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REVIEW

Methods in Obesity Research

Predictive equations for energy expenditure in adult humans: From resting to free-living conditions

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Abstract

Humans acquire energy from the environment for survival. A central question for nutritional sciences is how much energy is required to sustain cellular work while maintaining an adequate body mass. Because human energy balance is not exempt from thermodynamic principles, the energy requirement can be approached from the energy expenditure. Conceptual and technological advances have allowed understanding of the physiological determinants of energy expenditure. Body mass, sex, and age are the main factors determining energy expenditure. These factors constitute the basis for predictive equations for resting (REE) and total (TEE) energy expenditure in healthy adults. These equations yield predictions that differ up to ~400 kcal/d for REE and ~550 kcal/d for TEE. Identifying additional factors accounting for such variability and the most valid equations appears relevant. This review used novel approaches based on mathematical modeling of REE and analyses of the data from which REE predictive equations were generated. As for TEE, R^2 and SE were considered because only a few predictive equations are available. From these analyses, Oxford's and Plucker's equations appear valid for predicting REE and TEE in adults, respectively.