The Whitehall-Robins Supplement

A Selection of Recent Findings in the Field of Nutrition

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Plasma lycopene, other carotenoids, and retinol and the risk of cardiovascular disease in women.
There is growing evidence that lycopene, a major carotenoid has significant antioxidant properties. Lycopene is found in high concentration in a limited number of plant foods such as tomato, watermelon, pink grapefruit, papaya, and apricot. More than 80% of the lycopene intake in the American diet is from tomato products (ketchup, tomato juice, and tomato sauce). Lycopene may have an inhibiting effect on cholesterol synthesis and this may enhance LDL degradation. There is evidence from short term studies that lycopene can have an effect on LDL oxidation. This suggests that lycopene might have an effect on the risk of cardiovascular disease (CVD). Data concerning the relation between plasma lycopene concentrations and CVD are limited, particularly in women. Also, little is known whether all carotenoids, specific carotenoids such as lutein/zeaxanthin are associated with a reduced risk of CVD. This association was examined in a large prospective study of middle-aged and elderly women, who provided baseline blood samples. Plasma lycopene, other carotenoids, retinol, and total cholesterol were measured. During nearly five years of follow-up, 483 incident CVD cases were identified which were matched to 483 controls in this study. In this study, the investigators found that the women in the upper half of plasma lycopene had a significant 34% reduction in the risk of total CVD. For CVD, exclusive of angina, women in the upper three quartiles of plasma lycopene had a significant 50% risk reduction in CVD compared with those in the lowest quartile. This suggests that plasma lycopene may prevent more serious CVD. Increasing quartiles of plasma retinol, β-cryptoxanthin, and lutein/zeaxanthin were not associated with the risk of CVD. The authors conclude, "Further research on the potential mechanistic actions of lycopene in the prevention of CVD and other chronic diseases is warranted."
[Sesso HD, et al. Am J Clin Nutr 2004;79:47-53]

Association of obesity and cancer risk in Canada.
The prevalence of obesity is steadily increasing in developing and developed countries and is recognized as a major contributor to the global burden of several diseases. Obesity increases the risk of several diseases and/or conditions such as hypertension, type 2 diabetes, heart disease, stroke, some cancers, respiratory and joint problems as well as poor mental health. Obesity reduces life expectancy, particularly among young adults. It is estimated that 33% of Canadian are overweight and 15% are obese. It is estimated that the total cost for obesity-related health problems is nearly 2 billion dollars in Canada. Although the associations between obesity and most of the above mentioned conditions are well recognized, the relation of obesity to overall cancer and site-specific cancers has not been well researched. The authors assessed the relation of obesity to overall cancer and site-specific cancers using the National Enhanced Cancer Surveillance System (NECSS). This study found that obese and overweight people had a 34% and 9% increased risk for all 19 cancers respectively compared with subjects with a body mass index of less than 25 kg/m². Obese people had an increased risk of non-Hodgkin's lymphoma, leukemia, multiple myeloma, and cancers of the kidney, colon, rectum, breast, ovary, pancreas, and prostate. If this association is causal, then overweight and obesity would account for 7.7% of overall cancer. There are several plausible mechanisms for this association, including changes in endogenous hormone metabolism, increase in the production of free radicals, DNA damage, and alteration in carcinogen-metabolizing enzymes. The authors conclude, "Because obesity is a growing global problem and is also a modifiable lifestyle factor, the prevention or reduction of obesity by increasing physical activity and decreasing caloric intake would have enormous public health impact."
[Pan SY, et al. Am J Epidemiol 2004;159:259-268]

Antioxidants and physical performance in elderly persons: the Invecchiare in Chianti (InCHIANTI) study.
The assessment of physical function is an important component in the general evaluation of the elderly. Some of these performance measures, such as knee extension strength and performance as well as other measures have been shown to be useful in the prediction of institutionalization, disability, and mortality. There is recent evidence that age-related physical and functional activity decline might be related to oxidative damage caused by free radicals. The body contains an antioxidant defense, and the vitamins C and E, β-carotene, and retinol are the primary antioxidant nutrients. The objective of this study was to assess the correlation of plasma concentrations and daily dietary intakes of antioxidants with skeletal muscle strength and physical performance in the elderly. The study comprised of 986 men and women aged ≥ 65 years. In this study, plasma α–tocopherol was significantly correlated with knee extension and physical performance. Plasma γ-tocopherol was associated only with knee extension. Of the daily dietary intake measures, vitamin C and β-carotene were significantly correlated with knee extension strength and vitamin C was significantly associated with physical performance. The authors conclude, "Our study indicates a significant positive correlation between plasma antioxidant concentrations and physical performance and strength. Higher dietary intakes of antioxidants, especially of vitamin C, in the elderly were also found to be associated with greater skeletal muscular strength. However, the potentially positive effects of antioxidant intakes on performance and strength need to be confirmed in future prospective studies and clinical trials."
[Cesari M, et al. Am J Clin Nutr 2004;79:289-294]

Serum vitamin levels and the risk of asthma in children.
There is an increasing interest in the role of nutrition in the development of asthma, and it has been postulated that changes in diet and nutrition might explain the increasing prevalence of asthma. The research interest has focused on the intake of antioxidant vitamins, especially vitamins A, C, E and the carotenoids, because of their antioxidant properties. This association was investigated in 4,095 children between the ages of 6-17 years who were participating in the Third National Health and Nutrition Examination Survey (NHANES III) in the US. The study population represents a national population sample, and the data set includes medical information, socio-economic, anthropometric, as well as serum levels of some vitamins. The major result of the study is that the risk of childhood asthma is increased when the serum levels of vitamin C and the carotenoids, including α-carotene, β-carotene, and β-cryptoxanthin are low. There was no association of lower serum concentrations of vitamin A or E with the risk of having asthma. When potential confounding variables were adjusted for in the analysis, only low vitamin C and α-carotene were associated with the risk of having asthma.
[Harik-Khan RI, et al. Am J Epidemiol 2004;159:351-357]

Suggested Readings

Overweight and obesity mortality trends in Canada, 1985-2000
[Katzmarzyk PT, et al. Can J Public Health 2004;95:16-20]

α-tocopherol and ascorbic acid decrease the production of β-apo-carotenals and increase the formation of retinoids from β-carotene in the lung tissues of cigarette smoke-exposed ferrets in vitro. [Nut/Cancer Binder]
[Liu C, et al. J Nutr 2004;134:426-430]

Reduced risk of Alzheimer's Disease in users of antioxidant vitamin supplements. The Cache County Study
[Zandi PP, et al. Arch Neurol 2004;61:82-88]

Folate, vitamin B6 and B12 intakes in relation to risk of stroke among men.
[He K, et al. Stroke 2003;35:169-174]

Multivitamin use and colorectal cancer incidence in a US cohort: does timing matter?
[Jacobs EL, et al. Am J Epidemiol 2003;158:621-628]

Reduction of C-reactive protein levels through use of multivitamin.
[Church TS, et al. Am J Med 2003;115:702-707]

Lutein, but not α-tocopherol, supplementation improves visual function in patients with age-related cataracts: A 2-y double-blind, placebo-controlled pilot study.
[Olmedilla B, et al. Nutrition 2003;19:21-24]

Calcium supplementation provides an extended window of opportunity for bone mass accretion after menarche.
[Rozen GS, et al. Am J Clin Nutr 2003;78: 993-998]

Neural tube defects associated with maternal periconceptional dietary intake of simple sugars and the glycemic index.
[Shaw GM, et al. Am J Clin Nutr 2003;78: 972-978]

Antioxidant micronutrients and risk of rheumatoid arthritis in a cohort of older women.
[Cerhan CR, et al. Am J Epidemiol 2003;157:345-354]

Vitamin E reduces progression of atherosclerosis in low-density lipoprotein receptor-deficient mice with established vascular lesions.
[Cyrus T, et al. Circulation 2003;107:521-523]