

Over-the-Counter Enzyme Supplements: What a Clinician Needs to Know

Jithinraj Edakkanambeth Varayil, MD; Brent A. Bauer, MD;
and Ryan T. Hurt, MD, PhD

CME Activity

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Abstract

Over-the-counter (OTC) enzyme use is increasing in frequency in the United States. The numerous health benefit claims by manufacturers are leading to a surge in enzyme use for various conditions and symptoms. Clinicians need to help patients navigate this complex realm and make informed decisions about the use of OTC enzymes. This review focuses on key concepts for health care providers to understand the current evidence, risks, and benefits of OTC enzymes.

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During clinical encounters, patients often inquire about the use of dietary enzyme supplements (also termed over-the-counter [OTC] enzymes) to relieve symptoms. The Dietary Supplement Health and Education Act of 1994 classified OTC enzymes as dietary supplements, which specifically exempts manufacturers from having to prove the safety or efficacy of a product as long as it does not claim to prevent, treat, or cure a specific disease.¹ Despite these restrictions, manufacturers market OTC enzymes as

being effective for inflammatory disorders, multiple sclerosis, pancreatic insufficiency, allergies, burns, infections, and cancer. The popularity of these OTC enzymes is demonstrated by increased US sales in the past few years.² Nevertheless, the quality of dietary supplements has been a cause for concern and has led to the dismissal of these supplements by physicians. The purpose of this review was to summarize the current evidence for the use of OTC enzymes in various disease states, equipping clinicians to have the conversation with the patient.



From the Division of General Internal Medicine (J.E.V., B.A.B., R.T.H.), Division of Gastroenterology and Hepatology (R.T.H.), and Division of Endocrinology, Diabetes, Metabolism, and Nutrition (R.T.H.), Mayo Clinic, Rochester, MN.

WHAT ARE OTC ENZYMES?

Most clinicians are familiar with prescription pancreatic enzyme products that are used to treat pancreatic insufficiency, such as protease, pancrelipase, and pancreatic amylase. However, some enzymes are sold directly to consumers, including bromelain, papain, trypsin, and chymotrypsin, as well as numerous combination products (Table 1). Bromelain is a group of proteolytic enzymes derived from the stem and fruit of the pineapple (*Ananas comosus*).³ Taking oral bromelain combined with trypsin and rutin may improve the symptoms of osteoarthritis (OA). The papaya fruit (*Carica papaya*) contains several proteolytic enzymes (papain, chymopapain A, chymopapain B, and papaya peptidase A)³ and is mainly used in wound débridement. Over-the-counter trypsin is typically produced from bacterial, fungal, or porcine sources.³ Similar to papain, it is also used conventionally to aid in wound débridement (topical). As a supplement, most chymotrypsin is produced from bovine or porcine sources. Some evidence suggests that chymotrypsin might decrease tissue destruction in burn patients. Oral chymotrypsin seems to be effective for reducing the inflammation and edema associated with hand fractures.⁴ Enzymes derived from plant sources are touted as remaining active over a broader pH range, whereas animal-derived enzymes function in a narrower pH range. This wider pH range may protect plant-based enzymes from being degraded in the acidic environment of the stomach. Information about some of the more commonly used OTC enzymes, including dosage and adverse effects, are presented in Table 2.

MECHANISM OF ACTION OF OTC ENZYMES

The mechanism of action of OTC enzymes is not entirely clear as there are a number of studies demonstrating both pro-inflammatory and anti-inflammatory effects. The constituent of bromelain interferes with the growth of malignant cells and inhibits platelet aggregation. Animal studies suggest that it helps reduce

inflammation and edema and has fibrinolytic activity.⁵ Some evidence suggests that papain can increase the release of reactive oxygen species by polymorphonuclear cells.³ Multi-enzyme preparations also seem to induce tumor necrosis factor (TNF) α , interleukin (IL)-1 β , and IL-6 in a time- and dose-dependent manner.⁶ The main mechanism of trypsin is its proteolytic activity, especially in wounds.³ Chymotrypsin has ingredients with proteolytic, anti-inflammatory, and antioxidant activities that reduce tissue destruction.³

Does Enzyme Production Decrease With Aging and Can OTC Enzymes Help?

One of the main theories advocated by OTC enzyme proponents is that with age, natural enzyme production decreases and enzyme supplementation, therefore, becomes essential. However, enzyme production does not inherently decrease with age. For example, levels of amylin, a peptide hormone released from the endocrine pancreas, decrease in middle age but then increase in older age. Amylin has been implicated in appetite regulation because it is a potent anorectic agent when administered peripherally in rats. Increased amylin levels in older age suggests that it may contribute to anorexia of aging and delayed gastric emptying.⁷ No evidence indicates that exocrine pancreatic secretions decrease with age. Evidence supporting OTC enzyme supplementation in older patients is lacking.

Do OTC Supplements Help Digestion in Healthy Adults?

Although enzyme supplementation for patients with documented pancreatic insufficiency is well established,⁸ a recently growing trend is the use of supplemental enzymes to aid digestion in individuals with no obvious pancreatic pathology. Proponents suggest that common symptoms, such as gas and bloating, may indicate a relative deficiency of digestive enzymes that can be overcome with oral supplementation. A commonly cited study describes healthy participants who were given enzyme supplements (containing lipase, protease, and amylase) before and after a fatty meal and reported significantly less gas, bloating, and fullness than controls.⁹ However, the pancreatic supplement used (Creon 10; Solvay Pharmaceutical Inc) was a prescription enzyme product. Thus, the

TABLE 1. Common Claims About Over-the-Counter Enzymes by Their Manufacturers

- "Enzymes: The Brawn Behind Better Digestion"
- "Proteolytic Enzymes—A Potential Cure for Arthritis"
- "Enzymes for Cancer: Low Enzymes Are Always Found in Cancer ..."
- "How Systemic Enzymes Work to Cure Diseases"

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