

# The Whitehall-Robins Supplement

## A selection of recent findings in the field of nutrition

December 2009 - Volume 13, Number 4

### **Calcium plus vitamin D supplementation and fat mass loss in female very low-calcium consumers: potential link with a calcium-specific appetite control.**

Some studies suggested that in some obese individuals, calcium supplementation might accentuate fat mass loss in the context of a weight-reducing program. Several mechanism(s) have been proposed such as the suppression of calcitriol with increased calcium consumption, leading to a reduced lipogenic gene expression and stimulation of lipolysis. Moreover, a diet high in calcium was also shown to increase 24h lipid oxidation and reduce lipid absorption. There is also the possibility that low calcium intake or stores might trigger episodes of increased desire to eat calcium-containing items, and potentially other nutrients and/or food recognized as calcium-rich. This randomized, double-blind, placebo-controlled trial compared the effect of a 15-week weight-reducing program (-2900 kJ/d) on body fat and spontaneous energy/macronutrient intake either with or without calcium + vitamin D supplementation (600mg elemental calcium and 200 IU vitamin D, consumed twice a day). 63 overweight or obese women reporting a daily calcium intake <800mg participated in the study. The supplementation produced no significant increase in fat mass loss in response to energy restriction. However, when only the very low calcium consumer [VL-CC women, baseline calcium intake <600mg/d] were analyzed, the treatment group presented a weight and fat loss more than four times that observed to the placebo group. Compared to baseline, the treatment group also consumed significantly less lipids. The authors speculated that the co-occurrence of fats and calcium in many foods might orientate calcium-deficient individuals towards a selection of high-fat foods. No significant change was observed in the resting metabolic rates, suggesting that it did not contribute to the differences in body weights between groups. The authors concluded that “in the context of a weight-reducing programme, a calcium+D supplementation was necessary in female overweight/obese VL-CC to reach significant fat mass loss that seemed to be partly explained by a decrease in lipid intake. We propose that this change in lipid intake could be influenced by calcium-specific appetite control”.

[Major GC, et al. *Br J Nutr* 2009;101:659-663]

### **Inverse association of carotenoid intake with 4-y change in bone mineral density in elderly men and women: the Framingham Osteoporosis Study.**

Several studies suggested that carotenoids may inhibit bone resorption and stimulate osteoblasts. This study aimed to evaluate the association between carotenoid intake and bone mineral density (BMD). Specifically, BMD at the hip, spine, radial shaft and 4 year change in BMD. This study included 334 men and 540 women from the Framingham Osteoporosis Study. Carotenoids were assessed as a total and as individual components (-carotene, -carotene, -cryptoxanthin, lycopene, and lutein+zeaxanthin). No correlations were seen in cross-sectional analysis between carotenoids (total or individual) and BMD with the exception of lycopene. Data showed that among women, higher lycopene intake was associated with higher trochanter and radial BMD (P for trend was 0.02 and 0.07 respectively). However, in men, higher lycopene levels was associated with a lower BMD (P for trend = 0.005). When comparing the 4 year change of BMD in women, higher lycopene intake was associated with less bone loss from the lumbar spine (P=0.03). In men, higher intake of carotenoids was associated with less loss in trochanter BMD; this was seen for all carotenoids but was not statistically significant for -carotene and -cryptoxanthin (P>0.1). The authors concluded that “carotenoids showed protective associations against 4 year loss in trochanter BMD in men and in lumbar spine in women. No significant associations were observed at other bone sites. Although not consistent across all BMD sites examined, these results support a protective role of carotenoids for BMD in older men and women.”

[Sahni S, et al. *Am J Clin Nutr* 2009; 89:416-424]

### **Folic acid, pyridoxine, and cyanocobalamin combination treatment and age-related macular degeneration in women. The Women's Antioxidant and Folic Acid Cardiovascular Study.**

Age-related macular degeneration (AMD) is the leading cause of severe irreversible vision loss in older Americans. Currently, avoidance of cigarette smoking is the only known method to prevent this condition. However, recent cross-sectional and case-control studies indicate a direct association between the homocysteine concentration in blood and the risk of AMD, suggesting that homocysteine may be a modifiable risk factor for AMD. Treatment with folic acid, pyridoxine hydrochloride (vitamin B6) and cyanocobalamin (vitamin B12) has been shown to reduce homocysteine levels in intervention studies. This study was a randomized, double-blind, placebo-controlled trial that evaluated whether a combination of folic acid and vitamins B6 and B12 could reduce the incidence of AMD in women with preexisting cardiovascular disease or with 3 or more coronary risk factors. 5205 women were randomized into either the placebo group or treatment group which included a daily combination of folic acid (2.5mg/d), pyridoxine hydrochloride (50mg/d) and cyanocobalamin (1mg/d). After an average of 7.3 years of treatment and follow-up, 55 cases of AMD were reported in the treatment group versus 82 cases in the placebo group (risk ratio = 0.66, P=0.02). Of those reporting AMD, 26 cases were considered visually significant in the treatment group compared to 44 in the placebo group (risk ratio = 0.59, P= 0.03). The beneficial effect of the combination treatment on total AMD began to emerge

Hilary Schinkel, M.Sc., Scientific Affairs, Wyeth Consumer Healthcare is a contributing author.

# The Whitehall-Robins Supplement

## A selection of recent findings in the field of nutrition

at approximately 2 years of treatment and persisted throughout the trial. The authors concluded, “These randomized trial data from a large cohort of women at high risk of cardiovascular disease indicate that daily supplementation with folic acid, pyridoxine, and cyanocobalamin may reduce the risk of AMD.”

[Christen WG, et al. *Arch Intern Med* 2009; 169:335-341]

### **Effect of calcium supplementation on fracture risk: a double-blind randomized controlled trial.**

Many studies have examined the use of calcium and vitamin D supplementation on incidence of bone fractures. This study assessed the effect of calcium alone on the incidence of fracture. This double-blind randomized controlled trial, investigated whether 4 years of calcium supplementation will reduce the risk of fracture during and after treatment. Participants were randomly assigned into either the placebo group or the treatment group. The treatment group received a 4 year supply of calcium carbonate (providing 1200mg of elemental Ca/day). Participants were then followed for a mean average of 10.8 years with primary outcome being all fractures, and minimal trauma fractures caused by a fall from standing height or lower. In total, there were 100 fractures, 46 (15 from minimal trauma) in the calcium group and 54 (29 from minimal trauma) in the placebo group. Overall risk of fracture differed during the treatment phase [ Hazard Ratio(HR): 0.28; 95% CI: 0.09-0.85) but not during the post-treatment follow up (HR: 1.10; 95% CI: 0.71-1.69). This study concluded that “there was a marked reduction in the risk of fractures – particularly minimal fractures – during the 4-y treatment period. In subsequent follow-up this benefit was not apparent.” The authors conclude “ Calcium supplementation reduced the risk of all fractures and of minimal trauma fractures among healthy individuals. The benefit appeared to dissipate after treatment was stopped”.

[Bischoff-Ferrari HA, et al. *Am J Clin Nutr* 2008; 87: 1945-1951]

### **Suggested Readings**

#### **Is there Convincing biological or behavioral evidence linking vitamin D deficiency to brain dysfunction? [Review]**

[McCann JC, et al. *FASEB* 2008; 22:982-1001]

#### **Diet and risk factors for age-related maculopathy.**

[O’Connell ED, et al. *Am J Clin Nutr* 2008; 87:712-722]

#### **Folate, vitamin B6, vitamin B12, and methionine intakes and risk of stroke subtypes in male smokers.**

[Larsson SC, et al. *Am J Epidemiol* 2008;167: 954-961]

#### **Dietary intake of vitamin K and risk of prostate cancer in the Heidelberg cohort of the European Prospective Investigation into Cancer and Nutrition (EPIC-Heidelberg).**

[Nimptsch K, et al. *Am J Clin Nutr* 2008;87:985-992]

#### **Effect of vitamin B12 deficiency on neurodevelopment in infants: current knowledge and possible mechanisms.**

[Dror DK, et al. *Nutr Rev* 2008;66:250-255]

#### **Maternal Fish intake during pregnancy, blood mercury levels, and child cognition at age 3 years in a US cohort.**

[Oken E, et al. *Am J Epidemiol* 2008; 167:1171-1181]

#### **Independent association of low serum 25-hydroxyvitamin D and 1,25-dihydroxyvitamin D levels with all-cause and cardiovascular mortality.**

[Dobnig H, et al. *Arch Intern Med* 2008;168:1340-1349]

#### **Vitamin B 12 status and rate of brain volume loss in community-dwelling elderly.**

[Vogiatzoglou A, et al. *Neurology* 2008; 71:826-832]

#### **High vitamin C intake is associated with lower 4-year bone loss in elderly men.**

[Sahni S, et al. *J Nutr* 2008;138:1931-1938]

#### **Oily fish consumption, dietary docosahexaenoic acid and eicosapentaenoic acid intakes, and associations with neovascular age-related macular degeneration.**

[Augood C, et al. *Am J Clin Nutr* 2008;88:398-406]