

Original Article

Effects of acute swimming on pancreatic enzyme activity and intestinal glucose transporters content in rats

Saki KONDO, Ayumi FUKAZAWA, Shin TERADA

Department of Life Sciences, Graduate School of Arts and Sciences, The University of Tokyo

ABSTRACT

【Aim】

Long-term endurance exercise training reportedly increases pancreatic amylase activity in rats, suggesting that chronic exercise training enhances the carbohydrate digestive capacity. To clarify whether an acute bout of endurance exercise can also induce pancreatic adaptation and affect the glucose transport capacity in the small intestine, we evaluated the effects of acute swimming for different durations on pancreatic amylase activity and the intestinal glucose transporter contents in rats.

【Methods】

Male Sprague-Dawley rats were subjected to acute bouts of swimming for 1 h (Ex-1h group) or 6 h (Ex-6h group, two 3-h bouts separated by 1h of rest). Sedentary rats were used as a control (Con group). The pancreas and small intestine (jejunum) were removed immediately or 24 h after the exercise, and the amylase activity and glucose transporters (GLUT2 and SGLT1) contents were measured.

【Results】

While no significant difference in the total pancreatic amylase activity was observed between the Con and Ex-1h groups, the Ex-6h group had a significantly lower total amylase activity, compared with the Con group, both immediately and 24 h after the exercise. No significant differences in the GLUT2 and SGLT1 protein contents were observed among the three groups.

【Conclusion】

These results suggest that an acute bout of prolonged exercise for a long period (~6 h) may decrease the carbohydrate digestive capacity in the rat pancreas through a reduction in amylase activity, although the prolonged exercise had little effect on the intestinal glucose transporters contents.

Keywords: amylase, GLUT2, SGLT1, pancreas, small intestine