

The Nutrition Reporter™

© Jack Challem March 2009 Vol 20 No 3



The independent newsletter that reports vitamin, mineral, and food therapies

Vitamin K Supplements Greatly Reduce Risk of Bone Fractures and Cancer

Vitamin K has been garnering plenty of interest in nutrition circles, and the latest study has found that supplements of this vitamin can reduce the risk of bone fractures and cancer in women.

Angela M. Cheung, MD, PhD, of the University of Toronto, Canada, and her colleagues asked 440 postmenopausal women with osteopenia to take either 5 mg (5,000 mcg) of vitamin K₁ or placebos daily for four years. Osteopenia describes a decrease in bone mineral density and is generally considered a prelude to osteoporosis.

All of the women had normal levels of vitamin D, to eliminate that variable on fracture and cancer risk.

Both women taking vitamin K supplements and placebos experienced decreases in bone mineral density at several sites including the lumbar spine, hip, and femoral neck.

However, women taking vitamin K had substantial reduced risks of fractures and cancer during the study. Among women taking vitamin K, only nine had fractures, compared with 20 of the women taking placebos.

In addition, among the women taking vitamin K, only three developed cancer, compared with 12 in the placebo group.

Although vitamin K did not prevent the loss of bone, it “did protect against clinical fractures and cancers,” wrote Cheung and her colleagues. The finding suggested that vitamin K’s effect on bone may be mediated through mechanisms not directly related to bone density.

In addition, while other studies have found an anticancer benefit from vitamin K₂, this study “may be the first to suggest that vitamin K₁ also has anticancer effects,” the researchers wrote.

Several recent studies, conducted in the United States and Japan, have shown that vitamin K supplements can improve glucose tolerance, in effect boosting resistance to type 2 diabetes. Still other recent research suggests that vitamin K may regulate

where the body deposits calcium. These studies found that vitamin K may prevent calcium deposits in the arteries, also known as hardening of the arteries.

Supplements are sold in three different forms: vitamin K₁ and two different forms of vitamin K₂, the MK-4 and MK-7 forms.

Reference: Cheung AM, Tile L, Lee Y, et al. Vitamin K supplementation in postmenopausal women with osteopenia (ECKO trial): a randomized controlled trial. *PLoS Medicine*, 2008;5(10):e196. □

Perspectives

The Serotonin-Bone Connection

Our understanding of healthy bones got a little more complicated late last year, the consequence of a eye-opening study of serotonin and bone health.

Serotonin, of course, is a neurotransmitter that influences mood. General medical opinion is that low serotonin causes depression, anxiety, and aggressive behavior.

But 95 percent of the body’s serotonin is produced in the gut, not in the brain. And serotonin made in the gut cannot be transported to the brain. So what does all this serotonin do?

A recent study, by Gerard Karsenty, PhD, of the Columbia University College of Physicians and Surgeons, New York City, determined that gut serotonin governs bone formation. He and his colleagues reported in the journal *Cell* (2008;135:825-837) that high levels of serotonin *decreased* bone density. Conversely, low levels of serotonin increased bone density.

The implications of this research are profound. Anti-depressants are the most prescribed class of drugs in the United States. In 2005, doctors wrote 118 million prescriptions for anti-depressants, and most of these drugs (e.g., Prozac and Zoloft) work, according to the drug companies, by increasing levels of serotonin. Do they affect gut serotonin

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levels? It's likely that they do because many of the side effects of these drugs affect the gastrointestinal tract. When considered in light of Karsenty's study, these drugs may also be setting the stage for an epidemic of osteoporosis.

There are so many healthy nondrug ways to fight depression. Many are nutritional and work through a panoply of biochemical pathways. Others are lifestyle oriented and include yoga and exercise. And the same is true when it comes to maintaining healthy bones. There are few things that a drug can do that a nutrient cannot do better and with greater safety. –*JC*

Pycnogenol® Eases Side Effects from Chemo and Radiation

Pycnogenol, a proprietary antioxidant complex obtained from French maritime pine bark, can significantly reduce side effects from chemotherapy and radiation in cancer patients.

Gianni Belcaro, MD, PhD, of Gabriele D'Annunzio University, Italy, and his colleagues asked cancer patients who had previously undergone surgery to take either 50 mg of Pycnogenol or placebos three times daily for two months.

Thirty-four chemotherapy patients took Pycnogenol, whereas 30 took placebos. Meanwhile, 25 radiation therapy patients took Pycnogenol, and 21 took placebos. Patients were being treated for a variety of cancers, including cancers of the colon and rectum, liver, stomach, kidney, and lung.

The researchers reported that chemo patients who took Pycnogenol had drug side effects that were half as severe as those taking placebos. Most of the reduction in symptoms were related to nausea, vomiting, diarrhea, and weight loss.

Patients undergoing radiation therapy and taking Pycnogenol benefited from reduced ulceration and soreness of the mouth, as well as less nausea, vomiting, diarrhea, water retention, and weakness.

In addition, the incidence of blood clots was significantly lower among people taking Pycnogenol, compared with those taking placebos.

Belcaro and his colleagues wrote that Pycnogenol may have “considerable potential for lowering side effects during cancer therapy which may significantly contribute to a less affected quality of life.”

The researchers could not determine whether the supplements interfered with the cancer therapies.

Reference: Belcaro G, Cesarone MR, Genovesi D, et al. Pycnogenol® may alleviate adverse effects in oncologic treatment. *Panminerva Medica*, 2008;50:227-234. □

Combination of B Vitamins Slows Progression of Heart Disease

Several B vitamins are known to lower blood levels of homocysteine, a risk factor for coronary artery disease and stroke. But recent studies have yielded conflicting findings on the benefits of B vitamins in heart disease.

The latest study along these lines shows a clear benefit from the B vitamins – but only in people who had elevated homocysteine levels at the beginning of the study.

Howard N. Hodis, MD, of the University of Southern California, Los Angeles, and his colleagues asked 506 men and women to take high doses of B vitamins or placebos daily for a little over three years. Specifically, they took 5 mg (5,000 mcg) of folic acid, 400 mcg of vitamin B12, and 50 mg of vitamin B6.

Hodis and his colleagues measured the subjects' carotid artery intima media thickness, an accepted way of measuring the progression of heart disease. As the intima media thickness increases, the artery's internal diameter decreases and less blood can flow through.

People with an initial homocysteine level of 9.1 mmol/L had a significantly lower rate of intima media thickening by the end of the study.

The researchers wrote that their findings were consistent with other research showing that the risk of cardiovascular disease increases significantly when homocysteine levels rise above 8 to 9 mmol/L.

Reference: Hodis HN, Mack WJ, Dustin L, et al. High-dose B vitamin supplementation and progression of subclinical atherosclerosis. *Stroke*, Dec 31, 2008; epub ahead of print: doi 10.1161/stroke.aha.108.526798. □

Omega-3 Fat May Protect Against Breast Cysts and Cancer

High blood levels of eicosapentaenoic acid (EPA), one of the key omega-3 fats found in fish oils, is strongly associated with a low risk of benign breast cysts and breast cancer.

Jackilen Shannon, PhD, of Oregon Health Sciences University, Portland, and her colleagues, analyzed levels of EPA in the red blood cells of more than 1,600 women. Of the women, 155 had benign nonproliferative breast cysts, 185 had benign proliferative cysts, and 241 women had breast cancer, some with proliferative and others with nonproliferative benign cysts.

Shannon determined that women with the highest blood levels of EPA were 67 percent less likely to have benign nonproliferative breast cysts.

In addition, women with benign nonproliferative breast cysts and high levels of EPA also had a 49 percent lower risk of breast cancer.

Reference: Shannon J, King IB, Lampe JW, et al. Erythrocyte fatty acids and risk of proliferative and nonproliferative fibrocystic disease in women in Shanghai, China. *American Journal of Clinical Nutrition*, 2009;89:265-276. □

Vitamin B1 Supplements Helpful in People with Type 2 Diabetes

Researchers from England and Pakistan have reported that large amounts of supplemental vitamin B1 (thiamine) can reduce microalbuminuria in patients with type 2 diabetes. Microalbuminuria refers to excess urinary excretion of albumin, a protein, usually indicating kidney damage.

Paul J. Thornalley, PhD, of the University of Warwick, and his colleagues treated 21 men and 19 women with type 2 diabetes and microalbuminuria. They gave the subjects either 100 mg of vitamin B1 or placebo three times daily for three months.

Excretion of albumin decreased by an average of 41 percent among people taking vitamin B1. Furthermore, 35 percent of the patients with microalbuminuria had a return of normal albumin excretion rates after taking the vitamin.

“Further studies are now required to confirm this encouraging pilot-scale outcome that high-dose thiamine reverses early-stage nephropathy in type 2 diabetes,” wrote Thornalley and his colleagues.

Reference: Rabbani N, Alam SS, Riaz S, et al. High-dose thiamine therapy for patients with type 2 diabetes and microalbuminuria: a randomised, double-blind placebo-controlled pilot study. *Diabetologia*, 2009;52:208-212. □

Supplemental Omega-3 Fat Helps Brain Develop in Premie Girls

High-dose supplemental docosahexaenoic acid (DHA), one of the omega-3 fatty acids found in fish oils, aids brain development in baby girls born prematurely, according to a report in the *Journal of the American Medical Association*. The extra DHA did not seem to help premature baby boys.

Preemies – infants born after less than 33 weeks gestation – have a high risk of developmental disorders and learning disabilities.

Maria Makrides, PhD, of the Women’s and Children’s Hospital and Flinders Medical Centre, Adelaide, Australia, and her colleagues compared the effects of standard amounts of DHA and large amounts of DHA on 657 premature infants.

The high-dose DHA – 500 mg daily – was given in the form of supplements to lactating mothers or in

formula to babies that were not breast fed. Placebos consisted of soybean oil.

The DHA or placebos were provided within a few days of the babies’ birth until they reached their expected delivery date. The infants were then assessed 18 months later using tests to evaluate their memory, problem-solving ability, language ability, and early number concepts.

Baby girls receiving large amounts of DHA had better mental development compared with those fed a standard amount of DHA.

Looked at another way, only three of the baby girls in the high-DHA group experienced a significant mental delay, compared with 16 of those in the standard DHA group. Similarly, only 16 of the baby girls in the high-DHA group experienced a mild mental delay, compared with 40 in the standard DHA group.

Reference: Makrides M, Gibson RA, McPhee AJ, et al. Neurodevelopment outcomes of preterm infants fed high-dose docosahexaenoic acid. *JAMA*, 2009;301:175-182. □

Chondroitin Supplements Protect Joints in Osteoarthritis Patients

A proprietary form of chondroitin sulfate supplement reduces pain and significantly slows the progression of osteoarthritis of the knees, according to a report by European researchers.

André Kahan, MD, PhD, of Hospital Cochin, Paris, and his colleagues treated 622 patients with osteoarthritis of the knees. They were given either 800 mg of “chondroitins 4 and 6 sulfate” or placebo daily for two years. Chondroitins 4 and 6 are distinguished from other types of chondroitin by slight differences in their molecular structure.

Patients taking chondroitin had significant reductions in pain, compared with people taking placebo, during the first nine months of the study. After this time it was more difficult to measure differences in pain.

Most significantly, patients taking chondroitin experienced an average 0.07 mm loss in joint space width, a sign of joint deterioration. In contrast, people taking placebo had a 0.31 mm loss in joint space width, about 4.4 times worse, based on x-ray measurements of joints.

Kahan wrote that the chondroitin product, which is sold as a prescription drug in some European countries, “can prevent joint structure degradation in patients with knee osteoarthritis.”

Reference: Kahan A, Uebelhart D, De Vathaire F, et al. Long-term effects of chondroitins 4 and 6 sulfate on knee osteoarthritis. *Arthritis & Rheumatism*, 2009;60:524-533. □

Quick Reviews of Recent Research

• People can make their own aspirin

Traces of salicylic acid, the basic molecule that forms aspirin, are found in herbs, vegetables, and fruits, and may account for some of the anti-inflammatory benefits of these foods. In a recent study, researchers at the Dumfries and Galloway Royal Infirmary, Scotland, determined that people can convert benzoic acid, also found in vegetables and fruits, to salicylic acid.

Paterson JR. *Journal of Agricultural and Food Chemistry*, 2008;56:11648-11652.

• Natural compound eases drug withdrawal

Methadone is often prescribed to people addicted to heroin, but they can also become addicted to this drug. Researchers from the Catholic University Medical School in Rome gave 30 methadone-dependent patients either 2 grams of acetyl-L-carnitine or placebos daily during a three-week detoxification period. People taking the supplement experienced fewer withdrawal symptoms and less withdrawal-associated pain.

Janiri L. *Clinical Neuropharmacology*, 2008: epub ahead of print.

• Magnesium slows heart disease progression

People undergoing kidney dialysis develop heart disease earlier in life compared with other people. Researchers from Ankara, Turkey, treated 47 patients undergoing dialysis with either 610 mg of magnesium citrate or placebos every other day for two months. Patients taking magnesium supplements benefited from an improvement in the internal diameter of their carotid arteries, a sign of less atherosclerosis.

Turgut F. *International Urology and Nephrology*, 2008; 40:1075-1082.

• Resveratrol protects against fatty liver

Fatty liver, which impairs liver function, is a common consequence of alcoholism or obesity. In a study using laboratory mice, researchers at the University of South Florida, found that resveratrol supplements increased the activity of two molecules, SIRT1 and AMPK, and protected against fat accumulation in the liver. The researchers believe that SIRT1 and AMPK help clear fat from the liver.

Ajmo JM. *American Journal of Physiology – Gastrointestinal and Liver Physiology*, 2008;295:G833-842.

• Antioxidants protect against eye disease

Researchers from the London School of Hygiene & Tropical Medicine and other institutions analyzed blood antioxidant levels and lifetime sunlight exposure of 4,753 men and women who were at least 65 years of age. Exposure to blue light wavelengths, such as ultraviolet radiation, and low blood levels of

antioxidants were associated with an increased risk of age-related macular degeneration. A combination of these risk factors – particularly with low vitamin C, zeaxanthin, and vitamin E – increased the risk of macular degeneration by almost four times.

Fletcher AE. *Archives of Ophthalmology*, 2008; 126: 1396-1403.

• Drug ads influence coverage of supplements

Researchers from the Wake Forest University School of Medicine and the University of Florida analyzed the number of advertisements for drugs and whether the number of ads might influenced publication of articles on dietary supplements in 11 major medical journals. Journals with the most drug ads published significantly fewer articles about dietary supplements. Among journals with the most drug ads, 67 percent of the supplement articles concluded that they were not safe. In journals with the fewest drug ads, only 4 percent of the articles concluded that supplements were not safe. Also, journals with the most drug ads had 50 percent more articles concluding that dietary supplements were ineffective.

Kemper KJ. *BMC Complementary and Alternative Medicine*, 2008;8:11.

• Low selenium may increase bladder cancer

Researchers at the Dartmouth Medical School, New Hampshire, compared selenium levels and the risk of bladder cancer among 857 people diagnosed with the disease and 1,191 people without cancer. Overall, selenium was not related to the risk of bladder cancer. However, low selenium levels were associated with a higher risk of bladder cancer among three groups of people: low selenium increased the risk of bladder cancer in women by 34 percent, moderate smokers by 39 percent, and those with p53-positive cancers by 43 percent.

Wallace K. *Cancer Prevention Research*, 2009;2:70-73.

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