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A Selection of Recent Findings in the Field of Nutrition

Serum B vitamin levels and risk of lung cancer

The B vitamins, such as B2, B6, folate and B12 and factors related to 1-carbon metabolism are essential for DNA synthesis and methylation. This is important in maintaining DNA integrity and in the regulation of gene expression which may affect cancer risk. The objective of this study was to investigate whether 1-carbon metabolism factors are associated with onset of lung cancer. The study recruited 519,978 participants from 10 European countries between 1992 and 2000, of whom 385,747 donated blood at baseline. The investigators measured serum levels for 6 factors of 1-carbon metabolism (vitamins B2, B6, folate, B12, methionine and homocysteine) and the odds ratio (OR) of lung cancer. After controlling for smoking, higher serum levels of B6 and methionine were associated with a lower risk of lung cancer. Similar and consistent decreases in risk were observed in never, former, and current smokers which suggests that the results were not confounded by smoking status. The magnitude of risk was constant with the increase in follow-up time, which indicates that the associations were not explained by preclinical disease. Higher serum folate was also associated with a lower risk of lung cancer, although this was apparent only among former and current smokers. The results also suggested that above-median serum measures of both B6 and methionine, assessed on average 5 years prior to the onset of lung cancer, are associated with a 50% reduction of developing lung cancer. The authors conclude "Serum levels of vitamin B6 and methionine were inversely associated with risk of lung cancer".
[Johansson M, et al. JAMA 2010;303;2377-2385]

Long- chain ω-3 fatty acids for indicated prevention of psychotic disorders. A randomized, placebo-controlled trial.

Early treatment in Schizophrenia and other psychoses is associated with better outcomes. Intervention in at-risk individuals may provide better outcomes given that subclinical psychotic symptoms may predict psychotic disorder. The use of antipsychotic medication for the prevention of psychotic disorders is controversial. Several studies reported that long chain ω-3 and ω-6 polyunsaturated fatty acids (PUFAs) are reduced in individuals with schizophrenia. This suggested that dysfunction fatty acid metabolism might play a role in the etiology of the disorder. The beneficial effects of ω-3 fatty acids could be explained by their ability to alter membrane fluidity and receptor responses following their incorporation into cell membranes. Given the many health benefits of ω-3 fatty acids and their reassuring safety profile, their preventive use in psychosis is worth investigating. This randomized, placebo-controlled trial investigated whether ω-3 fatty acid can reduce the rate of progression to first-episode psychotic disorder in adolescents and young adults aged 13 to 25 y with subthreshold psychosis. Eighty one individuals at high risk of psychotic disorders were enrolled in this 12 week intervention study, using either 1.2 g/d ω-3 fatty acids or placebo. Following the intervention period, the participants were followed by a 40-week monitoring period and the total study period was 12 months. In this study, ω-3 fatty acid significantly reduced the transition rate to psychosis and was associated with significant symptomatic and functional improvements during the entire 12 months follow-up period. The incidence of adverse effects did not differ between the treatment groups. The authors conclude" Long chain ω-3 PUFAs reduce the risk of progression to psychotic disorder and may offer a safe and efficacious strategy for indicated prevention in young people with subthreshold psychotic states".
[Amminger GP, et al. Arch Gen Psychiatry 2010; 67:146-154]

Effects of multivitamin and mineral supplementation on adiposity, energy expenditure and lipid profiles in obese Chinese women.

Obesity results from a chronic imbalance between energy expenditure and energy intake. Obese individuals have a higher energy intake than normal weight individuals. Furthermore, vitamins and minerals have been reported to influence the balance of energy and blood lipid metabolism. Therefore, obese individuals may require a greater amount of vitamins and minerals to deal with the increased burden of a higher energy intake. It has been previously shown that when obese individuals were supplemented with a multivitamin, vitamin B-12, vitamin B-6 or chromium less weight was gained compared to individuals that were not supplemented. Furthermore, this study demonstrated that supplementation with 29 multivitamins and minerals for 26 weeks decreased body weight (BW), body mass index (BMI), fat mass (FM), respiratory quotient (RQ), total cholesterol (TC), low-density lipoprotein cholesterol (LDL-C) ($P<0.01$) and waist circumference (WC) ($P<0.05$); as well as, increased both high-density lipoprotein cholesterol (HDL-C) and resting energy expenditure (REE) ($P<0.01$), when compared to baseline. Hormones, genetic susceptibility, proteins and energy metabolism such as mitochondrial function contribute to the development of obesity. Vitamins and minerals can promote the expression of certain proteins and improve mitochondrial function which leads to increase energy homeostasis, upregulation of thermogenesis and promotion of lipolysis. Thus, the 29-ingredient multivitamin supplementation illustrated a beneficial effect on the lipid profile, blood pressure, energy metabolism and BW.
[Li Y, et al. Int J Obes 2010; 34: 1070-1077]

Associations between diet, lifestyle factors, and telomere length in women.

Telomeres are important in the maintenance of the structural integrity of the genome and in protecting chromosomes from degradation. Telomeres undergo erosion as they replicate, and this shortening may lead to cellular senescence or apoptosis and this process is accelerated by oxidative stress and inflammation. Telomere length shortens with age in various tissues and cell types. Leukocyte telomere length (LTL) could be used as a potential biomarker of biological age which reflects the cumulative burden of oxidative stress and inflammation. There is growing evidence suggesting that accelerated telomere attrition is associated with diseases of aging, including osteoporosis, coronary heart disease, diabetes and some cancers. Since telomere shortening is accelerated by oxidative stress and inflammation and that diet influences both of these processes, this study examined cross-sectionally the association between diet, body composition, and lifestyle factors on LTL in a subsample of 2,284 nurses participating in a large ongoing cohort study. In this study, waist circumference and polyunsaturated fatty acid intake were inversely associated with LTL, however, high fiber intake, specifically cereal fiber was positively associated with longer LTL. The findings that dietary factors and other lifestyle factors are associated with LTL, may partially explain potential pathways by which a diet and body composition affect the risk of developing type 2 diabetes, cardiovascular disease, and some cancers. There was no association between telomere length and smoking, physical activity, or postmenopausal hormone use. The authors conclude "Although the strength of the associations was modest in this population of middle-and-older-age women, our results support the hypothesis that body composition and dietary factors are related to leukocyte telomere length, which is a potential biomarker of chronic disease risk".
[Cassidy Aedin, et al. Am J Clin Nutr 2010; 91:1273-1280]

Suggested readings:

Safety of probiotics in patients receiving nutritional support: a systematic review of case reports randomized controlled trials, and nonrandomized trials.
[Whelan K, et al. Am J Clin Nutr 2010; 91:687-703]

Diagnosis and management of vitamin D deficiency
[Pearce SHS, el al. BMJ 2010; 340:b5664]

Dietary vitamin K guidance: an effective strategy for stable control of oral anticoagulation?
[Booth SL. Nutr Rev 2010; 68:178-181]

Effect of n-3 fatty acids on macro-and microvascular function in subjects with type 2 diabetes mellitus.
[Stirban A, et al. Am J Clin Nutr 2010; 91:808-813]

Maternal micronutrient deficiency, fetal development, and the risk of chronic disease.
[Christian P, et al. J Nutr 2010; 140:437-445]

Nutritional approach to sun protection; a suggested complement to external strategies.
[Shapira N. Nutr Rev 2010; 68:75-86]

Dietary calcium and magnesium intake and mortality: a prospective study of men.
[Kaluza, J, et al. Am J Epidemiol 2010; 171:801-807]

Folate-mediated one-carbon metabolism and its effect on female fertility and pregnancy viability.
[Laanpere M, et al. Nutr Rev 2010; 68:99-113]

Clinical trial of lutein in patients with retinitis pigmentosa receiving vitamin A.
[Berson EL, et al. Arch Opthalmol 2010; 128:403-411]

Adulthood obesity is positively associated with adipose tissue concentrations of vitamin K and inversely associated with circulating indicators of vitamin K status in men and women.
[Shea MK, et al. J Nutr 2010;140:1029-1034]

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