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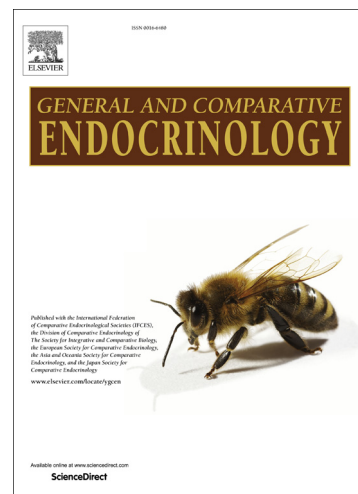
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A high-fat, high-protein diet attenuates the negative impact of casein-induced chronic inflammation on testicular steroidogenesis and sperm parameters in adult mice

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Abstract

The interaction between obesity and chronic inflammation has been studied. Diet-induced obesity or chronic inflammation could reduce the testicular functions of males. However, the mechanism underlying the reproductive effects of fattening foods in males with or without chronic inflammation still needs further discussion. This study was aimed to investigate the effects of high-fat, high-protein diet on testicular steroidogenesis and sperm parameters in adult mice under physiological and chronic inflammatory conditions. Because casein can trigger a non-infectious systemic inflammatory response, we used casein injection to induce chronic inflammation in male adult Kunming mice. Twenty-four mice were randomly and equally divided into four groups: (i) normal diet + saline (Control); (ii) normal diet + casein (ND + CS); (iii) high-fat, high-protein diet + saline (HFPD + SI); (iv) high-fat, high-protein diet + casein (HFPD + CS). After 8 weeks, there was a significant increase in body weight for groups HFPD + SI and HFPD + CS and a decrease in group ND + CS compared with the control. The serum levels of tumor necrosis factor alpha (TNF- α), interleukin-10 (IL-10) and lipid profiles were increased markedly in groups ND + CS, HFPD + SI and HFPD + CS compared with the control. A remarkable reduction of serum adiponectin level occurred in group HFPD + CS compared with group ND + CS. Sperm parameters (sperm count, viability and abnormality) were also adversely affected in groups ND + CS and HFPD + SI. Groups ND + CS and HFPD + SI showed severe pathological changes in testicular tissues. Semiquantitative RT-PCR, Western blot and immunohistochemical staining also showed significant reductions in both testicular mRNA and protein levels of steroidogenic acute regulatory (StAR) and cytochrome P450_{scc} (CYP11A1) in groups HFPD + SI and HFPD + CS compared with the control, whereas testicular mRNA and protein levels of 3 β -hydroxysteroid dehydrogenase (3 β -HSD) in groups HFPD + SI and HFPD + CS significantly increased. The mRNA and protein levels of the StAR and 3 β -HSD in group HFPD + CS were both higher than those of in group ND + CS. These results indicated that Kunming male mice with high-fat, high-protein diet and casein injection for 8 weeks can be used to establish a diet-induced obesity

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