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Is the Resting Metabolic Rate Ratio a Good Proxy Indicator of Energy Deficiency in Men? A Preliminary Study.

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Active individuals who have low energy availability may experience an energy deficiency, evidenced by low serum total triiodothyronine (TT3). The ratio of measured-to-predicted resting metabolic rate (RMRratio) has been established as a proxy indicator of energy deficiency and metabolic compensation in active women, but parameters for men have not yet been established. **PURPOSE:** To determine if RMRratio is associated with TT3 in active young men and to investigate possible cut-offs of the RMRratio to predict energy deficiency. **METHODS:** Subjects were men aged 22 ± 0.5 years ($n=41$), with a body mass index of 16-29.9 kg/m², exercising for a minimum of 150 min/week and who achieved peak oxygen consumption of at least 44 mlO₂/kg/min. Dual-Energy X-Ray Absorptiometry (DXA) assessed body composition. RMR was assessed after a 12-h fast via indirect calorimetry and a blood draw was obtained to assess serum TT3. The ratio of the measured RMR to the predicted RMR was calculated using the predictive equations of Cunningham₁₉₈₀, Cunningham₁₉₉₁, Harris-Benedict, and Hayes (DXA-predicted). Pearson's correlation coefficients and simple linear regressions determined the relationship between the RMRratios and TT3. Subjects within the lowest sample tertile of TT3 were categorized as energy deficient. **RESULTS:** The DXA-predicted (0.966 ± 0.014), Cunningham₁₉₈₀ (0.968 ± 0.013), and Cunningham₁₉₉₁ RMRratios (1.019 ± 0.014) were positively correlated with TT3 (114.4 ± 3.4 ng/dl) ($r=0.493$, $R^2=0.243$, $p=0.001$; $r=0.351$, $R^2=0.123$, $p=0.025$; and $r=0.379$, $R^2=0.144$, $p=0.015$, respectively), and the Harris-Benedict RMRratio (0.953 ± 0.017) was negatively correlated with TT3 ($r=-0.474$, $R^2=0.225$, $p=0.002$). A cut-off of 0.98 using Cunningham₁₉₈₀ predicted low TT3 with a sensitivity of 78.6% and a specificity of 51.9%, a cut-off of 1.00 using Cunningham₁₉₉₁ yielded 71.4% and 59.3%, respectively. The highest sensitivity and specificity were 78.6% and 66.7%, respectively, obtained with a 0.97 cut-off for the DXA-predicted RMRratio. **CONCLUSION:** The Harris-Benedict RMRratio does not account for body composition differences and does not seem useful to predict TT3. The Cunningham RMRratios and the DXA-predicted RMRratio have the potential to be used as proxy indicators of energy deficiency in men, but more data is necessary to confirm that assumption. **SIGNIFICANCE/NOVELTY:** This is the first study to investigate RMRratio cut-offs of energy deficiency in active young men.

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