



Pancreatic Enzyme Replacement Therapy (PERT)

What are pancreatic enzymes?

Pancreatic enzymes help digest fat, protein, and carbohydrates in the food you eat. However, diseases that affect the pancreas such as cancer of the pancreas, pancreatitis, cystic fibrosis, or surgeries that involve the pancreas, may block the release or reduce the amount of digestive enzymes made by the pancreas.

Without enough pancreatic enzymes, the foods you eat won't be fully digested and you won't absorb all the nutrients and calories available from them. This is sometimes called malabsorption, meaning you aren't absorbing all your nutrition, and can contribute to weight loss.

Symptoms of malabsorption can include:

- Gas.
- Bloating.
- Loose stools.
- Diarrhea.
- Pain after eating.
- Weight loss due to malabsorption.

When the fat in foods is not digested it can cause fatty stools, also known as steatorrhea. Symptoms of steatorrhea include:

- Light brown stools.
- Loose, oily stools that can be difficult to flush.
- Foul smelling stools.

What is pancreatic enzyme replacement therapy and how does it work?

Pancreatic enzyme replacement therapy is the use of medications that contain enzymes to replace what the pancreas is no longer making or releasing. These medications contain proteases to digest protein, amylases to digest carbohydrates, and lipases to digest fat. Digestion of protein, carbohydrates, and fats helps prevent malabsorption. The medications break down in your small intestine to help you digest and absorb nutrients from your food.

Guidelines on Dosing Pancreatic Enzymes

The dosing for these medications is based on the units of lipase in the capsules. The average dose strength is 24,000 to 36,000 lipase units per capsule. Children and people eating small amounts of food need lower doses, while adults are usually prescribed doses greater than 20,000 lipase units per capsule.

Your medical team will tell you the number of capsules you should take. Most adults take 2-3 capsules with a regular-sized meal and 1-2 capsules with small meals and snacks. You may need to start with a smaller dose and slowly increase it – this is called titrating up. Your care team may tell you to change the number of capsules you take based on the symptoms you are having and the level of enzymes in your body. Dosing is

personalized to you, and you may need to change your dose at times. Your care team will monitor you and change your dose if needed.

Formulas for Calculating Pancreatic Enzyme Doses

These are other ways to calculate dosing for adults and older children:

Dosing based on weight:

- 2,500 lipase units x weight in kilograms for a standard meal
- e.g. for 150 lb. / 68 kg person x 2,500 lipase units = 170,000 lipase units for a standard meal
- (about 7 capsules of the 25,000 lipase unit capsules)

Based on grams of fat eaten:

- 500 - 5,000 lipase units/g of fat/meal
- Consult with your dietitian on how to adjust enzymes based on the amount of fat consumed per meal. When dining out and consuming high fat meals, you may need to adjust your enzyme dosing accordingly.

Source: Cystic Fibrosis Foundation Clinical Care Guidelines: <https://www.cff.org/Care/Clinical-Care-Guidelines/Nutrition-and-GI-Clinical-Care-Guidelines/Pancreatic-Enzymes-Clinical-Care-Guidelines/>

How to Take Pancreatic Enzyme Replacement Medications

They should be taken with your first bite of food. You should swallow the capsules with cold or room temperature liquids. You should not take them with hot beverages because high temperatures can affect the enzymes and stop them from working. Do not chew or crush the capsules as they can hurt your mouth. The capsules can be large and sometimes hard to swallow. If you are having trouble swallowing the capsules, you can:

- Ask for lower dosed capsules, which are smaller. However, you will need to take more capsules to get the same dose of enzymes.
- Open the capsules and mix the enzymes with a little applesauce or other acidic foods (mashed banana or baby food fruit purées). Swallow it right away and then drink some fluid. You should not keep the enzymes in your mouth and make sure they are fully swallowed.

Timing the enzymes with your meals and snacks is important. Take the capsules with the first bite of food. The capsules have an enteric coating that dissolves (breaks down) in the small intestine, releasing the enzymes and allowing them to aid in digesting the nutrients you are about to eat. If you eat a large meal that takes longer to eat or you are a slow eater, you can take half of your dose at the start of the meal and the rest halfway through your meal. Meal replacement drinks (Ensure®, Boost®), protein drinks, smoothies, and shakes must also be taken with enzymes. You may find that you need more enzymes with fatty foods.

The only foods you can eat and not take enzymes are fruit juice and fruit (fresh and dried fruit) when eaten alone. Also, you often do not need enzymes when “nibbling” on very small, bite-sized snacks or drinking beverages to which you added a very small amount of milk or creamer.

Taking the enzymes allows you to eat any foods you want because they help digest foods that you may have had problems eating, such as fat. You should eat a broad diet, including foods high in protein and fat.

It is important to store the medication at room temperature and in a safe place. Avoid storing them in hot places such as cars. Carry enzymes in a small bag or container when away from home.

What if the PERT is not working?

Do not stop taking your enzymes if you keep having symptoms. Call your medical team for help and they may suggest increasing your dose. The amount of enzymes you need to digest your food may seem high, however, a normal pancreas releases 720,000 lipase units during a standard meal.

If you have nausea or other problems, you may want to try another enzyme brand. Sometimes the capsule coating can cause these problems. If the number of capsules you need is more than 4 capsules per meal, ask your medical team about changing your prescription. Some brands of enzymes have capsules that contain larger amounts of enzymes. If you switch to higher-dose capsules, you may be able to take fewer capsules with meals.

FAQ's

Can you take too many enzymes?

Very high doses of pancreatic enzymes can lead to a condition called fibrosing colonopathy, which can cause belly pain, distension (bloating/swelling), vomiting, and constipation. It is recommended that you not exceed 6000 lipase units for every kilogram of body weight per meal.

e.g. for 150 lb. / 68 kg person

$6000 \text{ lipase units} \times 68 \text{ kg} \times 1 \text{ meal} = 408,000 \text{ lipase units per meal}$

Are there programs that can help reduce the cost of the enzymes?

Most of the companies that make pancreatic enzymes have financial assistance programs that can help reduce the cost of your prescription. However, these programs are generally only available to people under 65 years who are not on Medicare. Information about these programs is posted on the brands' website. If the cost of the enzymes is a concern, discuss this with your medical team and the pharmacist in your cancer center.

What are the vitamin deficiencies associated with steatorrhea?

If you have steatorrhea (fatty stools), you may become deficient in fat-soluble vitamins (vitamins A, D, E, and K). There are special multivitamins that contain water-soluble versions of these vitamins. If you are concerned about potential vitamin deficiencies, discuss your concern with your medical team and ask for guidance on selecting a multivitamin. Some of the pancreatic enzyme brands offer these multivitamins for free through their patient assistance programs. For information, go to the brand's website.

Are there religious restrictions to PERT?

Pancreatic enzymes are extracted (taken) from the pancreas of a pig. Since some religions do not allow pork products, patients needing these medications may feel they cannot take them. However, most religions allow dispensation from this restriction when a medicine or food is needed for health purposes. Talk to your religious leader about receiving dispensation.

What about over the counter enzymes?

Digestive enzymes available in health food stores generally do not contain any lipase, protease, or amylase, and if they do, they have very low amounts. They generally contain plant enzymes. As with other OTC supplements, they are not required to meet standards for safety and standardization on dosing.

Who do I go to for help with questions about diet, managing symptoms, and general issues regarding pancreatic enzymes?

In addition to your doctors and nurses, the Registered Dietitian Nutritionist at your cancer center can help you with your pancreatic enzyme medication concerns. They can also help you with other nutrition and diet related problems. Contact your medical team for a referral to their dietitian.

Resources for More Information

Helpful information on symptom management, dosing guidelines, and financial assistance programs are available on the websites for the pancreatic enzyme brands.

- Creon: <https://www.creon.com/>
- Pancreaze: <https://www.vivus.com/our-products-and-pipeline/americas/>
- Pertzye: <https://www.pertzye.com/>
- Zenpep: <https://www.zenpep.com/>

OncoLink is designed for educational purposes only and is not engaged in rendering medical advice or professional services. The information provided through OncoLink should not be used for diagnosing or treating a health problem or a disease. It is not a substitute for professional care. If you have or suspect you may have a health problem or have questions or concerns about the medication that you have been prescribed, you should consult your health care provider.