

Exercise and Aging Process Related to Oxidative Stress

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Abstract : Introduction: Aging process is mainly related to endothelial function which may be impaired by oxidative stress (OS). Exercise is known to be beneficial to aging process, which may improve health and prevent appearance of chronic diseases in elderly. The aim of the study was to investigate the OS markers related to exercise. Methods: A number of 80 subjects (healthy volunteers) were examined (38 male and 32 female), divided in 3 age groups: group I ≤ 30 years (n=24); group II - 31-50 years (n=24); group III - ≥ 51 year (n=32). Each group was divided to subgroups of sedentary subjects (SS) and subjects who exercise (SE). Group I: SS (n=11), SE (n=13); group II: SS (n=13), SE (n=10); group III: SS (n=23) SE (n=9). Lipid peroxidation (LP) as a fluorimetric method with thiobarbituric acid was used to estimate OS. Antioxidative status was determined by cell antioxidants such as enzymes - superoxide dismutase (SOD), glutathione peroxidase (GPx) and glucose 6 phosphate (G-6-PD); and by extra cell antioxidants such as glutathione reductase (GR), nitric oxide (NO) and total antioxidant capacity (TAC). Results: Increased values of LP were noticed along the aging process: group I - $3.30 \pm 0.3 \mu\text{mol/L}$; group II - $3.91 \pm 0.2 \mu\text{mol/L}$; group III - $3.94 \pm 0.8 \mu\text{mol/L}$ ($p < 0.05$), while no statistical significance was found between male and female subjects. Statistical significance for OS was not found between SS and SE in group I as it was found in group II ($p < 0.05$) and in group III ($p < 0.01$). No statistical significance was found for all cell antioxidants and GR within the groups, while NO and TAC showed lower values in SS compared to SE in II ($p < 0.05$) and in group III ($p < 0.05$). Discussion and conclusion: Aging process showed increased OS which may be either due to impaired function of scavengers of free radicals or due to their enormous production. Well balanced exercise might be one of the factors that keep the integrity of blood vessel endothelium which slows down the aging process. Possible mechanism of exercise beneficial influence is shear stress by upregulation of genes coding for nitric oxide bioavailability. Thus, due to obtained results we may conclude that OS is found to be diminished in the subject groups who perform exercise.

Keywords : oxidative stress, aging process, exercise, endothelial function

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