

Lee JE, et al. Are dietary choline and betaine intakes determinants of total homocysteine concentration?  
*Am J Clin Nutr* 2010;91:1303-10.

**Background:** Elevated homocysteine concentrations are associated with an increased risk of cardiovascular disease and a decline in cognitive function. Intakes of choline and betaine, as methyl donors, may affect homocysteine concentrations.

**Objective:** The objective was to examine whether choline and betaine intakes, assessed from food-frequency questionnaires, are associated with total plasma homocysteine concentrations under both fasting and post-methionine-load conditions in both pre- and post-folic acid fortification periods in the United States.

**Design:** We assessed the association between choline and betaine intakes and fasting and post-methionine-load homocysteine concentrations using the US Department of Agriculture revised food-composition tables and evaluated whether the associations varied by folic acid fortification periods in 1325 male and 1407 female participants in the sixth examination (1995–1998) of the Framingham Offspring Study.

**Results:** A higher choline-plus-betaine intake was associated with lower concentrations of post-methionine-load homocysteine; the multivariate geometric means were 24.1  $\mu\text{mol/L}$  (95% CI: 23.4, 24.9  $\mu\text{mol/L}$ ) in the top quintile of intake and 25.0  $\mu\text{mol/L}$  (95% CI: 24.2, 25.7  $\mu\text{mol/L}$ ) in the bottom quintile ( $P$  for trend = 0.01). We found an inverse association between choline-plus-betaine intake and fasting homocysteine concentrations; the multivariate geometric mean fasting homocysteine concentrations were 9.6  $\mu\text{mol/L}$  (95% CI: 9.3, 9.9  $\mu\text{mol/L}$ ) in the top quintile and 10.1  $\mu\text{mol/L}$  (95% CI: 9.8, 10.4  $\mu\text{mol/L}$ ) in the bottom quintile ( $P$  for trend < 0.001). When we stratified by plasma folate and vitamin B-12 concentrations, the inverse association was limited to participants with low plasma folate or vitamin B-12 concentrations. In the postfortification period, the inverse association between choline-plus-betaine intake and either fasting or post-methionine-load homocysteine was no longer present.

**Conclusions:** Choline and betaine intakes were associated with both fasting and post-methionine-load total homocysteine concentrations, especially in participants with low folate and vitamin B-12 status. The inverse association between choline and betaine intakes and homocysteine concentrations was no longer present in the postfortification period.