Effects of Consuming Ounce-Equivalents Portions of Animal and Plant Protein Foods, As Defined by the Dietary Guidelines for Americans on Essential Amino Acid Availability

Gavin Connolly, Joshua Hudson, Robert Bergia III, and Wayne Campbell

Purdue University

Objectives: The objective of this study was to assess the effects of consuming ounce-equivalents (oz-eq) portions of lean pork versus nuts, beans, and eggs, as defined by the Dietary Guidelines for Americans (DGA), as part of a meal, on essential amino acid (EAA) substrate availability for protein anabolism in young adults.

Methods: In this single-blinded, randomized crossover study, 30 participants (15 male, 15 female; age: 26 ± 4.9 y; BMI: 26.4 ± 4.5 kg/m^2; mean ± SE) completed four testing sessions where they consumed a standardized test salad on each day with 2 oz-eq of either lean pork, whole eggs, black beans, or almonds. Blood samples were taken at baseline (prior to commencing meal consumption) and at 30, 60,120, 180,240, and 300 minutes following the initiation of meal consumption. Plasma from the blood samples were analyzed for amino acid concentrations via high-performance liquid chromatography (HPLC).

Results: The EAAs positive incremental area under the curve (iAUCpos) over 300 minutes for lean pork, egg, black beans, and almonds was 7353 ± 397 μg/mL (least-square mean ± standard error (SE)), 4653 ± 408 μg/mL, 2100 ± 398 μg/mL, and 1220 ± 398 μg/mL, respectively. Pork resulted in signifcantly greater EAAs availability compared to egg, black beans, and almonds (Tukey adjusted, $P < 0.0001$ for all, while egg resulted in significantly greater EAAs availability compared to black beans and almonds (Tukey adjusted $P < 0.0001$ for both). No difference for EAAs iAUCpos was found between black beans and almonds.

Conclusions: Based on the oz-eq concept used for the DGA, the protein sources included in this study, namely lean pork, whole egg, black beans, and almonds, are not equivalent regarding plasma EAAs availability for protein anabolism in young adults, in response to being consumed as part of a meal. More specifically on an oz-eq basis, lean pork provides a greater response than whole egg, followed by black beans and almonds, in terms of its ability to provide plasma EAAs as a substrate for protein anabolism This research serves as an important resource for future Dietary Guidelines Advisory Committees to reevaluate the appropriateness of equating Protein Foods on the current oz-eq basis.

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