The Whitehall-Robins Supplement

A Selection of Recent Findings in the Field of Nutrition

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Vitamin D and calcium intake in relation to type 2 diabetes in women.
There is growing evidence to suggest that calcium and vitamin D intake is associated with the risk of type 2 diabetes. Several studies suggested that low serum concentrations of 25-hydroxyvitamin D [25(OH) D] are associated with impaired glucose tolerance and that high calcium intake is inversely related to body weight and fatness, which are risk factors for type 2 diabetes. This large prospective study in women is the first to evaluate the association between vitamin D and calcium intake and the risk of type 2 diabetes. This cohort of nearly 84,000 women was followed for 20 years during which 4,843 incident cases of type 2 diabetes were documented. The participants had no history of diabetes, cardiovascular disease, or cancer at baseline. Vitamin D and calcium intake from diet and supplements was assessed every 2-4 years. Adjusting for multiple potential confounders, vitamin D and calcium intakes were inversely associated with type 2 diabetes, and the benefits of the two nutrients appears to be additive. For both nutrients, intakes from supplements rather than from diet were significantly associated with a lower risk of type 2 diabetes. The additive effects of calcium and vitamin D intake suggests that increased vitamin D may potentiate the effect of calcium, however, it does not preclude the direct effect of vitamin D independent of its role in calcium metabolism. In this study, a combined daily intake of > 1,200 mg calcium and > 800 IU vitamin D was associated with a 33% reduction in the risk of type 2 diabetes compared with an intake of <600 mg and 400 IU of calcium and vitamin D respectively. The authors conclude " The results of this large prospective study suggests a potential beneficial role for both vitamin D and calcium in reducing the risk of type 2 diabetes".
[Pittas AG, et al. Diabetes Care 2006; 29:650-656]

Estimation of optimal serum concentrations of 25-hydroxyvitamin D for multiple health outcomes.
Recent and convincing evidence suggests that vitamin D intake above the current recommendations is associated with favourable health outcomes. The optimal serum concentrations of 25-hydroxyvitamin D [25(OH) D] are not well defined. The common criterion of the optimal 25-hydroxyvitamin D concentration has been the level that maximally suppresses serum parathyroid hormone (PTH), which is a useful criterion for bone health in older white persons. Furthermore, estimates of optimal 25(OH) D concentrations using PTH suppression as a criterion vary widely from 10 to 110 nmol/L. The authors of this research article reviewed recent work to estimate the optimal 25 (OH) D concentration for multiple health outcomes. These health outcomes included bone mineral density (BMD) in younger and older adults of different racial or ethnic backgrounds, risk of falls or fractures, lower extremity function, dental health and colorectal cancer. For all of these endpoints, the most beneficial serum concentration of 25 (OH) D begins at 75 nmol/L and the ideal concentration was between 90-100 nmol/L. These concentrations could not be reached with the current recommended intakes of 200 and 600 IU vitamin /D for younger and older adults respectively. The authors conclude; "An intake for all adults of ≥ 1000 (40 µg) vitamin D (Cholecalciferol)/d is needed to bring vitamin D concentrations in no less than 50% of the population up to 75 nmol/L. The implications of higher doses for the entire adult population should be addressed in future studies".
[Bischoff-Ferrari HA, et al. Am J Clin Nutr 2006; 84:18-28]

Improvement in stroke mortality in Canada and the United States, 1990 to 2002.
Folic acid fortification of grain products was implemented in the United States and Canada in 1998. Following fortification, there was an increase in serum folate concentrations, reduction in the rate of neural tube defects, and a reduction in blood homocysteine concentrations in both populations. High blood homocysteine levels appear to be an independent risk factor for stroke and this reduction in homocysteine concentrations post fortification could be beneficial to health. Stroke is a major public health concern in the United States and Canada, however, stroke associated mortality improved in recent years. In this populations-based cohort study, the authors evaluated trends in stroke-related mortality before and after folic acid fortification in the United States and Canada and compared them to stroke mortality trends in England and Wales, where fortification is not required. The slow decline in stroke mortality rates in the early 1990 accelerated significantly in the United States and Canada post mandatory fortification in 1998. For example, the reduction in stroke mortality in Canada averaged -1.0% per year from 1990 to 1997 and accelerated to –5.4% per year in 1998 to 2002. These percentages means nearly 2,800 fewer stroke deaths per year than if the trend established in 1990 to 1997 had continued without change. Such an accelerated decline was not observed in Wales and England between 1990 and 2002. This improvement paralleled the reduction in the rates of neural tube defects in both countries. This improvement in stroke mortality in both countries appears to be largely independent of changes in all cause mortality. The authors conclude, "The improvement in stroke mortality observed after folic acid fortification in the United States and Canada but not in England and Wales is consistent with the hypothesis that folic acid fortification helps to reduce deaths from stroke".
[Yang Q, et al. Circulation 2006; 113; 1335-1343]

Magnesium intake and reduced risk of colon cancer in prospective study of women.
There are recent reports of an inverse association between magnesium intake and colorectal cancer. The possible mechanisms for such benefit are that magnesium may reduce oxidative stress, improve insulin sensitivity and decrease colonic epithelial cell proliferation. The authors of this study investigated this association in a cohort of 35, 196 women aged 55-69 years and free of cancer when the study began in 1986. Intakes of several nutrients including magnesium and other variables were assessed at baseline. Over 17 years of follow-up, 1,112 women developed colorectal cancer in this cohort. Adjusting for several potential risk factor high magnesium intake (307-351 mg/day) was associated with a 20% reduction in the risk of colorectal cancer. This reduction was mostly attributed to a reduction in the risk of colon cancer, as the association was largely absent for rectal cancer. The authors conclude, "These findings offer further evidence that a diet high in magnesium may reduce the occurrence of colon cancer among women. If replicated by other observational studies, a clinical trial would be needed to determine whether it is magnesium, specifically, and not other aspects of the contributing foods, that may offer benefit".
[Folsom AA, et al. Am J Epidemiol 2006; 163:232-235]

Suggested Readings

Orally administered betaine has an acute and dose-dependent effect on serum betaine and plasma homocysteine concentrations in healthy humans.
[Schwab U, et al. J Nutr 2006; 136:34-38]

Effect of Cholecalciferol plus calcium on falling in ambulatory older men and women. A 3-year randomized controlled trial.
[Bischoff-Ferrari HA, et al. Arch Intern Med 2006; 166:424-430]

Optimizing bone health and calcium intake of infants, children, and adolescents.
[Greer FR, et al. Pediatrics 2006; 117:578-585]

Faster plasma vitamin E disappearance in smokers is normalized by vitamin C supplementation.
[Bruno RS, et al. Free Radic Biol Med 2006; 40: 689-697]

Association of low intake of milk and vitamin D during pregnancy with decreased birth weight.
[Mannion CA, et al. CMAJ 2006; 174:1273-1277]

Vitamin K and the prevention of fractures. Systematic review and meta-analysis of randomized controlled trials.
[Cockayne S, et al. Arch Intern Med 2006; 166:1256-1261]

Calcium intake and 10-year weight change in middle-aged adults.
[Alejandro J, et al. J Am Diet Assoc 2006; 106; 1066-1073]

ω-3 fatty acids treatment in 174 patients with mild to moderate Alzheimer disease: OmegAD Study. A randomized double-blind trial.
[Freund-Levi Y, et al. Arch Neurol 2006; 63:1402-1408]

Vitamin D status and the metabolic syndrome.
[Martini LA, et al. Nutr Rev 2006; 64:479-486]

A randomized controlled study of effects of dietary magnesium oxide supplementation on bone mineral content in healthy girls.
[Carpenter TO, et al. J Clin Endocrinol Metab 2006; 91: 4866-4872]