

Associations between Essential Amino Acids and Functional Health Outcomes in Older Adults: Analysis of the National Health and Nutrition Examination Survey, 2001–2018

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Objectives: Little is known about the relationships between habitual essential amino acid (EAA) intake and functional health in older US adults. This cross-sectional study investigates associations between usual EAA intakes and body composition, muscle strength, and physical function in US adults ≥ 65 y.

Methods: The Food and Nutrient Database for Dietary Studies (FNDDS) 2001–2018 was linked to USDA FoodData Central to access existing EAA composition data for FNDDS ingredients. FNDDS ingredients without existing EAA data were matched to similar ingredient codes with available EAA data. Usual intakes of EAA, leucine, lysine, and sulfur-containing AAs (SAA; methionine + cysteine) from NHANES 2001–2018 were calculated as relative [mg/kg ideal body weight (IBW)/d] and absolute (g/d) intakes for individuals ≥ 65 y ($n = 10,843$). Dependent variables were muscle strength measured by isometric grip test, BMI, waist circumference (WC), DXA-measured appendicular lean mass and whole-body fat mass, and self-

reported physical function. Regression analyses were used to determine covariate-adjusted relationships between EAA, leucine, lysine, and SAA intake and functional health outcomes. $P < 0.0013$ was considered significant.

Results: Absolute and relative EAA, leucine, lysine, and SAA intakes were not associated with muscle strength or self-reported physical function in males or females or with body composition in males. Absolute EAA intakes (per g) were associated with WC in females ($\beta \pm \text{SEM}$, 2.1 ± 0.6 cm, $P = 0.0007$). Absolute lysine intakes (per g) were associated with BMI (3.0 ± 0.7 kg/m², $P < 0.0001$) and WC (7.0 ± 1.7 cm, $P = 0.0001$) in females. Relative EAA, leucine, and lysine intakes (per mg/kg IBW) were associated with BMI (0.07 ± 0.02 , 0.26 ± 0.07 , and 0.25 ± 0.04 kg/m², respectively; $P \leq 0.0004$ for all) and WC (0.18 ± 0.03 , 0.81 ± 0.17 , and 0.64 ± 0.10 cm, respectively; $P < 0.0001$ for all) in females. Relative lysine intakes (per mg/kg IBW) were associated with whole body fat mass (0.24 ± 0.07 kg, $P = 0.0006$) in females.

Conclusions: EAA intakes, particularly lysine, were positively associated with measures of adiposity in women ≥ 65 y. Investigating sources of lysine intake may provide insight about which foods or food groups are driving this relationship.

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