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Effects of Exercise on Klotho Expression and Klotho DNA Methylation in Obese Mice

Authors : Yao Huang, Hongjie Yu, Fangrong Xu, Longbiao Cai, Qiqiang He

Abstract : The Klotho gene has been found to be involved in cardiovascular health, and epigenetic mechanism has risen as good candidates to understand the role of lifestyle factors in obesity. The aim of this study was to investigate the effect of exercise intervention on the expression and DNA methylation of Klotho gene in high-fat diet induced obese mice. C57BL/6 male mice were fed a normal diet (ND) or a high-fat diet (HFD) for 12 weeks. HFD induced obese mice were divided into secondary group (SED) and exercise group (EX) randomly. The treadmill exercise was performed in EX group for 8 weeks. The expression and DNA methylation of Klotho were evaluated by Western blot, RT-PCR, and Methylation-specific PCR. Results indicated that Klotho protein and mRNA expression were significantly lower in the SED group than those in the ND and EX groups ($P<0.01$), whereas no significant difference, was found between ND group and EX group ($P>0.05$). Furthermore, mice in the ND group and SED group showed significantly lower levels of completely methylated Klotho DNA in ND group (0%) and SED group (50%) compared with the EX group (90%), and unmethylated Klotho DNA level in ND group (80%) was significantly higher than those in the SED (0%) and EX (0%) groups. These results suggested that exercise leads to increased Klotho expression and reduced Klotho DNA methylation level in HFD induced obese mice.

Keywords : DNA methylation, exercise intervention, klotho, obese mice
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