

One size does not fit all: Dietary guidelines for choline may be insufficient

March 27 2014

What is now considered to be the "right" amount of the essential nutrient, choline, might actually be "wrong," depending on who you are. That's because scientists have found that the "right" amount of choline needed by an individual is influenced by a wide range of factors, including gender, life stage, race and ethnicity of the individual. This means that using the current one-size-fits-all approach to determining a person's vitamin and mineral needs may leave them in less than optimal health. Choline is an essential nutrient used by the body to construct cell membranes and is necessary for the health of vital organs and muscles. This finding was published online in *The FASEB Journal*.

"Our study shows that gender, life stage and genetic makeup influence the requirement for choline in humans," said Kerry-Ann da Costa Ph.D., a researcher involved in the work from the Department of Nutrition at the University of North Carolina, Chapel Hill. "We hope that it will focus attention on setting the dietary recommendations at a level that is high enough to meet the needs of those with the greatest requirements for choline."

To make this discovery, da Costa and colleagues analyzed healthy men and women who were fed a baseline diet containing 550 mg choline/day (the adequate intake level set by the Institute of Medicine) for 10 days. Then they were put on a low choline diet (50 mg choline/day) for up to 42 days, and monitored for increased liver fat and changes in liver and muscle function. If they developed clinical symptoms, choline was returned to their diet until these symptoms resolved. Subjects were

categorized by symptoms – liver, muscle or none. DNA isolated from their blood was examined for 200 [single nucleotide polymorphisms](#) or SNPs in 10 choline-related genes to see which ones were associated with liver or [muscle damage](#) compared to the people with no symptoms. Several SNPs were identified in women that alter their risk when they are on a low choline diet. Other SNPs in the choline transporter gene SLC44A1 and choline kinase beta gene (CHKB) were identified in the people with muscle damage compared to the rest of the study participants. Researchers then looked at these SNPs in European-, Mexican-, Asian- and African-Americans and in individuals of African descent, and found that the distribution was often quite different between the groups.

"Getting the right amount of [choline](#) is important, and also important is this study which shows that each person has unique nutritional needs. Today's dietary guidelines are approximations at best, and one size does not fit all," said Gerald Weissmann, M.D., Editor-in-Chief of *The FASEB Journal*. "As we move toward an age of personalized medicine, studies like this should make it possible for health care professionals to judge how much of each nutrient your particular body needs."

More information: Kerry-Ann da Costa, Karen D. Corbin, Mihai D. Niculescu, Joseph A. Galanko, and Steven H. Zeisel. Identification of new genetic polymorphisms that alter the dietary requirement for choline and vary in their distribution across ethnic and racial groups. *FASEB J*. [DOI: 10.1096/fj.14-249557](https://doi.org/10.1096/fj.14-249557)

Provided by Federation of American Societies for Experimental Biology

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