Original Article

# Effects of co-ingestion of glucose with milk after exercise on insulin secretion in female university students

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## ABSTRACT

Insulin stimulates glycogen and protein synthesis in skeletal muscle. Post-exercise nutritional strategies designated to augment insulin secretion are therefore required for athletes to improve athletic performance and enhance training adaptations. In this study, we examined the effects of the post-exercise co-ingestion of glucose and milk, which has been shown to stimulate insulin secretion during post-exercise recovery in mice, on plasma insulin levels in female university students. Seven female university students completed 30-min cycle ergometer exercise on 2 separate occasions. Immediately after each exercise, they ingested a solution containing either 1) glucose alone (1 g/kg body weight dissolved in 250 ml of water) or 2) glucose (1 g/kg body weight) + milk (250 ml). Blood samples were collected before and 15, 30, 60 and 120 min after ingestion to determine the concentrations of blood glucose and the plasma insulin levels. The areas under the curve for plasma insulin and blood glucose were significantly higher and significantly lower after the co-ingestion of glucose and milk compared with glucose alone, respectively. These results suggest that the ingestion of glucose in combination with milk immediately after exercise potently stimulates insulin secretion in female university students.

**Keywords:** milk, insulin, human, cycle ergometer