中国药理学与毒理学杂志 2013 27 (2): 289-293 ISSN: 1000-3002 CN: 11-1115/R

实验方法

应用基准剂量法探讨氯蜱硫磷的参考剂量

何贤松，李亭亭，乙楠楠，吴惠，王霞，赵敏娴，王灿楠

东南大学公共卫生学院营养与食品卫生学系教育部环境医学与工程重点实验室，江苏 南京 210009

收稿日期 2012-4-3 修回日期 2012-9-5 网络版发布日期 2013-4-23 接受日期

摘要 目的 应用基准剂量(BMD)法探讨氯蜱硫磷(毒死蜱)的参考剂量。方法 80只清洁级成年雌性SD大鼠，ig给予氯蜱硫磷0.25，0.5，1，2，4，8和16 mg·kg^{-1}，每天1次，连续21 d。21 d后处死大鼠测定大鼠大脑皮质、海马和血清中乙酰胆碱酯酶(AChE)活性，观察氯蜱硫磷的未观察到损害作用剂量。采用R语言的PROAST28.1软件包计算BMD及其下限值，将BMD下限值除以安全系数100得到氯蜱硫磷的参考剂量。结果 与正常对照组相比，氯蜱硫磷4，8和16 mg·kg^{-1}使大鼠海马中AChE活性明显降低(P<0.01)；氯蜱硫磷2，4，8和16 mg·kg^{-1}使大鼠皮质中AChE活性明显降低(P<0.01)；而氯蜱硫磷1，2，4，8和16 mg·kg^{-1}使大鼠血清中AChE活性明显降低(P<0.01)。随着氯蜱硫磷染毒剂量的增加，大鼠海马、皮质和血清中的AChE活性表现出下降趋势。以AChE活性作为指标，海马、皮质和血清中氯蜱硫磷的未观察到损害作用剂量分别为低于2.0，1.0，0.5 mg·kg^{-1}的剂量，BMD分别为0.81，0.90和0.41 mg·kg^{-1}，参考剂量分别为5.5，4.6和3.6 μg·kg^{-1}；为人类膳食安全，将氯蜱硫磷的参考剂量定为3.6 μg·kg^{-1}。结论 BMD法可制定比未观察到损害作用剂量法更加安全的参考剂量，并可以进一步应用于膳食暴露风险评估。

关键词 氯蜱硫磷 乙酰胆碱酯酶 基准剂量 参考剂量

分类号 R965.2

Determination of reference dose of chlorpyrifos by benchmark dose method

HE Xian-song, LI Ting-ting, YI Nan-nan, WU Hui, WANG Xia, ZHAO Min-xian, WANG Can-nan

Key Laboratory of Medical Engineering Environment, Department of Nutrition and Food Hygiene, School of Public Health, Southeast University, Nanjing 210009, China

Abstract

OBJECTIVE To determine the reference dose of chlorpyrifos by the benchmark dose method. **METHODS** Eighty adult female SD rats were ig given chlorpyrifos 0.25, 0.5, 1, 2, 4, 8 and 16 mg·kg^{-1}, respectively, once daily, for 21 d. Rats were sacrificed, and acetylcholinesterase(AChE) activity in the hippocampus, cerebral cortex and serum of rats was determined after chlorpyrifos was ig given to rats for 21 d. The no-adverse-effect level (NOEAL) was observed and determined while. The benchmark dose (BMD) and the lower confidence limit of the benchmark dose(BMDL) were calculated by software of R language (PROAST28.1package). The reference dose of chlorpyrifos was obtained by BMDL dividing by safety factor 100. **RESULTS** Compared with normal control group, the AChE activity in hippocampus significantly decreased in chlorpyrifos 4,8 and 16 mg·kg^{-1} groups (P<0.01) , the AChE activity in cortex significantly decreased in chlorpyrifos 2, 4, 8 and 16 mg·kg^{-1} groups(P<0.01) and the AChE activity in serum significantly decreased in chlorpyrifos 1, 2, 4, 8 and 16 mg·kg^{-1} groups (P<0.01). The AChE activity showed decreasing trend with increasing dose. NOEAL in hippocampus, cortex and serum of rats was 2.0, 1.0 and 0.5 mg·kg^{-1}, respectively, and the BMD of chlorpyrifos was 0.81, 0.90 and 0.41 mg·kg^{-1}, respectively, while reference dose in the hippocampus, cortex and serum of rats was 5.5, 4.6 and 3.6 μg·kg^{-1}, respectively. For human saftey, the reference dose of chlorpyrifos was determined to be 3.6 μg·kg^{-1}. **CONCLUSION** This method can formulate more secure reference doses, that are potentially used in dietary exposure assessment in the future.

Key words chlorpyrifos acetylcholinesterase benchmark dose reference dose

DOI: 10.3867/j.issn.1000-3002.2013.02.028

通讯作者 王灿楠,E-mail:wcnseu@126.com,Tel:(025)83272568 wcnseu@126.com

扩展功能

本文信息

Supporting info

PDF(391KB)

[HTML全文](0KB)

参考文献

服务与反馈

把本文推荐给朋友

加入我的书架

加入引用管理器

复制索引

Email Alert

文章反馈

浏览反馈信息

相关信息

本刊中 包含“氯蜱硫磷”的相关文章

本文作者相关文章

- 何贤松
- 李亭亭
- 乙楠楠
- 吴惠
- 王霞
- 赵敏娴
- 王灿楠