

# Abstract

Am J Clin Nutr. 2008 Sep;88(3):738-46.

## Homocysteine, cysteine, and body composition in the Hordaland Homocysteine Study: does cysteine link amino acid and lipid metabolism?

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**BACKGROUND:** The lean phenotype of cystathionine beta-synthase-deficient homocystinuria and the positive association of plasma total cysteine (tCys) with body mass index (BMI) suggest that total homocysteine (tHcy) and tCys are associated with body composition.

**OBJECTIVES:** We aimed to study associations of tCys and tHcy with body composition in the general population.

**DESIGN:** Using data from 7038 Hordaland Homocysteine Study participants, we fitted regression models and dose-response curves of tCys and tHcy with BMI. In 5179 participants, we investigated associations of tCys and tHcy with fat mass and lean mass and examined whether changes in these aminothiols predicted body composition 6 y later.

**RESULTS:** tCys showed positive associations with BMI (partial  $r = 0.28$ ,  $P < 0.001$ ), and fat mass (partial  $r = 0.25$ ,  $P < 0.001$ ), independent of diet, exercise, and plasma lipids. Women in the highest tCys quintile had fat mass 9 kg (95% CI: 8, 10 kg;  $P < 0.001$ ) greater than that of women in the lowest quintile. The corresponding values for men were 6 kg (95% CI: 5, 7 kg;  $P < 0.001$ ;  $P < 0.001$  in both sexes, ANOVA across quintiles). The rise in tCys over 6 y was associated with greater fat mass at follow-up ( $P < 0.001$ ), but there was no effect on lean mass. tHcy was not associated with lean mass, and it became significantly inversely associated with BMI and fat mass only after adjustment for tCys. The association between tHcy and lean mass was not significant.

**CONCLUSIONS:** tCys concentrations show a strong positive association with BMI, mediated through fat mass. The link between cysteine and lipid metabolism deserves further investigation.

PMID: 18779291