

The Effect of Different Exercise Intensities on Plasma Endostatin in Healthy Volunteers

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Abstract : Background: The balance between angiogenesis and angiostasis is important in growth and developmental processes in the body. Angiogenic and angiostatic mediators control this balance. Endostatin is one of the prominent angiostatic mediators. The marked angiostatic effect of endostatin includes inhibiting endothelial cell migration, proliferation and apoptosis. Physical activity decreases the risk and development of many angiogenesis related health problems including atherosclerosis and numerous cancers. Physiological influences of different physical activities on plasma endostatin concentration are controversial and not completely clear. Moreover, correlation of physical characteristics and metabolic predictors during physical activity on circulating endostatin is indistinct and poorly speculated. The study aimed to determine the effects of mild, moderate and vigorous exercise on the concentration of endostatin in plasma. Methodology: 22 participants, 16 males (age = 30.6 ± 7.8 years) and 6 females (age = 26.5 ± 5 years) were recruited. Weekly session of different intensities exercise based on the predicted maximum heart of the participants [60%(low), 70% (moderate) and 80% (vigorous)] were carried out. The duration and work rate for each participant was determined through sub-maximal exercise. Standardization of the session was done on total energy expenditure of the participants per session. One pre exercise and two post exercise samples were taken at intervals of 10 and 60 minutes. Results: Pre-exercise mean endostatin was 101 ± 20 ng/dl. Low intensity exercise insignificantly decreased the endostatin concentration in plasma at 10 and 60 minutes 97 ± 20 ng/dl ($p = 0.5$), 98 ± 23 ng/dl ($p = 0.8$). However, moderate ($p = 0.022, 0.004$) and vigorous intensities ($p \leq 0.001, 0.02$) increased the endostatin concentrations significantly at both 10 and 60 minutes intervals respectively. The effects were not significantly influenced by gender, exercise mode (walking vs. running), components of exercise (HR, Speed, Gradients, distance, duration) or metabolism during exercise (VO_2 max, VCO_2 , RER, energy expenditure, rate of carbohydrate or fats oxidation). Conclusion: Low intensity exercises did not influence endostatin concentration. However, moderate to high intensity exercises significantly increase endostatin concentration and may have potential benefits.

Keywords : angiogenesis, exercise, endostatin, physical activity

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