

A selection of recent findings in the field of nutrition

A prospective study of plasma selenium levels and prostate cancer risk.

Prostate cancer is the most commonly diagnosed non-skin cancer and the second cause of death in men in most western countries. The variations in prostate cancer incidence and death rates among various racial/ethnic groups and geographic regions and the change in risk among migrants suggest that there might be modifiable factors that affect prostate cancer development. Animal studies demonstrated a chemoprotective role for selenium against several malignancies. The anticancer activity of selenium is believed to be related to its role in apoptosis, inhibition of cellular proliferation as well as being a key component of glutathione peroxidase. This study examined the association between pre-diagnostic plasma selenium levels and risk of prostate cancer in men enrolled in the Physicians' Health Study, a randomized, double-blind, placebo controlled trial among 22,071 healthy U.S. male physicians. Using plasma samples obtained at the beginning of the study from healthy men enrolled in this clinical trial, the investigators conducted a nested case-control study among 586 men diagnosed with prostate cancer during 13 years of follow-up and 577 control subjects. In this study, there was a statistically significant inverse association between pre-diagnostic plasma selenium levels and subsequent risk of advanced prostate cancer. Pre-diagnostic selenium levels were inversely associated with risk of prostate cancer only for case subjects with increased PSA levels at baseline (PSA > 4ng/mL). One interpretation for this observation is that increased selenium levels may slow prostate cancer tumor progression and reduce the increased PSA levels. The authors conclude "The inverse association between baseline plasma selenium levels and risk of advanced prostate cancer, even among men diagnosed during the post-PSA era, suggests that higher levels of selenium may slow prostate cancer tumor progression. Ongoing randomized trials of selenium supplements may help to further evaluate this issue."

[Li H, et al. *J Natl Cancer Inst* 2004;96:696-703]

Efficacy and tolerability of low-dose iron supplements during pregnancy: a randomized controlled trial.

Pregnant women are at higher risk of developing iron deficiency (ID) and iron deficiency anemia (IDA), because of the extra iron requirements in pregnancy. The exact prevalence of ID and IDA is not well documented, but it is thought to be high, based on pregnancy surveillance data and the results of randomized trials. Previous trials aimed at preventing IDA used high-dose iron (100 mg iron/day) supplements. It is known that high-dose iron supplements cause gastrointestinal side effects (more abdominal discomfort, nausea, and constipation), can interfere with zinc absorption, and are a common cause of poisoning in young children. Little is known about the benefits and risks of low-dose iron supplementation during pregnancy. This study is the first published randomized trials that assessed the effect on maternal IDA and ID of supplementing pregnant women with a low dose (20 mg/day) of iron given from 20 week of gestation. Effects on iron status were assessed at the time of delivery and at 6 months postpartum. Gastrointestinal side effects were assessed at 24 and 36 weeks of gestation. A total of 430 women were enrolled, and 386 completed the follow-up to 6 months postpartum. At delivery, fewer women from the iron-supplemented group had IDA and ID compared to the placebo group. Also, there was no significant difference in gastrointestinal side effect between iron-supplemented women compared to placebo. There were no significant differences in serum zinc concentrations between the women in the iron-supplemented group and those in the placebo group at delivery or at 6 months postpartum. The authors state "Ours is the first randomized trial in an industrialized country to show that low-dose iron supplementation has no adverse effect on the serum zinc concentrations of pregnant women. In summary, there were few side effects of low-dose iron supplementation during pregnancy, which may facilitate compliance. It is also timely to reassess the safety of routine iron supplementation with the higher doses that may be received through standard clinical practice." This study provides strong evidence that supplementing the diet of pregnant women with 20 mg iron/day until delivery is an effective strategy to prevent ID and IDA.

[Makrides M, et al. *Am J Clin Nutr* 2003;78:145-153]

Effect of vitamin D and calcium supplementation on falls: A randomized controlled trial.

Fractures, particularly hip fractures, are a serious and costly condition among the elderly, and 90% of hip fractures involve falls. Although the benefit of calcium in reducing the risk of fractures is well recognized, recent evidence suggest a direct effect of vitamin D on muscle strength, hence reducing the risk of falls. Vitamin D, in addition to its effect on calcium metabolism, binds to specific receptors in human muscle tissues. The investigators hypothesized that vitamin D and calcium supplementation would improve musculoskeletal function and decrease falls. This hypothesis was tested in a double-blind randomized controlled trial among 122 elderly women. The participants received 1200 mg calcium plus 800 IU vitamin D (Cal+ D-group) or 1200 mg calcium (Cal-group) for 12 weeks and the number of falls per person was compared between the treatment groups. The main results of this study showed that vitamin D and calcium supplementation reduced the number of falls per person by nearly 50%, improved musculoskeletal function, and increased vitamin D status.

Whitehall-Robins Supplement

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A possible explanation for the effect of vitamin D on muscle strength is that vitamin D acts directly on muscle tissue in addition to its effect on calcium metabolism. This is the first study that demonstrates a reduction in falls among frail elderly women with a single intervention and within a short period of only 3 months. The authors conclude that "Vitamin D and calcium were superior to calcium supplementation alone in regard to fall prevention, musculoskeletal function, and bone metabolism."

[Bischoff HA, et al. J Bone Miner Res 2003; 18:343-351]

Do multivitamin supplements attenuate the risk for diabetes-associated birth defects?

Offspring of mothers with diabetes are at an increased risk for birth defects of which the heart and central nervous system are the most prevalent defects. There is recent evidence that consuming multivitamin supplements periconceptionally may reduce the risk for birth defects. This study evaluated whether the risk of birth defects associated with maternal diabetes is reduced by consuming multivitamin supplements during the periconceptional period. The investigators used a population based birth defects database to examine this association. 3278 nonsyndromic birth defects cases that were reported to be associated with diabetes and 3029 infants without birth defects (controls) formed the study population. Maternal diabetes was defined as reported diabetes with onset before the birth of the index case. Periconceptional use of multivitamin was defined as regular use when consumed 3 months before pregnancy through the first 3 months of pregnancy. The results of this study showed that offspring of mothers with diabetes had an increased risk for selected birth defects such as hydrocephaly, outflow tract defects, septal defects, respiratory tract defects, pyloric stenosis, and anal atresia or stenosis. The increased risk was limited to offspring of mothers who had diabetes but had not taken multivitamins during the periconceptional period. Offspring of mothers who had diabetes and had taken multivitamins during the periconceptional period had no increased risk of birth defects. The authors conclude "Periconceptional use of multivitamin supplements may reduce the risk for birth defects among offspring of mothers with diabetes."

[Correa A, et al. Pediatrics 2003;111:1146-1151]

Suggested Readings:

Age related changes in the 25-hydroxyvitamin D versus parathyroid hormone relationship suggest a different reason why older adults require more vitamin D.

[Vieth R, et al. J Clin Endocrinol Metab 2003; 88:185-191]

Calcium intake and adiposity [Review Article].

[Parikh SJ, et al. Am J Clin Nutr 2003; 77:281-287]

Vitamin K and bone mineral density in women and men.

[Booth SL, et al. Am J Clin Nutr 2003; 77:512-516]

Folate intakes and awareness of folate to prevent neural tube defects: a survey of women living in Vancouver, Canada.

[French MR, et al. J Am Diet Assoc 2003; 103:181-185]

Six-year effect of combined vitamin C and E supplementation on atherosclerotic progression. The Antioxidant Supplementation in Atherosclerosis Prevention (ASAP) Study.

[Salonen RM, et al. Circulation 2003; 107:947-953]

Prevalence of vitamin D insufficiency in Canada and the United States: importance to health status and efficacy of current food fortification and dietary supplement use.

[Calvo MS, et al. Nutr Rev 2003; 61:107-113]

Iron supplementation for unexplained fatigue in non-anaemic women: double blind randomized placebo controlled trial.

[Verdon F, et al. BMJ 2003;326:1124-1126]