

How much carbohydrate do athletes really need to consume during exercise?

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The effects of carbohydrate (CHO) intake on substrate metabolism, exercise capacity and exercise performance have been studied for over 100 years. From a metabolic perspective, the ergogenic effect of CHO intake is likely mediated by liver (and potentially muscle) glycogen sparing, maintenance of plasma glucose concentrations and whole-body CHO oxidation rates, such that the required exercise intensity can be sustained for a longer duration thereby delaying fatigue. Accordingly, the 2016 sport nutrition guidelines from the American College of Sports Medicine recommend CHO intakes of 30-60 g.h⁻¹ (for endurance exercise and “stop and start” sport lasting 1- 2.5 h) and 90 g.h⁻¹ (from multiple transportable carbohydrates e.g. glucose/fructose mixtures) for “ultra-endurance” >2.5 to 3 h in duration. However, although recent anecdotal reports reflect a trend for endurance athletes to consume (and experiment with) higher rates of CHO ingestion during training and racing (i.e. 120-200 g.h⁻¹), the efficacy of such doses is not yet substantiated by current scientific research. Rather, contemporary research suggests that the guidelines for the upper limit of CHO intake could increase from 90 to 120 g.h⁻¹, considering that both exogenous and whole-body rates of CHO oxidation can be increased with these higher ingestion rates. Indeed, such absolute doses may also modulate important physiological determinants of performance (e.g. durability and economy) across cycling, marathon running and ultra-endurance exercise. Accordingly, this presentation will provide a contemporary review of CHO metabolism during exercise, factors affecting exogenous CHO oxidation rates (i.e. CHO blend, ratio, format, environmental considerations etc) and sport-specific research and insights from practice, before presenting an updated and more nuanced model to guide CHO personalisation strategies for endurance athletes. Directions for future research are also discussed, emphasising the need for collaborative research to study both male and female athletes during ecologically valid exercise protocols in order to better address the real-world fuelling challenges that are faced by elite athletes.