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DAROONWAN CHAKRAPHAN : EFFECTS OF EXERCISE TRAINING
ON LIPID PEROXIDATION, SCAVENGING ENZYMES AND MUSCLE
DAMAGE IN YOUNG THAI ATHLETES. THESIS ADVISORS : BUARONG
LEWCHALERMWONGSE M.Sc., CHAIVAT TOSKULKAO, D.V.M., Ph.D.,
PIPAT CHERDRUNGSU, M.Sc., CHUMPOL PHOLPRAMOOL, Ph.D. 148 p.
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This study was undertaken to investigate the effects of long-term regular exercise training on scavenging enzymes, namely, superoxide dismutase (SOD), catalase (CAT), and glutathione peroxidase (GPX) in humans at rest and at one hour after endurance exercise at 70% maximum heart rate. Anthropometry, physical fitness, plasma lipid peroxide using malondialdehyde (MDA) as an indicator, and muscle damage, using lactate dehydrogenase (LDH) and creatine phosphokinase (CPK) as indicators, were also studied. Thirty two boys, 10-14 years of age, were divided into 3 groups: sedentary, swim-trained, and football-trained subjects. After one year of regular exercise training (20 hours per week), besides the significant decrease in resting heart rate and the significant increases in physical fitness characteristics i.e. muscular strength, muscular endurance, and aerobic capacity-PWC₁₇₀, the trained subjects showed no increase in MDA either at rest or at one hour after endurance exercise. These results were in contrast with those found in sedentary subjects in which both resting and post-exercise MDA were found to be increased significantly after one year. For tissue damage indicators, there were no increases in either CPK or LDH in the trained subjects but a significant increase in LDH in sedentary subjects after exercise. Resting and exercise induced levels of scavenging enzymes in trained and sedentary subjects were also found to be different. After one year, SOD activities were significantly increased in football-trained subjects both before and after endurance exercise while no change was found in sedentary subjects. In addition, an increase in SOD level at 48 hours after exercise was also found in swim-trained subjects. Post exercise CAT was found to be decreased and post exercise GPX was found to be increased in both trained and untrained subjects after one year.

Our findings that long-term regular exercise training caused no increase in either resting or post exercise levels of MDA and that post exercise LDH was not increased in the trained subjects suggest that long-term exercise training has beneficial effects in preventing lipid peroxidation process and reducing tissue damage possibly by the increased induction of SOD scavenging enzymes found in the trained subjects in this study.