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Alpha-Lipoic Acid Boosts Energy Levels, Reverses Signs of Aging and Diabetes

Supplements of alpha-lipoic acid, a vitamin-like substance found in food and produced by the body, can reverse some of the fundamental signs of aging, according to a recently published animal study.

One of the most basic changes occurring during aging is a decrease in the efficiency of mitochondria, cell structures that burn glucose for energy. As mitochondria become less efficient, they do not use oxygen properly, resulting in declines in energy production and increases in free radical damage. Because of these changes, overall metabolic activity and physiological energy levels decline.

Alpha-lipoic acid functions as a cofactor in several key enzymes involved in mitochondrial energy production, and some studies have found that supplements can improve mitochondrial function and increase energy levels.

So Bruce N. Ames, PhD, and colleagues at the University of California, Berkeley, fed "old" laboratory rats diets with or without supplemental alpha-lipoic acid and compared them with young unsupplemented rats.

Ames noted that physical activity among untreated old rats was three times lower than that of young animals. However, when old rats received alpha-lipoic acid, their physical activity increased and approached that of the young animals.

At the cellular level, Ames found that oxygen consumption was significantly lower in old rats compared with young ones. This age-related decline in oxygen consumption was reversed when old rats were given alpha-lipoic acid supplements.

In addition, "mitochondrial membrane potential," an indicator of cellular energy production, is significantly lower in old rats compared with young ones. Supplements of alpha-lipoic acid increased mitochondrial membrane potential by 50 percent in old rats.

Alpha-lipoic acid is also a potent antioxidant. In the experiment, Ames found that supplements significantly reduced levels of free radicals. Alpha-lipoic acid also reversed an age-related decline in vitamin C and glutathione in the animals' liver cells, likely by helping the body recycle those antioxidants.

In a separate study, German and Italian researchers found that alpha-lipoic acid improved insulin function and lowered glucose levels among adult-onset diabetics, apparently by increasing mitochondrial activity.

Thomas Konrad, MD, of J. W. Goethe University, Frankfurt, gave 10 thin and 10 obese diabetics 600 mg of alpha-lipoic acid twice daily for four weeks.

Alpha-lipoic acid supplementation led to better insulin function (as measured by greater insulin sensitivity) and lower fasting glucose levels among the thin diabetics. Obese diabetics had improvements in insulin sensitivity, but not in glucose levels.

In addition, both thin and obese diabetes had decreases in blood levels of lactate and pyruvate, indicating more efficient glucose metabolism.

References: Hagen TM, Ingersoll RT, Lykkesfeldt J, et al., "(R)-a-lipoic acid-supplemented old rats have improved mitochondrial function, decreased oxidative damage, and increased metabolic rate," *FASEB Journal*, 1999;13:411-418. Konrad T, Vivina P, Kusterer K, et al., "a-lipoic acid treatment decreases serum lactate and pyruvate concentrations and improves glucose effectiveness in lean and obese patients with type 2 diabetes," *Diabetes Care*, 1999;22:280-287. □

Researchers find "Good" Fats Are Especially Good for the Brain

Some types of dietary fat can relieve manic-depression and improve thinking processes, according to two recent studies.

In the first study, Andrew L. Stoll, MD, of the Harvard Medical School gave 30 men and women with manic-depressive (bipolar) disorder either 9.6 grams of omega-3 fish oils or placebo daily for four months.

Patients taking the omega-3 fats benefited from a significant reduction in symptoms compared with patients taking a placebo. They were also far less likely to suffer relapses of manic-depression.

Manic-depression is characterized in part by overactive signaling by brain cells. According to Stoll, the omega-3 fats may help by dampening this signaling, which is similar to how the drugs lithium

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and valproate work in treating manic-depression.

In the other study, Anthony Capurso, MD, of the University of Bari, Italy, investigated how diet affected cognitive function in 278 senior citizens.

He found that people consuming the greatest quantities of monounsaturated fats, chiefly from olive oil, were 31 percent less likely to develop age-related memory loss.

The brain-enhancing benefits of olive oil were also apparent in poorly educated subjects, who are more susceptible than educated people to age-related memory loss. Monounsaturated fats form part of the structure of brain cell membranes.

The research was based on dietary analyses and tests to measure memory and comprehension. Subjects consumed 12 to 133 grams of olive oil daily, with an average of 46 grams daily.

References: Stoll AL, Severus WE, Freeman MP, "Omega 3 fatty acids in bipolar disorder. A preliminary double-blind, placebo-controlled trial," *Archives of General Psychiatry*, 1999;56:407-412. Solfrizzi V, Panza F, Torres F, et al., "High monounsaturated fatty acids intake protects against age-related cognitive decline," *Neurology*, 1999;52:1563-1568. □

Folic Acid May Reduce Risk of Breast Cancer for Some Women

The B-vitamin folic acid, which plays key roles in the synthesis and repair of deoxyribonucleic acid (DNA), may help reduce the risk of breast cancer in some women.

Shumin Zhang, MD, ScD, of Harvard University analyzed data from the ongoing Nurses Health Study, which includes more than 88,000 subjects. Zhang found that folic acid intake did not reduce the risk of breast cancer, except among women who also consumed alcohol.

In the study, the risk of breast cancer increased among women consuming greater quantities of alcohol. Those with the highest alcohol intake had a 24 percent increased risk of developing breast cancer.

However, if these women consumed large amounts of folic acid—more than 600 mcg daily—their risk of breast cancer was 45 percent lower than women consuming relatively little folic acid.

Reference: Zhang S, Hunter DJ, Hankinson SE, "A prospective study of folate intake and the risk of breast cancer," *JAMA*, 1999;281:1632-1637. □

Vitamin D Deficiencies Increase Risk of Hip Fractures

A lack of vitamin D may be a common cause of osteoporosis and hip fracture, according to a new study.

Somewhere between 26 and 38 million Americans have osteoporosis or are at risk of developing osteoporosis in the hip. Although calcium receives a lot

of attention for its role in forming strong bones, vitamin D is required for absorption of calcium and mineralization of bone.

Meryl S. LeBoff, MD, of the Brigham and Women's Hospital, Boston, compared vitamin D levels between 30 women hospitalized with hip fractures and 68 women admitted for elective joint replacement.

Women with hip fractures had lower levels of vitamin D, and half of them were seriously deficient.

Women with hip fractures also had lower blood levels of calcium and higher levels of parathyroid hormone, which stimulates bone loss.

"While there is increased awareness about the importance of calcium nutrition for skeletal health, these data suggest that deficient vitamin D levels should be of concern in women admitted with hip fractures," wrote LeBoff and her colleagues.

She suggested that vitamin D supplements (400-800 IU daily) or exposure to sunlight (which stimulates the body's production of the vitamin) could reduce the risk of hip fractures.

Reference: LeBoff MS, Koklmeier L, Hurwitz S, et al., "Occult vitamin D deficiency in postmenopausal US women with acute hip fracture," *JAMA*, 1999;281:1505-1511. □

Lutein Shows Promise in Treating Symptoms of Retinitis Pigmentosa

Many researchers believe that the carotenoid lutein, found in kale and spinach, may reduce the long-term risk of macular degeneration, a leading cause of blindness. In a pilot study, researchers have found that it may benefit other eye disorders as well.

Researchers at the Lions Vision Center, Johns Hopkins University, Baltimore, asked 18 subjects with retinitis pigmentosa and two with other eye disorders, to take 40 mg daily of lutein for two months, followed by 20 mg daily for four more months. Some of the subjects were also given a vitamin supplement.

Improvements among people taking lutein and lutein with vitamins were similar. Thirty-one percent gained significant improvements in visual acuity, and another 22 percent had modest improvements. Twenty percent of the subjects had significant improvements in visual field. Seventy-five percent noted improvements in adaptation to light and dark, glare, color perception, and night vision.

Reference: Zorge I, McDonald TM, Dagnelie G, et al., "Lutein improves visual function in some patients with congenital retinal degenerations—a pilot study via internet," *Investigative Ophthalmology and Visual Science*, 1999;40:S697 (Abst #3680-B538). □

Vitamin E Protects Prostate

High-fat diets are known to increase the risk of prostate cancer and to promote the growth of aggressive cancers. Meanwhile, recent research has shown vitamin E supplements to reduce the risk of prostate cancer in men by one-third.

The big question: can vitamin E protect against the cancer-promoting effects of high-fat diets? According to a recent study, it just might.

Neil Fleshner, PhD, of the Sloan Kettering Institute for Cancer Research, New York, injected laboratory mice with prostate cancer cells and then fed them either high- or low-fat diets. Some of the mice on each diet also received supplemental vitamin E.

The high-fat diet provided 40.5 percent fat, which is comparable to the amount of fat eaten by the average American. The low-fat diet contained 21.5 percent fat.

The growth of prostate cancers was most rapid among mice eating the high-fat diet without vitamin E. In contrast, mice eating the high-fat diet with vitamin E had significantly slower tumor growth. In fact, their growth rate of tumors was comparable to both groups of mice eating low-fat diets.

Reference: Fleshner N, Fair WR, Huryk R, "Vitamin E inhibits the high-fat diet promoted growth of established human prostate LNCaP tumors in nude mice," *Journal of Urology*, 1999;161:1651-1654. □

Zinc and Selenium Supplements Boost Immunity in Elderly

Supplements of zinc and selenium can boost immune function in the elderly, according to a team of researchers from 25 geriatric centers in France.

Led by Francois Girodon, MD, PhD, the doctors gave 725 institutionalized patients either a zinc/selenium supplement or a low-dose vitamin supplement for two years.

The researchers noted that the supplements corrected nutritional deficiencies within six months.

Subjects receiving zinc and selenium developed higher levels of infection-fighting antibodies, whereas those taking the vitamins did not. In addition, people taking zinc and selenium had fewer respiratory infections.

"Low-dose supplementation of zinc and selenium provides significant improvement in elderly patients...and could have considerable public health importance by reducing morbidity [illness] from respiratory tract infections," Girodon wrote.

Reference: Girodon F, Galan P, Monget A-L, et al., "Impact of trace elements and vitamin supplementation on immunity and infections in institutionalized elderly patients," *Archives of Internal Medicine*, 1999;159:748-754. □

Vitamin B6 Eases PMS Symptoms

Supplements of vitamin B6 can ease premenstrual symptoms, according to a review of published studies on the vitamin.

Katrina M. Wyatt, PhD, of North Staffordshire Hospital, England, analyzed data from nine of the best controlled scientific studies on the use of vitamin B6 in the treatment of PMS. A total of 940 patients were enrolled in these studies.

PMS causes mild physical symptoms in 95 percent of women (of reproductive age) and severe symptoms in 5 percent of women. The symptoms include bloating, weight gain, breast tenderness, abdominal discomfort, and headache. PMS can also cause anxiety, tension, aggression, and a sense of loss of control, according to Wyatt.

The studies used different dosages of vitamin B6 and often tracked different PMS symptoms. Although some of the studies did not show benefits, most did. Women taking 50-100 mg of vitamin B6 daily were more than twice as likely to have an improvement in overall PMS symptoms. They were also about two-thirds more likely to have fewer symptoms of premenstrual depression.

Reference: Wyatt KM, Dimmock PW, Jones PW, et al., "Efficacy of vitamin B6 in the treatment of premenstrual syndrome: a systematic review," *British Medical Journal*, 1999;318:1375-1381. □

Carotenoids, Vitamins May Reduce Premenopausal Breast Cancer Risk

A diet rich in carotenoids and vitamins may reduce the risk of breast cancer, according to a study by researchers at the Harvard School of Public Health.

Shumin Zhang, MD, ScD, analyzed the health and eating habits of 83,234 women participating in the ongoing Nurses Health Study. During the first 14 years of the study, almost 2,700 women were diagnosed with invasive breast cancer.

Women consuming the greatest amount of lutein and zeaxanthin from food had a 21 percent lower risk of breast cancer, and those getting vitamin A from food or supplements had a 22 percent reduction in risk.

In addition, women consuming five or more daily servings of fruits and vegetables had a 23 percent lower risk of developing breast cancer before menopause.

Premenopausal women with a family history of breast cancer seemed to benefit the most from a diet rich in alpha-carotene, beta-carotene (from supplements as well as food), lutein, and zeaxanthin, as well as vitamins C and A. Vitamin E also offered

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Quick Reviews of Recent Research

• Vitamin E reduces stroke risk

Researchers compared vitamin E intake (from both food and supplements) between 342 people who had suffered ischemic strokes and 501 people who had not had strokes. People taking vitamin E supplements, often as part of a multivitamin, had a 53 percent lower risk of suffering an ischemic stroke. Dietary vitamin E did not reduce stroke risk.

Benson RT, et al., *Neurology*, 1999;52 (Suppl 2): A146 (Abstract P02.080).

• Green tea protects against prostate cancer

Antioxidant polyphenols in green tea have been shown to protect against several different types of cancer. In a series of cell, rat, and mice studies, researchers used the male hormone testosterone to increase the activity of prostate cancer cells. Green tea polyphenols significantly reduced the cancer-stimulating effect of testosterone.

Gupta S, et al., *Cancer Research*, 1999;59:2115-2120.

• Vitamin B6 may reduce kidney stone risk

Researchers investigated the impact of vitamins B6 and C on the risk of kidney stones in a group of 85,000 women. Over a 14-year period, almost 1,100 of the women developed kidney stones. Women with the highest intake of vitamin B6 had a 34 percent lower risk of developing kidney stones. Vitamin C had no influence on risk.

Curhan GC, et al., *Journal of the American Society of Nephrology*, 1999;840-845.

• Coenzyme Q10 reduces blood pressure

Researchers gave 59 hypertensive patients daily supplements of either 120 mg of CoQ10 or a B-complex supplement for eight weeks. Patients taking CoQ10, a vitamin-like nutrient, benefited from reductions in systolic and diastolic blood pressure, insulin, glucose, triglycerides, and several markers of free radicals.

Singh RB, et al., *Journal of Human Hypertension*, 1999;13:203-208.

• Vitamin A safe in retinitis pigmentosa

Supplemental vitamin A has been shown to slow the progression of retinitis pigmentosa, a congenital eye disorder that can result in blindness. Researchers studied the safety of vitamin A supplementation among adults ages 18-54 with retinitis pigmentosa.

Carotenoids, Breast Cancer...

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some protection against breast cancer.

Reference: Zhang S, Hunter DJ, Forman MR, et al., "Dietary carotenoids and vitamins A, C, and E and risk of breast cancer," *Journal of the National Cancer Institute*, 1999;91:547-556. □

Patients taking high doses of vitamin A had an 18 percent increase in blood vitamin A levels after 12 years of supplementation. The researchers concluded that prolonged consumption of 25,000 IU of vitamin A daily was safe.

Sibulesky L, et al., *American Journal of Clinical Nutrition*, 1999;69:656-663.

• Pycnogenol® blocks inflammatory factor

Free radicals generated by exposure to ultraviolet (UV) radiation damage skin cells and increase the risk of skin cancer. In an experiment, researchers exposed skin cells to UV radiation, and some of the cells were also bathed in a solution of Pycnogenol®, a natural complex of antioxidants from the bark of French maritime pine trees. UV radiation activated nuclear factor kappa-B (NF-kB), a gene transcription factor that stimulates inflammation. Pycnogenol® prevented the activation of NF-kB, which reduced the inflammatory response.

Salious C, et al., Oxidants and Antioxidants in Biology, meeting of the Oxygen Club of California, March 3-6, 1999, Santa Barbara, California.

• Vitamin E, zinc may protect against AMD

Age-related macular degeneration (AMD) is a leading cause of blindness. Researchers compared blood levels of nutrients in 25 men and women with AMD and 15 free of the disease. Patients with AMD had significantly lower levels of vitamin E and zinc.

Belda JJ, et al., *Mechanisms of Ageing and Development*, 1999;159-164.

• Zinc has antioxidant properties

In an experiment using endothelial cells, researchers found that zinc deficiency increased oxidative (free radical) stress. Among the effects was an increase in the activity of nuclear factor kappa-B (NF-kB), which promotes inflammation. These changes were blocked by zinc supplementation.

Hennig B, et al., *Journal of the American College of Nutrition*, 1999;18:152-158.

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