Influence of exercise intensity on systemic oxidative stress and antioxidant capacity

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The aim of the current study was to examine the influence of exercise intensity on systemic oxidative stress (OS) and endogenous antioxidant capacity. Non-smoking, sedentary healthy adult males (n = 14) participated in two exercise sessions using an electronically braked cycle ergometer. The first session consisted of a graded exercise test to determine maximal power output and oxygen consumption (VO2max). One week later, participants undertook 5-min cycling bouts at 40%, 55%, 70%, 85% and 100% of VO2max, with passive 12-min rest between stages. Measures of systemic OS reactive oxygen metabolites (dROM), biological antioxidant potential (BAP), heart rate (HR), VO2 , blood lactate and rating of perceived exertion were assessed at rest and immediately following each exercise stage. Significant (P<0·05) differences between exercise bouts were examined via repeated measures ANOVA and post hoc pairwise comparisons with Bonferroni correction. Increasing exercise intensity significantly augmented HR (P<0·001), VO2 (P<0·001), blood lactate (P<0·001) and perceived exertion (P<0·001) with no significant effect on dROM levels compared with resting values. In contrast, increasing exercise intensity resulted in significantly (P<0·01) greater BAP at 70% (2427 ± 106), 85% (2625 ± 121) and 100% (2651 ± 92) of VO2max compared with resting levels (2105 ± 57 µmol Fe2+ /L). **The current results indicate that brief, moderate-to-high-intensity exercise significantly elevates endogenous antioxidant defences, possibly to counteract increased levels of exercise-induced reactive oxygen species. Regular moderate-to-high-intensity exercise may protect against chronic OS associated diseases via activation, and subsequent upregulation of the endogenous antioxidant defence system.**

One thing I think this study shows is that exercise is a kind of hormesis, upregulating stress defense mechanisms.