaw (Manchester, England) reported in *Annals of Rheumatic Disease* that he had obtained good results with enzyme treatment of more than 700 patients with rheumatoid arthritis, osteoarthritis, or fibrositis: "Some intractable cases of ankylosing spondylitis and Still's disease have also responded to this therapy." He said that of 556 people with various types of arthritis, 283 were much improved, and 219 were improved to a less marked extent; of 292 people who had rheumatoid arthritis, 264 of them showed several degrees of improvement. More time was required before improvement was seen when the duration of the disease had been long-term, although most people started to show some improvement after only 2 or 3 months of enzyme therapy. In spite of these favorable findings, digestive enzyme therapy has been reserved for diseases that directly result in a pathological deficiency of pancreas-derived digestive enzymes.

According to Schneider et al. (1985), common digestive disorders may benefit from enzyme replacement. Oral intake of exocrine pancreatic enzymes is of key importance in the treatment of maldigestion in chronic pancreatitis with pancreatic insufficiency. Schneider studied the therapeutic effectiveness of a conventional and an acid-protected enzyme preparation and an acid-stable

fungal enzyme preparation in the treatment of severe pancreatogenic steatorrhea. The results showed that a supplemental enzyme preparation is best for patients with chronic pancreatitis and those who underwent Whipple's procedure (a surgical procedure performed on pancreatic cancer patients), while patients with an intact upper GIT do best with an acid-protected porcine pancreatic enzyme preparation.

Rachman (1997) reported that 58% of the population has some type of digestive disorder and that lack of optimal digestive function associated with enzyme inadequacy may lead to malabsorption and other related conditions. In the elderly, the problem is often exacerbated because the elderly may have suboptimal production of gastric hydrochloric acid. "This can be a significant factor that can impact nutrient absorption along with the creation of maldigestive-type symptoms. Bacterial production of hydrogen and methane are determined after a carbohydrate challenge. Excessive levels of these gases reflect overgrowth of bacteria in the upper gut." Rachman suggests there may be improvement with enzyme replacement. He also adds that enzymes taken orally at meals may improve the digestion of dietary protein, thereby decreasing the quantity of antigenic macromolecules that leak across the intestinal wall into the bloodstream. Such leaking may trigger the body's defenses against what it perceives to be foreign protein or polypeptide invaders, producing the symptoms of allergies.

Howell (1986) also agrees that allergies can respond to adding enzymes to the diet. He also says excessive cholesterol levels can respond to dietary enzymes as well. Howell quoted a 1962 study by three British doctors (C.W. Adams, O.B. Bayliss, and M.Z. Ibrahim), who set out to discover why cholesterol clogs arteries, ultimately manifesting in heart disease. They found that all enzymes studied became progressively weaker in the arteries as people aged and the hardening became more severe. They suggested a shortage of enzymes is part of the mechanism that allows cholesterol deposits to accumulate in the inner part of arterial walls. As early as 1958, researcher L.O. Pilgeram conducted blood tests at Stanford University and demonstrated a progressive decline of lipase in the blood of atherosclerotic patients in advancing middle and old age.

About the same time, researchers at Michael Reese Hospital in Chicago found that enzymes in the saliva, pancreas, and blood became weaker with advancing age and speculated that fat may be absorbed in the unhydrolyzed state in atherosclerosis. They also found definite improvement in the character of fat utilization following the use of enzymes.

Intravenous (IV) administration of brinase, a proteolytic enzyme prepared from *A. oryzae*, was found by FitzGerald et al. (1979) to be beneficial in treating chronic arterial obstruction. Patients were observed for 3 months before they were given six IV infusions of either saline or brinase for more than 2 weeks. No changes were observed during the observation period. After infusion, resumed blood flow was found in 17 of 27 obstructed arterial segments. The number of patent segments increased from 11 to 27. No improvements were observed in the patients who were treated with placebos.

Pancreatin is secreted from the pancreas. It provides potent concentrations of the digestive enzymes protease, amylase, and lipase and is sold as a drug to treat those with pancreatic insufficiency. Pancreatin efficacy was demonstrated in a study conducted on patients taking pancreatin to maintain postoperative digestion. The effects of supplementation were determined by measuring the postoperative intestinal absorption and nutritional status in a randomized trial. The patients received pancreatin or a placebo. Before the trial, patients showed abnormal digestion of fats and protein. Total energy was low at baseline and at 3 weeks after surgery. Supplementation with pancreatin improved fat and protein absorption as well as improving nitrogen balance. However, those patients taking a placebo had worsened absorption after surgery. These data suggest that long-term, postoperative pancreatic enzyme supplementation is both effective and necessary in surgery patients who had pancreatitis.

Considerable evidence exists in support of the beneficial effects of enzymes, both natural and supplemental. Plant enzymes have shown obvious benefit for specific conditions. Research with intact absorption of food substrates has shown that nondigested food substrates enter the blood and that plant enzymes break down different food substrates that would otherwise have been passed into the blood partially digested.

Youth is the time of life when our normal ability to produce enzymes is greatest. It is also a time of rapid growth and often a time with no serious illness. As people age and their food enzymes become depleted, they often begin to suffer a broad range of health complaints.

According to Howell (1986), how long we live and our state of health are determined by our enzyme potential. Howell referred to a study by Meyer and associates at Michael Reese Hospital in Chicago that reported that the presence of enzymes in the saliva of young adults is 30 times higher than that in people over 69 years of age.

Therefore, humans consuming an enzyme-less diet use vast quantities of their enzyme potential from secretions from the pancreas and other digestive organs, perhaps resulting in shortened lifespan, illness, and lowered resistance to all types of stress.

In the early 1970s, G.A. Leveille, a University of Illinois researcher, discovered that enzyme activities in the tissues become weaker with age. Leveille conducted experiments on rats and found that at the age of 18 months--considered to be old for rats--when on enzyme-free fabricated diets, enzyme activity shrunk to less than 20% of its level at one month of age. Howell (1986) agrees: "The more lavishly a young body gives up its enzymes, the sooner the state of enzyme poverty, or old age, is reached."

The answer is to substitute raw foods for cooked foods as much as possible. Howell (1986) recommends that we eat foods with their enzymes intact and supplement cooked foods with enzyme capsules. He suggests we can stop abnormal and pathological aging processes. Howell singles out raw milk, bananas, avocados, seeds, nuts, grapes, and other natural foods as rich in food enzymes. He also suggests that an enzyme supplement be taken with all cooked food. Under medical supervision, Howell suggests large doses of enzyme therapy to treat certain diseases.

Few would disagree with the old adage that "we are what we eat," but it is not quite that simple. Enzymes make the digestion of food possible. This means we must make maximum use of enzyme activity, both internal enzymes and those consumed either in food or as supplements.

## **Benefits of Artichoke for Digestive Disorders**

- Biological Effects
- Effects on the Gastrointestinal System

The artichoke plant is best known for its heart, the bottom part of its spiky flower bud that many of us have learned to appreciate as both a delicacy and a nutritious vegetable. However, other parts of this tall thistle-like plant, which never reach the dinner table, have proven to be even more beneficial for our health. Clinical studies show its large basal leaves to be effective for improving digestion and liver function, as well as cholesterol levels.

Since ancient times, humans have looked to nature for help to cure diseases. Up until modern times, most remedies were derived from the plant kingdom, and even today a large percentage of our current pharmaceutical drugs are based on plant extracts from various parts of the world. Many old herbal remedies, however, have fallen into oblivion with the development of modern medicine.

Artichoke extract is one of the few phytopharmaceuticals whose experiential and clinical effects have been confirmed to a great extent by biomedical research. Its major active components have been identified, as have some of its mechanisms of action in the human body. In particular, antioxidant, liver-protective, bile-enhancing, and lipid-lowering effects have been demonstrated, which correspond well with the historical use of the plant. More research is needed to determine in detail the mechanisms of action for these effects. However, there appears to be enough evidence to suggest a potential role for artichoke extract in some areas where modern medicine does not have much to offer.

Used as a food and a medical remedy as early as 400 bc, the artichoke plant has a long history. At the time, a pupil of Aristotle by the name of Theophrastus was one of the first to describe the plant in detail. Enjoyed as a delicacy, an appetizer, and a digestive aid by the aristocracy of the Roman Empire, it later seemed to fall into oblivion until the 1500s, when medicinal use of the artichoke for liver problems and jaundice was recorded. In 1850 a French physician successfully used extract of artichoke leaves in the treatment of a boy who had been sick with jaundice for a month and had made no improvement from the drugs used at that time. This accomplishment inspired researchers to find out more about the effects of this extract, and their research resulted in the knowledge we have today about the extract and its mechanisms of action.

Artichoke leaf extract is made from the long, deeply serrated basal leaves of the artichoke plant. This part is chosen for medicinal use because the concentration of the biologically active compounds is higher here than in the rest of the plant. The most active of these compounds have been discovered to be the flavonoids and caffeoylquinic acids. These substances belong to the polyphenol group and include chlorogenic acid, caffeoylquinic acid derivatives (cynarin is one of them), luteolin, scolymoside, and cynaroside.

Cynarin was the first constituent of the extract to be isolated in 1934. Interestingly, it is found only in trace amounts of fresh leaves but is formed by natural chemical changes that take place during drying and extraction of the plant material. Cynarin was originally believed to be the one active component of the extract. Today the whole complex of compounds is considered important, since it has not yet been completely clarified which component is responsible for each effect. It is claimed that neither cynarin alone, nor fresh plant material achieves the potency of the dried total extract (Kirchhoff et al. 1994).

Chlorogenic acid, another major component of the artichoke leaf extract, has recently become known as a powerful antioxidant with exciting potential in many applications. Laboratory investigations are ongoing all over the world with promising findings for future clinical application in areas such as HIV, cancer, and diabetes.

Most of the modern research on artichoke has been done with the German artichoke extract Hepar SL Forte, standardized to contain 3% caffeoylquinic acids. A new, even more potent extract, standardized at 15% caffeoylquinic acids--calculated as chlorogenic acid--is now available on the American market.

### ***Biological Effects***

The original uses of artichoke since ancient times have been as an aid for indigestion and insufficient liver function. The mechanism of action, however, has been essentially unknown. Recent findings have provided a new foundation for our understanding and discovered additional benefits of the extract, such as antioxidant and lipid-lowering effects.

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# Digestive Disorders

## ***Effects on the Gastrointestinal System***

The importance of effective liver function for overall health in general, and proper gastrointestinal function in particular, is rarely emphasized in health discussions in the United States. One reason might be that there is neither laboratory evidence, nor specific physical symptoms to reveal an overburdened liver in the beginning stages. The symptoms may be nonspecific, such as general malaise, fatigue, headache, epigastric pain, bloating, nausea, or constipation. Discomfort following meals and intolerance of fat are also notable indications of disturbances in the biliary system.

It is estimated that at least 50% of patients with dyspeptic complaints have no verifiable disease. Because of the liver's essential role in detoxification, even minor impairment of liver function can have profound effects. It is therefore important to take such chronic complaints seriously. In Germany and France, for example, physicians frequently prescribe herbal liver remedies, such as artichoke extract, with good results when presented with these chronic but nonspecific symptoms. We may have something to learn here.

The proven basis for the beneficial effects of artichoke leaf extract on the gastrointestinal system is the promotion of bile flow. Bile is an extremely important digestive substance that is produced by the liver and stored in the gallbladder. The liver manufactures about 1 quart a day of bile to meet digestive requirements. It is secreted into the small intestine, where it emulsifies fats and fat-soluble vitamins and improves their absorption. Any interference with healthy bile flow can create a myriad of immediate digestive disorders, such as bloating.

Good bile flow is also essential for detoxification, which is one of the major tasks of the liver. The liver is constantly bombarded with toxic chemicals from the environment: the food we eat, the water we drink, and the air we breathe.

Bile serves as a carrier for these toxic substances, delivering them into the intestine for further elimination from the body. This is the major route for excretion of cholesterol. Yet another feature of the bile is helpful here: its promotion of intestinal peristalsis, which helps prevent constipation.

When the excretion of bile is inhibited for various reasons (gallstones or gallbladder disease), toxins and cholesterol stay in the liver longer with damaging effects. One of the causes of inhibited bile flow is obstruction of the bile ducts by the presence of gallstones. Other common reasons for impairment of the bile flow within the liver itself are, for example, alcohol ingestion, viral hepatitis, and certain chemicals and drugs. In the initial stages of liver dysfunctions, laboratory tests, such as serum bilirubin, alkaline phosphatase, SGOT, LDH, and GGTP, often remain normal. It is not adequate to rely on these tests alone. Symptoms that may indicate reduced liver function are general malaise, fatigue, digestive disturbances, and sometimes increasing allergies and chemical sensitivities.

Excessive alcohol consumption is by far the most common cause of impaired liver function in the United States. It stimulates fat infiltration into the liver cells, causing the so-called fatty liver. Some livers are very sensitive to even minute amounts of alcohol; others are more tolerant. Research suggests that fatty liver condition is more serious than previously believed. It may develop to more advanced liver disease, such as inflammation, fibrosis, and cirrhosis.

Because of its long historical use for liver conditions, it seemed reasonable to investigate the artichoke plant scientifically. The first clinical studies were conducted in the 1930s with encouraging results. In the 1990s the interest has been intensified, and several excellent clinical studies have been conducted during the past few years.

Realizing the importance of adequate bile flow for health, German researchers set out to confirm the earlier findings of bile-promoting effect of the artichoke plant in a controlled, double-blind study on healthy volunteers (Kirchhoff et al. 1994). The participants were given a 1-time dose of artichoke extract or placebo, and their bile secretion was measured over the following hours, using special techniques. The bile secretion was found to be significantly higher in the group that received the artichoke extract.

Another clinical study showed an improvement of symptoms in 50% of patients with dyspeptic syndrome after 14 days of treatment with artichoke leaf extract. The study involved 60 patients with nonspecific symptoms such as upper abdominal pain, heartburn, bloating, constipation, diarrhea, nausea, and vomiting. In the placebo group, as a comparison, improvements of less distinct quality were noticed in 38% of the participants (Kupke et al. 1991).

Interesting results were also demonstrated in a large open label study of 417 participants with liver or bile duct disease. Most of these patients had long-standing symptoms, some of them for many years. They suffered from upper abdominal pain, bloating, constipation, lack of appetite, and nausea. These patients were treated with artichoke leaf extract for 4 weeks. After 1 week, about 70% of the patients experienced improvement of their symptoms, and after 4 weeks, the percentage was even higher (approximately 85%) (Held 1991).

Even more remarkable improvement was shown in another completed open label study (Fintelmann 1996), where 553 outpatients with nonspecific dyspeptic complaints were treated with a standardized artichoke leaf extract. The subjective complaints declined significantly within 6 weeks of treatment. Improvements were found for vomiting (88%), nausea (83%), abdominal pain (76%), loss of appetite (72%), severe constipation (71%), flatulence (68%), and fat intolerance (59%). Ninety-eight percent of the patients judged the effect of the extract to be considerably better, somewhat better, or equal to that achieved during previous treatment with other drugs. The dosage used in this study was 1-2 capsules 3 times daily of the preparation Hepar SL Forte. One capsule contains 320 mg of dry extract of artichoke leaves, standardized to provide 3% caffeoylquinic acid.

The study by Fintelmann (1996) not only confirmed the efficacy of the artichoke extract for dyspepsia, but also demonstrated a significant effect of the extract on fat (lipid) metabolism. The researchers found a significant decline in both the cholesterol and triglyceride levels in the blood, which confirmed a discovery made as early as the 1930s.

Artichoke leaf extract is well tolerated and has few side effects in recommended dosages. The use of the artichoke plant as food in many countries over hundreds of years supports the safety of consumption. More important, however, is that several rigorous studies report the absence of adverse effects when using a standardized extract compared to the placebo. In a large safety study, only one out of 100 subjects reported mild side effects such as transient increases in flatulence.

Local eczematous reactions have been reported after occupational exposure and skin contact with the fresh plant or its dried parts. Such an allergy should be considered a contraindication for external use of the extract, although no reactions to orally ingested extract have been observed so far. Because of its bile-stimulating effect, the extract should not be taken by individuals with gallstones or other bile duct occlusion.

An artichoke extract is now available in the United States, giving Americans a chance to discover its merits. While the German artichoke products, cited in most European studies, typically contain 3% caffeoylquinic acids, this artichoke extract is standardized to contain 15% caffeoylquinic acids, calculated as chlorogenic acid.

Artichoke leaf extract has proven to be a safe and natural way to maintain and improve general health because of its many applications to improve essential physiological functions. As a nutritional supplement and antioxidant, it can safely be used as an adjunct to conventional therapies.

## **How Eastern Europeans Cope with Digestive Disorders--Digest RC**

- Popular in Europe
- Charcoal
- Cholic Acid
- The Science

The difference in life expectancy between the richest and poorest European countries is more than 10 years. In the early 1990s, overall Eastern European mortality was 20-100% higher than in the West. The reasons for these differences in mortality are attributed to poor diet, excess alcohol consumption, heavy smoking, and other dangerous health behaviors in Eastern Europe.

One dietary explanation for the decreased lifespan among Eastern Europeans is that their intake of antioxidants from fruits, vegetables, and nuts is much lower compared to the West. A severe deficiency of antioxidant vitamins, along with a low intake of folic acid and flavonoids, partially accounts for the high level of cardiovascular disease in Eastern Europe.

The traditional Eastern European diet consists of lots of animal fats and protein and very little in the way of fresh fruits and vegetables. This poor diet not only shortens lifespan, but also creates an epidemic of acute digestive disorders.

While digestive complications increase as people age, the bad health habits of the Eastern Europeans exacerbate common problems such as heartburn, bloating, gas, constipation, nausea, cramps, diarrhea, and irritable bowel syndrome.

In the United States, over-the-counter and prescription medications for digestive ailments are a multibillion-dollar industry. Most Eastern Europeans cannot afford the high-priced synthetic products sold by Western drug companies and instead rely on the natural herbal remedy, Digest RC. Rather than masking symptoms, this herbal preparation attacks the underlying cause of many forms of digestive disorder. Considering the magnitude of the digestive disorders caused by the poor health behaviors of the Eastern Europeans, the fact that this herbal remedy has such a strong track record makes it a fascinating potential solution for Americans.

### ***A Popular Digestive Aid in Europe***

Digest RC was introduced in Europe more than 45 years ago. Today, more than 100 million doses of the product are sold annually

in Europe.

The mechanism of action of the formula is to stimulate peristalsis of the intestines, speed digestion of fats, and prevent stagnation of food in the digestive tract. Benefits to the user are a reduction in esophageal acid reflux, alleviation of the feeling of fullness and bloating after eating, decreased digestive tract tension, alkalization of the gastric content, constipation relief, and normalized elimination.

#### **Benefits of Black Radish Juice**

Black radish juice extract is the primary active ingredient in Digest RC. Virtually unknown in the United States, the radish contains a variety of chemicals that increases the flow of digestive juices. The most important function of black radish extract is that it encourages the liver to produce fat- and protein-digesting bile and lowers the tension of the bile ducts. It also improves peristaltic movement. Constipation is another problem that is improved or eliminated from radish consumption. Rich in fiber and digestive stimulants, a regular consumption of radishes helps regulate the bowels. Since dehydration is a major cause of constipation, radishes help hydrate and lubricate the intestines and encourage relaxed bowel movements. The root juice extract of the black radish used in Digest RC is the most potent part of the plant.

A bonus is the radish's ability to assist the immune system, as it contains a variety of chemicals that possess natural antimicrobial actions. Regular consumption may lead to a significant improvement in the resistance against common microbial infections, such as colds, sore throats, ear infections, and the flu.

Prahaveanu et al. (1987) described a study in which liquid radish extract was administered to mice before they were inoculated with an influenza virus. There was a significant decrease in the mortality rate and a significant increase in the rate of survival as compared to the untreated controls. Another study by Ivanovics et al. (1947) found it to be protective against E. coli--more so than penicillin G.

A second ingredient of Digest RC is artichoke--which further increases production of bile and causes it to flow through bile ducts. Peppermint, another ingredient of Digest RC, increases secretion functions of the stomach and liver and the production of enzymes.

#### ***Benefits of Charcoal***

The charcoal in Digest RC is particularly useful in absorbing toxins. It is used in emergency departments to treat drug overdoses (Deshpande et al. 1999; Kawasaki et al. 2000; Yeates et al. 2000). It also calms a stressed digestive system, allowing digestive enzymes to be produced and released. Indigestion and nervous vomiting are also treated with this ingredient. The charcoal in Digest RC is actually a special herbal preparation of linden tree bark, traditionally used in Europe as a digestive aid. Unlike the specially prepared linden wood bark in Digest RC, ordinary activated charcoal is derived from materials such as peat or coconut shell. This special preparation has antibacterial properties and when used as directed helps balance the digestive tract and supports the creation of the proper intestinal flora. At the same time it creates an inhospitable environment for parasitic infestation.

#### ***Benefits of Cholic Acid***

Another key ingredient of Digest RC is cholic acid, or pure processed ox bile, a liver enzyme used for digestion. It is particularly helpful in digesting fats and meat protein. Also in Digest RC is calcium phosphate, which neutralizes stomach acid.

Digest RC uses a layered delivery system to ensure that the various herbal extracts perform their intended function in the right part of the digestive tract. The ingredients are cultivated in Europe in a pesticide-free environment and are standardized to ensure uniform potency. The safety profile and demonstrated efficacy of herbs such as artichoke, black radish, and peppermint, particularly in standardized extract form, suggest that this product may be the answer to the digestive problems of millions of Americans.

Used extensively in Europe and hailed as a huge success, Digest RC uses a formulation that simultaneously relieves digestive disorders while strengthening the digestive system. While there are numerous products that work on individual symptoms of poor digestion and elimination, Digest RC stands out because it relieves more than one symptom at the same time. Digest RC also helps the liver function properly by enabling the organ to release toxins and encouraging it to produce the correct amount of bile.

#### ***The Science behind Digest RC***

Immunologist Dr. Mark Pasula, president and research director of Signet Diagnostic Corporation at Oxford Nutritional Center in Florida, believes the Digest RC formula works because of its two-pronged approach that relieves most digestive disorders while it helps to build a healthy digestive system.

In short, Digest RC has the capacity to rapidly relieve symptoms in the short-term, while healing the source of the problems in the long run. Digest RC is the formula of choice for patients with digestive complaints who have not responded to food elimination therapy. Within a short time of regularly using the product, their digestive problems disappear and their digestive system actually

strengthens.

Independent clinical research was conducted on Digest RC to analyze the therapeutic effectiveness of the product among patients with chronic digestive problems. Results showed statistically significant improvement in patients' symptoms during treatment. Digest RC was most successful in eliminating the most frequently occurring symptom, gas, in more than 95% of the cases. Symptoms such as constipation, intestinal pains and cramps, heartburn (reflux), and stomach pains and cramps decreased or were completely eliminated in more than 90% of the cases. Bloating ceased in more than 80%, diarrhea in about 75%, and nausea and vomiting in approximately 65% of the cases.

Digest RC was found to minimize the assimilation of undigested toxic products that often stay in the gut for prolonged periods of time. Because of its cholepoietic and cholagogic abilities, Digest RC was particularly effective in preventing the stagnation of food and bloating in patients whose diet was rich in animal protein and fat. Because there are no specific contraindications, Digest RC can be taken together with any medication and can be taken by patients with different respiratory, cardiovascular, and musculoskeletal disorders. The only group of people who should avoid Digest RC are those with biliary tract obstruction or gallbladder disease because of the bile-stimulating effects of the black radish and artichoke extracts. It is not known how this product would affect those who have had their gallbladder removed.

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# Digestive Disorders

## WHAT CONVENTIONAL MEDICINE OFFERS

### ■ Ulcers

Some of the most popular drugs prescribed to treat digestive complaints are Prilosec or Prevacid. These drugs are known as gastric acid-pump inhibitors because of the unique way in which they block the final metabolic step in the production of stomach acid. These drugs are quite expensive but are more effective in suppressing disorders associated with excess stomach acid production than the older class of histamine-2 receptor antagonist drugs sold under the trade names Tagamet, Zantac, Pepcid, and Axid. Drugs such as Tagamet inhibit stomach acid secretion whereas Prilosec and Prevacid suppress virtually all stomach acid secretion.

Most stomach ulcers are now considered to be caused by the *Helicobacter pylori* bacteria. Special antibiotic regimens are now the therapy of choice in treating ulcers. The use of drugs that reduce stomach acid are therefore more frequently prescribed to treat esophageal reflux, where stomach acid regurgitates into the esophagus to cause heartburn. If left untreated, chronic esophageal exposure to stomach acid can cause esophagitis and esophageal cancer.

Some people with mild esophageal reflux may be able to use natural therapies to promote youthful peristaltic action and push food more rapidly out of the stomach, thereby alleviating reflux back into the esophagus.

### If You Suffer from Ulcers

The medical community has discovered that *H. pylori* bacteria cause most stomach ulcers. Blood tests can reveal the presence of the *H. pylori* antibody. Special antibiotic combinations can be used to eliminate *H. pylori* bacteria from the stomach within a matter of weeks. Those who fail to eradicate *H. pylori* are at a far greater risk for contracting stomach cancer.

## BENEFITS OF PHOSPHATIDYLCHOLINE

Extracellular phospholipids, synthesized on gastric mucosa, assist in the hydrophobic, or nonwetable, characteristics of epithelium, yielding protection from stomach acid and injurious materials. The nonwetable status of the epithelium is extremely important to the health of the GIT. This valuable protection is, however, vulnerable and can be transformed by aspirin or NSAIDs from a nonwetable state, resistant to harmful substances, to a wettable epithelium. The mucosa is now susceptible to injury from caustic substances.

Once the gastric mucosa has been disturbed, ulcers loom as an ongoing threat. Polyunsaturated phosphatidylcholine (PPC) has been shown to reduce the incidence of gastric ulcers, even after aggressive experimental ulcer inducement. Individuals at high risk for gastric ulcers, such as those taking high doses of either aspirin or NSAIDs, have lessened the injurious nature of the drugs when phospholipids are bound to the anti-inflammatory drugs (Leyck et al. 1985).

As noted earlier, the basic cause of many ulcers is the spiral-shaped bacterium *H. pylori* (Axon 1993). To investigate the effect of *H. pylori* infection on the gastric mucosal barrier, phospholipids and fatty acid composition of the gastric mucosa were analyzed in healthy volunteers with and without *H. pylori* infection. The gastric phosphatidylcholine content of *H. pylori*-positive healthy volunteers was less than that of *H. pylori*-negative healthy volunteers ( $p < 0.05$ ) (Wakabayashi et al. 1998). These findings suggest that *H. pylori* infection results in changes in the gastric mucosal phospholipid contents and their fatty acid composition, causing the gastric mucosa to be weakened. Attempts to increase the worthiness of the gastric mucosa appears indicated, particularly in individuals with a history of gastric ulcers or individuals who are on medicinal protocols known to impact the reliability of the mucosa.

Beyond the functions of gastric protection, polyunsaturated phosphatidylcholine assists in the digestion of fat. The presence of luminal phosphatidylcholine is important for the normal lymphatic transport of the absorbed digestion products of triglyceride, the major dietary fat (Tso et al. 1981; Richmond et al. 2001). Assisting in the metabolism and transport of fat may explain why some individuals find value in using lecithin in conditions of hypercholesterolemia.

PPC stimulates collagen breakdown in experimental models of liver cirrhosis. As important as this finding is relative to liver health, it also has pertinent implications regarding the integrity and maintenance of the GIT. Bowel strictures, abnormal temporary or permanent narrowing of the bowel, are characterized by excess deposition of collagen in the intestinal wall. A study was conducted to determine the effect of PPC in the prevention of bowel strictures. Three groups of rats were assessed: a control group, a confirmed colitis group, and a group of rats diagnosed with colitis, but receiving phosphatidylcholine. In conjunction with the study, collagen deposition and collagenase activity in colonic tissue were measured in all of the groups. None of the control rats, but 12 of

16 rats with colitis, developed colonic strictures.

In contrast, only two of 15 phosphatidylcholine-fed rats with colitis showed strictures. Collagen content was much higher in the rats with colitis than the phosphatidylcholine-fed rats with colitis and the control rats. Collagenase activity in colonic tissue was, also, much higher in the phosphatidylcholine-fed rats (Mourelle et al. 1996). Phosphatidylcholine appears to enhance collagen catabolism, restricting collagen buildup in inflamed intestinal tissue and the resulting stricture formation.

Individuals wishing to enhance the integrity of the GIT or to gain assistance in fat metabolism may wish to consider the use of unsaturated phosphatidylcholine. Unsaturated phosphatidylcholine is deemed well tolerated and without major risk factors.

## CONCLUSION

Aging is a critical factor that negatively impacts the digestive system. As we age, we become acutely aware of the limitations placed on our diets. Foods that were part of our carefree eating styles in younger years have become the culprits in our declining years. The variety of products marketed for digestive problems is astounding. Looking for relief, consumers purchase a myriad of remedies and yet continue to suffer.

The natural supplements mentioned within this protocol may prove to be new potent and cost-effective treatments in helping halt the digestive disease epidemic. Here are some natural approaches to treating digestive disorders and improving overall health:

### ■ Digestive Enzyme Supplements

Choosing the right enzyme supplement can be difficult. Enzymes are very delicate, and if not properly manufactured, they can easily lose their potency. Commercial enzyme supplements are often neutralized by varying pH levels of stomach acids. A digestive enzyme supplement should be broad-spectrum so that it can facilitate the digestion of protein, fat, carbohydrate, fiber, and milk lactose. The use of acid-protected enzyme formulas can enhance efficacy. One such formula that obtains its enzymes from fungus (but has no fungal residue) is called Super Digestive Enzyme Caps. This product is formulated to be effective in a broad spectrum of stomach acid pH conditions. Each capsule of Super Digestive Enzyme Caps contains a pancreatin and fungal enzyme concentrate that provides the following digestive activity:

Pancreatin 8X (equal to 1600 mg pancreatin USP)	200 mg
Amylase (carbohydrate enzyme)	20,000 USP units
Protease (protein enzyme)	20,000 USP units
Lipase (fat enzyme)	3600 USP units
Protease II(6000 USP per mg)	130 mg
Protease III (1000 FCC per gram)	130 mg
Amylase (25,000 FCC per gram)	140 mg
Lactase (5000 FCC per gram)	40 mg
Cellulase (4000 FCC per gram)	40 mg
Lipase (5000 FCC per gram)	20 mg
Whole fruit papaya powder	100 mg

Two to four dosages of an enzyme supplement with these potencies should be taken before or during meals. Digestive enzymes are quite reasonably priced compared to other supplements.

### ■ Bile Acid-Stimulating Agents

While digestive enzymes facilitate the breakdown of food in the stomach, the impact of bile acids secreted from the liver into the small intestine may be even more important. A healthy liver makes about 1 quart of bile acid a day, and this bile should freely flow into the small intestine to digest fat and protein. European doctors believe that inadequate bile acid flow is a major cause of most digestive disorders.

Artichoke extract facilitates the free flow of bile acid and also improves the overall health of the liver. The suggested dose is to take 300-600 mg of a standardized artichoke extract before, during, or after a heavy meal. The extract from artichoke used to measure pharmaceutical standardization is caffeoylquinic acid. Supplements can be found that contain as low as 3% and

up to 15% caffeoylquinic acid. Higher concentration artichoke extracts are recommended. Artichoke extracts are quite affordable and provide many ancillary health benefits in addition to improving bile acid flow and, hence, overall digestion. Those who want to optimize digestion should consider taking 2-4 digestive enzyme capsules before a meal along with 300-600 mg of a standardized artichoke extract.

A slightly more expensive way of stimulating bile acid flow is to use the European pharmaceutical preparation named Digest RC. Two to three tablets of Digest RC taken with meals provides standardized extracts from black radish and artichoke along with peppermint, cholic acid, and other digestive aids. Digest RC has a proven 45-year track record in Europe in treating a variety of common digestive disorders. After 3 weeks of using 2-3 tablets of Digest RC before every heavy meal, the dose can be reduced if symptoms of digestive discomfort dissipate.

**Those with gallstones or gallbladder disease should not take bile acid-stimulating agents such as artichoke or Digest RC.**

## SUMMARY

1. Super Digestive Enzyme Caps contain standardized potencies of protease, amylase, and lipase to aid in the breakdown of protein, carbohydrates, and fats. These enzyme caps are effective in a broad spectrum of stomach acid pH conditions. Two capsules at the beginning of each meal is recommended.
2. Digest RC accelerates the digestion of fats and meat proteins and treats a number of digestion-related disorders. One to two capsules before high-fat meals are suggested.
3. Artichoke Leaf Extract taken with meals (one or two 300-mg capsules) will help improve bile acid flow and overall digestion.
4. HepatoPro (formerly GastroPro) containing polyunsaturated phosphatidylcholine (PPC) protects gastric mucosa, aids in fat digestion, and helps to prevent bowel strictures. Two 900-mg capsules daily are recommended.

## FOR MORE INFORMATION

Contact the Digestive Disease National Coalition, Chicago, IL, (202) 544-7497; or the National Digestive Diseases Information Clearing House, Bethesda, MD, (800) 891-5389, <http://www.niddk.nih.gov/>

## PRODUCT AVAILABILITY

Digest RC, Super Digestive Enzymes, HepatoPro, and Artichoke Leaf Extract are available by calling (800) 544-4440 or by ordering online.



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