

The NUTRITION REPORTER™

Vol. 7 No. 1

THE INDEPENDENT NEWSLETTER THAT REPORTS VITAMIN AND MINERAL THERAPIES

January 1996

Tomato Sauces, Rich in Lycopene, May Reduce Risk of Prostate Cancer

Diets rich in tomato sauces appear to reduce the risk of prostate cancer, according to a Harvard Medical School study published last month. The most likely reason appears to be tomatoes' high content of lycopene, a red carotenoid related to beta-carotene.

In an ongoing study, Edward Giovannucci, MD, examined the dietary habits and health of 47,894 male health care professionals. Between 1986 and 1992, 812 of the men were diagnosed with prostate cancer. When Giovannucci analyzed 46 vegetables and fruits in the men's diets, he found four foods associated with a low risk of developing prostate cancer: tomato sauce (on spaghetti), pizza (with tomato sauce), tomatoes, and strawberries.

The men who ate the most of these foods were least likely to develop prostate cancer. Those who ate few tomato foods had the highest risk, according to Giovannucci's article in the *Journal of the National Cancer Institute* (Dec 6, 1995;87:1767-76).

Despite their red color, strawberries do not contain lycopene. Their inverse relationship to prostate may have been due to a statistical fluke or to some other nutritional component (such as a flavonoid).

Men who ate 10 or more servings of tomato foods weekly were 45 percent less likely to develop prostate cancer. Those who ate four to seven servings of tomato foods were 20 percent less likely to develop the disease.

Giovannucci's findings are consistent with other studies that

have reported a low incidence of prostate cancer in southern Mediterranean countries, including Italy and Greece, where tomato consumption is high.

Diets with abundant tomatoes cooked in oil—such as spaghetti sauce—were more readily absorbed than other forms of tomato. Pizzas and raw tomatoes were also protective against prostate cancer, but tomato juice was not.

The reason was twofold, according to Giovannucci. First, cooking broke down the tomatoes' cell walls, releasing more lycopene. Second, the oil enhanced absorption of the fat-soluble carotenoid. (It's possible that the oil in salad dressings enhances lycopene absorption with raw tomatoes.)

Other carotenoids, such as beta-carotene, did not affect the risk of prostate cancer, although they may very well influence the risk of other diseases. Dietary intake of vitamins C and E was not a factor in prostate

cancer either. Nor was vitamin A—the body does not convert lycopene to vitamin A.

Although tomatoes contain many other micronutrients, further analysis by Giovannucci strengthened the association between lycopene and low prostate cancer risk.

In general, men in this study had two times as much lycopene as beta-carotene in their blood, and lycopene is the most abundant carotenoid stored in the prostate gland. It is also a powerful antioxidant that can quench singlet-oxygen free radicals twice as efficiently as can beta-carotene.

Diets low in tomato provide virtually no lycopene. However, other studies have shown that blood levels of the nutrient increase dramatically within one day of eating a high-lycopene meal. They also decrease after a low-lycopene diet, suggesting that the nutrient is not stored in the body for long periods. □

Lycopene Protects Against Free Radicals, But Quickly Gets Used Up in the Process

Like a soldier who sacrifices himself to save others, lycopene seems to throw itself at free radicals to protect the body.

Judy D. Ribaya-Mercado, MD, of the USDA Human Nutrition Research Center on Aging at Tufts University, measured levels of lycopene and beta-carotene in the skin of healthy women before and after exposure to ultraviolet (UV) light comparable to sunlight.

Lycopene predominates in the testes and prostate, but both

carotenoids are found in the adrenal glands, liver, lung, pancreas, and fat.

The UV light did not affect beta-carotene levels in the skin, but the same UV exposure reduced skin lycopene levels 31 to 46 percent, according to an article in the *Journal of Nutrition* (1995;125:1854-9). "When skin is subjected to UV light stress, more skin lycopene is destroyed compared with beta-carotene, suggesting a role of lycopene in mitigating oxidative damage in tissues," Ribaya-Mercado wrote. □

Fish Oils Reduce Risk of Cardiac Arrest

Eating a 3-ounce serving of salmon once a week can dramatically cut your risk of suffering cardiac arrest. The fish is a rich source of essential omega-3 fatty acids, which are also documented to lower cholesterol levels and reduce abnormal clotting.

Cardiac arrest is not, however, caused by elevated cholesterol levels. It occurs after the electrical signals governing heart beats go awry, leading to spasms called ventricular fibrillation. About 250,000 people die from cardiac arrest each year in the United States.

David S. Siscovick, MD, MPH, of the University of Washington, compared 334 people who suffered cardiac arrest with 493 healthy people. Some of the patients or their surviving spouses were interviewed to assess how much fish was eaten during the month before cardiac arrest. In addition, blood specimens were obtained from 82 cardiac arrest patients and compared with 108 controls.

People who ate at least one fish meal rich in omega-3 fatty acids per week were only 50 percent as likely to suffer cardiac arrest as those who ate no fish at all, according to Siscovick's study in the *Journal of the American Medical Association* (Nov 1, 1995;274:1363-7).

Siscovick wrote that "the data suggest that when compared with no seafood intake, dietary intake of modest amounts of omega-3 fatty acids from seafood may reduce vulnerability to ventricular fibrillation and, thereby, reduce the risk of coronary heart disease mortality."

The strength of his finding was increased because Siscovick also used blood tests to compare omega-3 levels in the body. He measured omega-3 levels in the cell membrane of red blood cells, which are generally representative of other blood and heart cells.

High blood levels of omega-3 fatty acids were associated with a 50 percent decrease in the risk of cardiac arrest.

Herring, mackerel, and anchovies are also high in omega-3 fatty acids, which consist primarily of eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA). Albacore tuna contains about half the omega-3 fatty acids of salmon.

They are also found in sardines and other cold-water fish, as well as oysters and other shellfish.

Although the exact mechanism of why omega-3 fatty acids prevent cardiac arrest wasn't clear, it's possible that they help move electrolytes in and out of cells. These electrolytes—calcium, potassium, sodium and other minerals—control the electrical behavior of the heart. □

Acetyl-L-Carnitine Supplements Slow Progression of Alzheimer's Disease

A number of scientific studies have shown that carnitine, a nutrient consisting of two amino acids (lysine and methionine), may help slow the progression of Alzheimer's disease. The latest study, by Jay W. Pettegrew, MD, of the University of Pittsburgh School of Medicine, has confirmed its value.

Pettegrew and his associates gave 3 grams of acetyl-L-carnitine daily to seven probable Alzheimer's patients for one year. This form of the nutrient is the acetyl derivative of carnitine and is more potent than plain carnitine. It is involved in transporting fats into the cell, where they are burned for energy.

Five other probable Alzheimer's patients received a placebo, and 21 healthy patients were used as a control group. Tests to assess cognitive function were given to all the patients at six and 12 months, and a number of neurochemicals were also measured.

Although the acetyl-L-carnitine and the placebo groups had virtually identical cognitive scores at the beginning of the study, the acetyl-L-carnitine group ended the study with "significantly higher" scores. That was because they had maintained their cognitive function, whereas the placebo group had deteriorated, according to an article in *Neurobiology of Aging* (Jan/Feb 1995;16:1-4).

Pettegrew also monitored levels of phosphomonoesters and high-energy phosphates, which degrade in Alzheimer's. These neurochemical signs confirmed that the disease's progression slowed among patients taking acetyl-L-carnitine.

The findings are particularly significant in that the patients treated with acetyl-L-carnitine were older, and presumably more resistant to treatment, than the placebo group.

"These findings support the significance of membrane phospholipid changes in Alzheimer's disease and the ability of acetyl-L-carnitine to normalize these alterations," Pettegrew wrote. □

Books: New and Noteworthy

Order these books through your local book store or health food store.

Melatonin: Your Body's Natural Wonder Drug, by Dr. Russel J. Reiter and Jo Robsinon (Bantam, 1995, \$22.95). We give it □□□ .

Melatonin is more than just a hormone that regulates sleep. It enhances growth, boosts the immune system, and reduces the risk of heart disease and cancer. It's also a powerful antioxidant. This is the best of the recent crop of books on melatonin. By being easy to understand and providing 40 pages of references, the book is ideal for both physicians and consumers.

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Prenatal Zinc Leads to Healthier, Bigger Infants

Pregnant women who take prenatal supplements with zinc give birth to larger, healthier infants, according to a study conducted by the University of Alabama at Birmingham.

Zinc is an essential component of various proteins, hormones, and more than 200 enzymes in the body. Its deficiency is a well-documented cause of growth retardation and, in animal studies, of central nervous system deformities.

Robert L. Goldenberg, MD, and his colleagues gave 580 women a daily vitamin supplement containing vitamins and minerals with the exception of zinc. About half the group also received a daily 25 mg zinc tablet, and the other half got a

dummy pill identical in appearance to the zinc. The women, ages 13-44, were at high risk of delivering low birth-weight infants, and they began taking the supplements at the 19th week of pregnancy.

All of the infants born to mothers taking zinc weighed significantly more—an average of one-quarter pound—at birth. Head circumference was almost 0.16 inch larger in the zinc group as well, according to Goldenberg's study in the *Journal of the American Medical Association* (Aug 9, 1995;274:463-8). The increased weight is considered a sign of good health, and larger size heads are generally associated with greater intelligence. In contrast, low birth weight is often related to higher risk

of mental retardation and cerebral palsy.

Infants born to short, thin women—5-foot-4 and weighing under 110 pounds—seemed to benefit the most from the zinc. On average, they weighed almost a pound more than infants whose mothers did not receive zinc.

The women receiving zinc supplements also had fewer premature births. In addition, their babies were hospitalized for one day less and suffered fewer infections.

Goldenberg pointed out that prenatal vitamin formulas generally contain between 15 and 25 mg of zinc. He was not sure whether the optimal dose might be more or less. □

Antioxidant Supplements Very Safe

The most common antioxidant nutrients—beta-carotene and vitamins C and E—are extraordinarily safe at levels many times higher than the Recommended Dietary Allowance. That's the conclusion drawn by Harinder S. Garewal, MD, assistant director of cancer prevention and control at the University of Arizona's Cancer Center, Tucson.

These vitamins are widely consumed as dietary supplements for the prevention of cancer and heart disease. "Part of the attractiveness and acceptance of these agents undoubtedly relates to the fact that they are 'natural' substances, which are especially abundant in foods, such as fresh fruits and vegetables, that are associated with a 'healthy' diet," Garewal wrote in a review article in *Drug Safety* (1995;13:8-14).

Some of Garewal's key points were:

- Very high long-term beta-carotene consumption, 15-60 mg/day (25,000-100,000 IU) decreases vitamin E levels in the blood. Vitamin E supplements might reduce this effect.

- Excessive beta-carotene intake, from supplements or foods, will yellow the skin, but this is not toxic and it is completely reversible.

- Vitamin C does *not* interfere with vitamin B12—the idea that it does was the result of an analytical error.

- Vitamin C does *not* cause DNA damage.

- Ceasing vitamin C supplements probably does *not* result in any serious rebound scurvy.

- Vitamin E functions as an anticoagulant, but this may cause problems only if a person is already taking a blood-thinning drug, such as warfarin.

In conclusion, Garewal wrote that "it can be concluded that the so-called antioxidant nutrients, alpha-tocopherol [vitamin E], ascorbic acid and beta-carotene, are well tolerated and virtually free from toxicity, even when used in doses several-fold higher than the RDA....Furthermore, large sections of the population already supplement themselves, with no new serious toxicities having emerged as a consequence." □

Book Reviews...

Continued from page 2

Letters to My Patients, by Dr. Harlan Wright (Shallowater Press, 1996). □

Dr. Wright is getting on in years, and this book reflects on his use of nutritional medicine. It's folksy style makes it a good book for people new to vitamins, but it's far from comprehensive and lacks references.

Robert Crayhon's Nutrition Made Simple, by Robert Crayhon (M. Evans & Co., 1994). □□

Crayhon is a certified—and adept—nutritionist practicing in New York City, and this book provides an excellent overview of nutrition and the value of supplements for the average person. It also contains more than 500 references that might sway the more skeptical reader. □

Omega-3 fats and cancer

In a rat study, omega-3 fatty acids (fish oils) reduced the risk of colon cancer and the number of tumors. The researchers concluded that omega-3 fatty acids may help patients after colon cancer surgery. (Hendrickse CW, *Gastroenterology*, Aug 1995;109:431-9) □

Quick Reviews of Recent Research

The past year, 1995, was a banner year for medical journal articles on the health benefits of micronutrients. At times, THE NUTRITION REPORTER found itself trying to catch up with all the reports. For the next couple of months, we'll be providing brief summaries of some of the research. If you like this approach, drop us a note and let us know...and we'll make it a regular feature.

• Alpha-lipoic acid and cataracts

Researchers found that alpha-lipoic acid prevents the formation of cataracts in newborn rats. Alpha-lipoic acid is involved in cellular energy production. As a supplement, it functions as an antioxidant and enhances the production of endogenous antioxidants, including glutathione peroxidase.

Maitra I, et al., *Free Radical Biology & Medicine*, April 1995;18:823-9.

• Melatonin as an antioxidant

The hormone melatonin functions as a powerful antioxidant in the brain. It is more effective than glutathione in quenching hydroxyl radicals, the most dangerous type of free radical. Melatonin is also more efficient than vitamin E in neutralizing peroxy radicals, which damage fats.

Reiter RJ, *FASEB Journal*, April 1995;9:526-3.

• Free radicals and antioxidants

The body produces free radicals as a byproduct of normal metabolism and as a consequence of exposure to radiation and pollutants. These free radicals can damage cells and lead to many diseases. Antioxidants, found in fruits and vegetables, neutralize many free radicals. "In some pathologic conditions such as diabetes, and in critically ill patients, oxidative stress causes the level of antioxidants to fall below normal. Antioxidant supplements for such conditions are expected to be of benefit."

Sardesai VM, *Nutrition in Clinical Practice*, Feb 1995;10:19-25.

• Vitamin C recycles vitamin E

A deficiency of vitamin E in retinal

membranes leads to eye disease. Vitamin C helps recycle vitamin E in the retina, and alpha-lipoic acid helps recycle vitamin C.

Stoyanovsky DA, et al., *Current Eye Research*, March 1995;14:181-9.

• Beneficial bacteria reduce disease

Lactobacillus acidophilus is one of the dominant species of beneficial bacteria found in the upper region of the small intestine. It lowers blood levels of cholesterol and appears to protect against some cancers. *L. acidophilus* discourages the growth of many other species by producing hydrogen peroxide and its own antibiotics.

Mital BK, et al., *Critical Reviews in Microbiology*, 1995;21:175-214.

• Astaxanthin Enhances Immunity

Astaxanthin, a carotenoid the body does not convert to vitamin A, enhances the activity of the immune system's T and B cells. B cells are necessary for the formation of antibodies.

Jyonouchi H, et al., *Journal of Nutrition*, 1995;125:2483-92.

• Peppermint oil and colon spasm

Peppermint has a long history of use as a digestive aid. In recent years, peppermint oil has been prescribed for irritable bowel syndrome (IBS), but studies have produced contradictory findings. In a recent letter to *Lancet*, a physician in Wales reviewed some of the evidence and the fact that peppermint oil prevents colonic spasms before barium enemas. The peppermint oil is less expensive than a pharmaceutical antispasmodic.

Kingham JGC, *Lancet*, Oct 14, 1995;346:986.

• Methyl donors reduce cancer risk

The term methyl donor refers to compounds that donate hydrogen and carbon molecules for use in normal metabolism. Choline, related to the B vitamins, and the amino acid methionine are two important methyl donors. Vitamin B12 and folic acid help regenerate choline and methionine. Deficiencies of choline,

methionine, and folic acid increase the numbers of spontaneous and chemically induced liver, breast, colon and other types of cancers. Deficiencies of these nutrients appears to speed DNA synthesis and cell division, reducing the time needed for DNA to repair its damage.

Rogers AE, *American Journal of Clinical Nutrition*, 1995;61:659S-65S.

• Copper and immunity

In a study of 11 healthy young men, USDA researchers found that diets low in copper resulted in a less effective immune system response. Supplemental copper prevented further reductions in immune function but did not restore immunity to pre-study levels.

Kelley DS, et al., *American Journal of Clinical Nutrition*, 1995;62:412-6.

• Vitamins C and E curb free radicals

Neutrophils, a type of white blood cell, use free radicals to destroy bacteria. After a heart attack, free radicals from neutrophils increase damage to injured heart tissues. In a double-blind study involving 45 patients, doctors showed that vitamin C and E supplements (600 mg/day) reduced neutrophil free radicals in post-heart attack patients.

Herbaczynska K, et al., *European Heart Journal*, 1995;16:1044-9. □

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THE NUTRITION REPORTER™

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