

Abstract

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APOE genotype affects black-white responses of high-density lipoprotein cholesterol subspecies to aerobic exercise training.

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OBJECTIVE: The objective of the study was to determine whether ethnicity interacts with the APOE genotype to influence conventionally measured high-density lipoprotein cholesterol (HDL-C) subfraction levels and nuclear magnetic resonance-measured (HDL(NMR)-C) particle size at baseline and after training, and the changes with training.

METHODS: After a 6-week dietary stabilization period, men and postmenopausal women 50 to 75 years old underwent baseline testing (NMR lipid, maximum oxygen consumption, body composition, and genotyping assessments). Tests were repeated after completing 24 weeks of endurance exercise training.

RESULTS: At baseline, APOE2/3 blacks had significantly larger particle size ($P < .001$) and higher total HDL(NMR)-C particle concentration ($P = .006$) than whites. After 6 months of endurance exercise training, APOE2/3 blacks maintained a significantly larger HDL(NMR)-C particle size ($P < .001$) and particle concentration of the large HDL(NMR)-C than APOE2/3 whites ($P < .001$). In multivariate analyses of variance adjusted for demographic and environmental confounding factors and for training-induced changes in lean body mass and intraabdominal fat, the model explained approximately 33% of the observed variability in training-induced improvements in HDL(NMR)-C particle size ($P = .002$), with APOE2/3 blacks having a greater increase in training-induced changes in HDL(NMR)-C particle size. In a separate but similarly adjusted model for conventionally measured HDL(2)-C, the model explained approximately 49% of the observed variability in training-induced changes in HDL(2)-C.

CONCLUSIONS: Ethnicity interacted with the E2/3 genotype at the APOE gene locus to influence higher baseline and after-training levels, and greater exercise training-induced improvements in the advantageous HDL-C subfractions in blacks than in whites. APOE2/3 blacks may benefit more from aerobic fitness to reduce cardiovascular risk.

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