

Abstract

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Human plasma levels of vitamin E and carotenoids are associated with genetic polymorphisms in genes involved in lipid metabolism.

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BACKGROUND: Vitamin E and carotenoids are fat-soluble micronutrients carried by plasma lipoproteins. Their plasma concentrations are governed by several factors, some of which are genetic, but data on these genetic factors remain scarce. We hypothesized that genes involved in lipid metabolism, i.e. the genes implicated in intestinal uptake, intracellular trafficking, and the lipoprotein distribution of lipids, play a role in the plasma concentrations of these micronutrients.

METHODS: To verify this hypothesis, we assessed whether the plasma status of vitamin E and carotenoids is related to genes involved in lipid metabolism. Fasting plasma vitamin E (alpha- and gamma-tocopherol) and carotenoid (alpha- and beta-carotene, lutein, lycopene, beta-cryptoxanthin, and zeaxanthin) concentrations were measured in 48 males and 80 females. The following genes were genotyped [single nucleotide polymorphisms (SNP)]: apolipoprotein (apo) A-IV, apo B, apo E, lipoprotein lipase, and scavenger-receptor class B type I (SR-BI).

RESULTS: Plasma alpha-tocopherol concentrations were different ($P < 0.05$) in subjects bearing different SNP in apo A-IV, apo E, and SR-BI. Plasma gamma-tocopherol concentrations were different ($P < 0.05$) in subjects bearing different SNP in apo A-IV and SR-BI. Alpha-carotene concentrations were different ($P < 0.05$) in subjects bearing different SNP in SR-BI. Beta-carotene concentrations were different ($P < 0.05$) in subjects bearing different SNP in apo B and SR-BI. Lycopene concentrations were different ($P < 0.05$) in subjects bearing different SNP in apo A-IV and apo B. Beta-cryptoxanthin concentrations were different ($P < 0.05$) in subjects bearing different SNP in SR-BI. Plasma lutein and zeaxanthin concentrations did not differ in subjects bearing different SNP. Most of the differences remained significant after the plasma micronutrients were adjusted for plasma triglycerides and cholesterol.

CONCLUSIONS: These results suggest that genes involved in lipid metabolism influence the plasma concentrations of these fat-soluble micronutrients.

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