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Protein Requirements in the Elderly

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The Elderly



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“The Graying of America”

- The older population (65+) numbered 43.1 million in 2012, up 21% since 2002.
- One in every seven people in the country is an older American.
- By 65, an average life expectancy of an additional 19.2 years (20.4 for females and 17.8 for males)

US Dept of Health and Human Services Administration on Aging 2014

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It's a Different World for Older Adults

- Live in a variety of settings
- Diverse socio-economic backgrounds
- Wide range of health conditions
- Greater focus on good quality of life for older adults
- Goal is to get them back into the community leading full, rich lives

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The Older Adult

- Body composition changes with advancing age
 - Loss of protein tissue, all body protein compartments are reduced in size
 - Reduction in organ tissue, blood components, immune bodies, total body potassium and water
 - Skeletal muscle decreases to approx 27% of total body weight from 45% as a young adult
 - Protein tissue accounts for 30% of whole-body protein turnover but that rate declines to 20% or less by age 70.



Nutrition's Role

- Nutrition plays a huge role in maintaining high quality of life for older adults.
- In particular, protein plays an important role in helping older adults stay active and functional.



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Protein Plays Important Role in Muscle Preservation

- Protein is a macronutrient essential for muscle function; suboptimal intake can result in loss of skeletal muscle mass, impaired physical function, and poor overall health in older adults.
- Recommended Dietary Allowance for protein intake (0.8g protein/kg body weight/day) may not be adequate to support optimal health for older adults (Bernstein et al 2012).

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Position Food & Nutrition for Older Adults, August 2012 Highlights



- Physiologic changes and reduced lean body mass during aging leads to decreases in total body protein (functional muscle mass) and contributes to increased frailty, impaired wound healing, decreased immune function with age.
- Short-term nitrogen balance studies indicate protein requirement no different for healthy older adult than for young adult, but moderately greater protein intake may be beneficial to enhance muscle protein anabolism and reduce progressive muscle loss.
- Some experts suggest protein intake of 1.0 to 1.6 g protein/kg of body weight/day is safe and adequate to meet needs of healthy older adults.

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Protein in the Body

- Proteins compose the major part of lean body, 16% of body weight
- Regulation and maintenance of the body requires a variety of proteins
- Protein is required for:
 - Cell multiplication
 - Collagen and connective tissue formation
 - Enzyme activity

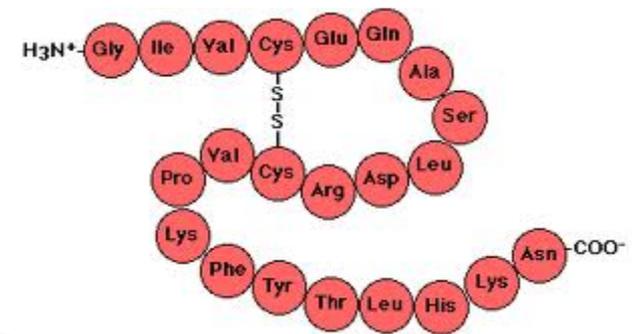
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Protein Building Blocks

- Body proteins are made of amino acids linked together to make a polypeptide chain
- Two main categories of amino acids
 - Indispensable (formerly called essential)
 - Must obtain from foods
 - Dispensable (formerly called nonessential)
 - Manufactured in the body, thus not and essential part of our diet





Key Body Functions

- Contribute to enzyme activity that promotes chemical reactions in the body
- Signal cells what to do and when to do it
- Transport substances around the body
- Keep fluids and pH balanced in the body
- Serve as building blocks for hormone production
- Helps blood clot
- Promote antibody activity that controls immune and allergy functions
- Serve as structural components that give our body parts their shapes

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Protein Requirements for Adults

Condition	Albumin Level	Protein Requirement
Normal Nutrition	>3.5 gm/dl	0.8 gm/kg/day (RDA)
Mild Depletion	2.8-3.4 gm/dl	1.0-1.2 gm/kg/day
Moderate Depletion (pressure ulcers)	2.1-2.7 gm/dl	1.2-1.5 gm/kg.day
Severe Depletion	2.1 gm/dl	1.5-2.0 gm/kg/day

Consultant Dietitians in Health Care Facilities, 2001. Pocket Resource for Nutrition Assessment
Committee on DRIs. Washington DC. National Academics Press 2002.

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The Older Adult

- At higher risk for impaired wound healing, loss of skin elasticity, inability to fight infections
- Additional levels of protein are required to meet demands of physiological stress
- Higher levels of dietary protein will not affect renal function
- Adequate dietary intake of protein may be more difficult for older adults to obtain.

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Protein Needs of the Older Adult

- Recommend: 1.0-1.2 gm protein/kg to achieve positive nitrogen balance
- Can adapt to lower dietary protein, but will compromise immune status and losing muscle mass.





Protein Needs of the Older Adult

- Role of dietary protein in sarcopenia (Paddon-Jones)
 - Increasing daily protein beyond 0.8g/kg body weight may enhance muscle protein anabolism and reduce the progress loss of muscle mass
- Study: RDA for Protein may not be adequate for older people (Campbell)
 - 14 week controlled study, 10 individuals (55-77 y.o.) given eucaloric diet and 0.8g protein/kg. Mean urinary nitrogen decreased over time indicating need for higher protein intake.

Inadequate Protein and Calorie Intake

- Consequences:
 - Protein Energy Malnutrition
 - Susceptible to infectious disease
 - Poor wound healing
 - Negative outcomes to intervention for chronic and acute conditions



Protein and Calories

We rely on our diet to supply needed protein. “ ... to use dietary protein efficiently, we must also consume enough total calories to meet energy needs. Otherwise, the amino acids in protein will be broken down and used for energy production, rather than for synthetic purposes.”

Wardlaw, G. Perspective in Nutrition. Mosby Publishing 1990

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Adequate Protein Intake Can be Challenging

- Data suggests that protein intake declines as people age.
- Frail older adults historically demonstrate poor protein intake below the RDA.
- Possibly due to financial status, changes in taste, the desire to go meatless, difficulty purchasing or preparing foods, or difficulty chewing.

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Protein Supplements

- Studies suggest that a balanced protein and energy supplement may be useful in preventing and reversing sarcopenia as part of a multimodal therapeutic approach (Morley et al 2010).
- May want to consider adding a protein-rich medical nutritional supplement or beverage to the meal plan, depending on the person's needs and intake.
- Whey protein supplementation preserves muscle mass by creating and maintaining a high concentration of essential Amino Acids in blood.

Evaluate The Resident First

- Evaluate the dining environment
- Type/amounts of foods served at and between meals
- Vitamin and mineral supplementation
- Pharmacologic intervention
- Alternate nutrition support routes



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Supplement Solution (Calories & Protein)



- Between Meal and evening Snacks
 - Smoothies, cookies, preferred snack foods
 - Frozen Shakes, Frozen Nutritional Treats or Juice drinks
- Med Pass Program
- Meal Supplementation
 - Adding protein or calories to food or beverages



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Keys to Improved Supplement Solution

- Offer a variety of textures and tastes, and varieties
- Maintain a high level of satiety with fortified, high calorie, nutrient dense products
- Administer oral supplements in small doses. We want them to eat their food first!

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Another Supplement Option: Modular Protein Supplements

Know your protein source

- Complete proteins
- Collagen based
- Amino acid dose

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Complete Proteins

- Protein derived from egg white, milk protein, soy protein
- Provide sufficient amounts of all 9 IAAs relative to human requirements
- Protein acts as both a substrate for protein synthesis and to provide AA for synthesis of other compounds

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Collagen Based / Amino Acid Dose

Collagen Based

- Protein concentrates derived from hydrolyzed collagen
- Contain 8 of 9 IAA, but the IAA levels are low

Amino Acid Dose

- One or more DAA provided to promote healing of wounds.

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How to Evaluate Quality of Protein

- PDCAAS - Protein digestibility corrected amino acid score
- “An indication of the overall quality of a protein because it represents the relative adequacy of its most limiting amino acid.”

Castellanos et al, Modular Protein supplements. Nutrition in Clinical Practice 21:485-504, Oct 2006

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PDCAAS Scores

Egg White	100%
Whey Protein	100%
Soy Protein	100%
Casein	100%
Collagen	0%

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Modular Protein

Whey

- Rapidly digested- positive correlation with protein gain and rapidly digested protein

Collagen

- Low in all 9 IAAs so not considered a good quality protein
- But, it contains a large amount of DAA to meet nonspecific nitrogen needs

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Additional Considerations

- ✓ *Amino acids are used most effectively for protein synthesis when consumed with CHO and FAT.*
- ✓ *There may be some benefit to providing additional protein at one meal time.*

Protein Timing

- Timing may be a critical component.
- Evidence suggests that there is an upper limit on how much protein can be used for muscle synthesis at a time—30g.
- Academy position paper recognized that experts suggest older adults should consume equal amounts of protein at each meal ~ 25 to 30g.
- Older adults should choose a high-quality, protein-rich source at each meal to meet this goal.

Implications for the Elderly

- Providing additional protein as part of a mixed meal or high-carbohydrate snack may provide greater benefit than a low energy snack or part of a med pass distribution.
- Reserve meal time for increasing protein consumption through intake of resident preferred high protein foods.
- If using a modular protein, disguise it in the food so as to not diminish food consumption.

Implications for the Elderly

- For between meal snacks, serve a ready to serve high calorie/high protein supplement or if using modular protein serve as part of a high carbohydrate snack (ex: smoothie, juice drink).
- Use baseline lab test data to assess hydration, kidney and liver status prior to starting concentrated protein supplements.
- Monitor kidney function and provide extra fluids with concentrated protein supplements.

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Putting it into Practice

- Translating the science on optimal protein intake takes great personalization and finesse.
- All older adults have different needs, based on their health conditions, physical activity, weight status, and dietary preferences.
- Estimating protein needs should be customized to the particular individuals, whether they are sick and confined to long-term care or healthy and active.

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Practice Considerations

- Know your sources of protein.
- Ensure adequate calories and protein needs met.
- Aid in provision of meals.
- Consider cultural, ethnic, religious preferences.
- Evaluate need for supplementation.
- Keep in mind other health conditions.
- Factor in the whole diet—don't just advise to "eat more protein."
- Avoid undesirable weight gain.

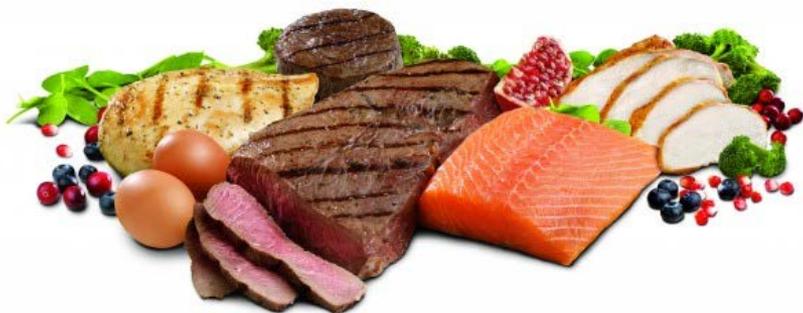
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Check List

- ✓ Is energy intake adequate to maintain body weight?
- ✓ Are protein needs being met with food?
- ✓ If a supplement is needed, consider a “complete protein” supplement first before a collagen based or amino acid dose.
- ✓ Make sure fluid intake is adequate

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Thank You!



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