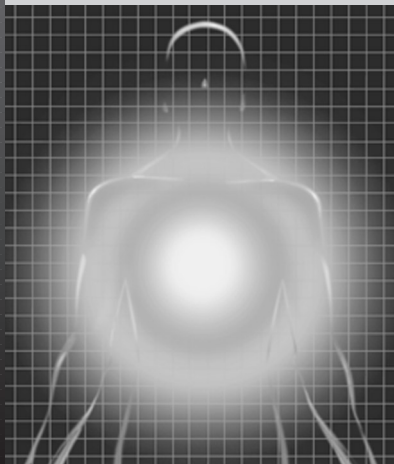


Ask DR. MURRAY



Michael T. Murray, ND is widely regarded as one of the world's leading authorities on natural medicine. He is a graduate and faculty member of Bastyr University in Seattle, Washington, and also serves there on the Board of Trustees. Dr. Murray is an accomplished writer, educator and lecturer. He is the author of over 20 books, including co-author of *How to Prevent and Treat Cancer with Natural Medicine* and is the Director of Product Development and Education for Natural Factors.



What are Proteolytic Enzymes?

Proteolytic Enzymes in Cancer Therapy

written by Dr. Michael T. Murray

Proteolytic enzymes (or proteases) refer to the various enzymes that digest (break down into smaller units) protein. These enzymes include the pancreatic proteases chymotrypsin and trypsin, bromelain (pineapple enzyme), papain (papaya enzyme), fungal proteases, and Serratia peptidase (the "silk worm" enzyme).

Proteolytic enzymes have a long history of use in cancer treatment. In 1906, John Beard, a Scottish embryologist, reported on the successful treatment of cancer using a pancreatic extract in his book *The Enzyme Treatment of Cancer and its Scientific Basis*. Proteolytic enzymes have been promoted by numerous alternative cancer practitioners for many years, but most recently by Nicholas Gonzalez, M.D., who is evaluating the benefit of proteolytic enzymes in patients with advanced pancreatic cancer in a large-scale study, funded by the National Institute of Health's National Center for Complementary and Alternative Medicine, with collaboration from the National Cancer Institute. This larger trial is a follow-up to a smaller study that showed dramatic improvements in these patients.¹



What clinical research has been done with proteolytic enzymes?

The clinical research that currently exists on proteolytic enzymes suggests significant benefits in the treatment of many forms of cancer.² Specifically, these studies have shown improvements in the general condition of patients quality of life, and modest to significant improvements in life expectancy. Studies have consisted of patients with cancers of the breast, lung, stomach, head and neck, ovaries, cervix, and colon; and lymphomas and multiple myeloma. These studies involved the use of proteolytic enzymes in conjunction with conventional therapy (surgery, chemotherapy and/or radiation) indicating that proteolytic enzymes can be used safely and effectively with these treatments.



Are proteolytic enzymes actually absorbed?

Yes. One of the outdated arguments against the effectiveness of orally administered proteolytic enzymes was that they either got digested or they were too large to be absorbed. Absorption studies with the various proteolytic enzymes have confirmed that they are absorbed intact. In fact, they appear to be actively transported across the gut wall.

Since stomach acid can destroy pancreatic enzymes, most pancreatin products are "enteric coated" – meaning that the pills have a coating around them to prevent the pill from being broken down in the stomach. An enteric-coated pill passes into the small intestine where, due to the pH change, it will break down there.



How do proteolytic enzymes work to fight cancer?

Once absorbed the body prevents digestion of proteins in the blood and other body tissues by producing anti-proteases. The production of these anti-proteases is critical to the mechanism of action of proteolytic enzymes. These antiproteinases block the invasiveness of tumor cells as well as prevent the formation of new blood vessels (angiogenesis). Proteolytic enzymes exert a number of other interesting anticancer mechanisms including the inhibition of metastasis (the spread of cancer) and the enhancement of the immune response.



What about the safety of proteolytic enzymes?

Proteolytic enzymes have an excellent safety profile, but there are situations in which they should not be used. For example, as the effects of proteolytic enzymes during pregnancy and lactation have not been sufficiently evaluated, they should not be used during these times unless directed to do so by a physician.

Although no significant side effects have been noted with any of the proteolytic enzymes, allergic reactions may occur (as with most therapeutic agents). Pancreatic enzymes should not be used by anyone allergic to pork; bromelain should not be used in anyone allergic to pineapple; and papain should not be used by anyone sensitive to papaya.

Clinical studies of proteolytic enzymes patients receiving chemotherapy²

Diagnosis	Study design	Number of patients	Medication	Duration of therapy	Effects of enzyme therapy
Inoperable lung cancer	Prospective randomized	26 vs. 25	Fluorouracil, vinblastine, cyclophosphamide vs. this combination plus enzymes	12 months	Improvement in general condition & quality of life, some improvement in life expectancy, fewer side effects
Gastric cancer	Prospective open	76 vs. 80 vs. 89	Mitomycin, fluorouracil, cytarabine vs. picibanil vs. picibanil plus enzymes	6-12 months	Increase in the ratio of T lymphocytes to total lymphocytes
Ovarian cancer	Prospective, randomized, placebo-controlled	23 vs. 36	Carboplatin, epirubicin, prednimustine plus placebo vs. plus enzymes	6 months	More rapid fall in tumor enzymes
Multiple myeloma	Retrospective parallel group cohort	99 vs. 166	Multicombination chemotherapy vs. plus enzymes	At least 6 months	Survival of patients with stage II multiple myeloma increased by 36 months
Colon cancer	Prospective, randomized, double-blind, placebo-controlled	30 vs 30	Fluorouracil + levamisole vs. plus enzymes	2-45 months	Reduction in adverse effects of chemotherapy, fewer patients with metastasis, and more patients surviving > 42 months
Colon cancer	Retrospective parallel group cohort	99 vs. 166	Combination chemotherapy vs. plus enzymes	Up to 83 months	3-year increase in survival time in patients with stage III colon cancer



What is the proper dosage for proteolytic enzymes?

Because the animal and vegetarian-derived enzymes have slightly different effects, I recommend using the combination of enzymes given above for maximum benefit. Begin by taking one tablet 20 minutes before meals three times daily for one week; then increase to two tablets three times per day for another week; until reaching the dosage of three tablets three times per day. For maintenance, take one tablet three times daily.



Can proteolytic enzymes be used along with conventional cancer treatments?

Yes. There does not seem to be any contraindication with chemotherapy or radiation. Proteolytic enzymes are not recommended for 2-3 days before or after a surgery as they may increase the risk of bleeding. Proteolytic enzymes have been shown to be quite helpful in relieving a complication of surgery and radiation known as lymphedema.



What proteolytic enzyme product do you recommend?

In order to get the most out of proteolytic enzymes it is essential to use a high quality product at an adequate dosage. To judge the quality of an enzyme preparation it is important to know what you are looking for. Most of the proteolytic enzymes have well established guidelines developed by the United

States Pharmacopoeia (USP) or the Food Chemical Codex (FCC). The product that I recommend, Zymactive™ by Natural Factors, contains the following ingredients per enteric-coated tablet.

Pancreatin (8X)	200 mg
Papain (30,000 USP)	120 mg.
Peptizyme SP (200,000 SPU)	52 mg.
Bromelain (1,200 M.C.U.)	50 mg.



What is pancreatin?

Pancreatin refers to pancreatic enzyme preparations prepared from fresh hog pancreas. The two primary proteases of pancreatin are chymotrypsin and

trypsin (also available from ox bile). These proteases are also available separately or in combination with pancreatin.



Can vegetarian proteolytic enzymes produce the same results as pancreatin?

Yes. In fact, vegetarian multi-enzyme formulas may prove to be more effective because they possess an unusually high stability and activity under a broader range of pH conditions. For example, pepsin is active only below a pH of about 4.5 while pancreatin has digestive activity only in an alkaline medium. In contrast, some preparations of vegetarian proteolytic enzymes are stable and active at pHs of 2 through 12.



What is Peptizyme SP?

Peptizyme SP is an enzyme derived from a bacteria that resides in the intestines of silk worms. It is also called "silk worm" enzyme as it is the enzyme used to breakdown the cocoon of the silk worm. It is more powerful and broader pH stability than the pancreatic enzymes chymotrypsin and trypsin and it has been used in Europe and Japan for over 25 years. Good clinical research support with positive results in inflammation models; post-surgical swelling; carpal tunnel syndrome; thrombophlebitis; and ear, nose, and throat disorders.

Clinical studies of proteolytic enzymes in patients receiving radiation therapy²

Diagnosis	Study design	Number of patients	Duration of therapy	Effects of enzyme therapy
Abdominal cancer	Prospective randomized	32 vs. 25	2-44 weeks	Delay in appearance of metastases, reduction in tumor size
Oral cancer	Open randomized	20 vs. 19	5 weeks	Shorter duration of radiation side effects
Head and neck cancers	Prospective randomized	47 vs. 53	At least 7 weeks	Significant reduction in mouth sores, difficulty in swallowing, and skin reactions
Cervical cancer	Prospective randomized	60 vs 60	Not more than 10 weeks	Significant reductions in radiation-induced side effects

References

1. Gonzalez NJ and Isaacs LL: Evaluation of pancreatic proteolytic enzyme treatment of adenocarcinoma of the pancreas, with nutrition and detoxification support. *Nutr Cancer* 1999;33:117-24.
2. Leipner J and Saller R: Systemic enzyme therapy in oncology: effect and mode of action. *Drugs*. 2000;59:769-80.