

Digestive Enzymes

See also: Bromelain

What do they do? Digestive enzymes—also called pancreatic enzymes—include three classes of enzymes: proteolytic enzymes needed to digest protein, lipases needed to digest fat, and amylases needed to digest carbohydrates. In several conditions that cause malabsorption, such as pancreatic insufficiency and cystic fibrosis, doctors sometimes prescribe digestive enzymes to improve absorption of food.

Nutritionally oriented doctors often tell people to try using pancreatic enzymes with meals when they have symptoms of indigestion that cannot be attributed to a specific cause. Research has not explored whether this use of enzymes is helpful.

According to one theory, allergies are triggered by partially undigested protein, while proteolytic enzymes reduce allergy symptoms.¹ Limited scientific evidence supports this theory.² Proteolytic enzymes such as trypsin, chymotrypsin, and bromelain are partially absorbed by the body.^{3 4 5} Once absorbed, they have anti-inflammatory activity and may even demonstrate antitumor effects.^{6 7 8 9} Proteolytic enzymes may also improve immune system function, for example, in people with shingles (herpes zoster), though this area of research has been poorly explored.¹⁰

Where are they found? 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 pineapples and is useful in many conditions; papain comes from unripe papayas. All of these enzymes are available as supplements.

Who is likely to be deficient? People with pancreatic insufficiency and cystic fibrosis frequently require supplemental pancreatic enzymes (which include proteolytic enzymes, lipases, and amylases). In addition, those with celiac disease, Crohn's disease, and perhaps indigestion may be deficient in pancreatic enzymes.¹¹ As bromelain and papain are not essential, deficiencies do not exist.

How much is usually taken? 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 United States Pharmacopeia (USP). For example, “4X 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). A dose of 3–4 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.¹²

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

Are there any side effects or interactions? The most important digestive enzymes in malabsorption diseases are usually fat-digesting enzymes called lipases. Proteolytic enzymes can digest lipases; therefore, people with enzyme deficiencies may want to avoid proteolytic enzymes in order to spare lipases.¹³ 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 traveled through the digestive system.

Fortunately, that does not happen with supplemental amounts. Research has not determined the level at which such problems might arise.

Digestive enzymes should not be taken with betaine HCl, or hydrochloric acid, which breaks down enzymes, reducing their activity.

References:

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