

Abstract

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Methylenetetrahydrofolate Reductase Variants That Associate with Hypertension and Cardiovascular Disease Interact with Dietary Polyunsaturated Fatty Acids to Modulate Plasma Homocysteine in Puerto Rican Adults.

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OBJECTIVE AND METHODS: Although methylenetetrahydrofolate reductase (MTHFR) genetic variants are associated with plasma homocysteine (Hcy) and cardiovascular disease (CVD), little is known whether dietary fatty acid intake modulates these associations. The goal was to examine the interaction of MTHFR variants with dietary fatty acids influencing plasma Hcy in 995 Boston Puerto Rican adults.

RESULTS: We found that plasma Hcy concentration was negatively correlated with (n-3) PUFA intake ($r = -0.117$; $P = 0.022$), and the ratio of (n-3):(n-6) PUFA in the diet ($r = -0.122$; $P = 0.009$). Further, 2 functional MTHFR variants, 1298A>C and 677C>T, which are not in linkage disequilibrium in this population, were significantly associated with hypertension (OR = 1.72, $P = 0.024$, and OR = 1.60, $P = 0.002$, respectively). In addition, the 1298A>C variant was significantly associated with CVD (OR = 3.32; $P = 0.030$). Importantly, this variant exhibited significant interactions with intakes of total and (n-6) PUFA and the (n-3):(n-6) PUFA ratio of the diet. The plasma Hcy concentration of carriers of risk allele 1298C was greater than that of noncarriers only when participants had consumed a high-PUFA diet (>7.8% energy) but was not greater when they had low intake of PUFA ($\leq 7.8\%$ energy). In addition, participants with combined genotypes of both SNP (677 TT with 1298 AC or CC) who consumed high levels of (n-3) PUFA (>0.66% energy) had lower plasma Hcy compared with those who had the same genotype and consumed low levels of (n-3) PUFA ($\leq 0.66\%$ energy).

CONCLUSION: Our study suggests that dietary PUFA intake modulates the effect of 2 MTHFR variants on plasma Hcy in Boston Puerto Rican adults.

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