Effects of 5 weeks resistance exercises on ANP-granules in wistar rats

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The major hormones that are metabolically active show changes with exercise in normal individuals. It is well known that atrial cardiocytes in mammals are endocrine cells which secrete atrial natriuretic peptide (ANP), which has diuretic, natriuretic and vasodilatory properties and exerts an inhibitory action on aldosterone, cortisol, arginine vasopressin and rennin release, and ANP is a peptide hormone believed to be involved in blood pressure and volume homeostasis. Many studies have been made on ANP in vertebrate hearts. By means of morphometry, the size and number of secretory granules were examined in various mammalian species, but no report has been presented on the effects of resistance exercise on the size and number of atrial secretory granules. The present study was designed to describe ultrastructurally and morphometrically the effects of resistance exercise on the number and size of atrial secretory granules in the Wistar rat. Fifteen young male rats were divided in three groups: Control group (C group), Resistance group without weight (R) and resistance with weight exercised group (RW). Rats from R and RW groups were trained to climb a 1.1-m vertical (80° incline) ladder with and without weights secured to their tail. The rats were trained once every day for 5 weeks. Each training session consisted of 6 climbs. At the completion of the training program, the trained and the control rats were killed by diethyl ether overdose and the heart was carefully excised. Two tissue blocks were chosen at random from each right auricle. Each block was examined by transmission electron microscopy. Ten micrographs of randomly selected fields of myocardium were taken from each block at 10.000 xs. The digital images were analyzed so as to determine granule diameter (nm) and the number of profiles of granules in the sampled areas of tissue. The means (±SD) were calculated from five animals from each group and statistically analyzed by ANOVA and Tukey's test ($p < 0.05$). The quantitative results are shown in table 1. Table 1 – Number and diameter of ANP granules in the atrial cardiocytes (means ± SD) Group Number Diameter x 1,000(μm^2) C 37 ± 29 22 ± 14 R 44 ± 34 to 32 ± 18 to RW 42 ± 22 to 30 ± 18 to $p < 0.05$ vs C. Resistance exercise with and without weight increased the diameter and number of ANP granules. No statistical difference was observed between the two exercised groups.