

AGE AND ETHANOL-INDUCED OXIDATIVE STRESS: IMPACT OF EXERCISE TRAINING ON GLUTATHIONE METABOLISM IN RAT MYOCARDIUM.

Kakarla Pushpalatha (P) and Kesireddy Sathyavelu Reddy

Department of Zoology, Sri Venkateswara University, Tirupati- 517502, A.P., INDIA

The interactive effects of exercise training and ethanol on oxidative stress and free radical detoxification in the myocardium of young and old rats with special reference to glutathione metabolism was studied. Male wistar rats of younger (3 months) and older (18 months) age groups were trained as follows: 1) Sedentary Control (SC); 2) Exercise training (Ex) for 2 months; 3) Ethanol treatment (Et) (2 g/kg) for 2 months; 4) Exercise plus Ethanol treatment (Ex+Et) for 2 months. The activity levels of glutathione reductase (GR), glutathione peroxidase (GPx), glutathione-s-transferase (GST) and glutathione (GSH) content were estimated in the myocardial tissue under the ethanol and age-induced oxidative stress and with the interactive effects of exercise training by employing the standard methods.

Rats exhibited significant changes in the specific activities of myocardial GSH content, GR, GPx and GST activities under the exercise and ethanol induced oxidative stress with reference to aging. In the present study exercise training significantly inhibited the activities of these enzymes in both the age groups. Inhibition of GR and GSH indicates reduced synthesis of GSH during ethanol-induced oxidative stress. The increased activity of GPx during exercise training indicates enhanced detoxification of hydroperoxides suggesting a protective role of this enzyme in reducing hydroperoxides and lipid peroxides. The stimulation of GST indicates involvement of multifunctional proteins in the detoxification processes. The present findings suggest that the biochemical changes due to ethanol-induced oxidative stress in the enzyme activities of glutathione metabolism are significantly altered with exercise training in both the age groups of rats.