

間欠的絶食による摂取エネルギー制限がラット骨格筋の
PGC-1 α および GLUT-4 蛋白発現量に及ぼす影響
Effects of calorie restriction by intermittent fasting
on PGC-1 α and GLUT-4 protein contents in rat skeletal muscle.

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Abstract

The purpose of this study was to examine the effects of calorie restriction by intermittent fasting on transcriptional co-activator, Peroxisome Proliferator-Activated Receptor γ coactivator-1 α (PGC-1 α) and glucose transporter, GLUT-4 protein contents in rat skeletal muscle. Four-week-old male Sprague-Dawley rats were randomly assigned either to 1) intermittent fasting (IF: n=5), 2) endurance exercise training (EX: n=5), or 3) control group (CON: n=5). IF group rats were provided with standard chow on alternate days for 6 wk, whereas rats in CON and EX groups were maintained on an ad libitum diet. EX group rats performed 3-h swimming exercise/day for 1 wk before sacrifice. After the 6-wk intervention, epitrochlearis muscles were excised for measurements of PGC-1 α and GLUT-4 protein contents. The body weight and total intra-abdominal fat mass were significantly lower in IF group than CON and EX groups ($p<0.05$), providing evidence that energy intake was severely restricted in IF group rats. PGC-1 α and GLUT-4 protein contents in epitrochlearis muscle were significantly higher in EX group than CON and IF group ($p<0.05$). In contrast, no significant difference in PGC-1 α was observed between CON and IF groups. Furthermore, GLUT-4 protein content was significantly lower in IF group than CON group ($p<0.05$). These results demonstrate that long-term intermittent fasting induces down-regulation of GLUT-4 content in rat skeletal muscle.

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