Dietary Protein Intake on Body Composition Changes in Healthy Aging

Jung Eun Kim, Ph.D., R.D.

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Longitudinal changes in body composition associated with aging

Sarcopenia

- The loss of muscle mass, strength and function related to aging

Impact of body composition changes on mortality risk

- 791 older adults (75 ± 9 yr, BMI: 25 ± 6 kg/m²; mean ± SD)
- Cohort study (1999 – 2011)

<table>
<thead>
<tr>
<th>Change (kg/m²/year)</th>
<th>HR</th>
<th>95% CI</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMI change</td>
<td></td>
<td></td>
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<tr>
<td>Maintenance</td>
<td>Reference (1.00)</td>
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<tr>
<td>Gain</td>
<td>0.89</td>
<td>0.59-1.36</td>
<td>0.612</td>
</tr>
<tr>
<td>Loss</td>
<td>1.12</td>
<td>0.76-1.64</td>
<td>0.562</td>
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<tr>
<td>FMI change</td>
<td></td>
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<tr>
<td>Maintenance</td>
<td>Reference (1.00)</td>
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<tr>
<td>Gain</td>
<td>1.05</td>
<td>0.70-1.58</td>
<td>0.805</td>
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<tr>
<td>Loss</td>
<td>0.87</td>
<td>0.57-1.34</td>
<td>0.536</td>
</tr>
<tr>
<td>FFMI change</td>
<td></td>
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<tr>
<td>Maintenance</td>
<td>Reference (1.00)</td>
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<tr>
<td>Gain</td>
<td>1.17</td>
<td>0.79-1.75</td>
<td>0.438</td>
</tr>
<tr>
<td>Loss</td>
<td>2.02</td>
<td>1.28-3.19</td>
<td>0.002</td>
</tr>
</tbody>
</table>

BMI: Body mass index; FMI: Fat mass index; FFMI: Fat free mass index
HR: Hazard ratio; 95% CI: 95% confidence interval

Adapted from Jackson AS et al. Br J Nutr, 2012
http://www.iofbonehealth.org/what-sarcopenia
Adapted from Mithal A et al. Osteoporos Int, 2013
How to improve/retain body composition for healthy aging?

- Insufficient Nutrition Status
- Aging
- Medical Conditions
- Sarcopenia
- Genetic Factors
- Hormonal Changes
- Higher total dietary protein intakes
- Sedentary Lifestyle

Impact of higher dietary protein intake on exercise-induced body composition changes in middle-aged and older US adults

- Purpose
To assess the impact of total protein intake on changes in body composition in overweight and obese, middle-aged adults who participated in a resistance and aerobic exercise training program

- A double-blind, placebo-controlled, community-based 36-wk intervention (n=188)
- Provided invalid 4-day food records (n=71)
- Data used for retrospective assessment (n=117)

Ages and BMI: 30 ± 3 kg/m²

Impact of total protein intake on the changes in body composition

- Total protein intake
  - < 1.0 g·kg⁻¹·d⁻¹ (n=43)
  - 1.0-1.2 g·kg⁻¹·d⁻¹ (n=29)
  - ≥ 1.2 g·kg⁻¹·d⁻¹ (n=45)

Sarcopenic obesity

- Age-related progress loss of skeletal muscle mass and strength with gain in fat mass

35 years old
BMI: 30 kg/m²

65 years old
BMI: 30 kg/m²

Mean ± SE
* indicates the mean value is significantly different from baseline at p<0.05
Different letters indicate statistical differences among the protein groups (p<0.05)

Adopted from Campbell WW et al. J Nutr, 2015

http://www.drsharma.ca/guest-post-icd-10-code-coming-for-sarcopenic-obesity


Sipilä S et al. Biogerontology, 2013
**Mortality risk for sarcopenic obesity**

Ahima RS, Lazar MA. Science. 2013

**Effect of dietary protein on % changes of body mass as fat mass and lean mass**

Tang M et al. Obesity. 2013
Leidy HJ et al. Obesity. 2007

**Impact of higher dietary protein intake on body composition changes after weight loss in older adults**

**PICOS criteria**

- **Population**
  - Adults mean age ≥ 50 y

- **Intervention**
  - Consumed energy-restricted diet with ≥ 1.0 g•kg⁻¹•d⁻¹ of dietary protein during weight loss

- **Comparison**
  - Consumed energy-restricted diet with < 1.0 g•kg⁻¹•d⁻¹ of dietary protein during weight loss

- **Outcome**
  - Changes in whole-body composition, body mass, lean mass, and fat mass

- **Setting**
  - Randomized controlled trials

- **Research Question**
  - What is the effect of higher dietary protein intake on whole-body composition changes after weight loss in older adults?

**Mean protein intakes**

- Higher protein intake: 1.31 g•kg⁻¹•d⁻¹ (1.01 – 1.57 g•kg⁻¹•d⁻¹)
- Normal protein intake: 0.79 g•kg⁻¹•d⁻¹ (0.58 – 0.97 g•kg⁻¹•d⁻¹)

**Systematic Review and Meta-Analysis**

- **Systematic Review**
  - More “objective” literature review.
  - Thorough search to find all relevant studies associated with a particular research question.

- **Meta-Analysis**
  - The use of statistical methods to combine results of different individual studies and identify patterns among study results.
  - Allows making the best use of all the information gathered in systematic review by increasing the power of the analysis.

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Impact of higher protein intake on body mass change during weight loss

Impact of higher protein intake on fat and lean mass change during weight loss

Conclusion

By Improving Age-Related Body Composition changes