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ORIGINAL RESEARCH COMMUNICATION

Vitamin E dietary supplementation significantly affects multiple risk factors for cardiovascular disease in baboons[1,2,3]

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Background: Oxidative stress is a widely accepted risk factor for cardiovascular disease (CVD), but the CVD benefit of dietary antioxidants, such as vitamin E, is controversial.

Objective: Therefore, we have investigated, in the baboon model, the effects of dietary vitamin E supplementation on risk factors for CVD.

Design: Pedigreed baboons (*n* = 251) were fed 2 atherogenic diets, high in fat and cholesterol, that differed in vitamin E concentrations. After 7 wk on each diet, blood samples were taken, and a panel of CVD risk factor traits (ie, indicators of lipoprotein metabolism and oxidative stress) were measured.

Results: Vitamin E supplementation caused significantly higher total antioxidant status (TAS) and lower oxidized LDL as expected. In addition, vitamin E caused 2 paradoxical effects on HDL metabolism: higher apolipoprotein A-I (apo A-I) concentrations and lower HDL sizes. We calculated a difference (Δ) variable for each trait as the value on the high-vitamin E diet minus that on the low-vitamin E diet and determined that several HDL concentration Δ variables were significantly correlated with Δ TAS, but only one, Δ apo A-I, was independently correlated. Genetic analyses showed that 2 Δ variables, Δ paraoxonase and Δ HDL_2, were significantly heritable, but that neither Δ TAS nor Δ apo A-I were heritable.

Conclusions: Thus, our data show that dietary vitamin E improves TAS and LDL quality. They also show 2 apparently paradoxical effects on HDL metabolism: lower HDL_2, which is mediated by genes, and higher apo A-I, which is not. These effects have contrasting associations with CVD risk and may help account for the mixed results from clinical trials of dietary vitamin E.

Key Words: Vitamin E • HDL • high-density lipoprotein • antioxidants • paraoxonase • apo A-I • apolipoprotein A-I • baboons