Calcium Intake is Associated with Adiposity in Black and White Men and White Women of the HERITAGE Family Study

OBJECTIVE
To examine the association between calcium intake and body composition, including overall and abdominal adiposity, in black and white men and women of the HERITAGE Family Study.

STUDY DETAILS
– Cross-sectional analyses of baseline data from the HERITAGE Family Study of healthy but sedentary individuals with a body mass index (BMI) of <40 kg/m² and systolic/diastolic blood pressure of ≤159/99 mmHg
– 362 men (109 blacks, 253 whites) and 462 women (201 blacks, 261 whites) participated
– Dietary intake was calculated from the self-administered Willett Food Frequency Questionnaire (FFQ). Subjects were divided into terciles of energy-adjusted calcium intake. The FFQ didn’t separate calcium sources into dairy and non-dairy sources
– Subjects also completed a health habit questionnaire, the ARIC-Baecke Physical Activity Questionnaire and a menstrual cycle history
– In addition, although the FFQ has reasonable reproducibility and validity, it might not be the best method to assess calcium intake
– Measurements included BMI; percentage body fat; sum of 8 skinfold thicknesses; computerized tomography of total abdominal fat, abdominal visceral fat and abdominal subcutaneous fat and waist circumference
– Exclusions included individuals with confirmed possible coronary heart disease, chronic or recurrent respiratory problems and uncontrolled endocrine and metabolic disorders, including diabetes, hypoglycemia and the use of antihypertensive or lipid-lowering drugs

KEY FINDING
High calcium intake among black men and white women was strongly associated with leaner bodies and lower body weights as well as less total, visceral and subcutaneous abdominal fat.
Low calcium intake was associated with higher percentage body fat in men and white women.

<table>
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<tr>
<th>Body composition measures in black men, high vs. low energy-adjusted calcium intakes*</th>
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<tr>
<td><strong>BMI (kg/m²)</strong></td>
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<td>Low calcium</td>
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<td>26.7</td>
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* BMI and % body fat were adjusted for age and generation. All other measures of body composition were adjusted for age, generation and height
† p for trend ≤0.01

Loos et al. 2004
RESULTS

– The strongest inverse associations between calcium intake and measures of body composition and abdominal obesity were seen in black men and white women

– Black men in the high-calcium group had significantly lower values for all adiposity measures compared to those in the low-calcium group. Significant inverse associations ($p \leq 0.01$) between the energy-adjusted calcium intake and adiposity were observed for BMI, percentage body fat, total visceral and subcutaneous abdominal fat with the strongest association observed for BMI ($p=0.001$); for every 100 mg/1000 kcal increase in calcium intake, BMI decreased by 1.03 kg/m$^2$

– In white men, high calcium intake was significantly associated only with decreased percentage body fat ($p=0.04$)

– High calcium intake resulted in a lower prevalence of overweight (BMI $\geq 25$ kg/m$^2$) or obese (BMI $\geq 30$ kg/m$^2$) black men ($p=0.018$ and 0.08 respectively)

– Only 11% of black men in the high calcium intake group were obese compared with 28% in the low calcium intake group

– In contrast, higher calcium intake in the black women led to a significant higher prevalence of obesity ($p=0.003$)

– In white, but not in black, women, a significant inverse association ($p \leq 0.03$) with energy-adjusted calcium intake was found for BMI, percentage body fat and with total, visceral and subcutaneous abdominal fat

– In fact, black women in the high-calcium group tended to have a higher BMI and waist circumference and significantly more fat-free mass ($p=0.02$), compared with women in the low-calcium group

– Total energy intake did not differ across calcium groups

– Including other variables such as macronutrients, physical activity, educational status, smoking, menopause and hormonal replacement therapy did not change the results