Genome-wide study identifies factors that may affect vitamin D levels

June 10 2010

An international research consortium has identified four common gene variants that are associated with blood levels of vitamin D and with an increased risk of vitamin D deficiency. The report from the SUNLIGHT consortium - involving investigators from six countries - will appear in *The Lancet* and is receiving early online release.

"We identified four common variants that contributed to the risk for vitamin D deficiency," says Thomas Wang, MD, of the Massachusetts General Hospital (MGH) Heart Center, a co-corresponding author of the Lancet report. "Individuals inheriting several of these risk-associated variants had more than twice the risk of vitamin D deficiency as was seen in those without these variants."

Vitamin D's essential role in musculoskeletal health is well known, and in recent years epidemiologic evidence has suggested that vitamin D deficiency may contribute to conditions like diabetes, cardiovascular disease and some cancers. Naturally produced in the skin in response to sunlight, Vitamin D has been added to many types of food and is available in dietary supplements. But studies have shown that from one third to one half of healthy adults in developed countries have low levels of vitamin D. While reduced sun exposure is clearly associated with lower vitamin D levels, environmental and cultural factors - including dietary intake - cannot completely account for variations in vitamin levels. The fact that vitamin D status tends to cluster in families suggests a genetic contribution.

The SUNLIGHT (Study of Underlying Genetic Determinants of Vitamin D and Highly Related Traits) Consortium involved a research team from the U.S., U.K., Canada, Netherlands, Sweden and Finland who pooled data from 15 epidemiologic studies of almost 32,000 white individuals of European descent. Results of the comprehensive genetic screening were correlated with participants' serum vitamin D levels. Statistically significant associations were found for four common variants, all in genes coding enzymes involved with the synthesis, breakdown or transport of vitamin D. The risk association was independent of geographic or other environmental factors; and the more variants an individual inherited, the greater the risk of vitamin D deficiency.

"It's possible that these results could explain why some people respond well to vitamin D supplements and others don't, but that needs to be studied further since we didn't specifically examine response to supplementation," Wang explains. "We also need to investigate how genetic background can modify response to sunlight, whether these associations are seen in other populations, and if these gene variants have an impact in the chronic diseases that appear to be associated with vitamin D deficiency."

Provided by Massachusetts General Hospital