PLASMA SOLUBLE INTERLEUKIN-6 RECEPTOR LEVELS CORRELATE WITH EXERCISE LOAD: A NOVEL MARKER OF PHYSICAL STRESS

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Fatigue is a predictable consequence of physical activity; yet its biological cause remains unclear. During exercise, a polypeptide messenger molecule interleukin-6 (IL-6) is actively produced. Previously, we have shown that administration of recombinant IL-6 impaired athletic performance in healthy, trained runners (Robson-Ansley et al 2004). Furthermore, elevated levels of soluble IL-6 receptor (sIL-6R) have been demonstrated to increase the responsivity of the brain to IL-6 and cause an augmented suppression of loco-motor activity and general sickness behaviour above that of elevated IL-6 levels alone (Schobitz et al. 1995). The aim of the present study was to investigate changes in plasma sIL-6R and IL-6 levels in response to a 6-day multi-stage endurance mountain bike event. Thirteen healthy endurance trained male subjects (mean +/- SD mass 7.6 kg +/- 5.9 kg, age 35 +/- 4 years) partook in the study. The subjects cycled a total distance of 468 km over varied terrain. Venous blood samples were obtained from the subjects, in a fasted state, each morning prior to exercise. Blood samples were analysed for plasma concentrations of IL-6, sIL-6R and cortisol. Subjects completed a daily log of their exercise duration and subjective rating of perceived exertion for each stage of the race, which was used to quantify exercise load (Foster, 1998). Plasma sIL-6R concentration was significantly elevated over the duration of the event compared with the pre-event sample but IL-6 and cortisol concentrations were unchanged. Plasma sIL-6R was also significantly correlated with exercise load (p<0.01). We propose that elevations in sIL-6R levels provide a novel biomarker of physical stress. Furthermore, we hypothesise that increased sIL-6R concentrations following prolonged exercise exacerbate the fatigue-inducing properties of elevated IL-6 levels.


Acknowledgements: Sciona Inc, Boulder, Colorado, USA.
Keywords: Endurance, Cytokines, Fatigue