

# Abstract

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## Dietary intake of antioxidants and risk of Alzheimer disease.

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**CONTEXT:** Laboratory findings have suggested that oxidative stress may contribute to the pathogenesis of Alzheimer disease. Therefore, the risk of Alzheimer disease might be reduced by intake of antioxidants that counteract the detrimental effects of oxidative stress.

**OBJECTIVE:** To determine whether dietary intake of antioxidants is related to risk of Alzheimer disease.

**DESIGN AND SETTING:** The Rotterdam Study, a population-based, prospective cohort study conducted in the Netherlands.

**PARTICIPANTS:** A total of 5395 participants who, at baseline (1990-1993), were aged at least 55 years, free of dementia, and noninstitutionalized and had reliable dietary assessment. Participants were reexamined in 1993-1994 and 1997-1999 and were continuously monitored for incident dementia.

**MAIN OUTCOME MEASURES:** Incidence of Alzheimer disease, based on Diagnostic and Statistical Manual of Mental Disorders, Revised Third Edition (DSM-III-R) criteria and National Institute of Neurological and Communicative Disorders and Stroke and Alzheimer Disease and Related Disorders Association (NINCDS-ADRDA) criteria, associated with dietary intake of beta carotene, flavonoids, vitamin C, and vitamin E.

**RESULTS:** After a mean follow-up of 6 years, 197 participants developed dementia, of whom 146 had Alzheimer disease. When adjustments were made for age, sex, baseline Mini-Mental State Examination score, alcohol intake, education, smoking habits, pack-years of smoking, body mass index, total energy intake, presence of carotid plaques, and use of antioxidative supplements, high intake of vitamin C and vitamin E was associated with lower risk of Alzheimer disease (rate ratios [RRs] per 1-SD increase in intake were 0.82 [95% confidence interval [CI], 0.68-0.99] and 0.82 [95% CI, 0.66-1.00], respectively). Among current smokers, this relationship was most pronounced (RRs, 0.65 [95% CI, 0.37-1.14] and 0.58 [95% CI, 0.30-1.12], respectively) and also was present for intake of beta carotene (RR, 0.49 [95% CI, 0.27-0.92]) and flavonoids (RR, 0.54 [95% CI, 0.31-0.96]). The associations did not vary by education or apolipoprotein E genotype.

**CONCLUSION:** High dietary intake of vitamin C and vitamin E may lower the risk of Alzheimer disease.

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