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Enhanced Hydrogen Peroxide Generation by Human Neutrophils Following Exercise [Abstract]

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ENHANCED HYDROGEN PEROXIDE GENERATION BY HUMAN NEUTROPHILS FOLLOWING EXERCISE. J.C. Strainer, D.O. McCarthy, M. Shlafer and M.J. Kluger, Depts. Physiology and Pharmacology, The University of Michigan Medical School, Ann Arbor 48109.

Exercise may increase host defenses against infection by increasing neutrophil production of cytotoxic oxygen metabolites, including hydrogen peroxide (HP). Five healthy human subjects underwent 1 hr of vigorous exercise (bicycle ergometer, 50% maximum capacity). Heparinized venous blood samples were taken immediately before, immediately after and 3 hr after exercise. Each subject served as a sedentary control; blood was sampled at times corresponding to exercise studies. Experiments were run at the same time each day. Neutrophils were isolated by density gradient centrifugation and suspended in phosphate buffered saline. HP generation at 37°C was stimulated by phorbol myristate acetate (25 ng/ml; 1 mM azide present) and measured polarographically for 20 min. HP generation was linear during this time. Exercise acutely increased rates and maximum amounts of HP formation by human neutrophils up to 3 hr after exercise. It is not known whether exercise affects neutrophil function in vivo.

HP Formed (nmols/1.35 x 10⁶ cells/20 min; mean ± S.E.)

| Group | Pre-Exercise | Post-Exercise | 3 hr Post-Exercise |
|-----------|--------------|---------------|--------------------|
| Sedentary | 61 ± 6 | 53 ± 4 | 41 ± 7* |
| Exercised | 56 ± 7 | 79 ± 9*** | 77 ± 7** |

* P=0.05; ** P=0.01; *** P=0.001 vs. Pre-Exercise Value