

# The Nutrition Reporter™

© Jack Challem May 2010 Vol 21 No 5



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

## Research Questions Role of Saturated Fats in Cardiovascular Diseases

Two new reports question the long-held belief that saturated fats are a major cause of cardiovascular diseases. The research instead points to refined carbohydrates as a more likely contributing factor in heart disease and stroke.

The articles, published in the *American Journal of Clinical Nutrition*, revisit a long-running controversy about the role of saturated fats in the development of cardiovascular diseases. The findings don't mean people have carte blanche to indulge in unreasonable amounts of saturated fat but, rather, that this type of fat may not be the dietary bogeyman long believed.

Both reports – one a study and the other a review of the scientific evidence – were directed by Ronald M. Krauss, MD, director of atherosclerosis research at the Children's Hospital Oakland Research Institute, a major medical research and treatment center in California.

In one of the reports, Krauss and his colleagues analyzed 21 published studies, which tracked 347,747 men and women from five to 23 years. During this time, 11,006 of the study's participants developed coronary heart disease or had a stroke.

His finding: People consuming the largest amounts of saturated fat in their diets did *not* have an increased risk of heart disease, stroke, or other types of cardiovascular disease.

Krauss wrote that there was "insufficient evidence" to conclude that saturated fat increases the risk of any form of cardiovascular disease. He did add, based on his findings, that "publication bias" tended to favor the publishing of articles linking saturated fat to cardiovascular disease.

In the second report, Krauss noted that higher carbohydrate intake, especially refined carbohydrates (e.g., sugary and starchy foods), increased levels of blood fats generally associated with heart disease, stroke, and cardiovascular disease risk.

Replacing saturated fat with carbohydrates tends to increase the small, dense form of low-density

lipoprotein (LDL) cholesterol, which is strongly associated with the risk of heart and other cardiovascular diseases.

"For a large proportion of the population...the effect of higher-carbohydrate diets, particularly those enriched in refined carbohydrates [sugars and processed starches], coupled with the rising incidence of overweight and obesity, creates a metabolic state that can favor a worsening of the atherogenic dyslipidemia that is characterized by elevated triglycerides, reduced HDL cholesterol, and increased concentrations of small, dense LDL particles," wrote Krauss.

He added that "there are few epidemiological or clinical trial data to support a benefit of replacing saturated fat with carbohydrate...given the differential effects of dietary saturated fats and carbohydrates...[people] should primarily emphasize the limitation of refined carbohydrate intakes and a reduction in excess adiposity."

References: Siri-Tarino PW, Sun Q, H FB, Krauss RM. Meta-analysis of prospective cohort studies evaluating the association of saturated fat with cardiovascular disease. *American Journal of Clinical Nutrition*, 2010;91:535-545. Siri-Tarino PW, Sun Q, H FB, Krauss RM. Saturated fat, carbohydrate, and cardiovascular disease. *American Journal of Clinical Nutrition*, 2010;91: 502-509. □

## Boosting Intake of PUFA Fats from Plants Good for the Heart

An analysis of eight studies concludes that increasing intake of polyunsaturated fats (PUFAs), such as the omega-3 and omega-6 fats, and reducing consumption of saturated fats can significantly reduce the risk of coronary heart disease.

Dariusz Mozaffarian, MD, of the Harvard Medical School, and his colleagues searched the scientific literature on saturated fat and PUFAs. They eventually focusing on eight human studies in which the subjects increased their intake of PUFAs and

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reduced their saturated fat consumption.

They found that, among the 13,614 people in the studies, an increase in PUFA consumption quickly led to a 19 percent lower risk of heart disease.

However, the researchers acknowledged that they could not determine whether the lower risk of heart disease was related to the decrease in saturated fats, to the increase in PUFAs, or to a combination of both changes.

Mozaffarian did not investigate the effects of omega-9 fats, such as those found in olive oil.

Reference: Mozaffarian D, Micha R, Wallace S. Effects on coronary heart disease of increasing polyunsaturated fat in place of saturated fat: a systematic review and meta-analysis of randomized controlled trials. *PLoS Medicine*, 2010;7:e1000252. □

## Perspectives

### Confused About Dietary Fats?

It's easy to feel confused by the evidence linking dietary fats to either an increased or decreased risk of cardiovascular diseases. And it's all too easy to become fat phobic.

One thing is certain: three types of dietary fats are required for our biochemistry and well being: *polyunsaturated fats* (e.g., the omega-3s and omega-6s), *monounsaturated fats* (e.g., the omega-9s in olive oil), and *saturated fats* (found in many animal foods and some plant foods). We need to get polyunsaturated fats from foods because our bodies don't manufacture them, but we can make monounsaturated and saturated fats. A lack of these fats will lead to health problems – just as vitamin deficiencies cause health problems.

Some of my friends and readers might argue the point with me, but the evidence linking saturated fats to heart disease has always been tenuous at best. Early studies failed to adequately distinguish the effects of dietary saturated fats, trans fats, and refined carbohydrates. Trans fats and refined carbohydrates (including sugars) *do* increase the risk of cardiovascular diseases.

Mozaffarian's analysis (previous article) of PUFA and saturated fat could not clearly determine whether eating less saturated fat improved cardiovascular risk. My hunch is that boosting intake of PUFAs led, overall, to a more balanced and healthier intake of the major dietary fats.

None of this research means that people can recklessly eat huge amounts of any type fat. I believe it is wise to maintain a moderate and balanced intake of dietary fats. It may be far more important to avoid all trans fats, not over-indulge in omega-6 PUFAs in corn and soybean oils, and minimize consumption of processed sugars and starches. –*JC*

## L-Arginine Improves Exercise Ability After Heart Transplant

L-arginine, an amino acid (protein building block) is the precursor to nitric oxide, a compound that relaxes blood vessels – and is also important in maintaining normal blood pressure and erectile function.

A new study by French doctors has found that supplements of L-arginine can work in similar ways to improve the exercise capacity of patients who had recently undergone a heart transplant.

Stephane Doutreleau, MD, of Nouvel Hôpital Civil, Strasbourg, and her colleagues first measured the exercise capacity of 22 heart-transplant recipients and 11 healthy subjects. Exercise ability typically decreases after patients undergo transplant surgery, and reduced physical activity typically leads to poorer quality of life.

The subjects were asked to take either 6 grams of L-arginine twice daily or placebos twice daily for six weeks. The L-arginine supplements improved nitric oxide levels and led to increases in exercise tolerance, based on walking distance and cycling on a stationary bike.

Doutreleau concluded that L-arginine might be useful as a therapeutic adjuvant to improve the quality of life and exercise tolerance of patients after a heart transplant.”

Reference: Doutreleau S, Rouyer O, Di Marco P, et al. L-arginine supplementation improves exercise capacity after a heart transplant. *American Journal of Clinical Nutrition*, 2010;10.3945/ajcn.2009.27881. □

## Studies Strengthen Role of Vitamin D in Flu Protection

A team of Japanese doctors has found that taking vitamin D supplements can protect school children against influenza A, a common type of flu.

Mitsuyoshi Urashima, MD, PhD, of the Jukei University School of Medicine, Tokyo, and his colleagues asked 167 children, ages six to 15 years, to take 1,200 IU of vitamin D3 daily from December 2008 through March 2009. They were compared with 167 children who were given placebos.

Children getting vitamin D had a 42 percent lower risk of contracting the flu. Of the children taking vitamin D supplements, 18 (10.8 percent) were diagnosed with influenza A. In contrast, 31 (18.6 percent) of those taking placebos were diagnosed with the flu. Diagnosis was based on a nasal swab for flu antigens.

In addition, vitamin D supplements reduced the risk of flu to a greater extent among children who

had not previously been taking vitamin D supplements and among those who had started nursery school after age three. In these groups vitamin D supplements conferred a 64 percent lower risk of flu.

A secondary benefit occurred in children with asthma. Vitamin D supplements reduced the risk of asthma attacks by 83 percent.

In a separate study, Carsten Geisler, MD, PhD, of the University of Copenhagen, Denmark, and his colleagues identified a key way that vitamin D protects against infection: the vitamin is needed to activate immune cells.

According to Geisler, immune cells remain “naive,” or dormant until they are turned on by a compound known as PLC-gamma 1. He found that PLC-gamma 1 activity depends on vitamin D.

Once activated, immune T cells can become “killer cells” that attack germs or “helper cells” that help the immune system remember experiences with specific germs.

References: Urashima M, Segawa T, Okazaki M, et al. Randomized trial of vitamin D supplementation to prevent seasonal influenza A in schoolchildren. *American Journal of Clinical Nutrition*, 2010; doi 10.3945/ajcn2009.29094. von Essen MR, Kongsbak M, Schjerling P, et al. Vitamin D controls T cell antigen receptor signaling and activation of human T cells. *Nature Immunology*, 2010; doi 10.1038/ni.1851. □

## Vitamin E Protects Against Nerve Damage from Chemo Drug

Taking supplements of natural-source vitamin E can greatly reduce the symptoms of peripheral neuropathy caused by cisplatin, a chemotherapeutic drug commonly used to treat patients with cancer.

Cisplatin causes peripheral neuropathy – nerve damage in legs, feet, arms, and hands – in 90 percent of patients taking the drug. Symptoms are typically more severe at higher dosages.

Andrea Pace, MD, of the Regina Elena National Cancer Institute, in Rome, Italy, and her colleagues tracked 41 cancer patients who had received very high doses of cisplatin, 300 to 630 mg/m<sup>2</sup>, in the treatment of lung, brain, endometrial, and other types of cancer. Seventeen of the patients received 400 mg (600 IU) of vitamin E, starting before chemotherapy began and continuing for three months after chemotherapy. Meanwhile, 24 patients received placebos.

Of the patients taking vitamin E, only 1 (5.9 percent) developed neurotoxicity. In contrast, 10 (41.7 percent) of the patients getting placebos had neurotoxicity symptoms. Those symptoms included a lack of nerve sensitivity to touch and vibration, as well as a pins-and-needle feeling.

“Experimental and clinical studies do not show significant differences in survival and tumor response in vitamin E-supplemented groups compared with control groups,” wrote Pace and her colleagues. “Moreover, the reduction of cisplatin-induced neurotoxicity could increase the therapeutic index and allow for the administration of higher doses.”

The researchers wrote that cisplatin neurotoxicity appears related to free radical damage and that, as an antioxidant, vitamin E protects against it.

Reference: Pace A, Giannarelli D, Galie E, et al. Vitamin E neuroprotection for cisplatin neuropathy. *Neurology*, 2010; 74:762-766. □

## Taking Supplements Improves Behavior of Prison Inmates

A large body of research indicates that dietary habits and many specific nutrients can influence mood and behavior. In the latest study along these lines, young men who took nutritional supplements had better behavior and incurred fewer infractions while serving time in prison.

Ap Zaalberg, MSc, of the Ministry of Justice, The Hague, Netherlands, and his colleagues, gave either nutritional supplements or placebos daily to 221 male prisoners at eight prisons. The men ranged from 18 to 25 years of age.

The daily supplements consisted of a modest multivitamin and multimineral supplement, plus 400 mg of eicosapentaenoic acid (EPA), 400 mg of docosahexaenoic acid (DHA), and 100 mg of gamma-linolenic acid. The supplements were taken for at least 30 days and up to 90 days.

Prison staff supervised the inmates when they took the supplements or placebos during lunch. When asked, the men did not know whether they were taking nutritional supplements or placebos.

Inmates taking the supplements were significantly less likely to break prison rules. They were far less likely to violate prison rules regarding the use or possession of alcohol or illegal drugs. In addition, men taking the supplements exhibited somewhat less aggressive and hostile behavior.

Meanwhile, men in the placebo group had a 14 percent increase in incidents.

The prison study was similar in design to one conducted in Britain and published in 2002.

EPA and DHA are especially important for brain and nervous system development, as well as mood and behavior.

Reference: Zaalberg A, Nijman H, Bulten E, et al. Effects of nutritional supplements on aggression, rule-breaking, and psychopathology among young adult prisoners. *Aggressive Behavior*, 2009;35:1-10. □

More research summaries on next page

## Quick Reviews of Recent Research

### • Resveratrol improves brain blood flow

British researchers gave 22 healthy adults 250 mg of resveratrol, 500 mg of resveratrol, or placebos on different days. Resveratrol is an antioxidant that had been shown to activate the Sirt1 gene, which can help maintain normal blood sugar levels and also plays an important role in longevity. Both doses of resveratrol increased blood flow in the brains of subjects, with the higher dose leading to greater improvements in blood flow.

Kennedy DO. *American Journal of Clinical Nutrition*, 2010: doi 10.3945/ajcn.200928641.

### • St. John's wort eases hot flashes

Iranian doctors treated 100 perimenopausal women with either the herb St. John's wort or placebos for eight weeks. After both four and eight weeks, the women taking St. John's wort had a significant reduction in hot flashes.

Abdali K. *Menopause*, 2010;17:326-331.

### • Amino acids might help brain injuries heal

Injuries to the brain result in a significant decrease of amino acids in the hippocampus, possibly because these building blocks of protein are needed for the healing process. Researchers at the Children's Hospital, Philadelphia, Pennsylvania, fed mice branched-chain amino acids (leucine, isoleucine, and valine) after they suffered a serious brain injury. The supplements improved cognitive function, and the researchers noted that a similar therapy could help people recover from traumatic brain injuries.

Cole JT. *Proceedings of the National Academy of Sciences*, 2009: doi 10.1073/pnas.0910280107.

### • DHA may have benefits in cancer treatment

Docosahexaenoic acid (DHA), one of the key constituents of omega-3 fish oils, and DHA's derivatives may have some benefits in fighting cancer. Researchers at the Karolinska Institute, Stockholm, Sweden, exposed neuroblastoma cells to DHA and by products of DHA. DHA destroyed the cancer cells, but some of the cellular byproducts of DHA, such as 17-HpDHA, had significantly greater anticancer effects. DHA also inhibited production of prostaglandin E2, a proinflammatory compound.

Gleissman H. *FASEB Journal*, 2010: epub ahead of print.

### • Vitamin K2 may protect against cancer

German researchers investigated the consumption of vitamin K2 from foods (primarily cheese) and its relationship to the risk of cancer in a group of 24,340 people. Overall, those with the highest intake of vitamin K2 were 14 percent less likely to develop cancer during a follow-up period of at least 10 years. High intake of vitamin K was associated with a

28 percent lower risk of death from cancer. The apparent benefits of vitamin K were most clear in men, with high levels of the vitamin associated with a lower risk of prostate and lung cancers.

Nimptsch K. *American Journal of Clinical Nutrition*, 2010: doi 10.3945/ajcn.2009.28691.

### • Selenium may reduce diabetes risk

French and British researchers studied the relationship between selenium consumption and the risk of developing prediabetes or type 2 diabetes in a group of 1,162 people. Over nine years of follow up, 127 cases of blood-sugar problems were diagnosed. People with the highest dietary consumption of selenium had one-half the risk of developing either impaired glucose tolerance of type 2 diabetes.

Akbaraly TN. *Nutrition & Metabolism*, 2010: doi 10.1186/1743-7075-7-21.

### • Cola drinks may impact semen quality

Danish researchers investigated the relationship between cola consumption and semen quality among 2,554 young men. Moderate intakes of caffeine from cola drinks did not affect semen quality. However, high cola consumption (with or without caffeine) reduced sperm counts by 30 percent. Consuming more than 34 ounces of soft drinks or more than 800 mg of caffeine daily had the greatest impact on sperm counts. Caffeine from other sources, such as from coffee and tea, had less of an effect on sperm.

Jensen TK. *American Journal of Epidemiology*, 2010: doi 10.1093/aje/kwq007.

### • Beta-carotene converts poorly to vitamin A

Researchers reported that the conversion of beta-carotene to vitamin A varies among different fruits and vegetables and in general is not very efficient. Only 1/12th to 1/27th of beta-carotene gets converted to vitamin A.

Tang G. *American Journal of Clinical Nutrition*, 2010: doi 10.3945/ajcn.2010.38674G.

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