

Digestion and related problems

Stomach acid for healthy digestion

A healthy acid/alkaline balance of your body is the key to great health. When your body is functioning in top form, the digestive tract alternates back and forth between an alkaline and acid pH. Digestion starts in the mouth (which works optimally at an alkaline pH). Moving downwards, digestion in the stomach requires an acid pH. Next, the small intestines need an alkaline pH. Finally the large intestine works best in a slightly acid pH. If any segment fails to keep its proper pH, then the segment before or after it can begin to malfunction. For example, the stomach works best at a low acid pH. If the stomach cannot produce enough stomach acid, then it becomes too alkaline. This in turn, can cause the small intestines (which should be alkaline) to become too acid.

Healthy stomach acid is needed for a healthy digestive tract. If you have low stomach acid, even the best food cannot be properly digested. If you are unable to absorb nutrients properly, this can lead to health problems.

The low pH of the stomach's hydrochloric acid also destroys ingested bacteria and other microorganisms. Healthy stomach acid helps kill disease-causing microbes and parasites routinely found in food you eat. If you have low stomach acid, these infecting invaders may not be destroyed by your stomach's acid bath. They can then cause many types of infections.

It helps digest food by breaking up fats and proteins and it is necessary for adequate absorption of protein, calcium, vitamin B12 and iron. Natural plant-source hydrochloric acid is better than animal sources.

Common symptoms of low hydrochloric acid

- Bloating or belching, especially after eating
- Burning in the stomach, especially after eating
- Fullness or heaviness in the stomach after eating
- Nausea after eating or taking supplements

- Intestinal gas
- Indigestion
- Bad breath
- Diarrhea or constipation
- Food allergies
- Itching around the rectum
- Weak or cracked fingernails
- Dilated blood vessels in the cheeks or nose (in non-alcoholics)
- Skin break-outs or acne
- Iron deficiency
- Chronic intestinal parasites
- Undigested food in the stool
- Chronic candida infection

Diseases associated with low hydrochloric acid

- Asthma
- Diabetes
- Osteoporosis
- Arthritis
- Hepatitis
- Eczema
- Acne Rosacea
- Psoriasis
- Gallbladder disease
- Herpes
- Hives
- Hyperthyroid
- Hypothyroid
- Thyrotoxicosis
- Autoimmune disorders
- Lupus erythematosus
- Myasthenia gravis
- Pernicious anemia
- Celiac disease
- Sjogren's Syndrome

Low Stomach Acid

Low stomach acid can cause indigestion. Believe it or not, too little stomach acid is the most common cause of an acid stomach, not excess acid.

Some people take antacids to relieve the uncomfortable acid feeling in their stomachs (common after eating high protein or high fat meals) which can itself cause serious problems as a side effect. But the vast majority of those with an 'acid stomach' suffer from not enough acid. They simply cannot digest what they have eaten. For some, an antacid may temporarily relieve a queasy stomach, but in the long run, regular use of antacids makes the problem worse. If you suffer from an acid stomach, avoid high protein meals, especially red meat. Instead of antacids, begin taking quality digestive enzymes at the end of each large meal, whether you have pain or not. [Do not take hydrochloric acid if you have an ulcer.] Be sure you have adequate daily salt intake (from natural sea salt). The chloride fraction in salt is essential for your body to make hydrochloric acid. That's why a low-salt diet commonly leads to poor digestion over time.

For many people, as they get older, the parietal cells in the stomach lining produce less and less hydrochloric acid. Over 50% of the people over age 60 have low stomach acid. By age 85, 80% have low stomach acid.

This is especially true of those who eat:

- 1) Foods cooked at very high temperatures (which have no live enzymes),*
- 2) Difficult-to-digest foods such as red meat or deep fried foods,*
- 3) Highly processed foods, such as those containing artificial preservatives and additives,*
- 4) Carbonated soft drinks, which contain high amounts of phosphorus, white sugar, and immune-stressing chemicals*
- 5) Barbequed or grilled foods, which cause high digestive stress. (The blackened areas of the food may contain carcinogenic [cancer-causing] agents.)*

Weak stomach acid allows infecting organisms (that would normally be killed by the acid) to get past the stomach and set up infections in other areas. They can cause food poisoning and dysbiosis of the intestinal tract (abnormal overgrowth of unhealthy intestinal microbes).

For people aged 60 to 80, over 20% have bacterial overgrowth in the intestines. Over age 80, the percentage increases to 40%. This abnormal bacterial overgrowth is also common in younger people. It is linked to low stomach acid as well as eating a nutrient poor diet, using antibiotics or pain killers, drinking excess alcohol and other factors. Thus, healthy stomach acid is a critical part of maintaining healthy intestines.

Absorbing Vitamins and Minerals

Adequate hydrochloric acid is necessary to absorb vitamin B12. B12 deficiency can cause muscle weakness, fatigue and many nervous system problems. Healthy stomach acid is also required to absorb many minerals, including iron, calcium, magnesium, zinc, copper and most B-complex vitamins. Those with poor stomach acid typically have low vitamin C levels.

Adequate amounts of stomach acid are necessary to break down protein. That is why overeating meat, especially highly cooked red meat, is hard on the stomach -- it uses up the stomach's acid and enzymes very quickly. Eating highly cooked red meat day after day can exhaust the stomach's ability to build up sufficient amounts of hydrochloric acid. Your best bet is to limit or eliminate red meat in your diet. Instead, enjoy an excellent, high quality protein source -- edible mushrooms!

Reinvigorate your digestion by choosing easy-to-digest high quality proteins derived from mushrooms. They are easy to prepare and cook, absolutely delicious and contain natural immune-boosting factors that improve your energy levels and vitality. In contrast, red meat is difficult to digest and contains arachidonic acid which encourages inflammatory by-products which can lead to joint pain, fatigue and osteoporosis.

Steps to 'Super Digestion'

- To ensure a healthy digestive tract, adopt the following healthy habits:
- Eat a diet rich in fresh vegetables (an excellent form of healthy fiber).
- Eat whole starches daily, such as brown rice and buckwheat (also excellent healthy fiber).
- Use healthy, sea salt rather than the ‘free flow’ variety which is ‘junk’ salt.
- Limit or eliminate your red meat consumption.
- Avoid eating heavy meals when under stress or emotionally disturbed.
- Eat slowly and chew the food properly.
- Avoid over / untimely eating.
- Avoid physical exertions of any kind immediately after a main meal.
- Avoid eating late dinners.

People with a wide variety of chronic disorders, such as allergies, asthma, and gallstones, do not produce adequate amounts of stomach acid.

Digestion enzymes

Digestion enzymes are enzymes that break down polymeric macromolecules into their smaller building blocks. Digestive enzymes are found in the digestive tract of animals (including humans) where they aid in the digestion of food as well as inside cells, especially in their lysosomes. Enzymes are also found in the saliva, which is produced from within the salivary glands.

Digestion enzymes are classified by their substrates: proteases and peptidases split proteins into amino acids, lipases split fat into three fatty acids and glycerol, carbohydrases split carbohydrates such as starch into sugars, and nucleases split nucleic acids into nucleotides.

In the human digestive system, the main sites of digestion are the oral cavity, the stomach, the duodenum, and the jejunum and digestive enzymes are

secreted by different glands: the salivary glands, the glands in the stomach, the pancreas, and the glands in the small intestine.

Actions of digestive enzymes:

- Bromelain tenderizes meat and acts as an anti-inflammatory agent.
- Betaine effects cell fluid balance as osmolytes
- Salivary Amylase (also known as ptyalin) (Mouth) produced by salivary glands breaks down starch into sugar.

The enzymes that get secreted in the stomach are called *gastric enzymes*. These are the following:

- Pepsin is the main gastric enzyme. It breaks proteins into smaller peptide fragments.
- Gelatinase, degrades type I and type V gelatin and type IV and V collagen, which are proteoglycans in meat.
- Gastric amylase degrades starch, but is of minor significance.
- Gastric lipase is a tributyrase by its biochemical activity, as it acts almost exclusively on tributyrin, a butter fat enzyme.
- Pepsin enzyme is secreted by gastric glands
- Rennin enzyme change the liquid milk to solid

The pancreas is the main digestive gland in our body. It secretes the enzymes:

- Trypsin, is a protease that cleaves proteins at the basic amino acids.
- Chymotrypsin, is a protease that cleaves proteins at the aromatic amino acids.
- Steapsin, degrades triglycerides into fatty acids and glycerol.
- Carboxypeptidase, is a protease that takes off the terminal acid group from a protein
- Several elastases that degrade the protein elastin and some other proteins.
- Several nucleases that degrade nucleic acids, like DNAase and RNAase

- Pancreatic amylase that, besides starch, and glycogen, degrades most other carbohydrates. Humans lack the enzyme to digest the carbohydrate cellulose.
- Pancreatic Secretion: Bile from the liver, which emulsifies fat, allowing more efficient use of lipase in the duodenum in converting lipids to smaller more manageable sizes. Bile is not considered an enzyme, but aids macronutrient degradation.

Small intestine enzymes

- Several peptidases.
- The jejunum and ileum secretes a juice called succus entericus which contains the following:

Four types of enzymes degrade disaccharides into monosaccharides:

- Sucrase, which breaks down sucrose into glucose and fructose
- Maltase, which breaks down maltose into glucose.
- Isomaltase, which breaks down maltose and isomaltose
- Lactase, which breaks down lactose into glucose and galactose

The intestinal lipase breaks down fatty acids.

The small intestine receives lipase, trypsin and amylase from the pancreas. They are transported from the pancreas to the duodenum through the pancreatic duct. Protein, fats and starch are broken down into smaller molecules. However, they are not fully broken down yet. This causes the enzymes of the small intestine to act upon them. These enzymes include peptidase, which breaks down peptides into amino acids and the enzyme maltase acts upon maltose which produces glucose. These molecules are absorbed by the villi in the small intestine and according to the molecule they are either absorbed by the lacteal or blood capillaries.

Digestive enzymes are complex proteins involved in digestion that stimulate chemical changes in other substances. They work optimally at specific temperature and pH. Digestive enzymes include pancreatic enzymes, plant-derived enzymes, and fungal-derived enzymes. There are three classes of

digestive enzymes: proteolytic enzymes needed to digest protein, lipases needed to digest fat, and amylases needed to digest carbohydrates.

Hcl Supplement

Only small amounts of the animal-based proteolytic enzymes, trypsin and chymotrypsin, are found in the diet; however, the pancreas can synthesize these enzymes. The plant-based proteolytic enzyme bromelain comes from the stems of pineapples and is useful in many conditions. Papain comes from unripe papayas. All of these enzymes are available as supplements.

Betaine Hcl is the most common hydrochloric acid-containing supplement. Normally it comes in tablets or capsules measured in grains or milligrams. Only people who have reduced levels of stomach acid ('hypochlorhydria') should take betaine Hcl; this condition can be diagnosed by proper tests.

Large amounts of betaine Hcl can burn the lining of the stomach. If a burning sensation is experienced, betaine Hcl should be immediately discontinued. People should not take more than 10 grains (650 mg) of betaine Hcl without the recommendation of a physician. All people with a history of peptic ulcers, gastritis, or gastrointestinal symptoms—particularly heartburn—should see a doctor before taking betaine Hcl. People taking nonsteroidal anti-inflammatory drugs (NSAIDs), cortisone-like drugs, or other medications that might cause a peptic ulcer should not take betaine Hcl. Betaine Hcl helps make some minerals and other nutrients more absorbable.

If you suffer from bloating, belching and flatulence after a meal, you may not have enough hydrochloric acid of your own and supplementation might be an important step for you to take. Also if you suffer from acid reflux, interestingly enough this could be a sure sign that you do not have sufficient amounts of stomach acid. This happens because a lack of Hcl prevents the stomach from being able to digest the food properly. If you lead a stressful, chaotic life, you almost certainly could benefit from betaine Hcl supplementation.

At the time of writing, there were no well-known drug interactions with Betaine Hydrochloride.

The digestive enzymes—proteolytic enzymes, lipases, and amylases—are generally taken together. Pancreatin, which contains all three digestive enzymes, is rated against a standard established by the U.S. Pharmacopeia (USP). For example, “4 X pancreatin” is four times stronger than the USP standard. Each “X” contains 25 USP units of amylase, 2 USP units of lipase, and 25 USP units of protease (or proteolytic enzymes). Three to four grams of 4X pancreatin (or a lower amount at higher potency) with each meal is likely to help digest food in some people with pancreatic insufficiency.

Those with chronic pancreatitis need to discuss enzyme intakes with their physician. Under medical supervision, seriously ill people with pancreatic insufficiency caused by pancreatitis are given very high levels of enzymes to improve fat digestion. In one successful trial, enough pancreatin was used with each meal to supply slightly over 1,000,000 USP units of lipase.⁴ Because pancreatin is rapidly emptied from the stomach during digestion, people taking these enzymes may obtain better results by spreading out supplementation throughout the meal.⁵

Supplemental enzymes that state only product weight, but not activity units, may lack potency.

Side effects of Supplements

The most important digestive enzymes in malabsorption diseases are usually fat-digesting enzymes called lipases. Proteolytic enzymes can digest, as well as destroy, lipases. Therefore, people with enzyme deficiencies may want to avoid proteolytic enzymes in order to spare lipases. If this is not possible (as most enzyme products contain both), people with malabsorption syndromes should talk with their doctor to see if their condition warrants finding products that contain the most lipase and the least protease.

In theory, too much enzyme activity could be irritating because it could start to ‘digest’ parts of the body as the enzymes travel through the digestive system. Fortunately, that does not happen with supplemental amounts

normally administered. Research has not determined the level at which such problems might arise.

A serious condition involving damage to the large intestines called fibrosing colonopathy has resulted from the use of pancreatic enzymes in children with cystic fibrosis. In some cases, the problem was linked to the use of high supplemental amounts of enzymes. However, the amount of enzymes used has not been linked to the problem in all reports. In some cases, lower amounts of enzymes have caused fibrosing colonopathy if the enzymes are enteric-coated. Some researchers now believe that some unknown interaction between the enteric coating and the enzymes themselves may cause damage to the intestines of children with cystic fibrosis. Until more is known, children with cystic fibrosis needing to take pancreatic enzymes should only do so under the careful supervision of a knowledgeable healthcare professional.

Certain medicines may interact with digestive enzymes.