

SCIENCE NEWS DIGEST



Up-to-the-Minute Research and Education
for Health Care Professionals

March 2009-- Vol. 1, No. 3

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Fruits and Cardiovascular Health

Understanding the Basics

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Cardiovascular disease (CVD), primarily from heart disease (CHD) and stroke, is the leading cause of death in the developed world for both men and women among all racial and ethnic groups. More than 850,000 Americans die each year from CVD accounting for nearly 40 % of all deaths. The cost of heart disease and stroke in the United States in 2005 is estimated at \$393 billion, including health expenditures and lost productivity. These costs are expected to increase by 2010. (1)

Many studies have established that high plasma levels of total cholesterol and LDL cholesterol are among the most important modifiable risk factors for heart disease. While the mechanisms through which these factors lead to atherosclerosis and heart disease are not completely understood, evidence points to the oxidation of LDL particles by either free radical byproducts, or by mediators of inflammatory processes, as a probable causative process.

Large epidemiological studies, such as the Nurses' Health Study (2) and the Scottish Heart Health Study (3) show that individuals who consume diets high in fiber have a lower risk for heart disease. Soluble fiber may be of particular preventive value since it appears to lower plasma cholesterol levels. The mechanisms which may explain how fiber lowers serum cholesterol have been extensively reviewed and include: lower cholesterol absorption, higher bile acid excretion, changes in bile-acid type present in the intestinal tract, and influences of short-chain fatty acid production by intestinal flora. (4,5)

Epidemiological and experimental evidence suggest a protective effect of polyphenols-rich foods against CHD and stroke(6). Polyphenols in fruits, vegetables and beverages may protect from atherosclerosis because of their antioxidant potential and through their anti-inflammatory activity. Flavonoids are known to react with a variety of disease promoting free radicals and to induce antioxidant enzymes.

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While human data is limited, in vitro and in vivo studies have shown that many polyphenols, quercetin among them, and polyphenol rich foods, inhibit LDL oxidation. They can modulate nitric oxide synthesis, promote vascular relaxation and inhibit platelet adherence to the vascular endothelium.

In addition, atherosclerosis is now viewed as a chronic inflammatory disease. Recent studies suggest that flavonoids protect from initiation and progression of atherosclerosis by modulating inflammatory pathways. They have been shown to inhibit mast cell secretion of pro-inflammatory cytokines and inhibit TNF-stimulated induction of endothelial cell adhesion molecules.

References:

- 1) *American Heart Association, Heart Disease and Stroke Statistics: 2005 Update. Dallas, TX 2005*
- 2) *Wolk A, Manson JE, Stampfer JE et al Long term intake of dietary fiber and decreased risk of coronary heart disease among women. JAMA 1999; 281:1998-2004*
- 3) *Todd S, Woodward M, Tunstall-Pedoe H, and Bolton-Smith C. Dietary antioxidants and fiber in the etiology of cardiovascular disease and all-cause mortality: results from the Scottish Heart Health Study. Am J Epidemiol 1999; 150:1073-80*
- 4) *Jalili T, Medeiros DM and Wildman REC. Dietary fiber and coronary heart disease. In: Handbook of Nutraceuticals and Functional Foods. (Wildman REC ed.) CRC Press, Boca Raton FL 2001 pp131- 44*
- 5) *Salas-Salvado J, Bullo M, Perez-Heras A and Ros E. Dietary fibre, nuts and cardiovascular disease. Br J Nutr 2006; 96(2):S46-51*
- 6) *Graf BA, Milbury PE and Blumberg JB. Flavonols, flavones, flavanones and human health: Epidemiological evidence. J Med Food 2005; 8(3) 281-90*

Good News for Vitamins

Three Studies Reinforce the Important Role of Vitamins

From the Council for Responsible Nutrition
WASHINGTON, D.C.

Three new studies recently published in the *Archives of Internal Medicine*, a publication from the *Journal of the American Medical Association (JAMA)*, further reinforce the varying and important roles that vitamins can play as part of a healthy lifestyle.

The first study suggests that women with higher intakes of calcium from both food and supplements—up to 1,300 milligrams (mg)/day—appear to have a lower risk of cancer overall, and both men and women with high calcium intakes have lower risks of colorectal cancer and other cancers of the digestive system. A second study showed that women who took a combination of B vitamins, including folic acid (2.5 mg/day), pyridoxine hydrochloride (vitamin B6, 50 mg/day) and cyanocobalamin (vitamin B12, 1 mg/day), decreased their risk of age-related macular degeneration (AMD), the leading cause of severe irreversible vision loss for older Americans.

The third study suggests that higher blood levels of vitamin D are inversely associated with the incidence of upper respiratory tract infections.

“These results are encouraging and may lead us in new directions of research,” said Andrew Shao, Ph.D., Vice President, Scientific and Regulatory Affairs, for the Council for Responsible Nutrition (CRN). “We’ve known for many years that these essential nutrients play important roles in health—vitamin D and calcium for bone health and folic acid for the prevention of neural tube birth defects—but these latest studies suggest new and exciting benefits that need further exploration.”

➤ **Calcium and Cancer**

Previous observational studies have shown an inconsistent relationship between calcium intake and cancer. This large prospective study, part of the National Institutes of Health (NIH) AARP Diet and Health Study, followed 293,907 men and 198,903 women, age 50 to 71. Participants were given a food frequency questionnaire when they enrolled in the study, asking how much and how often they consumed dairy, as well as other conventional foods, and

whether they took supplements. After seven years of follow-up, the study found that women with a calcium intake of up to 1,300 mg/day, from a combination of conventional foods and supplements, had a decreased risk of total cancer. The study also found that women who were in the top one-fifth of calcium consumption (1,881 mg/day from a combination of conventional food and supplements) had a 23 percent lower risk of digestive types of cancer, particularly colorectal cancer, than those in the bottom one-fifth (494 mg/day). Men who consumed the most calcium from conventional foods and supplements (about 1,530 mg/day) also had a 16 percent lower risk of digestive types of cancer than those who consumed the least calcium.

“What this means for consumers is that there may be benefits to calcium supplementation that go beyond bone health; but more research is still needed to help explain the observed differences in gender and to better assess the effects on other non-digestive cancers,” said Dr. Shao. “It’s also interesting to point out that the women in this study who had the highest calcium intakes—and lower risks of cancer—had lower body mass indexes, tended to be physically active, and were less likely to smoke cigarettes or drink alcohol. This further reinforces the notion that good health is truly a combination of overall healthy practices—and vitamins and other supplements are an important part of that formula.”

Source: Park Y, Leitzmann M, Subar A, et al. Dairy Food, Calcium and Risk of Cancer in the NIH-AARP Diet and Health Study. Archives of Internal Medicine, 2009; 169 (4):391-401.

▶ B Vitamins and Age-Related Macular Degeneration

Previous observational studies have suggested an association between lower homocysteine concentrations in the blood and lower risk of age-related macular degeneration (AMD), while intervention studies have shown that folic acid, vitamin B6 and vitamin B12 may lower homocysteine levels. But no intervention study had yet examined the effect of B vitamin supplementation on AMD risk.

This randomized, double-blind, placebo-controlled trial, part of the Women’s Antioxidant and Folic Acid Cardiovascular Study (WAFACS), followed 5,442 female healthcare professionals, age 40 years or older, who already had or were at high risk for heart disease for a little more than seven years. Participants were

assigned to receive a placebo or a combination of folic acid (2.5 mg/day), vitamin B6 (50 mg/day) and vitamin B12 (1 mg/day). After just two years, the beneficial effects of those women taking B vitamins emerged and persisted throughout the entire trial. After 7.3 years of follow-up, women taking the supplements had a 34 percent lower risk of any AMD and a 41 percent lower risk of visually significant AMD.

“This is very promising news for the millions of older Americans who may be at risk for age-related macular degeneration,” said Dr. Shao. “Currently, there are very few treatment options available for AMD, so prevention is key. The results of this study suggest that B vitamins could be combined with other supplemental nutrients including the antioxidants, vitamins C and E and carotenoids beta-carotene and lutein, which have also been shown to lower the risk of AMD. These supplements in turn, can be added to other preventive measures, including avoiding smoking and excessive sun exposure to provide even further protection.”

Source: Christen W, et al. Folic Acid, Pyridoxine, and Cyanocobalamin Combination Treatment and Age-Related Macular Degeneration in Women: The Women’s Antioxidant and Folic Acid Cardiovascular Study. Archives of Internal Medicine, 2009; 169 (4):335-341

▶ Vitamin D and Upper Respiratory Tract Infections

In recent years, vitamin D inadequacy has reemerged, resulting in the resurfacing of diseases such as rickets in children. According to the Dietary Guidelines for Americans 2005, “Older adults, people with dark skin, and people exposed to insufficient ultraviolet band radiation (i.e., sunlight) should consume extra vitamin D from vitamin D-fortified foods and/or supplements.” In a secondary analysis of the Third National Health and Nutrition Examination Survey (NHANES), a survey of the U.S. population, found that individuals with low blood levels of a vitamin D marker (25-hydroxyvitamin D) were also more likely to have an upper respiratory tract infection (URTI). Specifically, the analysis found that compared to those with levels greater than 30 nanograms/milliliter (ng/ml), individuals with less than 10 ng/ml had a 36 percent higher risk of having a recent URTI; those with 10 to less than 30 ng/ml had 24 percent higher odds.

“The evidence supporting the benefits of vitamin D continues to build,” said Dr. Shao. “The majority of Americans continue to fall short in getting adequate amounts of vitamin D through diet alone. Given that vitamin D is relatively low in most foods, and there are serious risks associated with excessive sun exposure, dietary supplements are an important alternative to achieving a sufficient intake. While this study on its own does not mean that higher vitamin D intake will ensure that you don’t get an upper respiratory tract infection this winter, it is consistent with, and adds to, the relatively new body of evidence showing that vitamin D plays a critical role in immune function.”

Says Dr. Shao, “The bottom line for consumers is that vitamins are an important component of good health. Science is an evolving process, and this recent good news about vitamins should certainly be encouraging to consumers, particularly those who take them consistently over the long-term in combination with other healthy habits.”

Source: Ginde A, Mansbach J, Camargo C. Association Between Serum 25-Hydroxyvitamin D Level and Upper Respiratory Tract Infection in the Third National Health and Nutrition Examination Survey. Archives of Internal Medicine, 2009; 169 (4):384-390.

Research Updates

Omega-3 fatty acids:

Kids need them but are not getting them

The importance of omega-3 fatty acids to the health of children has seen an explosion of awareness among researchers and medical professionals alike. Evidence published in the March 2009 issue of the *Journal of Nutrition* found that many young people are not getting the amount of omega-3 fatty acids they need.

The American Dietetic Association and their Canadian counterparts, Dietitians of Canada recommend a minimum daily intake of 351 mg. Based on this recommendation, 90% of the children in the study were deficient in omega-3 EPA/DHA. The U.S. Department of Health and Human Services indicate that in the U.S., the average consumption of omega-3 EPA/DHA for children 4-8-years of age is only 50mg/day. Therefore, although the study only involved Canadian children, American children are also well below the recommended levels.

The use of omega-3 fatty acids in the body begins at conception and is carried forward through all stages of life. Omega-3’s from mom is essential for full and healthy development, particularly for the brain and central nervous system. From birth to the age of three, DHA is involved in the development of the brain and eyes. Thereafter, both EPA and DHA are required for healthy cognitive function. There is growing evidence that dietary omega-3 insufficiency directly contributes to behavior and learning disorders, including Attention

Deficit Hyperactivity Disorder (ADHD) and Developmental Coordination Disorder (DCD). Other research has connected omega-3 deficiency with inflammatory conditions such as asthma, childhood depression, and increased the risk of type 1 diabetes.

Source: Madden SM, et al. Direct Diet Quantification Indicates Low Intakes of (n-3) Fatty Acids in Children 4 to 8 years old. J. Nutr. 2009 Mar; 139: 528-532.

Fruit and Vegetables:

Are our children suffering?

In the March issue of the *Journal of the American Dietetic Association* researchers showed once again that though they are important throughout life, we simply do not eat enough fruits and vegetables of color and are thus deficient when it comes to intake of the powerful phytonutrients they provide.

Using data from the 1999-2002 National Health and Nutrition Examination Survey, researchers showed that only 8% of vegetables consumed by children in all groups were the most nutrient dense dark green or orange. Unfortunately, they found that the most commonly consumed vegetables are the nutrient poor, high-calorie fried potatoes, accounting for about 46% of total vegetable consumption.

Source: Befort C., et al. Fruit, Vegetable, and Fat Intake among Non-Hispanic Black and Non-Hispanic White Adolescents: Associations with Home Availability and Food Consumption Settings. J Am Diet Assoc, 2009 Mar; 106(3): 367-373

Higher vitamin C linked to lower gout risk

The most prevalent inflammatory arthritis in adult males, present in nearly half to one extent or another is gout. New research published in the *Archives of Internal Medicine*, showed that for every 500 milligrams increase in vitamin C intake, a man's risk of gout was cut by 17 per cent. For men taking at least 1,500 mg daily gout risk was cut by 45%.

The finding came from a prospective study conducted by researchers from Boston University School of Medicine on 46,994 men. "The present study, to our knowledge, provides the first prospective evidence about the inverse association between vitamin C intake and risk of gout," wrote the researchers, led by Hyon Choi.

Gout is a disease caused by a disturbance in uric acid metabolism. During a gout attack the body uses uric acid to form painful urate crystals. According to the US National Institute of Arthritis and Musculoskeletal and Skin Diseases, gout occurs in 8.4 of every 1,000 people and is most prevalent in men over the age of 40.

Source: Choi H, et al. Vitamin C intake and the risk of gout in men: a prospective study. Arch Intern Med, 2009; 169: 502-507.

More evidence on omega-3 FA and female depression

A new study published in the February 2009 issue of the journal, *Nutrition*, showed that higher intakes of omega-3 fatty acids were associated with an up to 29 per cent reduction in depressive episodes in women.

According to researchers from Feinberg School of Medicine in Chicago, the University of North Carolina at Chapel Hill, and the University of California, San Francisco, women with the highest intake of oily fish reduced their number of depressive moments by 25 per cent, while a high intake of the omega-3 fatty acids EPA and DHA reduced this number by 29 per cent. However, men did not respond in the same as their female counterparts, according to findings.

"Our results are consistent with [...] other epidemiologic studies that have examined the association of fish intake or dietary omega-3 PUFAs with depressive disorders or mental disorders," wrote the researchers. "In addition, several small, randomized, double-blind trials found that adjunctive treatment with omega-3 PUFAs improved depression."

The evidence of the connection between omega-3 status and mood / depression / behaviour in adults and children has increased in recent years; including Norway (*Journal of Affective Disorders*), and England and Iran (*Australian and New Zealand Journal of Psychiatry*), have reported positive results.

Source: Murakami K., et al. Dietary intake of folate, other B vitamins, and ω -3 polyunsaturated fatty acids in relation to depressive symptoms in Japanese adults. Nutrition, 2009 Feb; 24(2):140-147

Omega-3 DHA boost for heart health in high-risk men: Study

The results of the new study, published in this month's *Journal of Nutrition*, reaffirm the anti-inflammatory benefits shown for GNLD Omega-3 Salmon Oil Plus, previously published in the October 2008 *Journal of the American College of Nutrition*.

Omega-3 fatty acids, most notably DHA and EPA (eicosapentaenoic acid), have been linked to a wide-range of health benefits, including reduced risk of cardiovascular disease (CVD) and certain cancers, good development of a baby during pregnancy, joint health, and improved behavior and mood.

This latest study, a double-blind, randomized, placebo-controlled parallel trial, showed that supplementation with DHA was positively linked to improving the ratio of inflammatory omega-6 fatty acids to anti-inflammatory omega-3.

Source: Darshan S., et al. DHA Supplementation Decreases Serum C-Reactive Protein and Other Markers of Inflammation in Hypertriglyceridemic Men. J Nutr., 2009;139:495-501.

Upcoming Events

April 7	World Health Day
Week of April 20 th	HPC Web Conference
May 21-23rd	World Team Conference