Background: Previous studies have reported that creatine (Cr) supplementation results in a consistent increase in fluid retention and body mass (BM) (Easton et al., 2007: International Journal Sports Nutrition and Exercise Metabolism, 17, 70-91). This additional fluid has been shown to attenuate cardiovascular and thermoregulatory responses and improve to fatigue during cycling exercise in the heat (Kilduff et al., 2004: International Journal of Sports Nutrition and Exercise Metabolism, 14, 446-46). While these physiological effects may be advantageous for endurance athletes who train and compete in hot climates, runners have been advised not to supplement with Cr as the additional BM will increase the energy cost of running (Noakes, 2004: Lore of Running, Champaign, IL: Human Kinetics). However, the effects of Cr on running economy have yet to be determined.

Purpose: To determine the effects of Cr supplementation on running economy in endurance-trained males.

Methods: Ethical approval was granted from Kingston University's Faculty Ethics Committee and all participants provided written informed consent prior to data collection. Twelve endurance trained males (age 24.69 ± 4.48 years, BM 79.47 ± 7.91 kg and VO2max 58.23 ± 7.89 ml kg-1 min-1) were matched for BM and randomly assigned to either a Cr or placebo (Pl) group. The Cr group received 11.4 g of Cr•H2O and 75 g of glucose (x 2 daily) and the Pl group received 85 g of glucose (x 2 daily) during a 7 day supplementation regimen. Following a preliminary incremental treadmill run (H/P/Cosmos Venus treadmill, Nussdorf-Traunstein, Germany) until exhaustion to determine running speed at aerobic capacity (vVO2max), participants performed a 10 min run at 70% vVO2max pre- and post-supplementation. Oxygen uptake and carbon dioxide production were measured throughout via breath-by-breath indirect calorimetry and energy expenditure was calculated using the Weir equation (Weir, 1949: Journal of Physiology, 109, 1–9). Heart rate measured continuously using a Polar F6 HR monitor (Polar Electro Oy, Kempele Finland). Data was analysed using a two-factor mixed model ANOVA to compare differences between groups and pre- and post-supplementation.

Results: BM increased in the Cr group (0.93 ± 0.85 kg, P=0.04 and effect size -.063) but not the Pl group (P=0.58). There were no differences in energy expenditure during exercise either between groups (P=0.54) or from pre- to post-supplementation (P=0.95) (Pl group pre: 17.79 ± 2.27 kcal•min-1, post: 16.6 ± 2.6 kcal•min-1; Cr group pre: 18.14 ± 1.8 kcal•min-1, post: 17.9 ± 1.95 kcal•min-1) Heart rate was not different between groups (P=0.94) or from pre- to post-supplementation (P=0.77).

Discussion: In the present study, a Cr induced increase in BM did not increase the energy cost of running in endurance trained runners. This is in contrast to previous studies who consistently report that increased mass can reduce running economy (Martin, 1985: Medicine and Science in Sports and Exercise, 17, 427–33). However, the increase in BM resulting from Cr supplementation is relatively small (approximately 1.15 % of BM) and spread equally throughout the intracellular water compartments in the body (Easton et al., 2007), which does not appear to negatively, affect the energy cost of running.

Conclusion: Cr supplementation does not alter running economy and may provide an effective means by which to limit the adverse physiological effects of thermal stress on exercise performance.

Further research is required to examine the effects of Cr supplementation on exercise performance in the heat.