COMPLEMENT (C1-INH, C3, C4) RESPONSES TO EXERCISE-INDUCED MUSCLE DAMAGE IN CAUCASIAN AND AFRICAN MALES

Semple Stuart1, Smith Lucille1, McKune Andrew1, Mokgethwa Barbara2, Wadee Ahmed3, Sibanda Emmanuel1
(Tshwane University of Technology1, NHLS, University of Witwatersrand2, NHLS, Witwatersrand3, South Africa)

Introduction: The complement system is composed of plasma proteins that are intricately involved in a diverse array of biological processes. More specifically, these proteins play an important role in innate immunity and inflammation. Strenuous and/or unaccustomed exercise has been shown to elicit increases in certain inflammatory markers including complement proteins. It has however not been shown if the response of complement proteins following strenuous activity would be different in different racial groups. Therefore, the aim of this study was to compare changes in complement proteins [C1-esterase inhibitor (C1-INH), C3, C4] in active untrained Caucasian (n=8) and African (n=7) males in response to eccentrically biased exercise. Methods: Venipunctures were performed on the subjects before, immediately post and then at 3, 6, 9, 12, 24, 48, 72h after 60min of downhill running (-13.5%). Concentrations of C1-INH, C3 and C4 were determined in a Behring Nephelometer (Behring Diagnostics, Germany). Results were analysed using a random block design (p<0.05). Where significance was found a Bonferroni post-hoc test was performed. A student T-test was computed to determine if baseline concentrations were different between the groups. Results: In the African males, significantly higher resting concentrations of C1-INH (p=0.012), C3 (p=0.014) and C4 (p=0.03) were observed compared to the Caucasian males. Mean concentration of C1-INH was significantly (p<.0001) higher (race effect) in the Africans (0.27 +/- 0.02g/l) compared to the Caucasian (0.12 +/- 0.02g/l) males. C3 concentrations were significantly (p<.0001) higher (race effect) in the Africans (1.29 +/- 0.08g/l) compared to the Caucasian (0.52 +/- 0.07g/l) males. C4 concentrations were also significantly (p<.0001) higher (race effect) in the Africans (0.29 +/- 0.02g/l) compared to the Caucasian (0.08 +/- 0.02g/l) males. No significant time or interaction effects were observed. Discussion: Thus, 60min of downhill running failed to elicit significant changes in selected complement proteins, there was however a significant difference in resting concentrations as well as in the exercise-induced responses between African and Caucasian males. Although speculative, differences in these proteins at rest and in response to physical stress may imply that African males have (a) an enhanced innate immune function and (b) may display a more rapid and robust ‘upregulated’ inflammatory response to exercise-induced muscle damage. The latter may provide insight into how these different racial groups respond to and adapt to physical stress.

References

Keywords: Immunology, Inflammation, Muscle Damage