

# Genetic variation may modify associations between low vitamin D levels and adverse health outcomes

November 13 2012

---

Findings from a study suggest that certain variations in vitamin D metabolism genes may modify the association of low serum 25-hydroxyvitamin D concentrations with health outcomes such as hip fracture, heart attack, cancer, and death, according to a study appearing in the November 14 issue of *JAMA*.

[Vitamin D](#) status is defined by the circulating concentration of 25-hydroxyvitamin D. Lower serum 25-hydroxyvitamin D concentrations are associated with greater risks of many [chronic diseases](#), prompting ongoing clinical trials to test whether vitamin D supplementation can reduce the risk of disease development. Certain complex [metabolic pathways](#) suggest that interindividual variability in vitamin D metabolism may alter the clinical consequences of measured serum 25-hydroxyvitamin D, according to background information in the article.

Gregory P. Levin, Ph.D., of the University of Washington, Seattle, and colleagues conducted a study to investigate whether known relationships between serum 25-hydroxyvitamin D and certain diseases would differ according to common variation in 25-hydroxyvitamin D metabolism genes. The study consisted of an examination of 141 single-[nucleotide polymorphisms](#) (SNPs) in a group of 1,514 white participants from the community-based Cardiovascular Health Study. Participants had serum 25-hydroxyvitamin D measurements in 1992-1993 and were followed up

for a median (midpoint) of 11 years (through 2006). Replication meta-analyses were conducted across the independent, community-based U.S. Health, Aging, and [Body Composition](#) (n = 922; follow-up: 1998-1999 through 2005), Italian Invecchiare in Chianti (n = 835; follow-up: 1998-2000 through 2006), and Swedish Uppsala Longitudinal Study of [Adult Men](#) (n = 970; follow-up: 1991-1995 through 2008) cohort studies.

The researchers found a SNP within the vitamin D receptor (VDR) gene that significantly modified associations of low serum 25-hydroxyvitamin D concentration with major [health outcomes](#) of [hip fracture](#), heart attack, cancer, and death over long-term follow-up. "Findings were observed within a large community-based study of older adults in the United States and were consistent in magnitude and direction across individual disease outcomes, and replicated in a meta-analysis of 3 large independent cohorts. An additional vitamin D receptor SNP significantly modified the low 25-hydroxyvitamin D-disease association in a meta-analysis that included results from the discovery and replication cohorts. The discovered [SNPs](#), which are common in European populations, identified subsets of individuals for whom associations between low 25-hydroxyvitamin D concentration and disease outcomes were either strongly positive vs. null. These results suggest that individuals with specific 25-hydroxyvitamin D metabolism genotypes maybe particularly susceptible to, or protected from, the potential adverse health effects of low vitamin D."

The authors add that "these findings represent a first step toward identifying what may be clinically relevant effects of 25-hydroxyvitamin D metabolism genes and may contribute to a better understanding of the biological impact of genetic variation within the vitamin D receptor. Further studies are needed to confirm these observed associations and to enhance knowledge of how variation in vitamin D metabolism genes may stratify individuals as to their susceptibility to vitamin D deficiency.

Evaluating the identified interactions in randomized clinical trials of vitamin D supplementation, when available, would help to assess the validity of our results and pave the way toward identifying individual patients who may benefit most from vitamin D interventions."

**More information:** JAMA. 2012;308(18):1898-1905

Provided by JAMA and Archives Journals

Citation: Genetic variation may modify associations between low vitamin D levels and adverse health outcomes (2012, November 13) retrieved 24 April 2024 from <https://medicalxpress.com/news/2012-11-genetic-variation-associations-vitamin-d.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.