

ORIGINAL RESEARCH COMMUNICATION

# Total body protein in healthy adolescent girls: validation of estimates derived from simpler measures with neutron activation analysis<sup>1, 2, 3</sup>

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**Background:** Little recent and accurate information about body protein content in healthy adolescent girls is available.

**Objective:** The objective was to assess the total body nitrogen (TBN) and total body protein (TBPr) contents of fat-free mass (P:FFM) in a group of healthy adolescent girls and to validate previously published TBN prediction equations.

**Design:** TBN was measured with in vivo neutron activation analysis (TBN<sub>NAA</sub>). Bone mineral density and FFM were measured with dual-energy X-ray absorptiometry (FFM<sub>DXA</sub>), total body water and FFM were measured with bioimpedance analysis, and FFM was assessed by measuring skinfold thicknesses in 51 girls with a mean ( $\pm$ SD) age of 14.7  $\pm$  0.7 y. The validity of the TBN prediction equations was assessed with Bland-Altman analysis.

**Results:** TBN<sub>NAA</sub> in our adolescent group was higher (1.49 kg) than values reported in earlier studies of women (1.25 and 1.31 kg), and P:FFM was slightly higher (23%) than that documented in adults (19–21%). Previously published TBN equations showed either systematic bias or wide limits of agreement.

**Conclusion:** A predictive equation derived from the present study population based on FFM<sub>DXA</sub> improves the prediction of TBN for groups of young girls but may not be helpful for individuals in clinical settings.

**Key Words:** Body composition • adolescents • total body protein • total body nitrogen • fat-free mass • neutron activation analysis • dual-energy X-ray absorptiometry • anthropometric measures • bioimpedance analysis

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