

Fisher LM, et al. Sex and menopausal status influence human dietary requirements for the nutrient choline. *Am J of Clin Nutr* 2007; Vol. 85, No. 5, 1275-1285.

**Background:** Although humans require dietary choline for methyl donation, membrane function, and neurotransmission, choline can also be derived from the de novo synthesis of phosphatidylcholine, which is up-regulated by estrogen. A recommended Adequate Intake (AI) exists for choline; however, an Estimated Average Requirement has not been set because of a lack of sufficient human data.

**Objective:** The objective of the study was to evaluate the dietary requirements for choline in healthy men and women and to investigate the clinical sequelae of choline deficiency.

**Design:** Fifty-seven adult subjects (26 men, 16 premenopausal women, 15 postmenopausal women) were fed a diet containing  $550 \text{ mg choline} \cdot 70 \text{ kg}^{-1} \cdot \text{d}^{-1}$  for 10 d followed by  $<50 \text{ mg choline} \cdot 70 \text{ kg}^{-1} \cdot \text{d}^{-1}$  with or without a folic acid supplement ( $400 \text{ } \mu\text{g/d}$  per randomization) for up to 42 d. Subjects who developed organ dysfunction during this diet had normal organ function restored after incremental amounts of choline were added back to the diet. Blood and urine were monitored for signs of toxicity and metabolite concentrations, and liver fat was assessed by using magnetic resonance imaging.

**Results:** When deprived of dietary choline, 77% of men and 80% of postmenopausal women developed fatty liver or muscle damage, whereas only 44% of premenopausal women developed such signs of organ dysfunction. Moreover, 6 men developed these signs while consuming  $550 \text{ mg choline} \cdot 70 \text{ kg}^{-1} \cdot \text{d}^{-1}$ , the AI for choline. Folic acid supplementation did not alter the subjects' response.

**Conclusion:** Subject characteristics (eg, menopausal status) modulated the dietary requirement for choline, and a daily intake at the current AI was not sufficient to prevent organ dysfunction in 19 of the subjects.