USANA Technical Bulletin

Mixed Carotenoids

Technical Background

- Carotenoids comprise a class of antioxidant molecules that help protect the human body from free radical damage.[1] All carotenoids are acquired through the diet, with fruits and vegetables being the primary sources.
- Beta carotene is perhaps the best known of the carotenoids because of its potential vitamin A activity. However, there are some 50-60 related compounds in our diet, 14 of which are readily absorbed by the body. Carotenoids of particular value include alpha-carotene, lutein, zeaxanthin, lycopene, and crytoxanthin. All have similar chemical structures, but different carotenoids appear to provide different health benefits.
- There is a growing body of research linking diets high in carotenoids and lower incidents of cancer. Alpha-carotene and lycopene may lower the risk of lung cancer.[2] Diets rich in carotenoids, especially lycopene, may prevent prostate cancer.[3,4] Other carotenoids may protect against ovarian cancer.[5]
- Research also indicates that carotenoids (particularly lycopene) could reduce the risk of cardiovascular disease.[6,7]
- Other carotenoids (lutein and zeaxanthin) have been shown to have important roles in maintaining healthy vision. Recent studies show that in the lens, lutein and zeaxanthin may afford protection against cataract formation[5,8] and macular degeneration (AMD).[6,7,8] In one study, adults with the highest levels of carotenoid intake had a 43% lower risk of AMD than adults at the lowest intake level.

Sources and Recommended Intake

- Carotenoids are found abundantly in fruits and vegetables. Principal food sources for lutein and zeaxanthin include dark green leafy vegetables like kale, spinach, and collard greens. Broccoli and winter squash also provide significant amounts.
- No Recommended Dietary Allowance (RDA) has been established for lutein or zeaxanthin.
- Like beta carotene, lutein is heat-stable and not destroyed by cooking.
- Supplements containing carotenoids are best used in the context of a healthy diet. They should not be used to replace servings of carotenoid-rich fruits and vegetables.

Abstracts

Jian L, Du CJ, Lee AH, Binns CW. Do dietary lycopene and other carotenoids protect against prostate cancer? Int J Cancer. 2005 Mar 1;113(6):1010-4 To determine whether dietary intake of lycopene and other carotenoids has an etiological association with prostate cancer, a case-control study was conducted in Hangzhou, southeast China

during 2001-2002. The cases were 130 incident patients with histologically confirmed adenocarcinoma of the prostate. The controls were 274 hospital inpatients without prostate cancer or any other malignant diseases. Information on usual food consumption, including vegetables and fruits, was collected by face-to-face interviews using a structured food frequency questionnaire. The risks of prostate cancer for the intake of carotenoids and selected vegetables and fruits rich in carotenoids were assessed using multivariate logistic regression, adjusting for age, locality, education, income, body mass index, marital status, number of children, family history of prostate cancer, tea drinking, total fat and caloric intake. The prostate cancer risk declined with increasing consumption of lycopene, alpha-carotene, beta-carotene, beta-cryptoxanthin, lutein and zeaxanthin. Intake of tomatoes, pumpkin, spinach, watermelon and citrus fruits were also inversely associated with the prostate cancer risk. The adjusted odds ratios for the highest versus the lowest quartiles of intake were 0.18 (95% CI: 0.08-0.41) for lycopene, 0.43 (95% CI: 0.21-0.85) for alpha-carotene, 0.34 (95% CI: 0.17-0.69) for beta-carotene, 0.15 (95% CI: 0.06-0.34) for beta-cryptoxanthin and 0.02 (95% CI: 0.01-0.10) for lutein and zeaxanthin. The corresponding dose-response relationships were also significant, suggesting that vegetables and fruits rich in lycopene and other carotenoids may be protective against prostate cancer. (c) 2004 Wiley-Liss, Inc.

References

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