

## **Heart Function in Rats: The Effects of Exercise Training**

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According to the American Heart Association, nearly 2400 Americans die each day from cardiovascular disease. Recent studies have shown that endurance exercise training can help protect the heart from cardiovascular disease. In this study, four out of eight rats were trained by voluntary wheel running and the other four rats served as controls. One trained rat was not included in data analysis due to complications during cannulation. The rats with access to running wheels ran from 9 to 12 km/day at speeds of 20 to 28 m/min. Voluntary exercise significantly increased ( $p \leq .002$ ) the weight of the heart ( $1995 \pm 41$  vs.  $1518 \pm 80$  mg, trained vs. control) and the heart weight to body weight ratio ( $5.9 \pm .14$  vs.  $4.0 \pm .23$  mg/g, trained vs. control) showing that the training had an effect on the heart.

Endogenous heart rates of controls ranged from 254 to 395 bpm, while for the trained animals the range was from 245 to 286 bpm. The average endogenous heart rate tended to be slower in the trained rats ( $264 \pm 12$  vs.  $312 \pm 30$  bpm), which is a common characteristic of trained animals. Systolic pressures at endogenous rates ranged from 64 mmHg to 147 mmHg in all subjects. Diastolic pressures were adjusted to 5.0 – 6.0 mmHg, but rose to as high as 15 mmHg after pacing. Total pressure (systolic – diastolic) averaged  $102 \pm 17$  and  $98 \pm 19$  mmHg in control and trained rat hearts, respectively.

Total pressure in hearts from the trained rats subjected to global ischemia did not show increased recovery as compared to the control hearts, with the mean percent recovery at  $26 \pm .09\%$  and  $24 \pm .09\%$ , respectively. However, the trained hearts did show a trend in maintaining total pressures better than the control hearts when paced at 350 bpm, especially after ischemia. At 350 bpm, the trained hearts maintained  $95 \pm 14\%$  of their endogenous pressures, while the controls averaged only  $75 \pm 1\%$ . This study coincides with previous studies which indicate that exercise training protects the heart from cardiovascular disease and can help the heart maintain steady pressures during pacing.