

The Whitehall-Robins Supplement

A Selection of Recent Findings in the Field of Nutrition

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Dietary intake of lycopene is associated with reduced pancreatic cancer risk.

In Canada, pancreatic cancer is the fourth leading cause of cancer-related mortality with an extremely low survival rate. Several epidemiologic studies suggested that high consumption of fruits and vegetables is associated with a reduced risk of pancreatic cancer. Fruits and vegetables are major sources of carotenoids such as α -carotene, β -carotene, lycopene, lutein and zeaxanthin, and β -cryptoxanthin. Experimental studies provided mechanistic evidence that carotenoids might be important in cancer prevention. This benefit could be due to their antioxidant activities, improving immune function, inhibition of cellular proliferation in addition to other functions. Despite this suggested evidence, no epidemiologic studies have investigated the possible association between dietary carotenoids and pancreatic cancer. This case-control study of 462 confirmed pancreatic cancer cases and 4,721 controls residing in eight provinces in Canada investigated this association as well as examining the modifying effect of smoking on this association. Adjusting for several confounding variables, lycopene (provided mainly from tomatoes) was associated with a 31% reduction in pancreatic cancer risk. High intake of β -carotene and total carotenoids were significantly associated with reduced risk of pancreatic cancer among those who never smoked. The authors conclude “as a whole, our data supported the association of a diet rich in vegetables with a reduction in risk of pancreatic cancer. More studies assessing associations between dietary carotenoids and the risk of pancreatic cancer are warranted to better elucidate the role of the diet in the etiology of pancreatic cancer.”

[Nkondjock A, et al. *J Nutr* 2005;135: 592-597]

Vitamin D deficiency and whole-body and femur bone mass relative to weight in healthy newborns.

Vitamin D is essential for bone mineralization and for bone growth. In Northern climates, endogenous vitamin D synthesis is limited to the months between April to September. It is becoming widely recognized that the current dietary recommendations (200 IU) for vitamin D is not adequate to prevent vitamin D deficiency. In Canada, vitamin D deficiency, is highly prevalent in different regions and populations across the country. For example, in Northern Manitoba, vitamin D deficiency, was reported to be as high as 76% and 43% among women and children (3-24 months) respectively. This study investigated whether maternal or infant vitamin D deficiency at birth is associated with bone mineral content (BMC) of Canadian infants born in Winnipeg. Plasma 25-hydroxyvitamin D [25(OH) D] that is an indicator of vitamin D status was measured in 50 healthy mothers and their newborn infants. For infants, anthropometry and lumbar, femur, and whole-body BMC were measured within 15 days of delivery. Furthermore, the mothers completed a 24-hour recall and 3-day food and supplement records. In this study, 46% of the mothers and 36% of the infants were vitamin D deficient based on their plasma 25-hydroxyvitamin D [25(OH) D] levels. Infants who were vitamin D deficient were on average heavier and longer than those with adequate vitamin D. However, despite this greater size, they had lower whole-body BMC relative to their body weight. This suggests that because of their inadequate vitamin D status, bone mineralization was compromised. Also, higher whole-body BMC was associated with greater gestational age and weight and higher plasma 25-hydroxyvitamin D [25(OH) D]. The authors conclude “a high rate of vitamin D deficiency was observed among women and their newborn infants. Among infants, vitamin D deficiency was associated with greater weight and length but lower bone mass relative to body weight. Whether a return to normal vitamin D status, achieved through supplements or fortified infant formula, can reset the trajectory for acquisition of BMC requires investigation.”

[Weiler H, et al. *CMAJ* 2005;172:757-761]

α -tocopherol disappearance is faster in cigarette smokers and is inversely related to their ascorbic acid status.

The adverse health effects of smoking are well known. This adverse effect of smoking is largely attributed to the increasing levels of free radicals, which react with biomolecules. Increased oxidative stress from smoking explains the higher requirements for ascorbic acid (vitamin C) for smokers. Very little is known whether, vitamin E requirements are also higher for smokers. This study investigated whether cigarette smoking increases plasma α -tocopherol disappearance in otherwise healthy humans. Smokers and non-smokers were given 75 mg of deuterium-labeled α -tocopherol acetates for 6 days. In this study, oxidative stress caused by cigarette smoking resulted in an increased disappearance rates of α -tocopherol. In cigarette smokers, but not in nonsmokers, the increased disappearance rates of α -tocopherol were significantly correlated with plasma ascorbic acid. The authors conclude “cigarette smoking increased α -tocopherol disappearance. Greater rates of α -tocopherol in smokers appear to be related to increased oxidative stress accompanied by lower ascorbic acid concentrations. Thus, smokers have an increased requirement for both α -tocopherol and ascorbic acid.”

[Bruno RS, et al. *Am J Clin Nutr* 2005;81:95-103]

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Vitamin C supplementation to prevent premature rupture of the chorioamniotic membranes: a randomized trial.

Premature rupture of the chorioamniotic membranes (PROM) complicates 10-20% of all pregnancies. PROM is associated with increased morbidity and mortality for mothers and neonates and is the main cause of preterm delivery worldwide. From public health point of view, preventing this condition is important. It has been suggested that adequate vitamin C is one of the important tools to reduce the risk of this condition. Vitamin C is involved in the synthesis and degradation of collagen and in the maintenance of the chorioamniotic membranes. This randomized double-blind controlled study evaluated the effectiveness of vitamin C supplementation in preventing PROM compared to placebo. This study enrolled 120 pregnant women in their 20th week of gestation who were randomly assigned to either 100 mg of vitamin C/day or placebo. The incidence of PROM was ascertained for each group. Mean plasma vitamin C concentrations decreased significantly in both groups, which could be explained by the effects of hemodilution and the active transport of vitamin C to the fetus. The incidence of PROM was 24.5% in the placebo group and 7.7% in the supplemental group. This translates to nearly a 75% reduction in the risk of PROM among the vitamin C supplemented group compared to placebo. The authors conclude "Daily supplementation with 100 mg vitamin C after 20 weeks of gestation effectively lessens the incidence of PROM."

[Casanueva E, et al. *Am J Clin Nutr* 2005; 81:859-863]

Suggested Readings

Dairy augmentation of total and central fat loss in obese subjects.

[Zemel MB, et al. *Int J Obes Relat Metab Disord* 2005; 1-7]

Greater maternal weight and the ongoing risk of neural tube defects after folic acid flour fortification.

[Ray JG, et al. *Obstet Gynecol* 2005;105:261-265]

Phylloquinone intake as a marker for coronary heart disease risk but not stroke in women.

[Erkilla AT, et al. *Eur J Clin Nutr* 2005;59:196-204]

The combination of high fruit and vegetable and low saturated fat intakes is more protective against mortality in aging men than is either alone: The Baltimore Longitudinal Study of Aging

[Tucker KL, et al. *J Nutr* 2005;135:556-561]

Consumption of trans fatty acids is related to plasma biomarkers of inflammation and endothelial dysfunction.

[Lopez-Garcia E, et al. *J Nutr* 2005;135: 562-566]

Caffeine and risk of atrial fibrillation or flutter: the Danish Diet, cancer, and Health Study.

[Frost L, et al. *Am J Clin Nutr* 2005;81:578-582]

Homocysteine and stroke: evidence on a causal link from mendelian randomization.

[Casas JP, et al. *Lancet* 2005;365:224-232]

Association between reported alcohol intake and cognition: results from the Women's Health Initiative Memory Study.

[Espeland MA, et al. *Am J Epidemiol* 2005;161:228-238]

Carbohydrate intake and glycemic index in relation to the odds of early cortical and nuclear lens opacities.

[Chiu C, et al. *Am J Clin Nutr* 2005;81; 141-1416]

Vitamin E in the primary prevention of cardiovascular disease and cancer. The Women's Health Study: A randomized controlled trial.

[Lee IM, et al. *JAMA* 2005;294:56-65]