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<AT>Protective effects of different exercise modalities in an Alzheimer's disease-like model

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<ABS-HEAD>Highlights► Aerobic exercise improves anxiety-like behaviour in an Alzheimer's disease-like model. ► Aerobic, resistance and combined exercises protect from oxidative stress and memory decline. ► Exercise has neurotrophic effects. ► Exercise decreases Aβ burden in developmental stage of Alzheimer's disease-like conditions.

<ABS-HEAD>Abstract

<ABS-P>Our aim was to investigate the probable protective effects of aerobic, resistance and combined exercise methods on ovariectomy and D-galactose induced Alzheimer's Disease (AD)-like model. D-galactose (100 mg/kg) or saline were administered intraperitoneally for 6 weeks to ovariectomized or sham-operated rats (n=8/group). Aerobic (AE), resistance (RE) and combined exercises (CE) (aerobic+resistance) were performed for 3 times a week for 6 weeks. Anxiety level and cognitive functions were evaluated via hole-board and object recognition tests. Brain myeloperoxidase, malondialdehyde, nitric oxide activity, lucigenin-enhanced chemiluminescence, glutathione and serum insulin like growth factor-I (IGF-I) assays were done. Hippocampal mRNA levels of nerve growth factor (NGF), brain derived neurotrophic factor (BDNF), and amyloid precursor protein 695 (APP695) were measured. Amyloid Beta (Aβ), NGF, BDNF, IGF-I immunoreactive neurons were evaluated. Freezing time were increased in AD-like model and decreased back with AE ($p<0.05$). Deteriorated working memory in AD-like model was improved with all exercise types ($p<0.05$-0.001). Reduced glutathione levels in AD-like model were increased and increased malondialdehyde levels were reduced and serum IGF-I levels were increased by all exercises ($p<0.05$-0.001). Increased APP mRNA levels in AD-like model were decreased via CE ($p<0.05$). Elevated Aβ scores in AD-like model were decreased by RE and CE ($p<0.01$) in hippocampus and by all exercise types in cortex ($p<0.05$-0.01). Decreased cortical NGF immunocytochemical scores of AD-like model were increased by CE ($p<0.05$). Different exercise models may have