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Lycopene and Myocardial Infarction Risk in the EURAMIC Study

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A multicenter case-control study was conducted to evaluate the relations between antioxidant status assessed by biomarkers and acute myocardial infarction. Incidence cases and frequency matched controls were recruited from 10 European countries to maximize the variance in exposure within the study. Adipose tissue needle aspiration biopsies were taken shortly after the infarction and analyzed for levels of carotenoids and tocopherols. An examination of colinearity including all covariates and the three carotenoids, α-carotene, β-carotene, and lycopene, showed that the variables were sufficiently independent to model simultaneously. When examined singularly, each of the carotenoids appeared to be protective. Upon simultaneous analyses of the carotenoids, however, using conditional logistic regression models that controlled for age, body mass index, socioeconomic status, smoking, hypertension, and maternal and paternal history of disease, lycopene remained independently protective, with an odds ratio of 0.52 for the contrast of the 10th and 90th percentiles (95% confidence interval 0.33–0.82, $p = 0.005$). The associations for α- and β-carotene were largely eliminated. We conclude that lycopene, or some substance highly correlated which is in a common food source, may contribute to the protective effect of vegetable consumption on myocardial infarction risk. *Am J Epidemiol* 1997;146:618–26.

adipose tissue; carotene; carotenoids; myocardial infarction

Coronary heart disease remains a major cause of mortality in developed countries and is increasingly recognized as an important cause of morbidity in the developing world as well. A number of important risk factors for coronary heart disease have been identified including hypertension, hypercholesterolemia, insulin resistance, and cigarette smoking. However, these factors can only partly account for variations in the incidence of coronary heart disease either between or within populations (1–3). Studies of lipid metabolism have suggested that oxidative modifications of low density lipoprotein accelerate atherogenesis (4–6), and supplements of the antioxidant vitamin E reduce the incidence of nonfatal myocardial infarction (7).

Hypothesized methods of promotion of atherogenesis by oxidized low density lipoprotein include stimulation of monocyte and platelet adhesion to endothelium, inhibition of vasodilation, stimulation of synthesis of autoantibodies, and promotion of proliferation of smooth muscle cells leading to the promotion of foam cells and fatty streaks in the arterial intima (8–10). Natural antioxidants present in the diet may inhibit the oxidative modification of low density lipoprotein and slow the progression of atherosclerosis (11).

Observational epidemiologic studies that explored the antioxidant vitamin hypothesis using ecologic studies and cross-sectional studies (12), case-control studies (13–16), and cohort studies (17, 18) generally provide evidence supportive of the hypothesis that some antioxidant vitamins may reduce the risk of coronary heart disease. However, several large scale trials have not confirmed a protective effect of β-carotene (19–21) and are inconsistent for vitamin E (7,

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