Sufficient protein for our elders?1,2

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Nutritional requirements for protein are arguably the best researched of all nutrients, and a new report on such was recently published by the WHO/FAO/UNU (1). However, such recommendations have always engendered vigorous debate with recent advocacy for the view that protein intakes above the Recommended Dietary Allowances may have benefit for adults, especially the elderly population (2). This comes at a time when animal protein consumption and production is reemerging as a global issue in the context of the environment, the rapid growth in consumption in the emerging economies, and increasing food insecurity (3). The new report did identify gaps in the knowledge base, particularly for the elderly population, in terms of both the minimum requirement for general health and well being and the optimum intake for healthy aging persons, especially with respect to sarcopenia and osteoporosis, which are potentially disabling conditions (1).

The protein requirement for adults was derived from a meta-analysis of nitrogen balance studies in healthy adults (4), which identified no significant age effects but included only one relevant study. The WHO/FAO/UNU (1) reviewed reports of reanalysis and aggregation of earlier nitrogen balance data suggesting that minimum protein requirements do increase with age. However, it accepted the view of a rigorous reassessment of such reports and all other available data (5) that no convincing evidence exists for a change in the protein requirement with age. This conclusion was confirmed by a more recent study in this issue of the Journal (6).

Nitrogen balance studies of younger and older men and women, measured after 14 d of adaptation, have been reported. Linear regression of the 3 protein intakes on nitrogen balance indicates intakes for nitrogen equilibrium of 0.59 g kg\(^{-1}\) d\(^{-1}\), with no significant age or sex effects, especially when calculated on the basis of fat-free mass. This value is within the range of the Estimated Average Requirement proposed in the new report, ie, 0.66 g kg\(^{-1}\) d\(^{-1}\) (1).

The nitrogen balance approach is the only available method with a conceptually straightforward endpoint (ie, nitrogen equilibrium), although it suffers from a lack of precision and the possibility of systematic error (1, 5). Thus, intakes above the requirement often result in an unrealistic positive balance that is not explained by weight or fat-free mass gains. Campbell et al (6) fed intakes of 0.5, 0.76 and 1 g kg\(^{-1}\) d\(^{-1}\) and reported positive nitrogen balances at the high and medium intakes and even at the lowest intake for the older women (6). As discussed by the WHO/FAO/UNU (1), any systematic positive error (eg, loss of

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United Kingdom, protein intakes for those aged ≥65 y cannot be described as low by any standards. Such intakes, if correct, are clearly not preventing sarcopenia and osteoporosis. However, no protein intake–related mechanism of sarcopenia has been identified, and any beneficial influence of protein on bone health (eg, through insulin-like growth factor I–mediated anabolic influences) has not been quantified (1). Although 1-[14C]leucine balance studies show that whole-body postprandial protein utilization is no different in elderly than in younger adults (10), a postprandial anabolic resistance to amino acids has been reported in the skeletal muscle of the elderly (11), which could account for sarcopenia. However according to the work of Campbell et al (12), resistance exercise reverses sarcopenia at relatively low protein intakes (ie, safe level of 0.8 g · kg⁻¹ · d⁻¹), and such training responses are not improved by higher protein intakes or influenced by protein quality (13). Indeed high levels of aerobic exercise have long been known not to prevent sarcopenia, even though they are, presumably, accompanied by high food and hence protein intakes. My own highly speculative view is that sarcopenia results from reduced tension on muscle as bones slightly shorten with age.

Thus, the key to health and active longevity may be sufficient appropriate exercise and healthy eating to ensure adequate intakes of protein and most other key nutrients to maintain muscle and bone strength and mobility. The demand for animal protein will no doubt continue to grow in the emerging economies, because meat is a preferred food in most societies. How much protein is needed will certainly continue to be debated, but whether global demands can be met is another story (3).

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REFERENCES