

# PROTEIN INTERVENTIONS AUGMENT THE EFFECT OF RESISTANCE EXERCISE ON LEAN MASS AND STRENGTH IN OLDER ADULTS: A SYSTEMATIC REVIEW AND META-ANALYSIS OF RANDOMIZED CONTROLLED TRIALS.

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## BACKGROUND:

Sarcopenia (muscle loss) is associated with chronic disease and lower quality of life in older adults<sup>[1-4]</sup>.

Increased protein intake is suggested as a strategy to slow or reverse this loss of muscle mass and strength. However, diverse study designs result in inconsistent findings on protein's effects<sup>[5-7]</sup>.

## DESIGN:

A systematic literature search conducted using PubMed, Medline, Web of Science and Cochrane CENTRAL databases from Jan 1990 - Oct 2019.

Meta-analysis used a random effects model (weighted mean difference (WMD)) and generic inverse variance methods to synthesize quantitative data, followed by a leave-one-out method for sensitivity analysis.

### Populations

- Men & women
- Mean age >50 years
- Healthy, frail or sarcopenic

### Interventions

- Higher vs. lower protein intakes
- NO isolated amino acids, vitamins, hormones or supplements known to induce hypertrophy
- With or without resistance exercise

### Muscle Mass

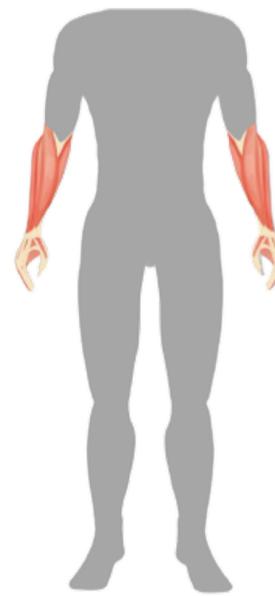


Total lean body mass

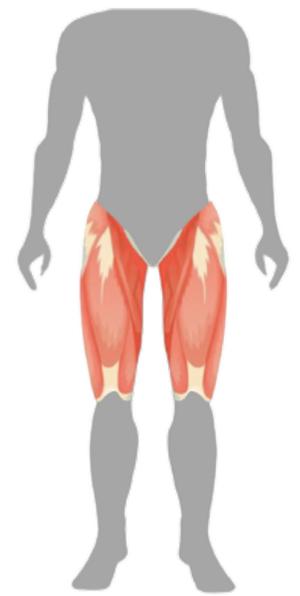


Appendicular lean mass

### Strength



Handgrip strength



Knee extension strength

Do HIGHER vs. LOWER protein intakes affect muscle mass or strength?	WITHOUT resistance exercise	No effect	No effect	No effect	No effect
	WITH resistance exercise	↑ WMD:0.25, p<0.01, I <sup>2</sup> :14.2%	↑ WMD:0.55, p=0.02, I <sup>2</sup> :0.0%	No effect	↑ WMD:0.435, p=0.03, I <sup>2</sup> :63.9%
What other factors positively contribute to these effects?		Baseline total lean body mass beta: < 0.01, p = 0.01	Per-meal protein dose beta: 0.02, p = 0.04	—	Older age & intervention duration beta: < 0.01, p = 0.02; beta: 0.03, p = 0.04

**Conclusions:** In healthy older adults undergoing resistance exercise, increased protein intake leads to greater lean body mass, appendicular lean mass and knee extension strength, although no superior effect is seen with the use of additional protein alone.

References & Data

