

## Calcium Intake and Body Composition in the HERITAGE Family Study

RUTH LOOS, TUOMO RANKINEN, ARTHUR LEON, D.C. RAO, JAMES SKINNER, JACK WILMORE, CLAUDE BOUCHARD.

*Baton Rouge, LA; College Station, TX; Bloomington, IN; St. Louis, MO; Minneapolis, MN*

An inverse relationship between calcium ( $\text{Ca}^{2+}$ ) intake and adiposity has been shown in rodents and humans. It is hypothesized that low  $\text{Ca}^{2+}$  intake leads to increased intracellular [ $\text{Ca}^{2+}$ ] due to changes in circulating calcium-regulating hormones, thereby reducing lipolysis and enhancing lipogenesis in adipocytes.

We examined the association between daily  $\text{Ca}^{2+}$  intake and body composition in the HERITAGE Family Study.

Height, weight, percent body fat (%fat), 8 skinfolds and waist circumference (WC) were measured in 362 men (109 black, 253 white, mean age: 35.4yr) and 462 women (201 black, 261 white, mean age: 34.1yr). BMI and sum of skinfolds (SF) were calculated and total abdominal fat area (TAF) was derived from CT-scan measures. The Willett Food Frequency Questionnaire was used to assess the daily  $\text{Ca}^{2+}$  intake. For analyses, subjects were divided into tertiles according to the energy-adjusted  $\text{Ca}^{2+}$  intake. Their body composition was compared by ANOVA. Measures of body composition were also regressed against the  $\text{Ca}^{2+}$ /energy ratio. Physical activity, educational status and smoking habits were included as covariates.

The strongest inverse associations were found in black men and white women. Black men in the high  $\text{Ca}^{2+}$  group were significantly leaner than the low  $\text{Ca}^{2+}$  group: BMI (mean $\pm$ SE: 23.4 $\pm$ 0.9 vs 26.7 $\pm$ 1.1 kg/m<sup>2</sup>, p=0.01), %fat (18 $\pm$ 1.3 vs 22.7 $\pm$ 2.1%, p=0.03), SF (77 $\pm$ 11 vs 109 $\pm$ 14 mm, p=0.048), TAF (179 $\pm$ 36 vs 324 $\pm$ 47 cm, p=0.004) and WC (82 $\pm$ 2.7 vs 93 $\pm$ 3.3 cm, p=0.003). P-values for trend were all <0.01. In white women, regression analyses showed significant inverse associations between  $\text{Ca}^{2+}$  intake and BMI (p=0.02), %fat (p=0.001) and TAF (p=0.008). White men in the highest  $\text{Ca}^{2+}$  group had a significantly lower %fat compared to the low  $\text{Ca}^{2+}$  group (22.9 $\pm$ 1.6 vs 25.9 $\pm$ 1.5%, p=0.04). No significant associations were found in black women.

Overall, the results of this study support previous findings. They suggest that low  $\text{Ca}^{2+}$  intake, adjusted for total energy intake, is associated with higher adiposity, particularly in men and white women.