

Effect of ageing and exercise training on myokine expression responses to acute exercise

DELLA GATTA PA¹, FARNFIELD MM¹, PEAKE JM^{2,3}, GARNHAM AP¹ and CAMERON-SMITH D⁴.

¹Centre for Physical Activity and Nutrition, School of Exercise and Nutrition Sciences, Deakin University, Australia

²School of Biomedical Sciences, Queensland University of Technology, Brisbane, Australia

³The Centre of Excellence for Applied Sports Science Research, Queensland Academy of Sport, Brisbane, Australia

⁴Liggins Institute, The University of Auckland, Auckland, New Zealand

ABSTRACT

Age-related muscle loss is a major contributor to falls, frailty and mortality. It has been widely suggested that chronic, age-related inflammation contributes to the gradual loss of skeletal muscle mass that occurs with ageing. Indeed, ageing is associated with elevations in a number of circulating inflammatory proteins, many of which have detrimental effects on skeletal muscle growth and protein balance. Exercise training has been shown to reduce chronic inflammation and, therefore, may represent an appropriate means to reduce age-related inflammation and counteract sarcopenia. Yet few studies have evaluated the effect of aging on skeletal muscle expression of inflammatory proteins and the effect of acute and repeated exercise on these factors.

The aim of the current study was to determine the effect of 12 weeks of resistance exercise training on the levels of myokines within skeletal muscle, both at rest and following an acute bout of exercise and to examine how these responses may vary in young and older subjects, thus evaluating the potential for exercise to reduce age-related muscle inflammation.

Six healthy young (aged 18-25 years) and 8 healthy older men (aged 60-75 years) completed 12 weeks of resistance exercise training. Muscle biopsies were collected before and 2 h after an acute exercise bout at the beginning and the end of the 12 week training period. Muscle tissue was analyzed for the expression of key inflammatory (MCP-1, IL-8, IL-6 and TNF- α) and anti-inflammatory cytokines (IL-10, IL-13 and IL-4) via bead-based multiplex analysis.

Acute exercise increased the expression of inflammatory myokines, while anti-inflammatory myokines remained unchanged. In contrast to the hypothesis for this study, neither age nor training had a significant effect on the expression of myokines within skeletal muscle either in the resting state or 2 hours following exercise. However, older individuals displayed an increased inflammatory response to exercise prior to training when compared to younger individuals. Twelve weeks of resistance exercise training appeared to normalize this difference. Given the variability in myokine levels between individuals and the small subject number in the current study, further research is required to confirm this finding

Formatted: Don't adjust space between Latin and Asian text, Don't adjust space between Asian text and numbers