

The effect of repeated bouts of level and downhill treadmill walking on plasma interleukin-6

N.C. Bevan¹, P.M. Bergin¹, T.J. Connor^{1,2} and S.A. Warmington¹, ¹Department of Physiology and ²Institute of Neuroscience, The University of Dublin, Trinity College, Dublin 2, Ireland.

The increase in plasma interleukin-6 (IL-6) appears dependent on factors such as exercise intensity, duration, muscle mass recruited, and mode (concentric vs eccentric) (for review see Febbraio & Pedersen, 2002). Particularly during the later stages of prolonged endurance exercise the increase in plasma IL-6 is most pronounced. The late appearance in the plasma following prolonged exercise suggests that a component of the rise in plasma IL-6 may be via damage to skeletal muscle. A single bout of eccentric exercise produces significant muscle damage. However, the same eccentric exercise bout performed some weeks afterward shows minimal damage to the active muscle (McHugh *et al.* 1999). Therefore, the aim of this experiment was to investigate the plasma IL-6 response with a single eccentric exercise bout, and 5 weeks later, with another identical "repeated" bout of eccentric exercise, to assess the contribution of skeletal muscle damage to the IL-6 response.

Fifteen inactive males volunteered for this study. Following ethical approval subjects were randomly assigned to a concentric exercise group (CON; n=7) or an eccentric exercise group (ECC; n=8). Subjects performed two bouts of walking exercise separated by 5 weeks (B1 & B2) on a motor driven treadmill at a constant speed (5 km.hr⁻¹) for 90 min. CON walked on the flat (0° decline) while ECC walked downhill (14° decline). Forearm venous samples were collected at regular intervals Pre-, during and post-exercise for determination of plasma IL-6 (R&D systems ELISA kit). Maximal voluntary isometric contraction (MVC) of the quadriceps muscle group, and delayed onset muscle soreness (DOMS) were determined at the same time points, except during exercise. A 2-way ANOVA for repeated measures and Student-Newman-Keuls *post hoc* test was used to assess significance with p<0.05.

MVC and DOMS showed no muscle damage in either B1 or B2 in CON. However, there was significant muscle damage in ECC post B1 only (not B2). Similarly, plasma IL-6 was elevated in ECC only (towards the end of B1), and peaked immediately post-exercise. All changes returned to baseline levels within 7 days.

In this study exercise intensity was not different between B1 & B2 for both CON and ECC. With no muscle damage or change in plasma IL-6 in B2, yet elevated plasma IL-6 in ECC in B1, it appears that exercise-induced muscle damage contributes almost exclusively to the increase in IL-6 reported following under these low intensity walking exercise conditions.

Febbraio, M.A. & Pedersen, B.K. (2002) *FASEB Journal* 16, 1335-1347.

McHugh M.P., Connolly, D.A.J., Eston, E.J. & Gleim, G.W. (1999) *Sports Medicine* 18, 157-170.