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Human serum 25-hydroxycholecalciferol response to extended oral dosing with cholecalciferol (vitamin D)

Vitamin D is not a nutrient in the usual sense. It is not naturally present in most food items and thus solar exposure is a required stimulus to its synthesis in humans. People working and living in northern latitudes (such as Canada) might be deprived of adequate sun exposure and might need supplemental vitamin D. Recently, the concentration of serum 25-hydroxycholecalciferol [25(OH) D] was recognized as the functional indicator for vitamin D adequacy. Vitamin D input required to achieve or maintain any given serum 25-hydroxycholecalciferol concentration are not known. The objective of this study was to estimate the amount of vitamin D required each day to meet or sustain any given concentration of serum 25-hydroxycholecalciferol [25(OH) D] and to estimate the proportion of the daily requirement during winter that is met by vitamin D reserves in body tissue stores. This study enrolled 67 men living in Omaha (41.2° N latitude) during the winter. The subjects were randomly assigned to receive daily, no supplemental vitamin D, 1000 IU vitamin D, 5000 IU vitamin D or 10,000 IU vitamin D for 20 weeks. The time course of serum 25-hydroxycholecalciferol concentration was measured at intervals over the course of treatment. The main findings were that calculated oral input of vitamin D required to sustain the serum 25-hydroxycholecalciferol concentration present before the study (i.e., in the autumn) was 500 IU/d, whereas the total amount from all sources (supplemental, food, tissue stores) needed to sustain the starting 25-hydroxycholecalciferol concentration was estimated at 3,800 IU/d. The authors conclude "Healthy men seem to use 3,000-5,000 IU cholecalciferol /d, apparently meeting 80% of their winter cholecalciferol need with cutaneously synthesized accumulations from solar sources during the preceding summer months. Current recommended vitamin D inputs are inadequate to maintain serum 25-hydroxycholecalciferol concentration in the absence of substantial cutaneous production of vitamin D."
[Heaney RP, et al. Am J Clin Nutr 2003;77:204-210]

Roles of drinking pattern and type of alcohol consumed in coronary heart disease in men

Moderate alcohol drinking decreases the risk of myocardial infarction, however, it is less clear whether the type of beverage consumed, the pattern of drinking, and the consumption of alcohol with meals have a modifying role in the apparent benefits of moderate alcohol consumption. These associations were investigated in a large on-going cohort study of 38,077 male health professionals who were free of cardiovascular disease and cancer at the beginning of the study. The consumption of beer, red wine, white wine, and liquor was assessed individually every four years using validated food-frequency questionnaires. During 12 years of follow-up (1986-1998), there were 1,418 cases of myocardial infarction. As compared with men who consumed alcohol less than once per week, men who consumed alcohol three to four or five to seven days per week had decreased risk of myocardial infarction. These associations were strongest for beer and liquor, intermediate for white wine, and weakest for red wine. The association of alcohol consumption with myocardial infarction was similar for fatal and non-fatal events. The risk was similar among men who consumed less than 10 g of alcohol per drinking day and those who consumed 30 g or more. No single type of beverage conferred additional benefits, nor did consumption with meals. A 12.5 g (one drink) increase in daily alcohol consumption over a four-year follow-up period was associated with almost a 25% reduction in the risk of myocardial infarction. The authors conclude that "among men, consumption of alcohol at least three to four days per week was inversely associated with the risk of myocardial infarction. Neither the type of beverage nor the proportion consumed with meals substantially altered this association. Men who increased their alcohol consumption by a moderate amount during follow-up had a decreased risk of myocardial infarction."
[Mukamal KJ, et al. N Engl J Med 2003; 348:109-118]

Maternal vitamin use and reduced risk of neuroblastoma

Neuroblastoma is an embryonic tumor of the peripheral nervous system. It is the most common tumor in infants and it is common in children under the age of 15 years. This early age diagnosis suggests a preconceptional or perinatal origin for this tumor. Several studies have suggested that maternal vitamin use during pregnancy may

reduce the incidence of childhood brain tumors. Using data from a large North American study, the authors examined the relationship between maternal vitamin use before and during pregnancy and development of neuroblastoma. The cases were children diagnosed with neuroblastoma between May 1, 1992 and April 30, 1994 throughout instititutions in the United States and Canada. The investigators obtained vitamin use information through telephone interviews during specific periods before and during pregnancy from 538 cases and 504 control mothers. The main results of this study were that maternal daily multivitamin use during pregnancy was associated with reduced risk of neuroblastoma in offspring. The risk was decreased by 30-40% among daily users during any trimester. The investigators were unable to isolate the effects of specific vitamins and minerals, because multivitamin/multimineral preparations were the most common form of supplementation. The authors conclude "the results of this study suggest that vitamin use during pregnancy might reduce incidence of neuroblastoma, consistent with findings from other childhood cancers."
[Olshan AF, et al. Epidemiology 2002;13:575-580]

Dietary intake of antioxidants and risk of Alzheimer's disease

Several findings suggest that oxidative stress may play an important role in the pathogenesis of Alzheimer's disease. This suggests that the risk of Alzheimer's disease might be reduced by intake of antioxidants that counteract the detrimental effects of oxidative stress. This hypothesis was investigated in a population-based, prospective study in the Netherlands. Intake of a range of antioxidants from food, namely beta-carotene, flavonoids, vitamin C, and vitamin E and the risk of Alzheimer's disease were investigated in this cohort. The study comprised of 5,395 participants who at baseline, were aged at least 55 years, non-institutionalized, free of dementia and had a reliable dietary assessment. After a mean follow-up of six years, 197 participants developed dementia, of which 146 had Alzheimer's disease. Adjusting for several confounding variables, high intake of vitamin C and vitamin E was associated with lower risk of Alzheimer's disease. This relationship was most pronounced among current smokers and also was present for intake of beta-carotene and flavonoids. The authors conclude that "high dietary intake of vitamin C and vitamin E may lower the risk of Alzheimer's disease."
[*Engelhart MJ, et al. JAMA 2002;287:3223-3229]*

Suggested Readings

Diet and basal cell skin cancer: results from the EPIC-Norfolk cohort
[Davies TW, et al. Br J Dermatol 2002;146:1017-1022]

Dietary intake of folate and risk of stroke in US men and women. NHANES I epidemiologic follow-up study
[Bazzano LA, et al. Stroke 2002;33:1183-1189]

Incidence of neural tube defects in Ontario, 1986-1999
[Gucciardi E, et al. CMAJ 2002;167:237-240]

Coffee consumption and cognitive function among older adults
[Johnson-Kozlow M, et al. Am J Epidemiol 2002;156:842-850]

Vitamin D and attainment of peak bone mass among peripubertal Finnish girls: a 3-y prospective study
[Lehtonen-Veromaa MKM, et al. Am J Clin Nutr 2002; 76: 1446-1453]

Association of neural tube defects and folic acid food fortification in Canada
[Ray JG, et al. Lancet 2002;360:2047-2048].

Maternal periconceptional vitamins: interactions with selected factors and congenital anomalies
[Shaw G, et al. Epidemiology 2002;13:625-630]

Homocysteine, B vitamin status, and cognitive function in the elderly
[Duthie SJ, et al. Am J Clin Nutr 2002;75:908-913]

Risk of gestational hypertension in relation to folic acid supplementation during pregnancy
[Hernandez-Diaz S, et al. Am J Epidemiol 2002;156:806-812]