



Exercise Biochemistry Review

Proceedings of IBEC 2018, Beijing, China, October 23-25
OR-006

Effect of Moderate-intensity Exercise on the Expression of Hypothalamic KiSS-1 and GPR54 mRNA in Diet Induced Obesity Rats

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Objective To observe the effect of high fat diet on the hypothalamic expression of KiSS-1 and the G-protein coupled receptor (GPR) 54 mRNA and explore the modulatory role of moderate-intensity exercise in the diet induced obesity male rats.

Methods After 8 weeks high fat feeding, 20 obesity 11-weeks SD rats were randomly assigned to high-fat diet sedentary (FS, n=8) and high-fat diet exercise (FE, n=8) groups, 20 normal diet 11-weeks SD rats also were randomly assigned to sedentary (SS, n=8) and exercise (SE, n=8) groups. During the following 8 weeks, obesity rats were continued expose to high-fat-diet. SE and FE groups did the 60%-70% $V(\bullet)O_2$ max treadmill training (5 days/week, 1 hour/day). The $V(\bullet)O_2$ max of exercise groups were remeasured every two weeks. The hypothalamic expression of KiSS-1 and GPR54 mRNA were tested in each group.

Results

After the first 8-weeks high fat feeding, the obesity rats were heavier than normal diet group (491.74 ± 26.19 g vs. 410.05 ± 45.77 g, $p < 0.01$). After 8-weeks training, the FE group was lighter than FS group (590.23 ± 35.74 g vs. 681 ± 52.56 , $p < 0.01$). The FS group had higher hypothalamic expression of KiSS-1 mRNA (1.51 ± 0.66 vs 0.75 ± 0.27 , $p < 0.05$) and GPR54 mRNA (2.45 ± 0.38 vs 0.61 ± 0.15 , $p < 0.01$) than SS group. The FE group had lower hypothalamic expression of KiSS-1 mRNA (0.69 ± 0.13 , $p > 0.05$) and GPR54 mRNA (0.58 ± 0.10 , $p < 0.01$) than FS group.

Conclusions

There is stimulating effect of high-fat diet induced obesity on hypothalamic expression of KiSS-1 and GPR54 mRNA. 8-weeks 60%-70% $V(\bullet)O_2$ max treadmill training could cure this effect.