

# The extracellular heat shock protein response to a 7-day desert-based ultra-marathon

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Extracellular heat shock protein 72 (eHsp72) concentration has been shown to significantly increase in response to extreme stress. Ultra-endurance events are becoming increasingly popular and place individuals under a prolonged duration of exercise stress, which is exacerbated when undertaken in extreme environmental conditions, particularly extreme heat. The extreme stress imposed upon the body under such conditions places individuals at increased risk of heat illness and cellular damage. The eHsp72 response to ultra-endurance events in extreme environmental conditions has received little attention and thus research is required to understand the heat shock response to such stress. **PURPOSE:** To investigate the effect of a desert based ultra-marathon (the Marathon des Sables; MDS) on the eHsp72 response in humans. **METHODS:** Thirteen (three female) competitors (age 42, range: 23-60 years, height  $1.74 \pm 0.10$  m, mass  $77.29 \pm 12.92$  kg,  $VO_{2max}$   $55.25 \pm 11.96$  ml.kg.min<sup>-1</sup>) provided blood samples via venepuncture for the measurement of eHsp72 concentration on two occasions prior to the race: i) 12 weeks (baseline), and ii) 7 d (pre-race) prior to departure for the MDS, and two further occasions post-race: iii) ~ 6 h post-race and iv) 7 d post-race. The MDS 2015 consisted of 7 consecutive stages, over 7 d, across the Sahara Desert, Morocco, equating to a total distance of 249.4 km. eHsp72 was determined using a commercially available ELISA kit and is displayed as a percentage change from baseline values. **RESULTS:** Participants completed the ultra-marathon in an average total time of  $3043 \pm 1002$  min. Post-race eHsp72 concentration was 122%, 117% and 108% greater than baseline, pre-race and 7 d post-race, respectively ( $F_{3, 45} = 63.348$ ,  $p < 0.001$ ). **CONCLUSION:** eHsp72 concentration is significantly elevated in response to 7 consecutive days of prolonged exercise heat stress in extreme environmental conditions and returns to near baseline values within 7 d post race completion.