

EFFECTS OF FOUR WEEKS TREADMILL TRAINING ON CARDIAC TISSUE MALATE DEHYDROGENASE AND MATRIX METALLOPROTEINASE ENZYMES ACTIVITIES IN EXPERIMENTAL HYPERHOMOCYSTEINEMIA IN RATS

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The aim of this study was to investigate the effects of experimentally induced hyperhomocysteinemia alone and under the condition of aerobic physical activity on, high-sensitive troponin T concentration in sera, cardiac tissue malate dehydrogenase and matrix metalloproteinase enzymes activities.

Male *Wistar albino* rats were divided into four groups (n = 10, per group): C: 0.9% NaCl 0.2 mL/day subcutaneous injection (s.c.); H: homocysteine 0.45 µmol/g b.w./day s.c.; CPA saline (0.9% NaCl 0.2 mL/day s.c.) and a program of physical activity on a treadmill; and HPA homocysteine (0.45 µmol/g b.w./day s.c.) and a program of physical activity on a treadmill. Subcutaneous injection of substances was applied 2 times a day at intervals of 8h during the first two weeks of experimental protocol. After four weeks samples of blood and tissue were taken for further analysis. High-sensitive troponin T concentration was increased in HPA in comparison to C (p < 0.01) and H (p < 0.05) group. Total activity of MDH was highest in HPA group but without reaching statistical significance. Three isoforms of malate dehydrogenase were expressed in rat cardiac tissue: peroxysomal (pMDH), mitochondrial (mMDH), and cytosolic (cMDH) isoform. Increased activity of mMDH was detected in HPA group compared to CPA group (p < 0.01). Individual application of Hcy did not lead to these changes. Physical activity led to activation of MMP-2 isoform and to increased activity of the MMP-9 isoform in both Hcy-treated (p < 0.01 vs. C; p < 0.01 vs H) and control rats (p < 0.01 vs. C; p < 0.01 vs H). Experimentally induced hyperhomocysteinemia under the condition of aerobic physical activity can lead to increased concentrations of high-sensitive troponin T in sera, mitochondrial isoform of malate dehydrogenase and MMP-9 isoform of matrix metalloproteinase in cardiac tissue of rats.

Keywords: Exercise; Heart; Homocysteine; Malate dehydrogenase; Rat