Low protein intake, muscle strength and physical performance in the very old

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Causes of non-optimal protein intake and utilisation in older adults

- Inadequate intake of protein (e.g., anorexia of aging)
- Reduced ability to use available protein (e.g., insulin resistance, protein anabolic resistance, high splanchnic extraction, immobility)
- Greater need for protein (e.g., inflammatory disease, oxidative modification of proteins)

Muscle strength & Physical performance

Loss of functionality (muscle, bone, immune systems)

Bauer et al 2013: PROT-AGE study group position paper, EUGMS
Protein requirements

• RDA 0.8 g/kg BW/d does not take into account multimorbidity, physiological changes, reduced physical activity and appetite in the very old 1-3

• 1-1.5 g/kg BW/d
  – 25-30g/meal (~10g EAA)
  – adjusted (ideal) body weight 4

Aims

• Association low protein intake (<1 g/ kg aBW/d), and muscle strength (grip strength, GS) and physical performance (Timed Up-and-Go, TUG) in the very old over 5 years.

• Explore if physical activity (PA) and protein intake distribution across the day influence these relationships.
The Newcastle 85+ Study

845 with health assessments and GP records data

+ 188 GP records data only

805 consented to dietary assessment

Excluded 12 with a single-day diet recall

793 (98.5%) complete 2x24-MPR

Excluded 2 without health assessment

791 with complete baseline data

722 lived in community

Analytic sample
Methods

• **Protein intake**
  - 2x24hr MPR to estimate protein intake
    - <1 g/kg aBW/d (Low protein intake) *
    - ≥1 g/kg aBW/d (Good protein intake).

• **Outcomes**
  - Decline in GS and TUG (baseline, 1.5, 3 and 5y follow-up)
  - Mixed linear models (stratified by sex and protein intake group)

• **Confounders**
  - Anthropometry, health-related, diet-related, life style, attrition

* Adjusted body weight to reflect a healthy BMI in those ≥71, Berner LA et al J Acad Nutr Diet 2013;113:809-15
• **no association** between low protein intake and GS in men.
• Protein distribution **was not associated** with GS in men.
• association between low protein intake and GS at baseline
• not with GS decline over time
• protein distribution was not a significant predictor of GS
• ↑PA predicted the rate of GS decline in the good protein intake group (grey lines), but not the rate in low protein (black lines).
• good protein intake group with low PA had the worst GS trajectory.
Decline in TUG by protein intake in men

- low protein intake was not associated with TUG in men.
- no significant interactions (PA*time)
Decline in TUG by protein intake in women

- low protein intake was associated with worse TUG at baseline only in women
- no interactions (PA*time) were found
- protein distribution was not associated with TUG
Conclusion

- Protein intake <1g/ kg aBW/d was associated with -0.83 kg GS and worse TUG in women at baseline only after adjustment for a range of confounders.
- Confirms previous reports that a higher protein intake above the current RDA is needed.
- Suggests that higher PA may be ineffective in the very old if protein intake is not adequate.
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Thank you