



Digestive And Metabolic Enzymes

BY MICHELLE FERCHOFF, N.D.

A nutritious diet is the foundation of a healthy body, but whether or not the body is able to access the nutrients contained in foods depends on many factors, particularly the presence of digestive enzymes. Digestion of food takes a high priority and has a high demand for enzymes. Poor eating habits, including inadequate chewing and eating on the run, can result in inadequate enzyme production and hence malabsorption of food.

Enzymes are protein molecules found in all living cells necessary for life. They catalyze and regulate nearly all biochemical reactions that occur within the body. Enzymes turn the food we eat into energy and unlock this energy for use in the body.

There are two primary classes of enzymes responsible for maintaining life functions: digestive and metabolic. The primary digestive enzymes—proteases, amylases and lipases—function as biological catalysts, helping to break down protein, carbohydrates and fats. Metabolic enzymes are responsible for the structuring, repair and remodeling of every cell. They operate in every cell, every organ and every tissue, and need constant replenishment.

Digestive organs such as the pancreas and liver produce most of the body's digestive enzymes, while the remainder comes from uncooked foods such as fresh fruit and vegetables, raw sprouted grains, seeds and nuts, and whole food enzyme supplements.

Digestive Enzymes are secreted along the digestive tract to break down food into nutrients and waste. Digestive enzymes include pancreaticin, pepsin, bromelain, papain, chy-

motrypsin, and trypsin.

Metabolic Enzymes speed up chemical reactions within cells for detoxification and energy production. They enable us to see, hear, feel and move. Metabolic enzymes are produced by the liver, pancreas, and gallbladder.

Food enzymes are introduced to the body through raw foods and enzyme supplements. Raw foods naturally contain enzymes providing an erogenous source of digestive enzymes when ingested. However, raw food manifests only enough enzymes to digest that particular food, not enough to be stored in the body for later use. The cooking and processing of food destroys all of its enzymes. Since most of the foods we eat are cooked or processed in some way, and since the raw foods we do eat contain only enough enzymes to process that particular food, our bodies must produce the majority of the digestive enzymes we require, unless we use supplementation to aid in the digestive process. All bodily functions can be enhanced and improved by supplemental enzymes.

Enzyme Deficiencies

There are varying degrees of enzyme deficiencies. At the extreme end of the spectrum is the inherited condition of cystic fibrosis, in which the enzymes needed to digest proteins, carbohydrates, and fats are either missing or are present in reduced amounts. Other severe conditions that are associated with enzyme deficiencies include pancreatic insufficiency, celiac disease, and Crohn's disease. The malabsorption of nutrients associated with these conditions greatly increases the risk of malnutrition.

A.) *Protease Deficiency*: Protease

digests protein. Acidity is created through the digestion of protein. A protease deficiency results in an alkaline excess in the blood. This alkaline environment can cause anxiety and insomnia. Since protein is required to carry protein bound calcium in the blood, a protease deficiency lays the foundation of arthritis, osteoporosis and other calcium deficient diseases. B.) *Amylase Deficiency*: Amylase digests carbohydrates along with dead white blood cells. When you are low in amylase you are a candidate for abscesses. Amylase is also involved in anti-inflammatory reactions. An Amylase deficiency can result in skin problems such as psoriasis, eczema, hives, allergic reactions, atopic dermatitis, and all types of herpes. Asthma and emphysema may also be exacerbated by an amylase deficiency.

C.) *Lipase Deficiency*: Lipase digests fat, fat-soluble vitamins and balances fatty acids. Lipase deficient people have a tendency towards high cholesterol, high triglycerides, difficult weight loss and diabetes. Lipase deficient people also have decreased cell permeability, which can cause nutrient deficiencies within cells. Conditions such as vertigo or dizziness aggravated by movement can result from lipase deficiency.

D.) *Cellulase Deficiency*: Cellulase breaks down fiber in our diet. Because our body does not produce cellulose, this food enzyme is essential. Only raw foods contain cellulose. Cellulose deficiency can be described as a malabsorption syndrome. This can cause lower abdominal gas, pain, bloating and problems with the pancreas.

E.) *Sucrase Deficiency*: Sucrase intolerance is when a person cannot split

the sucrose disaccharide into two units of glucose. Since glucose is a primary brain food, a lack of this can cause mental and emotional problems. Symptoms include panic attacks, depression, moodiness and severe mood swings.

F.) *Lactase Deficiency*: Lactase intolerance includes symptoms such as abdominal cramps and diarrhea. Asthma has also been witnessed from the ingestion of lactose containing products.

G.) *Maltase Deficiency*: Maltose intolerance can cause sensitivity to environmental conditions.

Health challenges that may benefit through the use of enzyme supplementation include indigestion, GERD, gastric disorders, flatulence, malabsorption, constipation, gout, weight problems, parasites, hypercholesterolemia, hiatal hernias, duodenal ulcers, ADHD, Chronic Fatigue Syndrome, hepatitis, diverticulosis, Crohn's disease, colitis, back pain, canker sores, herpes, dia-

betes, PMS, Epstein Barr Virus, osteoporosis, aching joints, fungal infestations, candidiasis, acute inflammation, infections, hypoglycemia, eating disorders, nutritional disorders, immune system problems, and hormonal imbalance.

Pesticides, preservatives and cooking, have caused nutrient depletion in our foods today. Americans are undernourished, so supplementation is a necessity. Supplements that come from whole foods feed the body important nutrients and enzymes that are lacking from our standard American diet.

Combining whole food supplements with eating food in its natural, unprocessed state is vital to the maintenance of good health. If foods are eaten uncooked, fewer of the body's digestive enzymes are required to perform the digestive function. The body thereby adapts to the external supply by secreting fewer of its own enzymes, preserving these enzymes to assist in vital cellular

metabolic functions. By eating foods with enzymes intact and supplementing cooked foods with whole food enzyme supplements, we can stop degenerative and pathological disease processes.

About The Author

Michele Ferchoff earned her B.S. in biology from the University Wisconsin, La Crosse and then attended the Southwest College of Naturopathic Medicine and Health Sciences, one of four accredited naturopathic medical schools in the country, where she graduated as a N.M.D. in 2002. Michele has several years of practical and clinical experience. She was selected as one of two residents for the National College of Naturopathic Medicine/Standard Process residency program, the first naturopathic residency in Wisconsin's history, beginning in September 2002. Michele is one of only five naturopathic physicians in Wisconsin who have graduated from a four-year accredited naturopathic medical school.

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