

# Abstract

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## The association between betaine and choline intakes and the plasma concentrations of homocysteine in women.

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**BACKGROUND:** Elevated total homocysteine (tHcy), a risk factor for many chronic diseases, can be remethylated to methionine by folate. Alternatively, tHcy can be metabolized by other 1-carbon nutrients, ie, betaine and its precursor, choline.

**OBJECTIVE:** We aimed to assess the association between the dietary intakes of betaine and choline and the concentration of tHcy.

**DESIGN:** We conducted a cross-sectional analysis in 1477 women by using linear regression models to predict mean fasting tHcy by intakes of betaine and choline.

**RESULTS:** tHcy was 8% lower in the highest quintile of total betaine + choline intake than in the lowest quintile, even after control for folate intake (P for trend = 0.07). Neither choline nor betaine intake individually was significantly associated with tHcy. Choline from 2 choline-containing compounds, glycerophosphocholine and phosphocholine, was inversely associated with tHcy. These inverse associations were more pronounced in women with folate intake < 400 µg/d than in those with intakes ≥400 µg/d (P for interaction = 0.03 for phosphocholine) and in moderate alcohol drinkers (≥15 g/d) than in nondrinkers or light drinkers (<15 g/d) (P for interaction = 0.02 for glycerophosphocholine and 0.04 for phosphocholine). The strongest dose response was seen in women with a low-methyl diet (high alcohol and low folate intake) (P for interaction = 0.002 for glycerophosphocholine and 0.001 for phosphocholine).

**CONCLUSIONS:** Total choline + betaine intake was inversely associated with tHcy, as was choline from 2 water-soluble choline-containing compounds. Remethylation of tHcy may be more dependent on the betaine pathway when methyl sources are low as a result of either inadequate folate intake or heavier alcohol consumption.