

EFFECT OF TREADMILL RUNNING ON CARDIAC AND SKELETAL MUSCLE METABOLISM AND RIGHT VENTRICLE INFLAMMATION IN RATS WITH PULMONARY ARTERIAL HYPERTENSION

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It has been suggested that a shift from oxidative to non-oxidative (glycolytic) metabolism promotes a right ventricle (RV) and skeletal muscle dysfunction in patients with pulmonary arterial hypertension (PAH), contributing to their reduced exercise tolerance. Exercise training may ameliorate this glycolytic switch in PAH as it does for other cardiopulmonary diseases. However, whether exercise-induced cardiac stress also promotes detrimental RV inflammation in PAH has not yet been thoroughly examined. We hypothesized that exercise training will promote a shift back towards the more efficient oxidative metabolism in cardiac and skeletal muscle of PAH rats and that 45 minutes of exercise at a prescribed moderate intensity will not promote greater RV inflammation in PAH rats. Tissues were obtained from monocrotaline-induced PAH and healthy control rats immediately following a 45 min treadmill run (75% VO₂max) that concluded a 4 week treadmill familiarization/running program (15-45 min, 4x/wk). A group of unexercised PAH and healthy rats served as sedentary controls. Immunofluorescent staining (IF) for inflammatory markers CD45 (lymphocytes) and CD68 (macrophages) in cryofixed RV sections were used to assess the acute inflammatory response to exercise. In fixed soleus and RV sections, IF for the glucose transporter Glut1, and for capillary marker CD31, were used as indicators of glycolytic metabolism and tissue capillarization, respectively. Data thus far indicates no greater acute exercise-induced RV inflammation in PAH rats compared to healthy rats. We observed higher expression of Glut1 and lower capillarization in the RV and soleus of PAH rats, indicative of a shift toward greater dependency on non-oxidative metabolism. However, since Glut1 levels for exercised rats were measured in tissue harvested immediately following a run bout, evaluation of a chronic training effect on Glut1 expression is potentially confounded by the acute exercise effect and therefore remains to be investigated in a follow-up study.

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