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Effect of Treadmill Running on Brown Adipose Tissue of Heart Failure Rats Induced by Abdominal Aortic Constriction

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Objective To observe the effect of treadmill exercise on brown adipose tissue of heart failure rats induced by abdominal aortic constriction(AAC).

Methods 210g healthy male SD rats were randomly divided into control group and AAC group, after 4 weeks abdominal aortic constriction rats were selected and randomly divided into AAC group and treadmill running group. The exercise rats underwent treadmill running at 12m/s (40 min each, for 4 weeks). Real-time PCR and immunohistochemistry were used to detect the mRNA content and protein expression of cardiac ANP, BNP, and pgc1-a, ucp-1, leptin and adiponectin of the brown adipose tissue respectively.

Results The rats with abdominal aortic constriction developed significant heart failure with preserved LV ejection fraction, increased LVAW d and LVID s. Compared with the control group, the myocardium levels of ANP and BNP in AAC group were significantly up-regulated. In the operation group, the function of brown adipose was enhanced. The volume of brown adipose cells decreased, the number of lipid droplet increased. The mRNA levels of UPC-1 and PGC1-a were significantly up-regulated, and the mRNA levels of leptin and adiponectin were down-regulated. In the exercise group, the browning of brown adipose was reduced, and the mRNA levels of UPC-1 and PGC1-a were decreased.

Conclusions Exercise can affect the function of brown adipose tissue in heart failure rats induced by abdominal aortic constriction.