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Branched-chain amino acid supplementation does not affect endurance exercise capacity in man

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Studies in the literature show that the administration of branched-chain amino acids (BCAA) to human subjects improves exercise capacity[1,2], but there are also many studies that show no benefit[3,4]. BCAA have been suggested to improve exercise capacity by impairing the uptake of tryptophan into the brain, and therefore reducing the production of the neurotransmitter serotonin, which is responsible for feelings of lethargy. Analysis of previous data generated by Watson and colleagues[5] has raised the possibility that BCAA supplementation may have an effect on exercise capacity in only some of those subjects who were tested. The aim of the present investigation was to determine whether there are responders and non-responders to BCAA supplementation.

Eight healthy males (age 25 (SD 3) years, height 1.84 (SD 0.08) m, weight 84.1 (SD 8.9) kg, V_{O2peak} 4.1 (SD 0.88) l/min) cycled to exhaustion at 30°C (47% relative humidity) and 55% V_{O2peak} on six separate occasions. All trials followed the same protocol. The first two occasions were familiarisation trials. During the four main trials subjects ingested either a lemon-flavoured placebo or a BCAA drink (g/l; leucine 6, isoleucine 3, valine 3), also lemon-flavoured. Each drink was administered twice, and the trials were performed in a double-blinded randomised cross-over design.

Subjects reported to the laboratory following an overnight fast and having standardised diet and activity patterns for 48 h before testing. Subjects rested for 2 h in a temperate environment before cycling to exhaustion in the heat. Exhaustion was defined as the point at which subjects could not maintain a pedal cadence of >50 rev/min despite verbal encouragement. During the pre-exercise rest period subjects consumed 250 ml of the appropriate drink every 30 min and then a further 150 ml every 15 min during exercise. During the trials 10 ml blood samples were taken at 0, 60 and 120 min of the rest period, every 15 min during exercise and at the point of exhaustion. Heart rate (HR), core temperature (Tc), skin temperature (Tsk), ratings of perceived exertion (RPE) and thermal comfort (TC) were recorded every 10 min during exercise. Expired air was collected every 30 min during exercise.

There was no difference in the time to exhaustion between the placebo drinks and the BCAA drinks ($P=0.992$). The mean time to exhaustion for the placebo drink was 105.8 min and for the BCAA drink it was also 105.8 min. There were also no differences between trials in the mean values for Tc ($P=0.675$), Tsk ($P=0.361$), body heat content ($P=0.861$), HR ($P=0.292$), RPE ($P=0.636$), TC ($P=0.815$), energy expenditure ($P=0.325$) or blood glucose ($P=0.562$) or lactate ($P=0.072$) concentrations, or in the change in plasma volume ($P=0.538$).

		Placebo 1	Placebo 2	BCAA 1	BCAA 2
Time to exhaustion (min):	Mean	104.9	106.6	108.0	103.5
	SD	29.6	34.5	31.4	31.9

The results suggest that BCAA supplementation does not appear to influence exercise performance in any individual, under well-controlled laboratory-based experimental conditions. Exercise capacity was highly reproducible and none of the variables measured showed any differences between trials.

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