

SIRT1 ACTIVITY IS INCREASED BY EXERCISE TRAINING IN AGED RATS

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SIRT1 is a histone deacetylase, involved in oxidative stress and aging (1-3). Because the role of aging and exercise training on sirtuins activity in rats is unknown, we investigated the effects of exercise training on age-related changes in the SIRT1 activity, comparing heart and adipose tissue of sedentary young (n=10), sedentary old (n=10) and trained old (n=10) rats. The trained old rats performed a 8-weeks moderate training on treadmill. On heart and adipose tissue of all rats SIRT1 activity was evaluated by assay kit, peroxidative damage measuring malondialdehyde (MDA) and protein-aldehyde adducts 4-hydroxynonenal (4-HNE), MnSOD, catalase and FOXO3a by western blot, and GADD45a, Cyclin D₂ and FOXO3a mRNA by RT-Pcr. Aging reduced SIRT1 activity in heart (p<0.0001) without effects in adipose tissue, producing an increase of MDA (p<0.0005; p<0.0001) and 4-HNE (p<0.005; p<0.0005), and a decrease of Mn-SOD (p<0.02) and catalase (p<0.0001) expression in both heart and adipose tissue. Aging did not affect FOXO3a protein expression in heart, and FOXO3a mRNA in adipose tissue. Exercise training produced an increase in heart FOXO3a protein expression (p<0.02) and in adipose tissue FOXO3a mRNA, associated to higher Mn-SOD (p<0.01; p<0.005) and catalase (p<0.0001; p=0.01) levels in both heart and adipose tissue of aged rats. In heart exercise-induced higher SIRT1 activity bring on decrease in Cyclin D₂ and increase in GADD45a mRNA expression. In adipose tissue we found a similar decrease in Cyclin D₂, without changes in GADD45a mRNA expression. These findings suggest that exercise training is able to increase SIRT1 activity in aged rats.

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