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## Research Project: [Mineral Intakes for Optimal Bone Development and Health](#)

Location: [Grand Forks Human Nutrition Research Center](#)

Title: *A Diet High in Meat Protein and Potential Renal Acid Load Increases Absorption and Urinary Excretion of Calcium, As Well As Serum IGF-I in Postmenopausal Women*

### Authors:

- [Cao, Jay](#)
- Johnson, Luann - UNIV. OF NORTH DAKOTA
- Hunt, Janet

Publication Date: April 27, 2009

**Technical Abstract:** Objective: The objective was to determine the effect of increasing protein and potential renal acid load (PRAL) on Ca retention and markers of bone metabolism. Methods: In a randomized crossover design, twenty postmenopausal women consumed two diets: one low protein, low PRAL (LPLP) and one high protein (mostly meat), high PRAL (HPHP) for 7 wk each, separated by a one-week break. After 3 wk, the entire 2-d menu of each diet was radio-labeled with  $^{47}\text{Ca}$  and retention was measured by whole body scintillation counting for an additional 4 weeks. Biomarkers of bone metabolism in blood and urine were measured. Results: Compared with the LPLP diet, the HPHP diet increased urinary acidity (pH: 7.1 vs. 5.9,  $\pm 0.25^*$ ,  $p < 0.01$ ), urinary Ca excretion (156 vs. 203,  $\pm 63$  mg/d,  $p < 0.01$ ), and blood IGF-I levels\*\* [137 (103  $\bar{\pm}$  184) vs. 174 (130  $\bar{\pm}$  232) ng/ml,  $p < 0.01$ ) consistently from week 1 through 7. The fractional Ca absorption was lower in subjects with LPLP than with HPHP diet (25.0 vs. 30.4,  $\pm 5.4\%$ , respectively,  $p < 0.02$ ). The HPHP diet tended to increase the absolute amount of Ca absorbed compared with LPLP diet (227 vs. 258,  $\pm 47$  mg/d,  $p < 0.08$ ). Conclusions: In postmenopausal women, a diet high in both meat protein and potential renal acid load increased serum IGF-I and Ca absorption, which was nearly equivalent to the increase in urinary excretion. A high meat diet does not appear detrimental for bone health. \*Mean  $\pm$  pooled SD; \*\*Geometric means, ranges.

**Citation:** Cao, J.J., Johnson, L.K., Hunt, J.R. A Diet High in Meat Protein and Potential Renal Acid Load Increases Absorption and Urinary Excretion of Calcium, As Well As Serum IGF-I in Postmenopausal Women. *Journal of Federation of American Societies for Experimental Biology*. 23:108.7.