

# Enzymes: Catalysts for the Body's Biochemical Reactions

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While we are all aware of the importance of a balanced diet and exercise in healthy aging and disease prevention, there is one non-nutritive element that can have profound effects on maintaining your health. The human body is dependent upon the activity of thousands of different enzymes. These essential biological molecules are the catalysts in all of the body's biochemical reactions.

The activity of enzymes varies significantly. While many have broad-based applications, others may only be utilized in one specific bodily reaction. As we age or are exposed to external stressors, our natural production of enzymes can decrease. Enzymes can also be extremely sensitive, and many can only exert their effects within narrow environmental conditions. Small changes in factors such as pH or temperature can cause enzymes to be destroyed or denatured (lose their structure). Due to the thousands of important roles enzymes play in normal body activity, insufficient production can severely impact overall health. Their multiple roles in overall body function and preserving health suggests a form of enzyme therapy may be beneficial for almost all of your patients.

## Natural Sources of Enzymes



One of the simplest ways to enhance your enzyme levels is to increase your intake of raw foods. Uncooked, unprocessed foods such as fresh fruits and vegetables contain natural enzymes that support

digestion and overall enzymatic activity. However, since many Americans consume inadequate amounts of these foods, supplementation may be necessary to ensure enzyme activity is supported. Increasing your intake of enzymes can help support every mode of cellular activity as well as improve overall body communication.

Aside from the digestive enzymes produced by our own bodies (see discussion below), nature provides [numerous protease enzymes](#) that may support cardiovascular and neurological health as well as reduce pain. Here are a few examples:

*Bromelain:* Derived from pineapple, bromelain is a proteolytic enzyme that has been shown to be effective at blocking pro-inflammatory metabolites. Bromelain has been used in cases of venous insufficiency, joint pain and autoimmune disorders.

*Papain:* A protease hydrolase enzyme found in papaya and mountain papaya, papain has been used historically as a treatment for insect bites and stings, breaking down both toxins and venom. It has also been used to promote wound healing and recovery from injury.

*Nattokinase:* Extracted from natto, a traditional Japanese food of soybeans fermented by *Bacillus natto*, nattokinase has powerful fibrinolytic and anti-clotting properties, which accounts for its use as a circulatory aide and in the treatment of vascular diseases. Recent research has also shown that nattokinase may have the ability to break down the amyloid-beta plaque associated with chronic degenerative brain diseases.

*Serrapeptidase:* A proteolytic enzyme derived from silkworms, serrapeptidase has been shown to successfully break down blood clots and tissue debris.

### Important Health Benefits

*Digestion:* Digestive enzymes, which are secreted in saliva and pancreatic juices, are responsible for the breakdown of food. This process helps facilitate proper nutrient absorption. In patients with pancreatic insufficiency or with food allergies, supplementation with a mild digestive enzyme blend can [enhance nutrient uptake as well as gastrointestinal comfort](#). In addition, anyone who consumes a diet high in processed foods may benefit from enzyme supplementation.

Historically, humans consumed much higher levels of raw, plant-based foods than they do today. When these raw foods were consumed with meals, the natural enzymes present would assist with the digestive processes. As Americans have decreased their intake of enzymes from raw foods, they have created the need for additional pancreatic enzyme secretion. Research suggests that the excess demand placed on the digestive organs over time can increase the risk of illness related to the intestines and pancreas. Insufficient enzyme secretion can also lead to abnormal secretion of hydrochloric acid by the stomach, as well as intestinal absorption of poorly digested proteins ("leaky gut").

*Inflammation:* Another known benefit of enzyme supplementation is the treatment of [inflammatory and immune-mediated conditions](#). Proteolytic enzymes, such as trypsin, chymotrypsin, bromelain, and papain, have the ability to neutralize inflammatory chemicals to aid in the healing of damaged tissues. Extreme benefit has been shown in patients with sports-related injuries using enzyme therapy. It is believed that proteolytic enzymes have the ability to promote healing by decreasing capillary permeability, improving circulation, and dissolving fibrin clot deposits. Enzymes have also been shown

to have positive effects on natural killer cells and macrophages, thus enhancing the overall immune response and body's defense against infection.

*Cancer:* The use of enzymes in cancer therapy was first proposed by the embryologist Dr. John Beard in the early 1900s. In his research, *The Enzyme Therapy of Cancer*, published in 1911, Dr. Beard discussed his theory on injection of pancreatic proteolytic enzymes as a form of cancer therapy. Cancer cells, as well as nearly all pathogens, are often protected by a thick, protein-based, fibrin coating. Proteolytic enzymes have the ability to assist in the breakdown of this fibrin coating, allowing the body's immune functions to take action against proliferating cancer cells. Although the original research was conducted almost a century ago, the use of proteolytic enzymes is being used as a new and innovative way to combat cancer.

### *Resources*

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