

Title: Fed or fasted? New considerations for exercise and glycaemic response testing

Author: Shelley Roberts (MNutrDiet)

Correspondence: Shelley Roberts

School of Public Health, Gold Coast Campus,

Griffith University, 4222, QLD, Australia.

Email: s.roberts@griffith.edu.au

Conflict of Interest: The author declares no conflict of interest

Funding: This paper received no funding.

To the editor:

I write in response to the article by Gonzalez and Stevenson [1], commenting on our recently published study investigating the effects of prior exercise and protein co-ingestion on the glycaemic response to carbohydrate. In our study, protein co-ingestion lowered the glycaemic response to carbohydrate, however prior aerobic exercise had no effect [2]. Whilst we discussed a number of factors that could potentially explain this result, Gonzalez and Stevenson suggest that an important factor was omitted – subjects' nutritional state prior to exercise [1]. Gonzalez et. al. conducted a study investigating the effects of breakfast and exercise on the glycaemic response to a test drink (chocolate milk) containing carbohydrate, protein and fat [3]. The authors found that in the fasted state, there was no difference in the glucose area under the curve (AUC) between rest and exercise trials, which confirms the results of our study. However, they found that in the fed state (i.e. when breakfast was consumed), the glucose AUC was 15% higher after exercise than rest [3]. This is a novel study and raises many important scientific questions, such as the splanchnic effects (blood flow, intestinal glucose absorption, glycogenolysis etc.) and hormonal effects involved with this observed increase in glucose AUC. It also challenges the customary fasted condition which is generally used for standardisation in clinical exercise trials.

In our study, subjects were fasted to ensure consistency within and between subjects. Whilst this may not always be reflective of every eating occasion, we felt this was a prudent control measure to ensure the best chance of answering the research question. We did not allude to prior nutritional intake as a potential explanatory factor for the lack of effect observed of exercise on glycaemic response, due to the limited evidence for this in the literature. The study by Gonzalez et. al. [3] is the first to investigate this effect, and the results highlight the need for further work in the area. Some further areas of research could include investigating

differences in macronutrient distributions of the breakfast meal, and more specifically, whether there are differences in the glycaemic response depending on the amount of carbohydrate consumed per kg body weight at this meal, as this may affect glycogen stores and circulating blood glucose. The research should incorporate both males and females to elucidate whether there are any gender differences in hormonal or splanchnic effects on the glycaemic response. The macronutrient composition of the test drink is also important, as differing proportions of these are likely to affect gastric emptying and insulin secretion, and in turn, glycaemic response.

References

1. Gonzalez JT, Stevenson EJ. Assessment of the post-exercise glycemic response to food: considering prior nutritional status. *Nutrition*. (in press);29:XX.
2. Roberts S, Desbrow B, Grant G, Anoopkumar-Dukie S, Leveritt M. Glycemic response to carbohydrate and the effects of exercise and protein. *Nutrition*. 2013;29(6):881-5.
3. Gonzalez JT, Veasey RC, Rumbold PLS, Stevenson EJ. Breakfast and exercise contingently affect postprandial metabolism and energy balance in physically active males. *Br J Nutr*. 2013:1-12.