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Gender-specific interactions of the ABCA1/R230C variant with dietary carbohydrate intake: Effects on metabolic traits

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Abstract

The ABCA1 is a highly polymorphic gene known for its role in HDL-C particle formation and pancreatic beta-cell function. The R230C/ABCA1 variant is of particular interest in America because it is private to Native-American and descendant populations, is frequent in Mexican-Mestizos and other Latin-American populations, has a functional effect decreasing cholesterol efflux and shows evidence of recent positive selection in Native-Americans. R230C/ABCA1 has been consistently associated with lower HDL-C levels, and inconsistently with obesity, type 2 diabetes and serum triglyceride levels. Gene-environment interactions have been explored in an effort to explain these inconsistencies and to identify additional factors that may further increase the metabolic risk of 230C allele-bearing individuals. The Genetics of Atherosclerotic Disease (GEA) study includes 1500 control individuals who answered a questionnaire for dietary habits previously validated in the Mexican population, and were thoroughly assessed for anthropometric, biochemical and abdominal computed tomography measurements. In this cohort, the percentage of dietary carbohydrates showed significantly positive correlations with homeostasis model of assessment for insulin resistance, visceral to subcutaneous abdominal fat ratio and serum triglyceride levels, only in pre-menopausal women bearing the 230C allele, but not in menopausal women or men regardless of their genotype. Although all pre-menopausal women showed positive and significant correlations of dietary carbohydrate intake with BMI and waist circumference, the magnitude of the correlation was higher in women with 230C allele than in those without the 230C allele. These gender-specific gene-diet interactions may explain some inconsistencies in associations of this variant with obesity and other metabolic traits.

Biography

Teresa Villarreal-Molina is a medical geneticist, with a Ph.D. degree in Experimental Biology granted by the Universidad Autónoma Metropolitana (UAM)-Iztapalapa in Mexico City. She currently leads the Laboratory of Genomics of Cardiovascular Disease at the National Institute of Genomic Medicine in Mexico City, and has published several papers on genetic factors involved in metabolic traits and cardiovascular risk factors.