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Rowing ergometer induced oxidative stress is altered by chronic dietary antioxidant intake
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Background – Rowing is regarded as an extremely demanding and competitive sport requiring large volumes of oxygen utilization, therefore potentially increasing oxidative stress.

Objectives – To investigate the effect of an acute rowing protocol on non-enzymatic antioxidant status in rowers and the relationship to dietary antioxidant intake

Design – The subjects were 58 elite highly trained rowers (24 males, 34 females). Blood samples were taken before and one hour after the termination of a 30-minute rowing ergometer test on a wind-resistance braked rowing ergometer, in which rowers were tested in groups competing against each other. The rowers completed an antioxidant food-frequency questionnaire.

Outcomes – Post exercise ascorbic acid concentration increased (mean ± SD: Pre 68.4 ± 18.4 µM versus Post 80.6 ± 20.5 µM), as did uric acid (Pre 450 ± 120 µM versus Post 550 ± 110 µM). Total dietary antioxidant consumption had a small correlation with the change in plasma ascorbic acid concentration (r=0.12; 90% confidence limits ± 0.22). Supplementation with vitamin-C had a small to moderate correlation with pre- (r=0.28;± 0.22), and post-exercise (r=0.33;±0.22) ascorbic acid concentrations. In addition, vitamin-C supplementation had a small but clear correlation with the change in plasma ascorbic acid concentrations with exercise (r=0.22;±0.22). These outcomes differ from those of acute supplementation studies that report no difference in resting ascorbic acid concentrations but rather with the change following exercise. Dietary factors are thought not to influence uric acid concentrations, however this study showed that antioxidant consumption did correlate with resting (r=0.20;±0.22) and post exercise (r=0.17;±0.22) uric acid concentrations.

Conclusion – Dietary practices can impact on the ability of elite and highly trained athletes to deal with oxidative stress and the non-enzymatic antioxidant status.

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Exercise, antioxidant restriction and the immune response in athletes
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Background – Exercise is beneficial for the immune system but excessive exercise has detrimental effects and can lead to chronic immunosuppression and decreased exercise performance in athletes [1].

Objective – To determine the effect of exercise on the immune system and the effect of dietary antioxidant restriction on the inflammatory process and antioxidant defence, which could exacerbate the effects of excessive or chronic exercise in athletes.

Design – Twenty athletes performed an overnight fasted treadmill VO2 max test (acute maximal exercise). Another seventeen athletes performed two overnight fasted treadmill exercise tests (short duration maximal exercise) separated by two weeks. Participants followed their habitual diet (H-AO) before completing the first exercise test. Participants then followed a restricted antioxidant diet (R-AO) for two weeks and then completed the same exercise test. Blood was collected at baseline and post-exercise for analysis. All participants completed a 4-day weighed food record.

Outcomes – Acute maximal exercise increased whole blood monocyte concentration 117% (P<0.00001) but did not increase pro-inflammatory cytokines in athletes. Short duration maximal exercise decreased the plasma carotenoids lycopene 54% (P<0.01) and β-carotene 56% (P<0.01) in the H-AO diet group. R-AO diet decreased baseline carotenoids to similar concentrations as post-exercise in the H-AO diet. R-AO diet increased TNF-α concentrations compared to the H-AO diet at baseline (28.30 vs 612.86 ng/ml; P<0.01) and post-exercise (34.23 vs 468.50 ng/ml; P<0.001). Perceived effort of short duration maximal exercise increased in the R-AO diet.

Conclusion – Dietary restriction of carotenoid containing foods can increase the inflammatory and oxidative response to exercise and may compound the negative effects of excessive exercise on the immune system. A diet high in carotenoid containing foods and/or carotenoid supplementation may help in maintaining a healthy immune system in athletes.

Reference