环境科学学报
ACTA SCIENTIAE CIRCUMSTANTIAE

研究报告

李宁,宋莲军,刘芳丽,贾金霞,李文杰.母体铅暴露对仔鼠海马组织中P-tau表达的影响[J].环境科学学报,2012,32(5):1206-1210

母体铅暴露对仔鼠海马组织中P-tau表达的影响

Effects of maternal lead exposure on the expression of phosphorylated tau in hippocampus of mouse offspring

关键词：铅 神经毒性 免疫组织化学染色法 蛋白质印迹 Tau蛋白

基金项目：引进博士科研启动基金(No.30300166)

作 者 单位

李 宁 河南农业大学食品科学技术学院, 郑州 450002

宋莲军 河南农业大学食品科学技术学院, 郑州 450002

刘芳丽 郑州大学公共卫生学院, 郑州 450001

贾金霞 郑州大学公共卫生学院, 郑州 450001

李文杰 郑州大学公共卫生学院, 郑州 450001

摘要：为了探讨母体铅染毒对子一代(F1)仔鼠海马组织中Tau蛋白磷酸化(P-tau)表达的影响,对雌性小鼠自妊娠第1 d开始经饮水染铅(0.3、1.0、3.0 g·L^{-1},对照组饮蒸馏水)至仔鼠出生后21 d断乳为止,随机抽取各组仔鼠,在出生后第21 d分别测其血液和海马组织中铅的含量,并通过免疫组化方法和Western Blot法测定各组仔鼠海马组织中Tau蛋白磷酸化的表达.结果发现,孕哺期不同剂量铅暴露后,仔鼠血铅、海马铅水平均明显高于对照组(p<0.05).免疫组化染色结果显示,P-tau免疫组化阳性反应主要定位于胞浆,与对照组相比,各个铅暴露组仔鼠海马组织的CA1区域P-tau免疫组化阳性反应物的面密度显著增加,但平均灰度值明显降低(p<0.05).Western Blot结果显示,中、高剂量铅暴露组仔鼠海马组织中P-tau的表达明显高于对照组(p<0.05),但低剂量铅暴露组仔鼠海马组织中P-tau的表达与对照组相比差异不显著(p>0.05).母体铅暴露使铅在仔鼠体内蓄积,增强了仔鼠海马组织中Tau蛋白磷酸化水平,高磷酸化的Tau蛋白可能通过诱导微管功能紊乱、神经细胞死亡等,损伤仔鼠的学习记忆能力.

Abstract: To explore the effects of maternal lead exposure on the expression of phosphorylated Tau protein and to reveal the underlying molecular mechanism of neurotoxicity induced by lead, lead exposure was conducted through freely drinking the corresponding lead acetate solutions with dosages of 0.3 g·L^{-1}, 1.0 g·L^{-1}, and 3.0 g·L^{-1}, respectively. Each group was composed of 10 mice. The lead contents in blood and hippocampus of the offspring 21 days after birth were determined. On the 21st day, the phosphorylation expression of Tau protein in hippocampus of all offspring in various dosage groups was determined by immunohistochemistry assay and the Western Blot. The lead levels in blood and hippocampus of 21d lead-treated pups were higher than those in the control group (p<0.05). The results of immunohistochemistry showed that the P-tau was mainly located in the cytoplasm, The area density of P-tau positive immune reaction in CA1 area of mouse pups in three lead exposure groups were higher than the control group (p<0.05), but the average gray value in lead exposure groups were lower than the control group (p <0.05). The results of Western Blot showed that the expression of P-tau protein in hippocampus of medium and high lead exposure group pups was higher than the control group (p<0.05), but the expression P-tau between low lead exposure group and the control group had no statistical significance (p>0.05). Maternal lead exposure may induce lead accumulation in hippocampus of offspring. Lead exposure during pregnancy enhanced the expression of P-tau protein in hippocampus of pups and subsequently affected the release of neurotransmitter, which may lead to the learning and memory damages.

Key words: lead neurotoxicity immunohistochemistry western blot tau

主办单位：中国科学院生态环境研究中心

单位地址：北京市海淀区双清路18号 邮编：100085

服务热线：010-62941073 传真：010-62941073 Email：hjkxxb@rcees.ac.cn