Indeed, several nutrigenetics studies have shown diet to significantly modify the relationship between polymorphisms in genes coding antioxidant enzymes and cancer

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Nutrigenetics and Modulation of Oxidative Stress
by Laura A. Da Costa et al.

Key insights
This article highlights some of the recent nutrigenetic studies that examine interactions between diet, genetic variation in antioxidant enzymes, and oxidative stress.

Current knowledge
Oxidative stress develops as a result of an imbalance between the production and accumulation of reactive species and the body’s ability to manage them using exogenous and endogenous antioxidants. Oxidative stress has been implicated in the development of several chronic diseases, including cardiovascular disease and cancer. Individual genetic variation in the endogenous antioxidant defense systems may affect oxidative stress and subsequent disease development. Diet modifies the relationship between genetic variation in endogenous antioxidant enzymes and oxidative stress biomarkers and related disease risk.

Practical implications
As more data emerge, our understanding of the complex relationship between genetics, diet, and disease development should improve. In addition to gaining knowledge of the role of oxidative stress in disease pathogenesis, this type of research may also have important public health implications in identifying subgroups that would benefit from dietary intervention.

Recommended reading

Genetic variation in the absorption, metabolism, distribution or elimination of exogenous dietary antioxidants can influence the level of reactive species exposure to target cells and/or tissues. ROS = Reactive oxygen species; RNS = reactive nitrogen species. When the balance is tipped to one side (i.e. accumulation of ROS/RNS), the result is altered gene expression, molecular damage, leading to oxidative stress, nitrative stress, inflammation, and subsequent disease development. See text for details.