

Original Article

Effect of the rate of body weight gain on body composition in growing rats

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ABSTRACT

[Aim]

The aim of this study was to investigate the effect of the rate of body weight gain (WG) on the ratio of increases in the fat-free mass (FFM) and fat mass (FM) and on the amount of energy required for WG.

[Methods]

Six-week-old rats were fed *ad libitum* for 11 days; this group was named the rapid-WG group (R group; n = 5). In the slow-WG group (S group; n = 5), the body weight (BW) of the rats was increased over a 17-day period to a level comparable to that ultimately achieved in the R group by restricting energy intake. The BW, energy intake (EI) and energy expenditure (EE) were measured throughout the experimental period. The ratio of increases in the FFM and FM were calculated based on the energy content of the FFM and FM, and the energy deposition (ED) was obtained as the difference between the EI and the EE.

[Results]

The ratio of increases in the FFM and FM did not differ between the groups. The total EI and EE in the S group were greater than those in the R Group ($P < 0.001$), whereas the total ED did not differ between the groups. The estimated EI and EE required to increase the BW by 1 kg were greater in the S group than in the R Group ($P < 0.001$), whereas the ED did not differ between the groups.

[Conclusion]

These results suggest that a greater amount of energy is required for WG when the BW increases slowly, while the ratio of increases in the FFM and FM are not influenced by the rate of WG.

Keywords: Body weight gain, Energy balance, Energy deposition, Body composition