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Do Pancreatic Enzymes Help in Cancer? Pilot Study Reports That They Do

The use of pancreatic proteolytic enzymes in cancer treatment, first proposed by a Scottish scientist in 1906, has long been dismissed as an unproved alternative therapy. The rationale was that pancreatic (or digestive) enzymes were the body's principal defense against cancer.

Now, in an article in the respected journal *Nutrition and Cancer*, Nicholas J. Gonzalez, MD, and Linda Lee Isaacs, MD, of New York City, describe the dramatic improvements in life expectancy among a group of cancer patients given supplemental pancreatic enzymes.

The 11 patients in the pilot study had been diagnosed with pancreatic cancer, which is usually rapidly terminal. Only about 25 percent of pancreatic cancer patients survive a full year after diagnosis, and only 10 percent survive two years. Less than 1 percent of patients live five years after diagnosis.

"As of 12 January 1999, of 11 patients entered into the study, 9 (81%) survived one year, 5 (45%) survived two years, and at this time 4 [36%] have survived three years. Two patients are alive and doing well: one at three years and the other at four years," Gonzalez and Isaacs wrote.

Each of the patients was placed on a diet that emphasized fresh raw fruits, raw and steamed vegetables, and fresh vegetable juice. The diet included plant sources of protein, including cereals, nuts, seeds, and whole-grain products; one or two eggs daily; whole milk or yogurt; and fish several times a week, but no red meat or poultry.

Patients also took supplements of vitamins and minerals in a "supportive, not an anticancer, role," as well as 25-40 grams of pancreatic enzymes in capsule form. "Each cancer patients typically ingests a total of 130-160 capsules/day, taken with and away from meals," Gonzalez and Isaacs wrote. "The products used in the program are available as food substances or dietary supplements and do not require a prescription."

One of the long-term surviving patients is a 62-year-old woman who underwent a mastectomy for breast cancer in 1982. In 1995, she was diagnosed with pancreatic cancer, and Gonzalez began treating her in 1996. "She is completely asymptomatic at three years

from diagnosis and remains very compliant with her protocol," the authors wrote.

Gonzalez and Isaacs noted that 13 patients who decided not to follow the therapy provided an informal control group. "Of the 12 patients in this group we could track, the mean survival was 4.3 months (range 2-7.5 months), consistent with the usual survival for the disease," they wrote.

Reference: Gonzalez NJ and Isaacs LL, "Evaluation of pancreatic proteolytic enzyme treatment of adenocarcinoma of the pancreas, with nutrition and detoxification support," *Nutrition and Cancer*, 1999;33:117-124. □

Vitamin E Supplements Reduce Diabetic Complications

High-doses of natural vitamin E can improve kidney function and blood flow in the eyes, according to a study by researchers at the Harvard Medical School and the Joslin Diabetes Center, Boston.

George L. King, MD, and his colleagues gave either 1,800 IU of vitamin E or a placebo to 36 Type 1 (insulin-dependent) diabetics and nine nondiabetic subjects for four months. The treatments were then crossed over, so each participant took vitamin E and placebo for four months during the eight-month study. The subjects included both men and women, ranging in age from 18 to 45 years.

At the start, the average retinal blood flow in the diabetics was 17.3 percent below normal and creatinine clearance (an indicator of kidney function) was 11 percent above normal. Diabetics have a very high risk of developing eye and kidney disease.

"After vitamin E treatment, diabetic patient retinal blood flow was significantly increased and was comparable with that of nondiabetic subjects," King and his colleagues wrote. "Additionally, vitamin E treatment significantly normalized elevated baseline creatinine clearance in diabetic patients."

The most significant improvements occurred in diabetics with the most serious problems with glucose control, retinal blood flow, and kidney function. The researchers noted that there were no significant changes in glycemic control among the diabetics, all of

Continues on next page

whom had been diagnosed with Type 1 diabetes during the previous ten years.

"Vitamin E is a low-cost and readily available compound associated with few known side effects; thus, its use could have a dramatic socioeconomic impact..." the researchers wrote.

Reference: Bursell S-E, Clermont AC, Aiello LP, et al., "High-dose vitamin E supplementation normalizes retinal blood flow and creatinine clearance in patients with type 1 diabetes," *Diabetes Care*, 1999;22:1245-1251. □

High Vitamin E Intake May Help Maintain Memory in the Elderly

People who maintain high blood levels of vitamin E are more likely to have good memories as they age, researchers report.

Anthony J. Perkins, PhD, of the Regenstrief Institute for Health Care, Indianapolis, and his colleagues analyzed data from the Third National Health and Nutrition Examination Survey (NHANES III). They studied 4,809 black, white, and hispanic subjects over age 60. All of the subjects had provided blood samples for measurement of their antioxidant levels and dietary information, as well as undergoing memory tests.

Perkins found that people with the highest blood levels of vitamin E, relative to their cholesterol levels, had the best memories. People with low vitamin E relative to high cholesterol levels, had poorer memories.

"Increasing levels of vitamin E were associated with better memory performance for this ethnically diverse elderly population," Perkins and his colleagues wrote.

In addition, people who ate poor diets or skipped meals also had greater memory problems. The researchers failed to find a relationship between vitamins A and C and beta-carotene with memory.

Reference: Perkins AJ, Hendrie HC, Callahan CM, et al., "Association of antioxidants with memory in a multiethnic elderly sample using the third national health and nutrition examination survey," *American Journal of Epidemiology*, 1999;150:37-44. □

Lutein May Reduce the Risk of Developing Cataracts

Diets high in lutein and zeaxanthin reduce the risk of developing cataracts, according to a brief report by researchers at the University of Massachusetts, Amherst.

Lisa Chasan-Taber, PhD, and her colleagues analyzed the dietary habits and incidence of cataract-extraction surgery among 77,466 women in the Nurses

Health Study. Over 12 years of follow up, 1,471 cases of cataract surgery were reported.

After reconciling other risk factors for cataract, such as age and smoking, Chasan-Taber noted that women with the highest intake of lutein and zeaxanthin had a 22 percent decreased risk of cataract extraction, compared with women who consumed low levels of these nutrients.

"Lutein/zeaxanthin and foods rich in these carotenoids may decrease the risk of cataracts severe enough to require extraction," Chasan-Taber and her colleagues wrote.

In addition to her findings related to lutein and zeaxanthin intake, Chasan-Taber also found that intake of spinach and kale were also associated with a moderate decrease in the risk of cataracts. Both of these foods are high in lutein.

Lutein and zeaxanthin are carotenoids that are increasingly being recognized for their role in reducing the risk of macular degeneration and retinitis pigmentosa.

Reference: Chasan-Taber L, Willett WC, Seddon MJ, et al., "A prospective study of carotenoid and vitamin A intake and risk of cataract extraction among U.S. women," *American Journal of Epidemiology*, 1999;149:S32 (Abst #125). □

Beta-Carotene Supplements Ease Asthmatic Symptoms

High doses of natural beta-carotene may reduce the severity of exercise-induced asthma attacks, according to a recent study.

Asthmatics run a high risk developing breathing problems when they engage in physical activities. Because some research indicates that free radicals promote asthmatic reactions, Ami Ben-Amotz, PhD, of Israel's National Institute of Oceanography, and his colleagues tested whether the antioxidant beta-carotene might ameliorate asthmatic reactions.

Ben-Amotz asked 38 asthmatics to exercise on a treadmill under laboratory conditions. At the start of the study, the subjects initially had an average decrease of at least 15 percent in their "forced expiratory volume in one second (FEV1) after running for a few minutes. FEV1 refers to the amount of air exhaled in one second, a standard measure of lung function.

Next, the subjects took 64 mg of natural beta-carotene, derived from *Dunaliella* algae, daily for seven days. They then repeated the same treadmill test.

Twenty of the 38 subjects, or 53 percent of them, had significant improvement in post-exercise breathing after taking the beta-carotene supplements for one week.

Of particular interest, this subgroup of 20 patients

initially had an average 25 percent decrease in the amount of air they could exhale after running on the treadmill. After taking beta-carotene, they had only an average 5 percent reduction in the amount of air they could exhale.

Another recent study found that vitamin C supplements could also reduce asthma attacks. According to Ben-Amotz, beta-carotene and vitamin C may help reduce asthmatic reactions by quenching free radicals.

"Physical activities are beneficial for asthmatic patients, and ingestion of certain antioxidants, such as vitamin C or beta-carotene may enable them to enjoy full participation in such activities," Ben-Amotz and his colleagues wrote.

Reference: Neuman I, Nahum H, Ben-Amotz A, "Prevention of exercise-induced asthma by a natural isomer mixture of b-carotene," *Annals of Allergy, Asthma and Immunology*, 1999;82:549-553. □

Vitamins Block Cancer-Promoting Effect of Male Hormones

Antioxidant vitamins may counter the cancer-promoting effect of male hormones, according to a study by researchers at the University of Wisconsin, Madison.

The study provides a detailed explanation of why vitamin E supplements appear to reduce the risk of prostate cancer.

Androgens, such as testosterone, are needed for the growth and development of the prostate, but they may also promote the growth of prostate cancer, according to an article by George Wilding, MD, and his colleagues in the *Journal of the National Cancer Institute*.

"We hypothesized that androgens contribute to prostate carcinogenesis by increasing oxidative stress. We further hypothesized that antioxidants reduce prostate cancer risk by modulating androgen effects on cellular processes," they wrote.

In the first part of their cell-culture experiment, Wilding and his colleagues exposed both androgen-dependent and nonandrogen-dependent prostate cancer cells to a synthetic form of testosterone. The hormone increased the activity of two DNA transcription factors, AP-1 and NF-kB, in androgen-dependent prostate cancer cells, a change associated with the growth of cancer cells. In addition, the testosterone increased free radical levels in the cells by 57 percent.

The testosterone had no effect on nonandrogen-dependent cancer cells.

In the second part of their study, Wilding added vitamins C and E to the cell cultures. These vitamins

blocked the activity of AP-1 and NF-kB and reduced free radical levels in the androgen-dependent prostate cancer cells.

Reference: Ripple MO, Henry WF, Schwarze ST, et al., "Effect of antioxidants on androgen-induced AP-1 and NF-kB DNA-binding activity in prostate carcinoma cells," *Journal of the National Cancer Institute*, 1999;91:1227-1232. □

Antioxidants Block Effects of Elevated Homocysteine

In recent years, researchers and physicians have recognized high blood levels of homocysteine as a risk factor for heart disease and stroke. The compound is formed during the breakdown of methionine, an essential amino acid, and normally should be converted back to methionine or to other useful biochemicals. When homocysteine levels remain elevated, the compound damages blood vessel walls and sets the stage for cholesterol deposits.

Several of the B vitamins, particularly folic acid, B6 and B12, play key roles in the metabolism of homocysteine and reducing its levels in the blood. A recent study indicates that vitamins E and C may also protect against the consequences of high homocysteine levels.

Francesco Nappo, MD, PhD, of the Institute of General Pathology and Oncology, Afragola, Italy, administered large doses of methionine to 20 men and women, which temporarily increased their blood homocysteine levels by 2.5 times. As a consequence, their blood also became more susceptible to clotting, and they had increased levels of "adhesion molecules," which promote an inflammatory process involved in heart disease.

One week later, Nappo gave the subjects 800 IU of vitamin E and 1,000 mg of vitamin C, followed by another high dose of methionine. Pretreatment with the vitamins blocked the changes induced by methionine and homocysteine and "normalized" the subjects' risk of heart disease.

In another phase of the study, Nappo found that endothelial function was also impaired when homocysteine levels were elevated. Impairment of endothelial cells, which form part of blood vessel walls, prevents blood vessels from periodically relaxing and increases the risk of heart disease. Again, supplemental vitamins E and C maintained normal blood vessel function.

Reference: Nappo F, De Rosa N, Marfella R, "Impairment of endothelial functions by acute hyperhomocysteinemia and reversal by antioxidant vitamins," *Journal of the American Medical Association*, 1999;281:2113-2118. □

Quick Reviews of Recent Research

• Tomatoes increase resistance to free radicals

Lycopene, the red carotenoid found in tomatoes, is a powerful antioxidant. Researchers fed a high-tomato diet to 10 women. Lymphocytes taken from the women showed them to suffer 42 percent less DNA damage after exposure to hydrogen peroxide.

Riso P, et al., *American Journal of Clinical Nutrition*, 1999;69:712-8.

• Vitamin E reduces risk in dialysis

In a study of 50 patients over two years, researchers tested a new type of dialysis machine in which the blood filters were coated with vitamin E. The patients benefited from lower levels of free radicals, lower levels of oxidized cholesterol, and less calcification of the aorta.

Mune M, et al., *Kidney International*, 1999;56 (Suppl 71): S126-S129.

• Vegetables may lower diabetes risk

In a study of 1,122 subjects, ages 40-64, researchers found that diets consistently high in vegetables were strongly associated with a low risk of adult-onset diabetes. People who regularly ate vegetables were 84 percent less likely to develop diabetes. The researchers noted that 4.5 percent of the subjects were diabetic, but had not previously been diagnosed, and that 16.8 percent had impaired glucose tolerance.

Williams DE, et al., *Journal of Clinical Epidemiology*, 1999;52:329-335.

• Zinc may protect against prostate cancer

The prostate contains the highest zinc levels of any tissue in the body, but zinc levels are very low in cancerous prostates. In a cell-culture study, researchers incubated prostate cancer cells with zinc. Zinc inhibited the growth of both hormone-sensitive and nonhormone-sensitive prostate cancer cells. The zinc interrupted the replication of new cancerous cells.

Liang JY, et al., *Prostate*, 1999;40:200-207.

• Carnitine helpful in heart failure

Researchers compared carnitine levels in 91 children with heart failure and 30 healthy children. Carnitine levels were significantly lower in the children with heart failure. Twenty-four of the 91 children were given carnitine supplements, and their health improved faster than those not given the supplement.

Ergur AT, et al., *Journal of Tropical Pediatrics*, 1999;45:168-169.

• Vitamin E eases side effects in runners

Marathon runners commonly suffer from gastrointestinal pain and internal bleeding after a race. Researchers asked 26 runners to take 1,000 IU of vitamin E daily for two weeks before a race; other runners took placebos. The group of runners taking vitamin E

developed fewer cases of abdominal pain. Fewer of the runners taking vitamin E also had blood in their stools, an indicator of gastrointestinal bleeding.

Buchman AL, et al., *Nutrition*, 1999;15:278-283.

• NAC and vitamin E may slow lung cancer growth

In a study with lung cancer cells, researchers found that both N-acetylcysteine and vitamin C reduced free radical oxidation and boosted glutathione levels. The effect of NAC and vitamin C was greater than either nutrient by itself. The researchers noted that the antioxidant effect would minimize the proliferation of lung cancer.

Vanisree AJ, et al., *Journal of Clinical Biochemistry and Nutrition*, 1999;26:1-8.

• Genistein may control lung cancer cells

Genistein, an antioxidant flavonoid found in soy, has been shown to reduce the proliferation of estrogen-dependent cancers. In cell studies with two different types of human lung cancer, researchers found that genistein inhibited cancer growth by inducing apoptosis (self-destruction). The effect was greater with higher doses of genistein.

Lian F, et al., *Nutrition and Cancer*, 1999;33:125-131.

• Alpha-lipoic acid reduces glucose levels

Alpha-lipoic acid, a naturally occurring antioxidant, has been shown to reduce nerve disorders in diabetics. In a study with diabetic rats, researchers found that supplemental alpha-lipoic acid reduced glucose, but not insulin levels. A large body of research suggests that it can improve insulin function and nerve damage in diabetics. The researchers concluded that alpha-lipoic acid worked by blocking glucose production.

Khamaisi M, et al., *Metabolism*, 1999;48:504-510.

• Vitamin B12 helpful in diabetic neuropathy

In a study of nine diabetics undergoing periodic dialysis, researchers found that vitamin B12 injections improved nerve function.

Kuawabara S, et al., *Internal Medicine*, 1999;38:472-475.

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