

Post-Workout Sports Drink? Try Cereal and Milk Instead

By Crystal Phend, Staff Writer, MedPage Today

Athletes may get the same post-workout boost from a bowl of cereal as they might expect from a sports drink, researchers found.

A bowl of cereal with nonfat milk after exercise produced statistically similar results as a carbohydrate-electrolyte drink for nearly all measures of muscle glycogen and protein synthesis, Lynne Kammer, M.S.E., M.A., of the University of Texas at Austin, and colleagues reported.

The findings, in trained cyclists and triathletes, were reported in the *Journal of the International Society of Sports Nutrition*.

Exercise depletes muscle stores of glycogen -- converted to glucose as fuel -- and also breaks down muscle protein. This suggests that "the ideal recovery food must contain both carbohydrate and protein to provide substrate for glycogen synthesis and achieve net protein balance," the researchers wrote.

A sports drink containing both protein and carbohydrates may have been a more fair comparison, the researchers noted.

The sports drink contained only carbohydrates (78.5 g) and electrolytes whereas the cereal plus milk contained carbohydrates (77 g), protein (19.5 g), and fat (2.7 g).

But carbohydrate-only drinks such as Gatorade and Powerade are more familiar to recreational athletes and the at-home exercise crowd, who "may not understand the benefit of added protein in post-exercise supplementation," they said.

For refueling at home, "cereal and nonfat milk provide a less expensive whole food option as compared to sports drinks," they wrote. "It also provides easily digestible and quality protein in the milk, which could promote protein synthesis and training adaptations."

Their crossover-design study included eight male and four female cyclists or triathletes in good health. They were randomized to glycogen-depleting endurance exercise, followed by a typical, two-serving bowl of Wheaties cereal with nonfat milk or two 20-oz bottles of a sports drink.

This was followed several days later by a second bout of exercise -- two hours cycling on a stationary bike at moderate intensity -- with the other post-workout snack.

Muscle biopsies and blood samples taken before and several times after exercise indicated that the cereal group had higher insulin secretion than the sports drink group during the recovery period (191 versus 123.1 pmol/L, $P<0.05$). This might have been expected because of the amino acids in milk, the researchers wrote.

While blood glucose levels were statistically significantly lower in the cereal group 60 minutes into the recovery period (5.6 versus 6.1 mmol/L, $P<0.05$), the "treatment" effect was not significantly different ($P=0.395$).

Plasma lactate levels, though, were lower with cereal with a significant treatment effect (1.00 versus 1.4 mmol/L, $P<0.05$).

This difference could indicate that "a higher percentage of glucose was taken up by the muscle and stored as glycogen after cereal rather than converted to lactate," Kammer's group said.

Muscle biopsies indicated improved glycogen levels in both groups at 60 minutes into the recovery period compared with immediately afterward. There was no difference between the groups in the rate of glycogen synthesis or change in glycogen phosphorylation ($P=0.682$ and $P=0.362$, respectively).

Among the measures of proteins controlling initiation of protein synthesis, only the mammalian target of rapamycin (mTOR) was different between groups. These findings 60 minutes into the post-exercise recovery period included:

- Increased mTOR phosphorylation with cereal but not the sports drink, for a significant difference in the mean change between treatments ($P<0.05$)
- Increased protein kinase B (Akt) phosphorylation with cereal compared with the sports drink but no significant treatment effect ($P=0.091$)
- No differences in change in ribosomal protein S6 (rpS6) phosphorylation between groups ($P=0.911$)
- Similar changes in eukaryotic translation initiation factor 4E (eIF4E) phosphorylation between groups ($P=0.856$)

The researchers concluded that a bowl of cereal would be at least as good as sports drinks for at-home "refueling" after exercise.

They cautioned that the findings might have been limited by the timing of the second muscle biopsy, because glycogen and protein synthesis don't occur at the same rate after exercise.

Primary source: Journal of the International Society of Sports Nutrition

Source reference:

[Kammer L, et al "Cereal and nonfat milk support muscle recovery following exercise" *J Int Soc Sports Nutr* 2009](#)