

ORIGINAL RESEARCH COMMUNICATION

Aging does not impair the anabolic response to a protein-rich meal^{1, 2, 3}

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Background: Sarcopenia is a debilitating condition afflicting the elderly that may be facilitated by insufficient or ineffectual intake of dietary protein. We previously showed that free-form essential amino acids acutely stimulate muscle protein synthesis in both the young and the elderly. However, the ability of an actual protein-rich food to stimulate anabolism in the young and the elderly has not been explored.

Objective: We aimed to characterize changes in plasma amino acid concentrations and to quantify muscle protein synthesis in healthy young (41 ± 8 y old; *n* = 10) and elderly (70 ± 5 y old; *n* = 10) persons after ingestion of a 113-g (4-oz) serving of lean beef.

Design: Venous blood samples and vastus lateralis muscle biopsy samples were obtained during a primed (2.0 μmol/kg) constant infusion (0.08 μmol · kg⁻¹ · min⁻¹) of L-[ring-¹³C₆] phenylalanine. Plasma amino acid concentrations were measured and a mixed-muscle fractional synthesis rate (FSR) was calculated during the premeal period and for 5 h after beef ingestion.

Results: Mixed-muscle FSR increased by ≈51% in both the elderly (mean ± SE measurements: 0.072 ± 0.004%/h and 0.108 ± 0.006%/h before and after the meal, respectively) and the young (0.074 ± 0.005%/h and 0.113 ± 0.005%/h before and after the meal, respectively) after beef ingestion (*P* < 0.001). Plasma amino acid concentrations peaked at ≈100 min after beef ingestion in both age groups but were substantially higher in the elderly (2185 ± 134 nmol/mL compared with 1403 ± 96 nmol/mL; *P* < 0.001).

Conclusion: Despite differences in the concentration of amino acids in the plasma precursor pool, aging does not impair the ability to acutely synthesize muscle protein after ingestion of a common protein-rich food.

Key Words: Nutrition • stable isotopes • sarcopenia • diet • beef • amino acids

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