

Enzymes: The Weakest Link In Your Digestive System

If you are like most Americans, you consider mild episodes of indigestion as part of life. But, as you'll shortly learn, these seemingly harmless, but discomforting experiences can signal more serious problems. In fact, nearly 200,000 people die each year from problems stemming from the digestive system.

According to Lawrence Cheskin, M.D., director of gastroenterology at John Hopkins Bayview Medical Center in Baltimore Maryland, most conditions such as toxic bowel syndrome (TBS), fatigue, skin rashes, headaches, lack of concentration and irritability can be "directly linked to poorly digested foods." Unfortunately, because of a lack of awareness about digestive disorders — and treatment options — most people have learned to live with these conditions.

What many Americans do not realize is most digestive problems are preventable. While the mainstream medical establishment provides basic (and often outdated) dietary guidelines and treat digestive disorders with drugs and surgery, alternative practitioners tend to focus on digestion as if your life depended on it.

As you are about to learn, your life *does* depend on proper digestion: Your digestive system is the keystone to health and vitality.

The "Rodney Dangerfield" of Healing

The problem, says, Howard Loomis, D.C., a leading expert in enzymatic research, is "digestion is the

Rodney Dangerfield of the healing arts. It doesn't get any respect — it never has . . . everyone assumes that digestion just normally happens, but it doesn't."

Ironically, though theories differ, medical professionals agree that the ability to fight illness, delay aging and maintain positive well-being is tied to proper digestion — the process of breaking down foods and assimilating nutrients.

When your digestive system is com-

"Enzymes are critical for life. . . It's not only what we eat, but also what our bodies absorbs that keeps us healthy and energetic."

— Anthony J. Cichoke, D.C.,
The Complete Book of Enzyme Therapy

promised, even the healthiest diet can't be put to effective use. At first, you may notice only common discomforts such as heartburn, constipation, diarrhea and gas. But, depriving your body of nutrients over time can cause more serious problems. The inability to absorb calcium, for example, can eventually lead to osteoporosis. If your body isn't breaking down sugars properly, a yeast buildup in the intesti-

nal tract can lead to candida, which causes irritability and bloating.

As you are about to learn, enzymes may be the "weakest link" to proper digestion. Though improved diet and lifestyle changes can improve digestion, clinical studies and scientific research now show that enzyme supplementation may be the best way for improving health and longevity.

In a moment, you'll learn more about enzymes, but first let's review how the digestive system works.

Understanding How the Digestive System Works

Anthony J. Cichoke, DC, author of *The Complete Book of Enzymes and Enzyme Therapy* describes the digestive process as a freight train moving along the tracks:

"In the first 'box car' food enters the mouth and encounters enzymes secreted by the salivary glands. These enzymes initiate the digestive process and work best if you chew food thoroughly. In the stomach, food is broken down into even smaller pieces and mixed with hydrochloric acid and pepsin, the main enzyme produced by the stomach. It's in the small intestine that the great amount of digestion and absorption takes place, with the help of pancreatic enzymes. Few

nutrients remain by the time partially-processed food reaches the large intestine where unusable bulk or fiber is processed, water absorbed and waste excreted.”²

What are Enzymes?

Enzymes are substances which make life possible and are present at every stage of the digestive process. In *Enzymes: The Fountain of Life*, the authors write that enzymes act as the human body’s “labor force to perform every single function required for our daily activities and are required to keep us alive. They are responsible for all the functions of every organ system in our bodies.”³

They also point out how enzymes positively affect our immune system:

“Enzymes are not only necessary to eat, digest and absorb nutrients and other food factors, but they are also necessary to receive sensory input, such as hearing, seeing, smelling and tasting, and required for our blood and coagulation systems, cardiovascular functions, kidneys, liver and for sexual excitement or activity. When enzyme activity stops, life stops and the person or organism dies.”⁴

More specifically, enzymes are protein substances that work as catalysts for both the digestive system and many chemical reactions in the body. Without them, no activity would take place.

Anthony J. Cichoke, DC, says researchers have identified more than 2,700 different enzymes in the human body. “Every second of our lives these enzymes are constantly changing and renewing, sometimes at an unbelievable rate,” he writes. “Nothing can take place without energy and energy cannot be used or produced without enzymes.”

Types of Enzymes

For the purpose of this discussion, enzymes can be divided into three groups: Food, Digestive and Metabolic:

Foods and the Supplemental Enzymes That Digest Them

Meat, Fish and Chicken:

Protease (peptidase, bromelain and papain).
Lipase, if there is fat content.

Dairy Products (Cheese, yogurt, ice cream, milk, butter and sour cream):

Lactase to digest milk sugar lactose.
Protease for digesting the protein component found in most dairy products.

Lipase, for digesting the fat found in most dairy products in which it has not been removed.

Fruits and Vegetables:

Amylase contributes to the digestion of complex carbohydrates (polysaccharides) by breaking interior bonds. Ultimately glucose is released.

Glucoamylase acts on terminal or end bonds of polysaccharides, also releasing glucose.

Malt diastase breaks terminal bonds of polysaccharides resulting in the release of maltose (a disaccharide).

Alpha-galactosidase digests some vegetables and legumes that contain the sugars raffinose, stachyose, and/or verbascose.

Cellulase digests *cellulose*, one of the main components of the fibrous cell walls of plants.

Pectinase acts to break down Pectin, a fibrous polysaccharide that holds together cells in fruits and berries.

*CereCalase*TM breaks the bond of hemicellulose, phytate, and beta glucans, which are all fibrous mineral and enzyme binding structures found in vegetables and grains.

Breads, Cereals and Other Foods Composed Mainly of Grains:

Amylase, *Glucoamylase*, *Malt Diastase*, *Cellulase* and *CereCalase*TM, as mentioned above.

Butter, Oil and Other Fats:

Lipase digests fats (triglycerides) into free fatty acids and glycerol.

Sweets:

Invertase (or *sucrase*) breaks down sucrose or table sugar. Many sweets also contain other components. For example, ice cream is a dairy product that also contains sugar. The enzymes needed would be those that digest dairy products as well as invertase to break down the refined sugar. Most cakes, pies, and cookies also contain grain products and fats. All the enzymes listed for those foods as well as invertase would be needed.

Source: National Enzyme Company

1. Food Enzymes

All raw food contains its own “food” enzymes, necessary for aiding the digestive process. When raw food is eaten, enzymes present within the food are released. They include:

- **Protease** breaks down long protein chains (polypeptide), found in meats, nuts, eggs and cheese, into smaller amino acid chains and eventually into single amino acids.
- **Amylase** breaks down large carbohydrates (starch and other polysaccharides), starches, and sugars, found in potatoes, fruits, vegetables and many snack foods, to disaccharides — sucrose, lactose and maltose.
- **Lipase** breaks down fats (triglycerides), found in most dairy products, nuts, oils and meats, into free fatty acids and glycerol.
- **Lactase** breaks down lactose (milk sugars).
- **Cellulase** breaks down the bonds found in fiber. By disturbing the structure of the fiber matrices, which envelop most of the nutrients in plants, cellulase increases the nutritional value of fruits and vegetables. (*Cellulase is not found in the human system. It is found only in plant enzymes.*)

2. Digestive Enzymes

Digestive enzymes, such as trypsin, chymotrypsin and pepsin, are produced naturally in the body. They are produced primarily in the pancreas, and to a lesser extent in the stomach and small intestine, breaking down proteins, carbohydrates and fats into usable nutrients.

When we eat, our pancreas produces 22 different types of digestive enzymes that do most of their work in the small intestine, not the stomach. Without raw food, the body must depend on the enzymes it produces itself. With enzymes from raw foods, the pancreas’ workload is decreased.

3. Metabolic Enzymes

Metabolic enzymes run the body’s tissues and organs, allowing you to perform such basic activities like walking and talking. John A. Allocca, Sc.D., author of *Essential Nutrition for Body Composition, Weight Reduction and Great Health*, explains that “[metabolic enzymes] take proteins, fats and carbohydrates and structure them to build

and carry out the normal functions of the body and to repair damage and decay, and heal diseases.”

How Enzymes Aid the Digestive Process

From the time food enters the mouth, enzymes are at work breaking down food into smaller and smaller bits, until it can be absorbed through the intestinal wall.

When food is ingested, enzymes are released in the mouth, helping to break open carbohydrate cell walls. As food flows through the digestive tract, other enzymes are released. The ultimate breakdown of food occurs in the small intestine, helped by the release of pancreatic enzymes. The browning of a ripe banana is an excellent example of enzymes in action.

What Happens When Your Body Doesn’t Get Enough Enzymes?

As we mentioned earlier, your digestive system is the keystone to health and vitality. For proper digestion to occur, it is important that your diet contains sufficient enzymes to support your digestive system. A diet lacking in enzymes can lead to *enzyme deficiencies* that can cause serious, and far-reaching health problems.

As the European authors of *Enzymes: The Fountain of Life*, explain:

“Within the sum total of our bodies, enzymes work constantly like a majestic orchestra, conducting a splendid symphony in perfect harmony. This perfect equilibrium keeps us active and preserves our health, performing all functions through a delicate and yet phenomenal system of checks and balances. Enzymes work as tireless, highly-skilled workers on a conveyer belt, dismantling, controlling, protecting, destroying, eliminating, reassembling or performing whatever we need in order to exist day and night.”⁵

But as Anthony J. Cichoke points out: “[Without enzymes] healthy cells become disorganized, leading to illness and even death.”

What Causes Enzyme Deficiencies?

So what can cause the “majestic orchestra” to move out of perfect harmony? There are four reasons:

1. Battle Between Metabolic and Digestive Enzymes

Though each enzyme has its own function, tension can occur between metabolic and digestive enzymes when too much of the body’s enzyme potential is being used for digestion. This battle places a strain on the production of metabolic enzymes. With fewer of these controlling enzymes being made, the body’s metabolic process suffers. As John A. Allocca explains:

“The glands and major organs, including the brain, suffer the most from the unnatural digestive drain on the metabolic enzyme potential. The pancreas, which produces the most digestive enzymes, swells to meet the great demand for digestive enzymes while the brain decreases in size . . . this deficiency also affects the size of the liver, heart, pituitary, thyroid and other endocrine glands.”⁶

As Allocca explains, placing the full digestive burden on the body causes the digestive process to become stressed, resulting in improper digestion and malabsorption of nutrients that can have far-reaching effects. Consequences of malabsorption can include everything from abdominal discomfort, gas, indigestion and passing undigested food in the stool to impaired immunity, allergic reaction, poor wound healing, skin problems, and mood swings.

2. Cooking and Processing Foods Destroy Enzymes

Perhaps the biggest problem is the result of how we process food. Modern food processing techniques and all types of cooking destroy nearly 100% of the enzymes occurring naturally in food. According to Dr. Edward Howell, M.D., author of *Enzyme Nutrition* (Avery, 1985):

“. . . Cooked, enzyme-free diets contribute to a pathological over-enlargement of the pituitary gland [which in turn] regulates the other glands.”

Likewise, Howell believes the massive

size of the human pancreas is the result of a pathological adaptation to a cooked food diet. Research conducted at the University of Minnesota showed significant changes in the organ weights of rats fed heat-treated food. Both the pancreas and submaxillary glands increased in weight by 20% to 30%.

Enzymes are destroyed when exposed to temperatures over 188 degrees F — a temperature lower than what is required to bake a casserole. Pasteurization, the process in which dairy products and fruit juices are heated to kill bacteria, also destroys enzymes.

As a result of the way we prepare our food, more is demanded of our body's digestive enzymes, thus exacerbating the battle between metabolic and digestive enzymes. Subsequently, incompletely digested food passes into the colon, taking vital nutrients with it, and often result in intestinal upset.

3. Our Bodies Produce Fewer Enzymes as We Age

According to Howard Loomis, author of *Enzymes: The Key to Health*, as we age, the body produces fewer and fewer enzymes. For example, the amount of amylase present in an average 25-year-old's saliva is 30 times more abundant than in a 65-year-old's. "This is why many people experience digestive woes for the first time in their 40s," say Loomis. "Around age 45, the quantity of our body's enzymes decreases and so does the quality . . . [and] our cells just don't have enough energy to maintain production."⁷

4. Environmental Factors

To complicate the matter, a number of environmental factors can also destroy enzymes. Among them are pesticides, chemicals used in food preparation, water fluoridation and food irradiation.

Four Solutions for Enzyme Deficiency

There are four ways you may reverse enzyme deficiency and improve your overall health:

1. Change Your Diet

Enzyme therapists suggest including raw food with every meal to enhance diges-

tion. According to *Vegetarian Times*:

"Vegetarian diets are typically more enzyme-rich than the average Americans' because they are likely to include salads and raw foods."⁸

But as the article warns, vegetarians are not immune to digestive problems and enzyme deficiency. One reason is not all foods are good sources of enzymes. For example:

"Seeds, nuts, grains and beans must be soaked, cooked or sprouted to deactivate natural enzyme inhibitors," says Lita Lee, Ph.D., an enzyme therapist in Lowell, Oregon and Sunnyvale, California. "Compounds in cruciferous vegetables (broccoli, cabbage and cauliflower) can also inhibit thyroid function if eaten raw."⁹

John Allocca also warns that: "Eating seeds and nuts with enzyme inhibitors causes the pancreas to secrete digestive enzymes, leading to a decrease in the supply of metabolic enzymes . . . though, soaking them in water — a technique known as germination — for 24 hours will neutralize these inhibitors and release the enzymes."¹⁰

In addition, some foods are more rich in enzymes than others. For examples, see "Raw Foods Rich in Enzymes" to the right.

2. Change the Way You Prepare Food

Raw, uncooked foods can be a valuable source of enzymes. "Unfortunately, it is more often the tendency in our American culture to cook and often overcook our foods prior to eating them," says Annell St. Charles, Ph.D. As *Whole Foods Magazine* (November 1997) explains:

"Dicing vegetables or germinating nuts may be a bit less convenient than 'nuking' a frozen meal, but simply doing so may give you more time in your life to enjoy eating them."

Enzymes cannot tolerate heat. Therefore, cooking food, especially with temperatures over 188 degrees F, destroys the natural enzymes available for digestion, before they reach your mouth. Food irradiation and pasteurization also destroy enzymes. To obtain enzymes from foods,

they must be eaten in their raw, natural state.

3. Change Your Eating Habits

Elizabeth Lipski, M.S., C.C.N. recommends eating in a relaxed manner, and chewing food thoroughly, to begin enzyme and digestive action. She also recommends limiting beverages with meals, which dilutes the gastric juices in the stomach and pancreatic juice in the small intestines.¹¹

4. Supplement Your Diet with Enzyme Supplements

Nearly everyone can benefit from enzyme supplements — even healthy people. Benefits may include:

- Easing the battle between metabolic and digestive enzymes.
- Improving absorption and use of nutrients by enhancing the enzymes available in raw food.
- Replacing enzymes lost when food is cooked or processed.
- Allowing more digestion to begin in the gastric region, easing the burden on the digestive system. (*The earlier that digestion can begin, the greater the likelihood that no undigested food will enter the colon where bacteria can feed upon it, causing such problems as gas and bloating.*)

Of course these benefits may vary, depending upon your diet and general health. Individuals in good health can expect to notice less fullness after meals, increased energy, faster emptying of the stomach contents, decreased gas, and more regular bowel habits.

In a moment, you'll learn what to look for in enzyme supplements, but first, let's look at the background of Enzyme Therapy.

Enzyme Therapy

Once considered controversial, enzyme therapy is slowly gaining acceptance among medical professionals, even some conventional physicians. Today, more than 2,000 enzyme specialists exist in the U.S., with varied medical disciplines: Osteopathy, naturopathy, chiropractic and nutrition. According to Trent Nichols,

M.D., C.N.C., a gastroenterologist and nutritional counselor in Hanover, Pennsylvania:

“There are a lot of physicians who have been out there for 10, 20 or 30 years who are just not getting results with conventional medicines and surgery . . . They’re more willing to try something else.”¹²

Enzyme therapy has received recent attention due to the work of Nicholas Gonzales, M.D., a New York immunologist. He has used pancreatic enzyme therapy and dietary guidelines to treat cancer of the pancreas. Initially considered highly controversial, researchers recently received \$1.4 million from the National Institute of Health to further Gonzales’ research.

About 100 years ago, a Scottish physician and embryologist, John Beard, received attention when he injected purified enzyme juices into the veins and malignant tumors of cancer patients.

Enzyme therapy became more established, however, when Dr. Edward Howell began experimenting with enzymes in 1924.

More recently, U.S. physician, Max Wolf, created interest when he treated digestive disorders by having patients reduce animal fat intakes, increase raw food consumption and take enzyme supplements. (Incidentally, Dr. Wolf was a respected physician whose patient list included Pablo Picasso and members of the Kennedy family.)

Dr. Edward Howell’s Pioneering Enzyme Research

While on the staff at Lindlahr Sanitarium in Illinois, Dr. Howell began treating patients, suffering from chronic degenerative diseases (mainly tuberculosis) with enzyme therapy. Patients, who were put on a raw food and juice diet, showed dramatic improvement. After seeing these results, Dr. Howell measured the enzyme activity levels of cooked and raw vegetables, and learned that enzyme levels were missing in the cooked foods. His research led him to the canning industry where

enzymes are killed in the canning process.

Dr. Howell theorized that if he could replace the enzymes lost in the cooking process of food, he could enhance nutrient assimilation and in turn, promote general good health. Through his extensive research, he learned that the pancreas will adapt to whatever food is taken into the body, and react accordingly. Referred to as the Law of Adaptive Secretion of Digestive Enzymes, he discovered that if you take supplemental enzymes, then part of the burden of producing enzymes will be relieved. In general, the body will adapt (within three to seven days) to the composition of the diet. If you eat a high carbohydrate diet, the body will eventually begin secreting more amylase.

In 1932, Dr. Howell established a private practice for the treatment of advanced illness, using nutritional and physical therapies. Through extensive clinical and laboratory research, Dr. Howell developed a method of cultivating and extracting certain plant enzymes. Since then, his company, the National Enzyme Company (*the oldest enzyme company in North America*), continues working with nutritional companies to produce the highest quality, most efficacious enzyme-based supplements available in the world.

How to Find Quality Enzymes

When considering an enzyme supplement, you should consider three things:

1. Source of the Enzyme: The Important Differences Between Pancreatic, Plant and Microbial Enzymes

Supplemental pancreatic, plant and microbial enzymes are designed to enhance digestion. But the derivation of the enzyme can make a huge difference in how well they perform in the digestive system. For example:

- **Plant and microbial enzymes use a “proactive” approach and begin working on foods sooner after ingestion.** Gastric enzymes begin working approximately 30 minutes after food reaches the stomach. Because of their stability in the

Raw Foods Rich in Enzymes

A great approach to improving digestive enzyme function in the body is to eat some raw fruits or vegetables at every meal. This is particularly important when ingesting hard-to-digest foods, such as meat. Foods rich in enzymes include:

- Fermented foods, such as yogurt or kefir (a drink made with milk-fermenting enzymes and yeasts.)
- Unpasteurized fruit juices in between meals.
- Soy sauce.
- Miso.
- Tempeh.
- Pineapple (produces bromelain).
- Papaya (produces papain).
- Aspergillus, a type of mushroom.
- Bananas.
- Avocados.
- Grapes.
- Mangoes.
- Fresh raw dates.
- Fresh raw figs.
- Raw honey.
- Raw butter.
- Unpasteurized raw milk.
- Germinated inhibitor-free cereal grains, seeds and tree nuts.
- Herbal bitters: Gentian, wormwood, boldo, goldenseal, barberry, dandelions and hops. Many of the herbs can be found in bitter combinations. Artichoke is another great bitter.

acidic environment of the upper stomach, plant and microbial enzymes can begin their digestive action immediately after the food reaches this region. With the increased exposure to digestive enzyme activity, food has a better chance of being broken down into small, more readily-absorbed particles.

- **Plant and microbial enzymes activate at**

Enzymes at a Glance

Pancreatic:

- They have very specific action.
- Activated by the body's enzymes.
- Derived from animal tissues, typically pancreatic tissue from pigs.
- Easily destroyed by acidity of the stomach.
- Delayed effect.
- Don't break down fibers or certain carbohydrates.
- No sucrase, maltase, or lactase activity.

Plant:

- Derived from certain plants such as pineapple and papaya.
- Effective within a broad pH range.
- Predominantly proteolytic activity.

Microbial:

- Derived from selected microorganisms such as aspergillus by the process of fermentation.
- Broad pH range.
- Activated in the upper stomach.
- Begin working immediately.
- Broad action on a variety of foods.

a broader pH range. Specially selected for compatibility with the body's temperature, microbial enzymes produce activity across a broad pH range. Unlike supplemental enzymes of animal origin, microbial enzymes work at the pH found in the upper stomach, where food sits as long as an hour before gastric secretions begin action.

Several studies conducted at major universities have shown that the enzymes in saliva continue their digestive activity in the upper stomach and can digest up to 30% of the ingested protein, 60% of ingested starch and 10% of ingested fat during the first 30 to 60 minutes after consumption. Although salivary enzymes accomplish a significant amount of digestion, their activity is limited to the pH level of 5.0. Supplemental microbial enzymes are active in the pH range of 3.0 to 9.0 and can facilitate the hydrolysis of a much larger amount of protein, carbohydrates and fat before hydrochloride is secreted in suffi-

cient amounts to neutralize their activity.¹³

In contrast, supplemental enzymes of animal origin are destroyed by the low pH within the stomach unless they are enterically-coated. Furthermore, animal-based enzymes function only at the narrow pH ranges found at specific anatomical sites. Pepsin is only active in the highly acidic environment of the active stomach. Pancreatin, trypsin and chymotrypsin are only active in the alkalinity of the duodenum.

Supplemental microbial enzymes exhibit activity throughout the digestive tract. Therefore, microbial enzymes can play a significant role in improving food nutrient use.

• Larger variety of enzymes available.

Another advantage of microbial enzymes is the variety of enzymes available for supplementation. Enzyme supplements derived from animal products (listed as "pancreatin" on the ingredient label) offer only protease, lipase and amylase activities. Microbial enzymes, on the other hand, offer protease, peptidase, lipase, amylase, glucoamylase, invertase, malt diastase, lactase, alpha-galactosidase, cellulase, hemicellulase, pectinase and phytase activities.

• Plant and microbial enzymes are animal friendly, and safe for vegetarians.

Vegetarian-safe supplements are called "plant-harvested," and are derived from a fungus called *Aspergillus oryzae*, used to ferment soy sauce, tamari and miso.

These enzymes work in a much wider range of pH than pancreatic enzymes, enhancing digestion in the stomach as well as in the intestines. Because they are not broken down by stomach acid, the required dosage is much smaller than that for pancreatic enzymes.¹⁴

• Plant and microbial enzymes are less likely to cause food allergy reactions.

2. Non-Enteric Coated Capsules

One of the more common questions is whether food or supplemental enzymes can survive the acidic portion of digestion and reactivate in the intestine. To prevent stomach acid from destroying these

enzymes before they can perform their important functions, supplemental enzymes are often coated with a substance, "enteric coating" that doesn't dissolve until it reaches the intestine.

Studies have shown that non-enteric coated products can be more effective than coated products.

3. Potency and Formulas

Choosing a quality enzyme supplement is more difficult than just looking for a plant or fungal-based product. Enzyme potency and activity level is not evaluated by weight, because weight does not necessarily correlate with digestive capability. The activity level of a digestive enzyme is measured by the quantity of digestion (hydrolysis) that occurs under specific conditions. This activity depends upon concentration, quantity, pH, temperature and substrate.

Is Taking Supplemental Enzymes SAFE?

Digestive enzymes are generally safe; however, if you experience soft stools, flatulence, or bloating, you should reduce the dosage. People who suffer from gastritis (stomach inflammation) or an ulcer should consult a health care practitioner before taking digestive enzymes. It is also believed that one proteolytic enzyme may interfere with folate absorption, and the proteolytic enzyme, papain, might increase the blood-thinning effects of warfarin and possibly other anticoagulants.¹⁶

Formula for Healthy Digestion

For individuals suffering from chronic fatigue, fibromyalgia, frequent diarrhea or constipation, frequent gas and bloating, leaky gut syndrome, poor immune response, chronic bladder infections, allergies, food sensitivities, chronic vaginal infections or high cholesterol, products with the following ingredients could be helpful:

1. FOS. One of the best-known prebiotics on the market is FOS. FOS isn't metabolized by the digestive system, but instead provides nutritional support to the natural flora of

the intestines.

Studies have shown that FOS supplementation can significantly increase the population of Bifidobacteria in the colon, help relieve constipation, improve blood lipids in hyperlipidemia and inhibit the growth of the pathogenic bacteria *Clostridium perfringens*.

2. **Amylase**, isolated from a selected strain of *Aspergillus oryzae*, helps break down carbohydrates.
3. **Protease 3.0™, 4.5™, and 6.0™** allows protein digestion to begin further up in the digestive tract where the pH is lower, and to continue and augment the endogenous proteases that are active in the higher pH environment of the small intestine.
4. **Glucosylase** is added to assure the breakdown of starch glycogen into glucose from the hydrolysis of starch.
5. **Lipase** is the enzyme that specifically digests fats (triglycerides) into fatty acids and glycerol, allowing easier absorption of fat-soluble nutrients through the intestine. *(Considerable digestive distress — even malabsorption of nutrients such as vitamins A and E can result from improper fat digestion.)*
6. **Lactase** digests lactose (milk sugar) into glucose and galactose. *(Nearly 70% of the world's population is deficient in intestinal lactase, with more than one-third of the U.S. population unable to digest dairy products. Supplemental lactase has been found*

Enzyme Therapy: Case Studies

Lowered Fat Levels. A double-blind, placebo-controlled study published in the August 2000, *American Journal of Gastroenterology*, concluded that pancreatic enzymes help fat digestion. The study focused on 74 people with cystic fibrosis, characterized by insufficient release of pancreatic enzymes, as well as poor metabolism. Of those who took a dosage of 4,550 U/kg (approximately one capsule) of pancreatic enzymes, 91% to 97% had less fat in their stools than the placebo group.

Less Bloating. In a small double-blind study published in *Digestive Diseases and Science* in 1999, researchers fed 18 healthy subjects high-calorie, high-fat meals; then also gave them three pancreatic enzyme capsules or a placebo. Those who took the supplement experienced significantly less bloating over the course of 17 hours than those who took the placebo.

Enzyme Supplementation Reduces Bruising and Inflammation. A German study published in 1995 found that bromelain, an enzyme from pineapple, reduced severe bruising and inflammation. Fifty-nine participants with various blunt injuries were given high dosages of bromelain and most experienced a significant reduction in swelling and pain over a one- to three-week period.

According to Anthony Cichoke, upon injury, “a series of biochemical changes takes place in a predictable fashion, Capillary permeability increases, which allows excess bodily fluids to accumulate in the injured area, leading to swelling. The result is a wall-like deposit of insoluble proteins, particularly fibrin. This insoluble fibrin formation leads to local circulatory interference that causes pain. The therapeutic use of protease enzymes is most effective at this stage of inflammation because they hydrolyze the peptide bonds that join amino acid within a protein, thus dissolving the fibrin plugs. This fibrin reduction allows more oxygen to reach and revive tissue cells. Excess fluid is also reabsorbed reducing inflammation.¹⁵

to decrease the symptoms of lactose intolerance associated with the consumption of dairy products.)

7. **CereCalase™** is designed to break down non-starch polysaccharides (NSPs), which have a tendency to bind minerals and other nutrients, and prevent intestinal absorption. NSPs are common in grains, beans and herbs.
8. **Invertase** helps digest sugars.

9. **Malt Diastase** digests starches.

10. **Cellulase** breaks down fiber.

11. **Bromelain** digests proteins and contains pineapple. If you are taking medications that thin the blood, such as Coumadin (Warfarin) or Heparin, sedative drugs such as Benzodiazepines, or antibiotics, Bromelain might amplify their effect.

12. **Papain** digests proteins.

Recommended Reading

Enzyme Nutrition: The Food Enzyme Concept, Dr. Edward Howell, Avery Publishing.

The Complete Book of Enzyme Therapy, Anthony J. Cichoke, Avery Publishing.

The Enzyme Cure: How Plant Enzymes Can Help You Relieve 36 Health Problems, Lita Lee, Lisa Turner, Burton Goldberg, Future Medicine Publishing.

The Healing Power of Enzymes, Dicqje Fuller, Ph.D., Sc., Forbes Custom Publishing.

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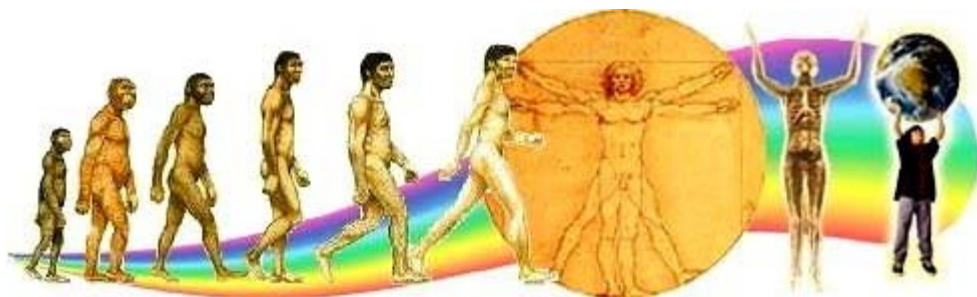
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Why Do Personal Development?

A natural trait of humans is to be constantly developing, growing and moving toward a **balanced and mature way of being**. Our present personality is determined by both who and what we have been and by the person we strive to become. The goal of personal development is to learn and apply that which enables us to attain emotional wellbeing, understanding and effectiveness, and to share this knowledge with others.

Personal development is the conscious evolution of human nature, and yet throughout history it has been sorely lacking! Although it is in our nature to learn and grow, we are held back by our culture, which is predominantly focused on survival needs, each of us in competition with others, and our spiritual inner nature is repressed. The animal rules. We make no room for unconditional love.

Even though the culture may have evolved with technological advancement and administrative complexity, human nature has not moved forward as it might. Our consciousness and mindfulness remain as always. We are now paying the price for Mankind's selfishness and inconsideration. **Going forward, the quality of our lives on this planet - even our survival - now depends on each of us taking responsibility for our personal growth.**

The human being needs to awaken to the soul that inhabits each body and is our true self and source of inner knowing. Awaken through a process of self-discovery, leading to one's own, self-directed spirituality. We need to become mindfully conscious instead of ruled by the dictates of instincts, past habits and fixed beliefs. We need to throw away dogma, open our minds and reconsider. **Instead of fear about our survival and competitive angst, we will then be motivated by compassionate understanding and creative love.**

For those that do move forward, the next epoch - that is almost upon us as we move into 2012 - will be a celebration of human cooperation and shared love. **It's our best hope for the future - and it's in our hands.**

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