

Abstract

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Folate intake and the MTHFR C677T genotype influence choline status in young Mexican American women.

Abratte CM, Wang W, Li R, Moriarty DJ, Caudill MA.

Department of Human Nutrition and Food Science, Cal Poly Pomona, Pomona, CA 91768, USA.

BACKGROUND: Numerous studies have reported a relationship between folate status, the methylenetetrahydrofolate reductase (MTHFR) 677C-->T variant and disease risk. Although folate and choline metabolism are inter-related, only limited data are available on the relationship between choline and folate status in humans.

OBJECTIVE: This study sought to examine the influences of folate intake and the MTHFR 677C-->T variant on choline status.

RESULTS: Mexican-American women (n=43; 14 CC, 12 CT and 17 TT) consumed 135 microg/day as dietary folate equivalents (DFE) for 7 weeks followed by randomization to 400 or 800 microg DFE/day for 7 weeks. Throughout the study, total choline intake remained unchanged at approximately 350 mg/day. Plasma concentrations of betaine, choline, glycerophosphocholine, phosphatidylcholine and sphingomyelin were measured via LC-MS/MS for Weeks 0, 7 and 14. Phosphatidylcholine and sphingomyelin declined (P=.001, P=.009, respectively) in response to folate restriction and increased (P=.08, P=.029, respectively) in response to folate treatment. The increase in phosphatidylcholine occurred in response to 800 (P=.03) not 400 (P=.85) microg DFE/day (week x folate interaction, P=.017). The response of phosphatidylcholine to folate intake appeared to be influenced by MTHFR C677T genotype. The decline in phosphatidylcholine during folate restriction occurred primarily in women with the CC or CT genotype and not in the TT genotype (week x genotype interaction, P=.089). Moreover, when examined independent of folate status, phosphatidylcholine was higher (P<.05) in the TT genotype relative to the CT genotype.

CONCLUSION: These data suggest that folate intake and the MTHFR C677T genotype influence choline status in humans.

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