

High Alpha-Carotene Blood Levels Linked With Reduced All-Cause Mortality

Jim Kling

November 23, 2010 — Higher blood levels of α -carotene are associated with a lowered risk for death, according to an article in the *Archives of Internal Medicine*, published online on November 22, 2010.

The study suggests that increased consumption of fruits and vegetables, which produce α -carotene and carotenoids, could be an effective strategy to reduce the odds of premature death.

Previous studies have shown that increased fruit and vegetable consumption has a protective effect against chronic diseases such as cancer, coronary artery disease, and diabetes, but it is unknown what constituents of these foods confer the protective effect.

Carotenoids are antioxidants and are believed to be protective through mitigation of oxygen-related damage to DNA, proteins, and fats, which may play an important role in chronic diseases such as heart disease and cancer.

Randomized trials of β -carotene supplements have revealed no protective effect against cancer, cardiovascular disease, or type 2 diabetes, suggesting that some other element must be responsible.

The antioxidant α -carotene is chemically similar to β -carotene, but in vitro studies have demonstrated that α -carotene is approximately 10 times more effective in inhibiting proliferation of human neuroblastoma cells, and it inhibits liver carcinogenesis.

Other studies have shown that yellow-orange and dark green vegetables, which have a high α -carotene content, are most protective against lung cancer vs all other vegetables.

The researchers examined 15,318 people in the United States who participated in the Third National Health and Nutrition Examination Survey Follow-up Study, which was designed to be a representative sample of the US civilian population. Included patients were at least 20 years old. The original study was performed, and serum samples were collected between 1988 and 1994.

The researchers separated participants into those with blood α -carotene levels of 0 to 1 $\mu\text{g}/\text{dL}$ and those with higher levels. The researchers linked the participants to the National Death Index to determine their status as of December 31, 2006. Higher levels were associated with reduced risks for premature death: Participants with levels between 2 to 3 $\mu\text{g}/\text{dL}$ had a relative risk for death of 0.73 (95% confidence interval [CI], 0.68 - 0.87), and those with levels from 4 to 5 $\mu\text{g}/\text{dL}$ had a relative risk of 0.73 (95% CI, 0.65 - 0.83). Also, participants with levels of 6 to 8 $\mu\text{g}/\text{dL}$ had a relative risk of 0.66 (95% CI, 0.55 - 0.79), and those with levels of 9 $\mu\text{g}/\text{dL}$ or higher had a relative risk of 0.61 (95% CI, 0.51 - 0.73).

The researchers also identified links between blood α -carotene concentrations and the risk for death from cardiovascular disease ($P = .007$), cancer ($P = .02$), and all other causes ($P < .001$). The researchers stratified participants into subgroups of demographic characteristics, lifestyle habits, and health risk factors, and they found that the link between α -carotene levels and all-cause mortality was significant in most groupings.

Some previous studies have looked at levels of α -carotene and the risk for death from cardiovascular disease, but they found no link. The researchers say that the inconsistency might be because of different demographics among participants, as well as small sample sizes and short follow-up periods.

Strengths of the study included a large sample size and long follow-up period. There were also several limitations. First, only a single measure of serum α -carotene was available, which could cause bias in the form of regression to the mean that could have led to underestimation of the strength of associations. Second, misclassification of the cause of death of study participants, particularly of diabetes, could similarly cause underestimation. Finally, α -carotene concentrations could also be an indicator of other forces that directly affect mortality outcomes.

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