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New Research Finds that Natural Dietary Supplements Protect Joints and Bones

A study by American researchers adds to the growing research showing that supplements of glucosamine and chondroitin can significantly reduce the severity of knee osteoarthritis. Meanwhile, European researchers have reported that supplemental omega-3 fish oils can prevent bone loss, with potential benefits in osteoporosis to periodontal disease.

In the first study, Amal K. Das Jr., MD, of Hendersonville Orthopedics Associates, Hendersonville, N.C., asked about half of a group of 93 patients with knee osteoarthritis to take 2,000 mg of glucosamine hydrochloride, 1,600 mg of chondroitin sulfate, and 304 mg of manganese ascorbate daily for six months. The other patients took placebos.

All of the tested nutrients – glucosamine, chondroitin, manganese, and vitamin C – play important roles in the cells that make up the articular cartilage, the pads that cushion joints.

Fifty-two percent of patients with mild or moderate osteoarthritis of the knee had their condition improve by 25 percent or more after taking the dietary supplement. In contrast, only 28 percent improved with the placebo.

"In this study, a significant improvement in osteoarthritis symptoms was observed," wrote Das. "The results are in agreement with previous reports on osteoarthritic animals and humans studying the same combination of glucosamine, chondroitin sulfate and manganese ascorbate."

In the other study, French researchers investigated the relationship between essential fatty acids, inflammatory compounds, and bone loss. They compared 78 patients with periodontal bone loss and 27 healthy subjects. Periodontal bone loss and osteoporosis are often viewed as two manifestations of the same disorder.

The researchers found that high blood levels of omega-6 fatty acids, which form the basis of the body's inflammation-promoting prostaglandins, were higher in patients with periodontal bone loss. Conversely, levels of omega-3 fatty acids, which have an antiinflammatory effect, were lower in these patients than in healthy subjects.

Cold-water fish (such as salmon), flaxseed, and leafy green vegetables are sources of omega-3 fatty acids or their precursors. The building blocks of omega-6 fatty acids, which are proinflammatory, are found in corn, soy, and safflower oils.

After some of the patients increased their omega-3 levels—by supplementing with 360 mg/day of eicosapentaenoic acid (EPA) and 240 mg/day of docosahexanoic acid (DHA)—bone levels of the proinflammatory prostaglandin E2 decreased and bone loss ceased.

References: Das A Jr, Hammad TA. Efficacy of a combination of FCHG49 glucosamine hydrochloride, TRH122 low molecular weight sodium chondroitin sulfate and manganese ascorbate in the management of knee osteoarthritis. *Osteoarthritis and Cartilage*, 2000;8:343-350. Requirand P, Gibert P, Tramini P, et al. Serum fatty acid imblanace in bone loss: example of periodontal disease. *Clinical Nutrition*, 2000;19: 271-276. □

Perspectives...

Is the Food Pyramid One Big Flop?

Ten years ago, the U.S. Department of Agriculture replaced the "four food groups" with the "food pyramid." The nutrition message was simple: eat a lot more grains (breads, pastas, cereals), more veggies and fruit, and cut back on meat and saturated fat.

While the food pyramid correctly recommended that people consume more veggies and fruit, it failed to distinguish between important types of good fats (found in fish and avocados) and bad fats (found in corn, soy, and safflower oils). The pyramid also recommended that people consume more grain products than any other food, without distinguishing between whole and refined grains (e.g., nutrient-rich whole-wheat bread vs. nutrient-poor white bread).

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Researchers recently answered the big question—does eating according to the food pyramid reduce your risk of serious disease? The answer is no.

The Harvard University researchers tracked the health of 106,000 men and women. People who followed the food pyramid dietary guidelines had only a slight, practically insignificant decrease in their risk of heart disease and no reduced risk of cancer. Being as politic as they could, the researchers wrote that the food pyramid might have some "shortcomings" and need some "improvements." (McCullough ML, et al. *American Journal of Clinical Nutrition*, 2000;72:1214-1222 and 1223-1231.)

From my perch, the recommended 6-11 daily servings of grain-based foods are excessive. First, refined grains are associated with a higher risk of diabetes, heart disease, and cancer. Second, even whole grains are high in carbohydrates relative to the micronutrients they contain. Third, compelling evidence suggests that large numbers of people are biologically maladapted to grains, which have been part of the diet for less than 10,000 years. I suspect that the roughly one in 100 prevalence of celiac disease – an intolerance to gluten, a protein found in wheat, rye, and barley – is just the tip of the proverbial iceberg.

At the very least, a diet built around large quantities of grain-based carbohydrates includes too many calories. I suspect that our nation's passion for pasta, a major source of dietary grains, has helped 61 percent of Americans become overweight. But then, I am admittedly a reformed pastaholic – I lost 20 pounds and 4 inches from my waist after giving up pasta and nearly all other grain products.

I should point out that giving up grains isn't the same as going on a high-protein diet. Eating more veggies should fill the void of a no- or low-grain diet. Meat and veggies are what our hunter-gatherer ancestors ate, and I think this is diet still well-suited to most people. *— Jack Challem*

Low Vitamin B1 Levels May Contribute to Psychiatric Symptoms in Anorexia

A severe deficiency of vitamin B1 (thiamin) can lead to a variety of psychiatric symptoms, including depression, mood swings, and loss of appetite. It may be more than coincidence that patients with anorexia nervosa, who typically have such symptoms, frequently lack adequate levels of this vitamin.

Anthony P. Winston, MRCPsych, of the Leicester General Hospital, England, analyzed blood levels of nutrients in 35 women and two men who were being treated for anorexia. Winston compared their blood nutrient levels with blood samples from 50 healthy subjects.

Fourteen (38 percent) of the patients with anorexia were deficient in vitamin B1, and seven (19 percent) were severely deficient. Their low vitamin B1 levels were not related to lack of eating, frequency of vomiting, or consumption of alcohol. Instead, people with anorexia may have above average requirements for vitamin B1.

"These results suggest that biochemical thiamin deficiency is underrecognized in anorexia nervosa.... [this] deficiency may contribute to depression and cognitive deficits in anorexia nervosa," wrote Winston.

Reference: Winston AP, Jamieson CP, Madira W, et al. Prevalence of thiamin deficiency in anorexia nervosa. *International Journal of Eating Disorders*, 2000;28:451-454. ▯

Long-Term Use of Vitamin Supplements May Lower Risk of Developing Cataracts

Taking a multivitamin – or any supplement with vitamins C or E – can greatly reduce the risk of developing cataracts. The catch is that you have to take the vitamins for at least 10 years.

Julie A. Mares-Perlman, PhD, of the University of Wisconsin Medical School, Madison, and her colleagues analyzed data from 2,434 subjects, ages 43 to 86, in the town of Beaver Dam, Wisconsin. She found that people who had reported taking multivitamins, vitamin C, or vitamin E for at least 10 years were 60 percent less likely to develop cataracts in the subsequent five-year period.

The finding is consistent with other recent studies showing that long-term use of vitamins C or E can reduce the likelihood of cataract formation.

Reference: Mares-Perlman JA, Lyle BJ, Klein R, et al. Vitamin supplement use and incident cataracts in a population-based study. *Archives of Ophthalmology*, 2000;118:1556-1563. ▯

Lycopene Supplements Can Ease Symptoms of Exercise-Induced Asthma

Lycopene, the antioxidant carotenoid that gives tomatoes their red color, is well known for reducing the risk of prostate disorders. A new study has found that it can also often reduce asthmatic symptoms triggered by exercise.

Ami Ben-Amotz, PhD, of the National Institute of Oceanography, Israel, asked 20 subjects to undergo a monitored exercise program to document the severity of their exercise-induced asthma. The subjects then repeated the exercise program after taking either 30 mg daily of lycopene or a placebo for one week.

When the patients received the placebo, all of them experienced at least a 15 percent reduction in

forced expiratory volume in one second (FEV1) after exercising, indicating poorer lung function. FEV1 refers to the amount of air exhaled in one second, a standard measure of lung function.

Overall, after lycopene supplementation, asthma symptoms were reduced by a little more than half. However, not all of the subjects benefited. Eleven (55 percent) of the 20 subjects had post-exercise improvements in breathing.

Asthmatics experience high levels of oxidative stress – high levels of free radicals relative to antioxidants – which promotes an inflammatory response. Other studies have reported that beta-carotene and vitamin C can also reduce asthma symptoms.

The 30 mg of lycopene used in the study is roughly equal to that of seven tomatoes.

Reference: Neuman I, Nahum H, Ben-Amotz A. Reduction of exercise-induced asthma oxidative stress by lycopene, a natural antioxidant. *Allergy*, 2000;55:1184-1189. □

Two New Studies Back Up the Value of Natural Vitamin E in Heart Disease

Two more studies show that natural vitamin E supplements are a convenient and inexpensive means of preventing coronary heart disease.

The first study, led by Mona Boaz, PhD, of the Wolfson Medical Centre, Israel, studied 196 kidney dialysis patients. Such patients are four times more likely to die of cardiovascular disease at any given age, compared with healthy people.

Because dialysis patients suffer above-average levels of oxidative (free radical) stress, Boaz and her colleagues gave the patients either 800 IU of natural vitamin E or a placebo daily for an average of 17 months. Only five of the patients taking vitamin E had heart attacks during the study. In contrast, 17 patients – more than three times the number – taking placebos had heart attacks.

In the other study, a team of Belgian researchers gave 22 type 1 diabetics 750 IU of natural vitamin E for one year. They also gave a second group of 22 type 1 diabetics a placebo for six months, followed by 750 IU of vitamin E for another six months.

After vitamin E supplementation in both groups, the subjects' low-density lipoprotein (LDL) and very low-density lipoprotein (VLDL) had contained fewer free radicals and were more resistant to oxidative damage. There was no change in LDL and VLDL when patients took placebos.

Free radical oxidation to the LDL and VLDL forms of cholesterol is recognized as a key step in the development of coronary artery disease.

References: Boaz M, Smetana S, Weinstein T, et al. Secondary prevention with antioxidants of cardiovascular disease in endstage renal disease (SPACE): randomised placebo-controlled trial. *Lancet*, 2000;356:1213-1218. Engelen W, Manuel y Keenoy B, Vertommen J, et al. Effects of long-term supplementation with moderate pharmacologic doses of vitamin E are saturable and reversible in patients with type 1 diabetes. *American Journal of Clinical Nutrition*, 2000;72:1142-1149. □

Folic Acid Also of Great Importance to a Healthy Heart, Researchers Report

Low levels of the B-vitamin folic acid greatly increase the risk of death from cardiovascular disease, and supplements can significantly reduce mortality and medical costs, according to two recent studies.

Folic acid is essential for the body's recycling of homocysteine, a byproduct of protein metabolism. Homocysteine is toxic to blood vessel walls, oxidizes low-density lipoprotein (LDL) cholesterol, and stimulates artery-clogging smooth muscle cells.

Catherine M. Loria, PhD, of the National Heart, Lung, and Blood Institute, Bethesda, Md., analyzed data from the Second National Health and Nutrition Examination Survey (NHANES II), focusing on 689 adults ages 30 to 75 years.

Among people without diabetes, those with the lowest blood levels of folic acid were more than twice as likely to die as a result of cardiovascular disease. Diabetics with low folic acid levels appeared to have an even greater risk of death from cardiovascular disease, but the small number of diabetics in the study made that calculation unreliable.

In a separate study, Brahmajee K. Nallamothu, MD, and colleagues at the University of Michigan, Ann Arbor, developed a computer model to determine the likely health and cost benefits of taking folic acid and vitamin B12 supplements.

The computer model included information about the relationship between homocysteine and heart disease, and how folic acid and vitamin B12 reduce homocysteine levels.

The computer model was based on people taking 400 mcg of folic acid and 500 mcg of B12, and it analyzed two different scenarios: one that projected the benefits of giving all 40-year-old men and 50-year-old women folic acid and B12, and the other that screened people at highest risk and gave vitamins only to them.

According to the computer model, the "treat all" scenario was most effective overall in reducing the risk of heart disease. However, it was much more expensive than the "screen and treat" scenario.

The "treat all" strategy more than doubled the "life-years saved" – essentially meaning the number

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Quick Reviews of Recent Research

• Antioxidants may slow "mad cow" disease

Antioxidants seem to be good for just about anything, so why not mad cow disease or its human variant, Creutzfeldt-Jakob disease? Researchers have reported that the mineral copper, part of the body-produced antioxidant superoxide dismutase, might inhibit activity of infectious prions, which cause these diseases. Since 1996, researchers have also reported cell studies showing that vitamin E and N-acetyl-cysteine also inhibit prion activity.

Wong B-S, et al. *Biochemical and Biophysical Research Communications*, 2000;275:248-252.

• Pycnogenol® has antiinflammatory properties

In a cell study, researchers found that Pycnogenol® reduced production of interleukin-1b, a proinflammatory compound. It did this by blocking the activation of nuclear factor kappa B and activator protein-1, two substances that turn on genes that promote inflammation. Pycnogenol® is a flavonoid-rich antioxidant complex derived from the bark of French maritime pine trees.

Cho K-J, et al. *Toxicology and Applied Pharmacology*, 2000;168:64-71.

• Carotenoids may reduce lung cancer risk

As part of a study of 124,000 men and women, researchers found that people with the greatest dietary intake of mixed carotenoids, indicating diverse fruit and vegetable intake, were 32 percent less likely to develop lung cancer, compared with those who consumed few carotenoids. Nonsmokers with a high intake of alpha-carotene had a 63 percent lower risk of lung cancer, and lycopene was associated with a 27 percent reduced risk of lung cancer among smokers.

Michaud DS, et al. *American Journal of Clinical Nutrition*, 2000;72:990-997.

• Beta-carotene may reduce some cancer risks

Researchers analyzed data from the Physicians' Health Study, which asked 22,000 American physicians take 50 mg of beta-carotene or a placebo every other day for 13 years. Beta-carotene reduced the general risk of cancer by 20 percent in men over 70 years of age, in daily drinkers of alcohol, and in men who were overweight. In addition, beta-carotene slightly reduced the risk of prostate cancer among overweight men and the risk of colon cancer among men who regularly consumed alcohol.

Cook NR, et al. *Cancer Causes and Control*, 2000;11:617-626.

• Soy isoflavones lower cholesterol levels

Researchers asked 13 healthy premenopausal women, ages 18-35, to consume different amounts of an isoflavone-rich soy protein product daily for three menstrual cycles. Although the women had normal cholesterol levels, consuming the soy isoflavones reduced low-density lipoprotein by 7.6 to 10 percent. In addition, the ratios of total cholesterol to high-density lipoprotein (HDL) cholesterol improved by about 10 percent, and the ratio of LDL to HDL cholesterol improved by almost 14 percent.

Merz-Demlow BE, et al. *American Journal of Clinical Nutrition*, 2000;71:1462-1469.

• Alpha-lipoic acid improves nerve function

Alpha-lipoic acid is a natural antioxidant used in Europe to treat diabetes and diabetic complications. In a study with laboratory rats, researchers found that supplemental alpha-lipoic acid improved nerve function in the animals' toes, but not in their sciatic nerves. The nerve damage in their toes was comparable to the polyneuropathy in diabetics.

Stevens MJ, et al. *Diabetes*, 2000;49:1006-1015.

Folic Acid and the Heart...

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of years added to a person's life – compared with the "screen and treat" approach. However, the "screen and treat" model was substantially less expensive

"Homocysteine lowering with folic acid and vitamin B12 supplementation could result in substantial clinical benefits at reasonable costs," wrote Nallamothu. "If homocysteine lowering is considered, a screen and treat strategy is likely to be more cost-effective than universal supplementation."

References: Loria CM, Ingram DD, Feldman JJ, et al. Serum folate and cardiovascular disease mortality among US men and women. *Archives of Internal Medicine*, 2000;160;3258-3262. Nallamothu BK, Fendrick AM, Rubenfire M, et al. Potential clinical and economic effects of homocysteine lowering. *Archives of Internal Medicine*, 2000;160:3406-3412. □

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