

# Glucose-fructose beverages do not alter the effects of training on lactate metabolism

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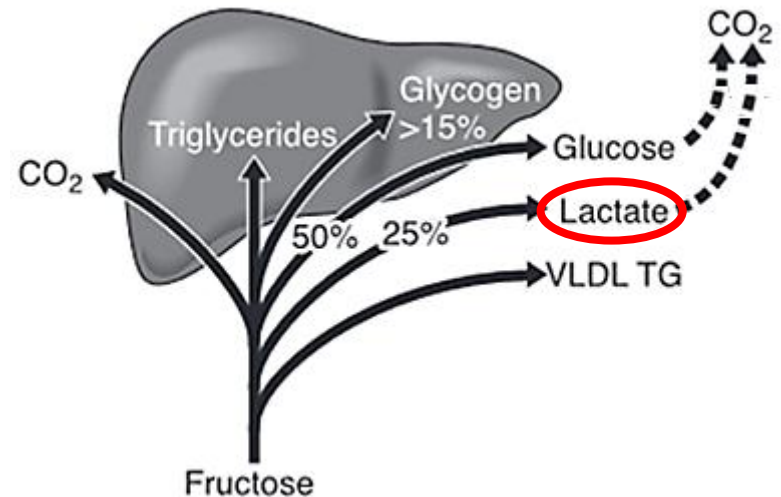
**Introduction:** During exercise, plasma lactate is mainly produced and used by muscle or recycled to glucose in the liver.

However, when fructose is ingested, fructose is partly metabolized into lactate in the liver, and we previously showed that this increases lactate fluxes and oxidation during exercise.

*Lecoultre et al. 2010*

How this liver to muscle fructose-lactate shuttle is regulated remains unknown.

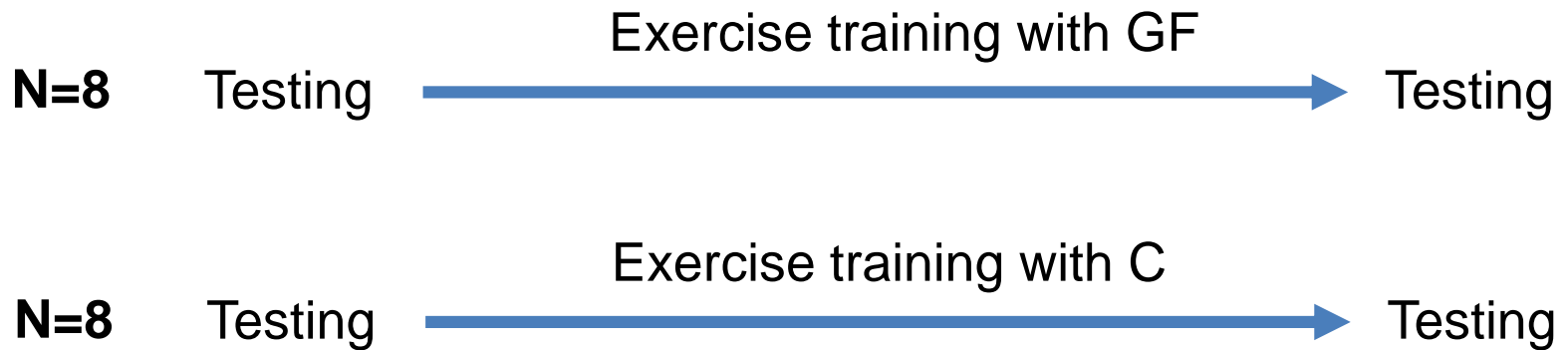
In this study, we assessed whether fructose-containing beverages alter the effects of training on lactate metabolism.



*Modified from Tappy and Lê 2010*

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**Methods:** Two groups of eight sedentary males were endurance-trained for three weeks while ingesting glucose-fructose (GF) beverages or water (C) before/during sessions.



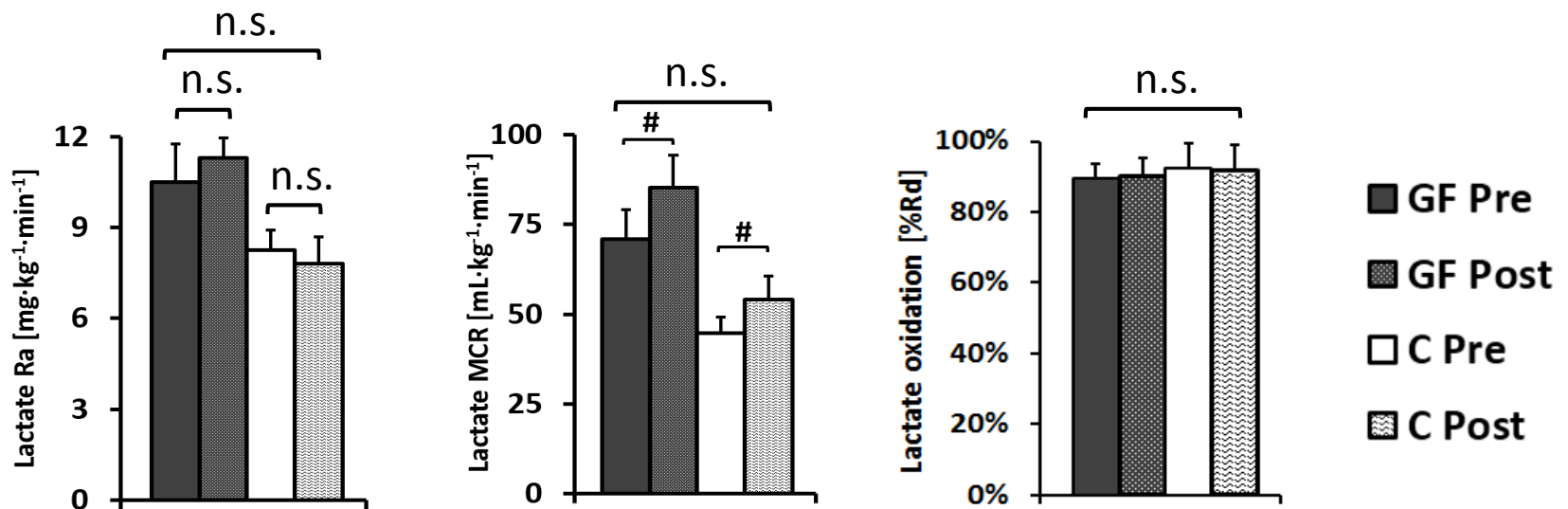
- Testing:**
- Incremental test:  $\dot{V}O_{2\max}$ , lactate turnpoint.
  - Metabolic test: 90min cycling at 45%  $\dot{V}O_{2\max}$  with GF beverages.
    - Plasma lactate appearance -Ra-, oxidation -Rox- and metabolic clearance rate -MCR- using stable isotope tracers.

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**Results:** Both interventions similarly increased  $\dot{V}O_{2\max}$  and workload of lactate turnpoint.

Exercise-training decreased submaximal lactate concentrations (GF:  $-0.2 \pm 0.1$  vs. C:  $-0.4 \pm 0.1$  mmol·L<sup>-1</sup>) similarly in GF and C (two-way RM-ANOVA: T effect:  $P < 0.01$ ; TxC interaction:  $P = n.s.$ ).

This was due to increased lactate metabolic clearance in both GF and C, whereas lactate appearance was unchanged:



Lactate was primarily oxidized, similarly in all conditions.

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**Discussion:** Our data confirm that fructose is partly converted into lactate in splanchnic organs, to be subsequently oxidized during exercise.

They also confirm that training lowers lactate concentration by increasing metabolic clearance (Donovan and Brooks 1983).

However, GF beverages ingested during training sessions do not alter the effects of endurance-training on lactate metabolism.

- No effect on lactate turnover.
- Similarly enhanced lactate metabolic clearance.
- No alteration in lactate oxidation.

