CHANGES IN CREATINE KINASE (CK) IN AFRICAN VERSUS CAUCASIAN MALES AFTER A BOUT OF EXERCISE INDUCED MUSCLE DAMAGE

Semple Stuart, Naidoo Melissa, Smith Lucille, Mckune Andrew, Neveling Nevel, Van Zyl Francois, Sibanda Emmanuel
(Tshwane University of Technology, South Africa)

Introduction: Recent reports have suggested that there may be racial differences in athletic ability, with Africans displaying superior ability in certain events (1). Several reasons have been postulated, but remain controversial. Since training involves injury and healing adaptations, we speculated that the hyper-inflammatory response seen in skin conditions (2), may also be present systemically, in response to muscle injury. CK has consistently been used as an indirect marker of muscle damage, with some suggestion that it's proportional to loss of strength (3). Therefore the purpose of this study was to induce eccentrically biased muscle damage and compare serum CK responses in an African and Caucasian cohort, before and after exercise. In addition, we investigated if differences would occur during the initial 12 h after exercise or in the following days/weeks. Methods: 9 black and 9 white healthy but untrained males were required to run down a -13.5% treadmill grade for 1 h, at a similar intensity of VO2max. Serum CK was assessed (Refletron, Boehringer) before, after, 3, 6, 9, 12, 24, 48, 72, 96, 120, 144 h, and then at 7, 14 and 21 d. Results were analyzed using a randomized block design (p<.05). Results: For the initial 12 h period, there was a race effect (p=.0001) with values (mean +/- se) for Africans (461 +/- 15 IU/L) being significantly higher than for Caucasians (264 +/- 16 IU/L). For the 24 h periods including 7, 14, and 21 d, there was also a race effect, with values for Africans (374 +/- 18 IU/L) again being higher (p=.0001) than for Caucasians (140 +/- 19 IU/L). Discussion: Prior to exercise, although not significantly different, values for Africans (175 +/- 58) were 250% higher than for Caucasians (70 +/- 58). Although the pattern of change across time was similar for both groups, the Africans had a more pronounced response with values for both groups peaking at 12 h (Blacks = 693 +/- 35 and Whites = 427 +/- 40 IU/L). Furthermore, values for Caucasians returned to baseline from 72 h onwards, while values for Africans remained elevated through 14 d. Since CK is used as a marker of muscle membrane damage/change in permeability, these results suggest that Africans experienced more muscle membrane damage compared to Caucasians during downhill running. Alternatively, the elevated CK levels could have been associated with an exacerbated inflammatory response and a subsequent increase in secondary damage (5).


Keywords: Eccentric Exercise, Race, Creatine kinase

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