

Abstract

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Alcohol drinking determines the effect of the APOE locus on LDL-cholesterol concentrations in men: the Framingham Offspring Study.

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BACKGROUND: The effect of alcohol drinking on LDL-cholesterol concentrations is unclear. The reported variability may be due to interactions between genetic factors and alcohol intake.

OBJECTIVE: The purpose of the study was to examine whether variation at the apolipoprotein E gene (APOE) locus modulates the association between alcohol drinking and LDL cholesterol.

DESIGN: We used a cross-sectional design in a healthy population-based sample of 1014 men and 1133 women from the Framingham Offspring Study.

RESULTS: In male nondrinkers ($n = 197$), LDL cholesterol was not significantly different across APOE allele groups [APOE*E2 (E2), APOE*E3 (E3), and APOE*E4 (E4)]. However, in male drinkers ($n = 817$), differences were observed ($P < 0.001$); those with the E2 allele had the lowest concentrations. LDL cholesterol in men with the E2 allele was significantly lower in drinkers than in nondrinkers but was significantly higher in drinkers than in nondrinkers in men with the E4 allele. This APOE-alcohol interaction remained significant ($P < 0.001$) after age, body mass index, smoking status, and fat and energy intakes were controlled for. In women, the expected effect of APOE alleles on LDL cholesterol occurred in both drinkers ($n = 791$; $P < 0.001$) and nondrinkers ($n = 342$; $P < 0.001$). Multiple linear regression models showed a negative association ($P < 0.05$) between alcohol and LDL cholesterol in men with the E2 allele but a positive association in men with the E4 allele. No significant associations were observed in men or women with the E3 allele.

CONCLUSION: In men, the effects of alcohol intake on LDL cholesterol are modulated in part by variability at the APOE locus.

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