A Measure of Dietary Protein Requirement in Endurance Trained Women

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Stuart Douglas Houltham

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Abstract

Purpose: Inference from dietary surveys and experimental models suggest that the female endurance athlete dietary protein requirement is 15-20% less than their male counterparts, but to date empirical measurement of the habitual protein requirement has not been undertaken. **Methods:** 72-h nitrogen balance (NBAL) was determined in 10 female cyclists training 10.8 $h \cdot w^{-1}$ (SD: 2.82), following two habituated protein intakes: a) a diet representing normal habitual intake (NH) (Protein: 85$g.d^{-1}$ Energy: 9078$kJ \cdot d^{-1}$), b) an isolcaloric high-protein diet (HP) (Protein: 166$g \cdot d^{-1}$, Energy: 8909$kJ \cdot d^{-1}$). Total 72-h nitrogen intake was determined from Leco total combustion analysis from samples of the ingested food items, while total loss was determined from micro-kjeldahl analysis of total 72-h urine, urea nitrogen concentration of regional resting and exercise sweat sampling, and literature-based estimates of fecal and miscellaneous nitrogen losses. Habituated protein requirement was estimated by the mean regression of the two estimates of 72-h nitrogen balance vs. nitrogen intake. **Results:** Mean (SD) 24-h dietary protein intake during the 72-h sampling period was NH: 85 (11g), HP: 166 (19g). Mean 24-h urinary nitrogen during the NH and HP blocks were 13.19 (2.39 $g \cdot d^{-1}$) and 21.53 (3.94 $g \cdot d^{-1}$) respectively. Sweat urea nitrogen excretion was NH: 0.33 (0.08 $g \cdot d^{-1}$) and HP: 0.54 (0.12 $g \cdot d^{-1}$). Normal habitual and high-protein intakes resulted in a mean negative and positive nitrogen balance, respectively (mean ± SD) (NH: -0.59 ± 1.64, HP: 2.69 ± 3.09). Estimated mean protein requirement to achieve NBAL was calculated to be 1.63 $g \cdot kg^{-1} \cdot d^{-1}$ (95% confidence interval: 1.14–3.77). **Conclusions:** Our data shows that the dietary protein requirement for well-trained females taking part in daily moderate intensity and duration endurance training is within the range of measured requirement for similarly trained men and suggests that the current estimated range of protein requirement for females may be inadequate.

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The Massey University Human Ethics Committee: (Southern A, Application 10/76) approved the testing procedure and written consent was obtained from all participants prior to commencing the study.

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