中国药理学与毒理学杂志 2004 18 (1): 66-70 ISSN: 1000-3002 CN: 11-1115/R

论著

急、慢性铅中毒对海马CA1区长时程增强和活化的细胞外信号调节激酶2影响

杨 菁[1], 孙黎光[1*], 蔡 葵[2], 宗志宏[1], 邢 伟[1], 刘素媛[1], 刘 宁[1]
（中国医科大学 1. 基础医学院生物化学教研室, 2. 脑研究所神经生理研究室, 辽宁 沈阳 110001）

收稿日期 2003-4-11 修回日期 网络版发布日期 2008-8-20 接受日期 2003-7-23

摘要 目的 探讨急、慢性铅中毒对大鼠海马活化的细胞外信号 调节激酶2(ERK2)含量的影响及其与海马CA1区长时程增强（LTP）的关系。方法 大鼠怀孕后分别饮用蒸馏水或0.2%醋酸铅溶液，断乳后鼠仔则直接饮用，于30 d后测定LTP，并取海马作为慢性铅中毒标本测定ERK2含量。正常30 d大鼠海马片稳定培养2 h后 ，分别用含或不含20 μmol•L^{-1}醋酸铅的人工脑脊液孵育，不同时间点收集，作为急性铅中毒标本测定ERK2含量。用Western印迹法测定标本活化的ERK2含量。结果 高频刺激后对照组和慢性铅中毒组峰电位分别为刺激前的185%和88%；慢性铅中毒组活 化的ERK2则比对照组降低了46%。海马片培养中，对照组活化的ERK2含量基本保持不变，铅中毒组在30和60 min时分别下降了68%和33%，120 min后恢复到正常水平。结论 活化的ERK2含量降低可能是铅中毒致使CA1区LTP不能形成的原因之一。

关键词 铅 海马 蛋白激酶类 长时程增强
分类号 R995

Effect of acute and chronic lead exposure on CA1-long term potentiation and active extracellular signal-regulated kinase 2 of rat hippocampus

YANG Jing[1], SUN Li-Guang[1*], CAI Kui[2], ZONG Zhi-Hong[1], XING Wei[1], LIU Su-Yuan[1], LIU Ning[1]

(1. Department of Biochemistry, Basic Medical College, 2. Department of Neurophysiology, Brain Research Institute, China Medical University, Shenyang 110001, China)

Abstract

AIM To investigate the effect of acute and chronic lead exposure on CA1 long term potentiation(LTP) and active extracellular signal-regulated kinase 2(ERK2) of rat hippocampus. **METHODS** For chronic lead exposure *in vivo*, pregnant female rats were given 0.2% lead acetate in their drinking water before breeding and throughout gestation and lactation. After weaning at postnatal 21 d, the pups were provided 0.2% lead acetate in drinking water. Until 30 d, two group rats alternatively were determined LTP and hippocampus was got as a chronic sample. For acute lead exposure *in vitro*, the rat brain was quickly removed and immersed in ice-cold culture medium bubbled with 95% O_2+5% CO_2, and 350 μm hippocampal slices were prepared. After 2 h stabilization, 20 μmol•L^{-1} lead acetate was added into the media, the slice was collected at different time(3, 7.5, 15, 30, 60, 120 min). The control group in acute or chronic experiments used water instead of lead acetate. The content of active ERK2 was determined by Western blots. **RESULTS** After the application of the high frequency stimulant, the control group population spike increased in relation to baseline amplitude to 185%, while chronic lead exposure group decreased to 88%. In chronic experiment, the lead results in active ERK2 content decreased to 54%. In acute experiment, active ERK2 content decreased remarkably at 30 and 60 min, and returned to normal level at 120 min, while control group had no obvious changes. **CONCLUSION** Chronic lead exposure inhibits LTP induction and expression; the mechanism of this inhibition might be related to the decreased active ERK2.

Key words lead hippocampus protein kinases

DOI:

通讯作者 孙黎光 ydslg@163.com