Protein and Older Persons

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KEYWORDS

• Protein • Amino acids • Requirements • Supplementation • Older persons

KEY POINTS

- Older persons require more protein than their younger peers in order to maintain and build up muscle.
- Between 1.0 and 1.2 g protein per kilogram body weight should be consumed daily.
- The anabolic threshold for the daily protein and amino acid intake is higher in older than in younger adults, and should be set at approximately 25 to 30 g per meal, containing 2.5 to 2.8 g leucine.
- The source of protein and the amount of protein should be considered in all meals based on these recommendations for optimal protein intake.

INTRODUCTION

The percentage of older individuals more than 80 years of age is growing in all industrialized countries across the world, implying an increasing number of individuals who will be at risk of becoming dependent as a consequence of deteriorating strength and mobility. The optimization of protein intake is an important condition for preserving functionality and autonomy in older persons. Recent longitudinal studies provide evidence that the amount of protein consumed daily is associated with muscle mass, muscle strength, and physical function in older adults.[1,2]

FACTORS AFFECTING PROTEIN REQUIREMENTS IN OLDER AGE

Several mechanisms may lead to an insufficient protein intake in older people. In general, older people have decreasing energy needs, which is mainly a consequence of changes in physical activity. If the percentage of protein remains identical to that in the younger population, this decline in energy intake leads to an insufficient intake of protein. In older individuals, the requirement of protein should therefore always be calculated based on their BW. Age-associated anorexia, certain comorbidities, neurosensory changes in appetite and food preference, as well as bad dental status may be underlying reasons for a low intake of energy and, in parallel, of protein.

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Especially in older individuals with dental problems, preferences may shift toward foods that are rich in carbohydrates and fat and that have less protein.[3] The capacity to make use of the ingested protein anabolically may be reduced in older individuals by several pathomechanisms. The aging process is accompanied by an increasing anabolic resistance that affects muscle protein synthesis. This anabolic resistance is caused by numerous factors, such as decreased protein digestion and resorption as well as increased splanchnic sequestration of amino acids. In parallel, the postprandial availability of amino acids may be negatively affected by impaired muscle perfusion, which decreases the uptake of dietary amino acids by muscle.[4] In this context, an increase in insulin resistance with age may also be of relevance. In addition, certain subgroups of older persons have a greater need for protein because of their comorbidities (eg, inflammatory diseases). An overview of the mechanisms described earlier is provided in **Fig. 1**.[5]

At present, the World Health Organization, the US Institute of Medicine, and the European Safety Authority recommend a daily intake of 0.8 g/kg body weight (BW) for all adults, without any consideration of age.[6–8] These recommendations were based almost exclusively on nitrogen balance studies that, in most instances, included only a limited number of healthy older subjects, which is not representative of the older population in general. In the nitrogen balance studies a median estimated nitrogen requirement of 105 mg/kg BW per day was documented, which corresponds with 0.66 g of good-quality protein. The 97.5th percentile, 0.8 g protein/kg BW, was therefore set as the recommended daily allowance.[9] Nitrogen balance studies are based on the principle that protein constitutes the major source of nitrogen in the body. Therefore, loss of nitrogen represents a loss of protein. In nitrogen balance studies, nitrogen

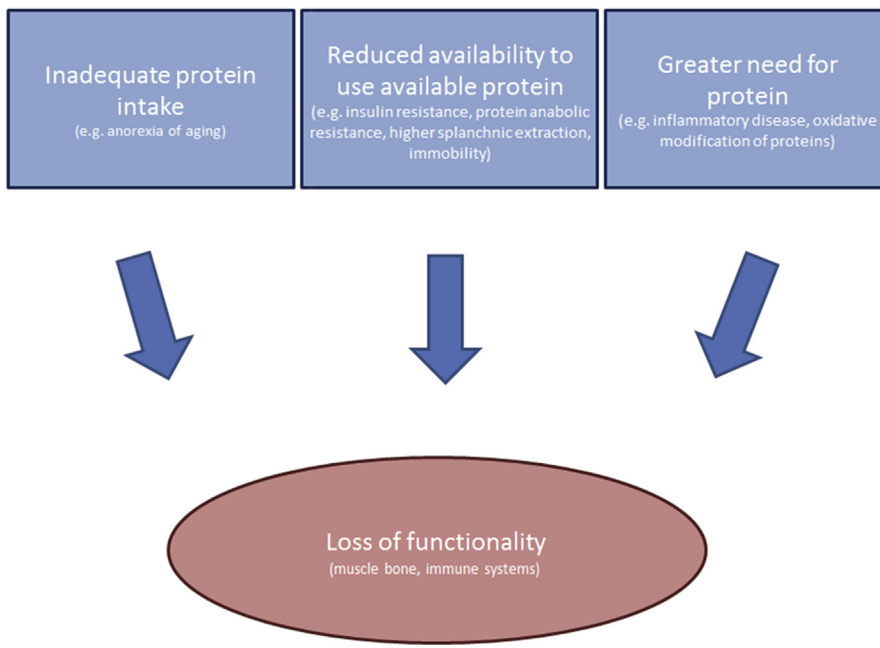

Fig. 1. Age-associated causes of protein deficits. (*From* Bauer J, Biolo G, Cederholm T, et al. Evidence-based recommendations for optimal dietary protein intake in older people: a position paper from the PROT-AGE Study Group. J Am Med Dir Assoc 2013;14(8):544; with permission.)