

# Enzyme Therapy for Malabsorption

Enzymes are made naturally in the pancreas and secreted into the small intestine to help break down protein, fat and carbohydrate in food. In some patients enzyme secretion is limited, causing malabsorption of food due to:

- **Surgery side-effects or inflammation of pancreatic ducts**
  - Pancreatitis or pancreatic cancer
- **Changes in signals to the pancreas** due to altered GI “geography”
  - Some gastric or esophageal cancers; other GI surgeries

## Signs and symptoms of malabsorption may include:

- Foul smelling stools, also called steatorrhea
  - The result of malabsorbed fat, the most diagnostic sign
- Weight loss, when calories are not effectively absorbed
- Bloating, gas and abdominal pain
  - When the bacteria in the lower GI tract metabolize the “picnic” of food that is now available to them
- Oily stools that often float on the surface in the stool basin
- Diarrhea

## Pancreatic Enzyme Therapy

Prescription enzymes are a mixture of lipase (digesting fats), amylase (digesting carbohydrates) and protease (digesting proteins). There are several companies that produce enzymes and each offers several different strengths of capsules.

### Enzyme Names/Brands

Enzyme names typically have numbers following, indicating their strength as thousands of units of lipase in the capsule. When the brand name is alone, it reflects the lowest strength, containing 4,000 to 4,500 units in a capsule.

- Pancrearb MS 4 (000), 8 (000), or 16 (000)
  - Microspheres (MS) are used to increase surface area/efficacy
- Creon 10 (000), 20 (000). Creon also uses microspheres
- Pancrease MT 10 (000), 20 (000)
  - Pancrease is delivered in larger microtabs (MT)
- Ultrase 12 (000), 18 (000); Ultrase also uses microtabs

Due to wide variations in formulation, dosage and potency, the FDA now is requiring that all prescription enzymes undergo studies in order to obtain FDA approval by 2008. There has been significant variability in response to enzymes, particularly when generics were used.

**Enzyme Effectiveness** can be impacted by several factors which include:

- **pH balance** in the upper GI tract. Acid from the stomach keeps the typical pH at 6 -7 when the pancreas is not secreting bicarbonate normally. Enzymes work best at 9.0, so some doctors will add a proton pump inhibitor (PPI) to lower acid production by the stomach.
  - Pancrecarb enzymes have added bicarbonate, raising the local pH into a more effective zone without a PPI.
- **Enteric coating** of the enzyme tablets or spheres is needed to allow them to survive the stomach in adequate amounts. With the exception of Viokase, the first enzyme produced, almost all prescription enzymes are enterically coated. Lack of this coating is one reason that over the counter forms can be less effective.

### **Dosing of Pancreatic Enzymes**

Finding the right dose involves starting at a low level and increasing it gradually if symptoms remain. 500 to 4,000 units of lipase are recommended for every gram of fat, but in practice dosing by weight (thus calories, assuming a certain percentage of fat) is far easier for patients.

- Start with 1,000 units of lipase per kilogram of weight per day
  - 60 kg = 60,000 units of lipase through the day
  - Divide by four = 15,000 units/meal; 8,000 units/snack
- Enteric coated forms can be opened, put into non-dairy, acidic, soft foods
  - Do not chew or crush the capsule
  - Talk to your dietitian about ways to add them for tube feedings
- **Adjust doses as needed if symptoms improve but persist**
  - Suboptimal = a baby aspirin for migraines
  - Upper doses should be kept at 2,500 mg/kg/MEAL
    - = 10 times the starting dose; rarely needed for GI patients
- **Consistency is critical!**
  - **Take them with anything with fat or protein you want absorbed, *including with oral supplements***
  - Meals especially high in fat will need a higher dose, at that meal

### **Few side effects**

- Constipation can occur at too high a dose
- Allergic reactions can occur with allergies to pork
- Lipase may reduce the effectiveness of two oral diabetic meds: acarbose (Precose) and miglitol (Glyset)

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