

ORIGINAL RESEARCH COMMUNICATION

Supplementation of soy protein with branched-chain amino acids alters protein metabolism in healthy elderly and even more in patients with chronic obstructive pulmonary disease<sup>1, 2, 3</sup>

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**Background:** It is often suggested that chronic wasting diseases [eg, chronic obstructive pulmonary disease (COPD)] may benefit from branched-chain amino acid (BCAA) administration via improved protein metabolism.

**Objective:** The aim was to examine whether adding BCAAs to a soy protein meal would enhance protein anabolism in COPD patients and in healthy elderly persons.

**Design:** Eight normal-weight COPD patients and 8 healthy control subjects were examined on 2 test days. Simultaneous continuous intravenous infusion of L-[ring-<sup>2</sup>H<sub>5</sub>] phenylalanine (Phe) and L-[ring-<sup>2</sup>H<sub>2</sub>]tyrosine tracers was done postabsorptively and at 2 h of ingestion of a maltodextrin soy or maltodextrin soy + BCAA protein meal (rate of ingestion: 0.02 g protein · kg body weight<sup>-1</sup> · 20 min<sup>-1</sup>) in a crossover design. Together with the meal, oral ingestion of 1-[<sup>13</sup>C]Phe was performed to measure first-pass Phe splanchnic extraction (SPE<sub>Phe</sub>). The endogenous rate of Phe appearance [reflecting whole-body protein breakdown (WbPB)], whole-body protein synthesis (WbPS), and net WbPS (WbPS – WbPB) were calculated. Arterialized venous blood was sampled for amino acid enrichment and concentration analyses.

**Results:** Soy feeding induced a reduction in WbPB and an increase in WbPS. BCAA supplementation of soy protein resulted in a significantly higher (*P* < 0.05) increase in WbPS than did soy protein alone in COPD patients but not in the healthy elderly. BCAA supplementation did not significantly alter the change in WbPB or net WbPS. Furthermore, BCAA supplementation decreased (absolute) SPE<sub>Phe</sub> (*P* < 0.05) but did not change the percentage Phe hydroxylation in the splanchnic area, which indicates a BCAA-related reduction in splanchnic protein synthesis.

**Conclusion:** BCAA supplementation to soy protein enhances WbPS in patients with COPD and alters interorgan protein metabolism in favor of the peripheral (muscle) compartment in healthy elderly and even more in COPD patients.

**Key Words:** Chronic obstructive pulmonary disease • protein feeding • branched-chain amino acid supplementation • whole-body protein turnover • interorgan protein metabolism

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