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Commentary

See corresponding articles on pages 18 and 73.

Protein Requirements: Are We Ready for New Recommendations?[1,2]

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In this issue of *The Journal of Nutrition*, 2 articles on protein requirements in women authored by the same research group are presented. The first deals with protein requirements during early and late gestation (1), and the second reports on requirements in women >65 y of age (2). Both studies conclude that the protein Estimated Average Requirements (EARs) and the RDAs are higher than the current FAO/WHO (3) and Institute of Medicine (4) recommendations (**Table 1**). Similar findings indicating higher protein requirements in octogenarian women (5), young men (6), and children (7) were published previously by the same research group (Table 1).

The determination of protein requirements in humans is a challenging undertaking because of the limitations inherent to all the methods available. Nitrogen balance, considered by many as the "gold standard," is not only tedious and time consuming but, even under extremely controlled conditions, fails to account for all of the nitrogen ingested (8). For this reason, alternative methods based on the oxidation of tracers have been proposed. One of these methods is indicator amino acid oxidation (IAAO), which has been used extensively to determine amino acid and protein requirements by the authors of the 2 articles published in this issue of *The Journal of Nutrition*. The main appeal of the IAAO technique is that it is minimally invasive and requires only a brief adaptation, thereby facilitating the determination of multiple intake points in the same individual. In addition, because of the short dietary interventions, it allows for the study of requirements in infants, children, and other vulnerable groups. However, there has been considerable debate on the theory behind the IAAO method and its application (9, 10). Therefore, the higher protein requirements that this method has yielded have been questioned. To their credit, the authors reanalyzed the existing nitrogen balance data and concluded that the RDA for adults should be 0.99 g protein/d or ~24% higher than the FAO/WHO recommendations (6).

Although current recommendations (0.8 g protein/d) appear to be sufficient to maintain nitrogen balance in healthy people >65 y old (11), some studies suggest that a higher protein intake (1.0–1.2 g protein/d) could be beneficial in order to maintain muscle mass and function, among other physiologic endpoints (12). Likewise, higher protein intakes (1.2–1.4 g protein/d) are recommended for endurance athletes (13), although college students were able to maintain nitrogen balance for 2 mo at protein intakes as low as 0.6 g/d (14). Thus, it seems that the protein requirements for "optimal" health and function are higher than the requirements to maintain nitrogen and protein balance. Regardless, these "optimal" and often elusive endpoints cannot be determined with short-term protocols, such as the IAAO technique.

Protein malnutrition is not considered to be prevalent in the United States (15), although a small fraction of adolescent females and women >71 y old have usual protein intakes below the FAO/WHO RDA. However, a strikingly different picture emerges if RDAs estimated by using the IAAO technique are considered. For women aged >65 y the RDA estimated by Rafii et al. (2) exceeds the usual protein intake of ~74% of the U.S. population (15) (Table 1). Furthermore, the RDAs estimated by Stephens et al. (1) in early and late pregnancy exceed the protein intakes of 64% and >87%, respectively, of pregnant women from the same population (16). These new recommendations based on the IAAO technique carry serious policy implications and can affect programs such as the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) (17), the National School Lunch Program (18), and the Elderly Nutrition Program (19), which serve 8, 30, and 3 million people, respectively, at a cost >$16 billion/y. The consequences for food supplementation programs targeted toward vulnerable populations in developing countries would be substantially greater.

For these reasons I would like to echo the concluding remarks of Tang et al. (5) regarding the IAAO technique in that "the limitations of this short-term, noninvasive method underscore the need for new research that uses alternative experimental designs and measuring physiologic, morphologic, and health-related outcomes."

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TABLE 1 EARs, RDAs, and usual protein intakes for pregnant women, women >65 y, young men, and children[1]

		IAAO, g/d		Current recommendations, g/d		Usual protein intake, g/d		Intake below
Category (reference)	Age,[2] y	EAR	RDA	EAR	RDA	Mean	SD	IAAO RDA, %
Early pregnancy[3] (1)	30.6 ± 3.9	1.22	1.66	0.88[4]	1.10[4]	1.50[5]	0.44	64
Late pregnancy[6] (1)	30.3 ± 2.8	1.52	1.77	0.88[4]	1.10[4]	1.30[7]	0.42	87
Women >65 y (2)	74.3 ± 7.4	0.96	1.29	0.66[8]	0.80[8]	1.10[9]	0.30	74
Women >80 y (5)	82.0 ± 1.0	0.85	1.15	0.66[8]	0.80[8]	1.00[10]	0.30	69
Young men (6)	26.8 ± 2.0	0.93	1.20	0.66[8]	0.80[8]	1.50[11]	0.40	23
Children (7)	8.4 ± 1.4	1.30	1.55	0.76[8]	0.95[8]	1.90[12]	0.70	31

[1] EAR, Estimated Average Requirement; IAAO, indicator amino acid oxidation.
[2] Values are means ± SDs.
[3] Early pregnancy = 16.5 ± 2.6 wk.
[4] Institute of Medicine and Nutrition Board (4) requirements for second and third pregnancy trimesters.
[5] Protein intake during pregnancy week 16 (16).
[6] Late pregnancy = 35.4 ± 1.8 wk.
[7] Protein intake during pregnancy week 36 (16).
[8] FAO/WHO (3).
[9] Protein intake in women aged 51–70 y (15).
[10] Protein intake in women aged ≥71 y (15).
[11] Protein intake in men aged 19–30 y (15).
[12] Protein intake in boys aged 9–13 y (15).

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