

Effect of chronic resistance exercise and of resistance exercise associated with aerobic exercise in the myocardium of the left ventricle of wistar rats: a morphoquantitative study

Souza, RR.¹, Pimenta, L.¹, Maifrino, LBM.¹, Curi, TCP.², and Gama, EF.¹

¹Universidade São Judas Tadeu

²Universidade de São Paulo

Exercise training is strongly associated with a variety of beneficial metabolic, psychological, and neurovegetative effects. The present study seeks to determine the effects of resistance exercise and resistance exercise associated with aerobic exercise on left ventricle. Fifteen young male rats were divided in three groups: control group (C group), Resistance group (R) and Resistance associated with Aerobic exercised group (RA). Rats from R and RA groups were trained to climb a 1.1 m vertical (80° incline) ladder with weights secured to their tail. The rats were trained once every day for 5 weeks. Each training session consisted of 6 climbs. The RA group was also subjected daily to a treadmill running program. They trained to run 1 hour/day, 5 days/week, at 0.5 km/h on the treadmill. Two tissue blocks were chosen at random from each ventricle. Each block with myofibers oriented transversely were examined by transmission electron microscopy. Twenty micrographs of digital images were analysed so as to determine muscle fiber area (μm^2), the number of profiles of myocytes and capillary lumina in the sampled areas of tissue. Using a grid consisting of 72 sampling points the volume fraction of myocardial components was measured in 300 micrographs by counting the sampling points overlying myocytes (Vv[myoc]), capillary lumen (Vv[cap]), and interstitium (Vv[int]). The results are shown in table 1. Table 1 – Quantitative data in left ventricular myocardium.

	Control	Resistance	Resistance+aerobic
Transverse area of myocytes (μm^2)	213 ± 7	301 ± 8 *	271 ± 8*§
N° of myocyte profiles/area	12 ± 0.5	14 ± 0.5	17 ± 1 *
N° of capillary profiles/area	12 ± 0.5	14 ± 0.5	17 ± 1*§
Vv[myoc] (%)	79 ± 1	83 ± 1	84 ± 1**
Vv[cap] (%)	5.0 ± 0.5	5.5 ± 0.5	8 ± 0.5a
Vv[int] (%)	15 ± 0.5	10 ± 0.5c	7 ± 0.5b

Results are expressed as mean ± SEM. * p < 0.05 vs. C; § p < 0.05 vs R; **p < 0.01 vs. C; a p < 0.05 vs. C and R; bp < 0.01 vs. C and R; c p < 0.01 vs. R. In the left ventricle resistance exercise plus aerobic exercise increased the transverse area of myocytes, the number of myocytes and capillaries/area and the volume fraction of myocytes and capillaries/area and decreased the volume fraction/area of the interstitium. Resistance exercise increased the transverse area of myocytes and decreased the volume fraction/area of the interstitium. This results could be of interest for optimizing cardiac function.