Whey protein exerts influence on glucose transporters in skeletal muscle of rats

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Physical exercise is known to augment muscle glycogen stores. We have shown that the whey protein has the capacity to recover and/or preserve glycogen stores in skeletal muscle after exercise, but the mechanism responsible for this is not known. The aim of this study was to investigate the effect of exercise and whey protein on glucose transporters (GLUT-4 and GLUT-1) in skeletal rat muscle. Forty-eight male Wistar rats were divided into sedentary or exercised groups with each group being fed either casein, intact whey protein or prehydrolysed whey protein as the source of dietary protein for 10 days. Exercised rats were trained in a single exercise session. All animals were fasted overnight to maintain similar glycogen stores. Two hours before the sacrifice, the rats received 2 g the experimental diets. For glycogen analysis the skeletal muscle were collected. The glucose transporters, GLUT-4 and GLUT-1 present in cytoplasmic membrane were analyzed by western blot. The glycogen contents in skeletal muscle were significantly greater in rats fed whey protein compared with the control (casein), regardless of the animals having been sedentary or exercised. The prehydrolysed whey protein and exercise increased the translocation of glucose transporter GLUT-4 from cytoplasm to cell membrane. These results showed that prehydrolysing the whey protein produced an increase of the active GLUT-4 comparable to that produced by physical exercise, without altering GLUT-1. Such an increase in translocation of GLUT-4 should favour glucose transport into the muscle.