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## 论文

### 长期酒精灌胃对大鼠肝GSK-3 $\beta$ 及AMPK水平的影响

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摘要:

目的 探索长期饮酒对大鼠肝内糖原合成酶激酶-3(GSK-3)、磷酸腺苷激活的蛋白激酶(AMPK)、葡萄糖转运蛋白4 (GLUT4)的影响。方法 用AMPK激动剂(AICAR)注射大鼠, 观察其对糖原、GSK-3 $\beta$ 、AMPK的影响。取Wistar大鼠48只,随机分为A、B、C、D组, 给予酒精灌胃, 对应酒精剂量分别为5g/kg·d、2.5g/kg·d、0.5g/kg·d及零(生理盐水), 20周后取其肝组织测GSK-3 $\beta$ 、AMPK(AMPK $\alpha$ , P-AMPK $\alpha$ )、GLUT4蛋白和AMPK、GLUT4 mRNA的表达以及切片组织GSK-3 $\beta$ 的荧光表达。结果 注射AICAR大鼠的肝糖原含量增高, GSK-3 $\beta$ 、AMPK也较原水平有所变化。服酒精各组GSK-3 $\beta$ 荧光信号强, A组更明显, 蛋白表达增强; 而酒精各组P-AMPK $\alpha$ 蛋白表达均明显降低(P均<0.01); GLUT4mRNA和蛋白也降低(P均<0.05)。结论 大鼠长期酒精灌胃可能影响GSK-3 $\beta$ 、AMPK水平, 继而降低肝糖原水平。

关键词: 酒精; 糖原合成酶激酶-3; 磷酸腺苷激活的蛋白激酶; 糖原; 大鼠, Wistar

### Influence of long-term ethanol feeding on glycogen synthase kinase-3 $\beta$ and AMP-activated protein kinase in Wistar rats

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Abstract:

Objective To investigate influences on glycogen synthase kinase-3 $\beta$ (GSK-3 $\beta$ ), AMP-activated protein kinase(AMPK) and glucose transporter type 4(GLUT4) after ethanol feeding for a long time. Methods AMPK activator (AICAR) was injected into rats and influences on hepatic glycogen, GSK-3 $\beta$  and AMPK were observed. 48 Wistar rats were randomly divided into 4 groups: feeding different doses of ethanol (A,B,C, 5,2.5, 0.5g/kg·d) or normal saline (D) for 20 weeks. Then GSK-3 $\beta$ , AMPK (AMPK $\alpha$ , P-AMPK $\alpha$ ) and GLUT4 proteins, AMPK and GLUT4 mRNAs, and glycogen in the liver were measured. Results AICAR injection resulted in high expressions of glycogen and phosphorylated AMPK $\alpha$ (P-AMPK $\alpha$ ) and lower expression of GSK-3 $\beta$  in the liver of rats. In ethanol-fed rats, GSK-3 $\beta$  was over-expressed in the three ethanol feeding groups, especially in group A, while the P-AMPK $\alpha$  protein expression was significantly decreased(P<0.01). The decreased mRNA and protein expressions of GLUT4 were found(P<0.05). Conclusion Long-time ethanol feeding affected GSK-3 $\beta$  and AMPK levels, and then decreased the level of hepatic glycogen.

Keywords: Ethanol; Glycogen synthase kinase-3; 5' AMP activated protein kinase; Glycogen; Rat, Wistar

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