SAMPLING TIME IS CRUCIAL FOR MEASUREMENT OF EXERCISE-INDUCED OXIDATIVE STRESS BIOMARKERS

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Purpose: To thoroughly investigate the time course changes of several commonly used markers of oxidative stress by performing serial measurements during a 24-hour period following an acute bout of strenuous cardiovascular exercise. Methods: Eleven untrained men performed two trials. In the experimental trial the subjects exercised for 45 min at 70-75% of VO2max followed by 90% of VO2max to exhaustion on a treadmill while in the control trial they remained at rest. Blood samples were drawn before and following exercise (immediately post-exercise as well as 0.5, 1, 2, 3, 4, 5, 6, 8, 10 and 24 h). Reduced glutathione (GSH), oxidized glutathione (GSSG), GSH/GSSG, thiobarbituric-acid reactive substances (TBARS), protein carbonyls, catalase activity and total antioxidant capacity (TAC) were determined. Results: The time to lowest concentration post-exercise was 1.7 ± 0.7 h (mean ± SD) for GSH/GSSG while the time to highest concentration post-exercise was 1.2 ± 0.6 h for TBARS, 4.4 ± 0.5 h for protein carbonyls, 0.5 ± 0.4 h for catalase, 2.2 ± 0.9 h for TAC. The greatest change post-exercise was 8722.74 ± 9 % for GSH/GSSG, 129 ± 29 % for TBARS, 135 ± 53 % for protein carbonyls, 51 ± 16 % for catalase and 24 ± 10 % for TAC. Conclusion: There is no best time-point for collecting blood samples after aerobic exercise applying to all markers. The optimum post-exercise time-points for blood collection in untrained individuals are: immediately post-exercise for catalase, 1 h for TBARS, 2 h for TAC, GSH and GSSG as well as 4 h post-exercise for protein carbonyls.

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