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Beta-carotene may protect certain people against Alzheimer's

By Stephen Daniells

04/12/2006- **High levels of the carotenoid beta-carotene may protect cognitive decline in people with a certain genotype that is said to increase the risk of Alzheimer's, say researchers.**

"Among high-functioning older persons, antioxidants and beta-carotene in particular may offer protection from cognitive decline in persons with greater genetic susceptibility," wrote lead author Peifeng Hu in the *Journal of Gerontology*.

Cognitive performance declines naturally with age, but genetics does play a part in the complex progression of Alzheimer's. Indeed, in 1993 scientists reported that people with a gene that codes for the blood lipoprotein, apolipoprotein E4 (apoE4) have a higher risk of developing Alzheimer's disease at an earlier age than people with apoE2 or apoE3.

The new study, by researchers at UCLA School of Medicine, the University of Southern California, and the National Institute on Aging, used data from a seven-year cohort study of older people to investigate if serum beta-carotene levels had an effect on cognitive decline in people with differing ApoE 4 genotypes (homo- or heterozygous).

Out of the sample population of 455 people, the researchers report that nine people were ApoE4 homozygous, and 97 were ApoE4 heterozygous. Serum beta-carotene levels were measured at baseline, and cognitive function assessed using a 9-item Short Portable Mental Status Questionnaire (SPMSQ).

During the seven years of follow-up, cognitive decline (as measured by falling SPMSQ scores) was documented in 249 people. Hu and co-workers reported that the presence of at least one ApoE 4 allele was linked to a higher risk and larger decline in SPMSQ scores.

The researchers report that high serum beta-carotene levels was associated with a 89 per cent reduction in the risk of cognitive decline in people with at least one APOE 4 allele. For those with no ApoE4 alleles, high serum beta-carotene levels were associated with only a modest 11 per cent reduction in the risk of cognitive decline.

Although the mechanism of Alzheimer's is not clear, more support is gathering for the build-up of plaque from beta-amyloid deposits. The deposits are associated with an increase in brain cell damage and death from oxidative stress.

It is against the oxidative stress that beta-carotene may offer protection.

In 1999 researchers from Washington University School of Medicine in St. Louis reported that apoE4 may be a risk factor for Alzheimer's because it is not as efficient as ApoE3 in preventing the build up of beta-amyloid deposits (*Journal of Clinical Investigation*, Vol. 103, pp. R15 to R20).

More research is needed to further investigate the potential link between beta-carotene and lower risk of Alzheimer's disease.

Alzheimer's is the most common form of dementia and currently affects over 13 million people worldwide. The direct and indirect cost of Alzheimer care is over \$100 bn (€ 81 bn) in the US alone. The direct cost of Alzheimer care in the UK was estimated at £15 bn (€ 22 bn).

Source: *The Journals of Gerontology Series A: Biological Sciences and Medical Sciences*
Volume 61, Pages 616-620

"Association Between Serum Beta-Carotene Levels and Decline of Cognitive Function in High-Functioning Older Persons With or Without Apolipoprotein E 4 Alleles: MacArthur Studies of Successful Aging"

Authors: P. Hu, P. Bretsky, E.M. Crimmins, J.M. Guralnik, D.B. Reuben and T.E. Seeman