

## What you eat after exercise matters

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Many of the health benefits of aerobic exercise are due to the most recent exercise session (rather than weeks, months and even years of exercise training), and the nature of these benefits can be greatly affected by the food we eat afterwards, according to a study published in the *Journal of Applied Physiology*.

"Differences in what you eat after exercise produce different effects on the body's metabolism," said the study's senior author, Jeffrey F. Horowitz of the University of Michigan. This study follows up on several previous studies that demonstrate that many health benefits of exercise are transient: one exercise session produces benefits to the body that taper off, generally within hours or a few days.

"Many of the improvements in metabolic health associated with exercise stem largely from the most recent session of exercise, rather than from an increase in 'fitness' per se," Dr. Horowitz said. "But exercise doesn't occur in a vacuum, and it is very important to look at both the effects of exercise and what you're eating after exercise."

Specifically, the study found that exercise enhanced <u>insulin sensitivity</u>, particularly when meals eaten after the exercise session contained relatively low carbohydrate content. Enhanced insulin sensitivity means that it is easier for the body to take up sugar from the <u>blood stream</u> into tissues like muscles, where it can be stored or used as fuel. Impaired insulin sensitivity (i.e., "<u>insulin resistance</u>") is a hallmark of Type II diabetes, as well as being a major risk factor for other chronic diseases, such as heart disease.



Interestingly, when the research subjects in this study ate relatively lowcalorie meals after exercise, this did not improve insulin sensitivity any more than when they ate enough calories to match what they expended during exercise. This suggests that you don't have to starve yourself after exercise to still reap some of the important health benefits.

The paper, "Energy deficit after exercise augments lipid mobilization but does not contribute to the exercise-induced increase in insulin sensitivity," appears in the online edition of the journal. The authors are Sean A. Newsom, Simon Schenk, Kristin M. Thomas, Matthew P. Harber, Nicolas D. Knuth, Haila Goldenberg and Dr. Horowitz. All are at the University of Michigan. The American Physiological Society (APS: <u>www.the-aps.org</u>) published the research.

## **Study Design**

The study included nine healthy sedentary men, all around 28-30 years old. They spent four separate sessions in the Michigan Clinical Research Unit in the University of Michigan Hospital. Each session lasted for approximately 29 hours. They fasted overnight before attending each session, which began in the morning.

The four hospital visits differed primarily by the meals eaten after exercise. The following describes the four different visits:

- 1. They did not exercise and ate meals to match their daily calorie expenditure. This was the control trial.
- 2. They exercised for approximately 90 min at moderate intensity, and then ate meals that matched their caloric expenditure. The carbohydrate, fat, and protein content of these meals were also appropriately balanced to match their expenditure.



- 3. They exercised for approximately 90 min at moderate intensity and then ate meals with relatively low carbohydrate content, but they ate enough total calories to match their calorie expenditure. This reduced-carbohydrate meal contained about 200 grams of carbohydrate, less than half the carbohydrate content of the balanced meal.
- 4. They exercised for approximately 90 min at moderate intensity and then ate relatively low-calorie meals, that is, meals that provided less energy than was expended (about one-third fewer calories than the meals in the other two exercise trials). These meals contained a relatively high carbohydrate content to replace the carbohydrate "burned" during exercise.

The exercise was performed on a stationary bicycle and a treadmill. The order in which the participants did the trials was randomized.

In the three exercise trials, there was a trend for an increase in insulin sensitivity. However, when participants ate less carbohydrate after exercise, this enhanced insulin sensitivity significantly more. Although weight loss is important for improving metabolic health in overweight and obese people, these results suggests that people can still reap some important health benefits from exercise without undereating or losing weight, Dr. Horowitz said.

The study also reinforces the growing body of evidence that each exercise session can affect the body's physiology and also that differences in what you eat after exercise can produce different physiological changes.

## **Next Steps**



The research team is now performing experiments with obese people, aimed at better identifying the minimum amount of exercise that will still improve insulin sensitivity at least into the next day.

More information: <a href="http://jap.physiology.org">http://jap.physiology.org</a>

## Provided by American Physiological Society

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