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To eat or not to eat (before exercising)—that is the question

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Exercise enthusiasts often wonder whether it's better to eat or fast before a workout. A new study is the first of its kind to show the effects of eating versus fasting on gene expression in adipose (fat) tissue in response to exercise. This study highlights the different roles fat plays in powering and responding to exercise. The study is published ahead of print in the *American Journal of Physiology—Endocrinology and Metabolism*.

Researchers from the University of Bath in the U.K. studied a group of overweight males. The volunteers walked for 60 minutes at 60 percent maximum oxygen consumption on an empty stomach and, on another occasion, two hours after consuming a high-calorie carbohydrate-rich breakfast. The research team took multiple blood samples after eating or fasting and after exercising. The researchers also collected adipose tissue samples immediately before and one hour after walking.

Gene expression in the adipose tissue differed significantly in the two trials. The expression of two genes, PDK4 and HSL, increased when the men fasted and exercised and decreased when they ate before exercising. The rise in PDK4 likely indicates that stored fat was used to fuel metabolism during exercise instead of carbohydrates from the recent meal. HSL typically increases when adipose tissue uses stored energy to support increased activity, such as during exercise, explained Dylan Thompson, corresponding author of the study.

These results reinforce the view that "adipose tissue often faces

competing challenges," Thompson wrote. After eating, adipose tissue "is busy responding to the meal and a bout of exercise at this time will not stimulate the same [beneficial] changes in adipose tissue. This means that exercise in a fasted state might provoke more favorable changes in adipose tissue, and this could be beneficial for health in the long term," he noted.

More information: Yung-Chih Chen et al. FEEDING INFLUENCES ADIPOSE TISSUE RESPONSES TO EXERCISE IN OVERWEIGHT MEN, *American Journal of Physiology - Endocrinology And Metabolism* (2017). DOI: 10.1152/ajpendo.00006.2017

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