
**Background:** Severe choline deficiency adversely affects cellular methylation and DNA integrity, with potentially serious implications for disease risk.

**Methods:** As part of a 12-wk controlled choline intervention study conducted in folate-compromised Mexican-American men (n = 60; 18–55 y) differing in the methylenetetrahydrofolate reductase (MTHFR) C677T genotype (21 677CC, 29 677TT), this study evaluated the effects of varied choline intakes (300, 550, 1100, and 2200 mg/d) on the change (i.e. wk 12–0) in markers of cellular methylation and DNA integrity.

**Results:** Choline intake affected the change in plasma S-adenosylmethionine (P = 0.044), with decreases tending to be greater (P ≤0.08) in the 300 and 550 mg/d groups than in the 2200 mg/d group. Choline intake also interacted with the MTHFR C677T genotype to affect the change in genomic DNA methylation and DNA damage. In men with the MTHFR 677CC genotype, choline intake affected (P = 0.007) the change in DNA methylation, with a greater decrease (P < 0.02) in the 300 mg/d group than in the 1100 and 2200 mg/d groups. In men with the MTHFR 677CC genotype, choline intake also affected (P = 0.047) the change in DNA damage, with the increase tending to be greater (P = 0.07) in the 550 mg/d group than in the 2200 mg/d group. Choline intake did not affect these variables in men with the MTHFR 677TT genotype.

**Conclusions:** Overall, these data suggest that choline intake exceeding current dietary recommendations preserves markers of cellular methylation and attenuates DNA damage in a genetic subgroup of folate-compromised men.