

NSA

The New Nutrition: Molecular Nutrition and Nutrionics

The interaction of genes and food regarding cardiovascular risk

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Lifestyle modification is the cornerstone for the primary prevention of cardiovascular disease. Dietary modifications are an integral part of such lifestyle modifications. Reduced intake of total fat is associated with reduced risk of cardiovascular disease. There is also compelling evidence that the fatty acid composition of foods also significantly influences cardiovascular risk. Based on this knowledge, we prescribe diets to reduce cardiovascular risk. In general, the same dietary recommendations are given to a wide variety of individuals. However, while we are able to make reasonable estimates of the effects of these dietary modifications for groups of individuals, the individual response is variable. This adds a further layer of complexity to the issue of optimal dietary therapy for heart disease reduction. Polymorphisms at various genetic loci that encode proteins involved in lipoprotein metabolism have shown gene-nutrient interactions in relation to the determination of plasma lipid profiles. For example, the -514C>T polymorphism at the *LIPC* locus interacts with dietary fat and plasma lipids. The TT genotype appears to identify a subset of the population who are prone to develop hypertriglyceridemia and low HDL-cholesterol in the setting of a high fat diet. These individuals with the TT genotype may benefit most from a low fat diet. On the other hand, for those with the CC and CT genotypes, a high fat diet may result in a less atherogenic lipid profile. The S447X polymorphism at the *LPL* locus interacts with both cigarette smoking and alcohol consumption in relation to HDL-cholesterol concentration. In terms of raising HDL-cholesterol, Homozygotes for the S447 allele may benefit more from smoking cessation and less from increasing alcohol intake. These observations may provide the first steps in our ability to personalize dietary therapy to maximize the risk reduction achievable.