

文章编号:1004 - 616X(2000)04 - 0196 - 04

· 论著 ·

微核形态用于区分非整倍体毒剂和染色体断裂剂的研究

杨录军, 曹 佳

(第三军医大学分子毒理学实验室, 重庆 400038)

摘要:目的:通过比较非整倍体毒剂和染色体断裂剂诱导的各种微核形态类别的差异,探讨以微核形态指标区分两类诱变剂的可能性。方法:对6种标准诱变剂(非整倍体毒剂:秋水仙碱,长春新碱;染色体断裂剂:环磷酰胺,丝裂霉素C,乙基磺酸甲酯,射线)诱导的小鼠骨髓红细胞微核,进行形态学分类分析。结果:非整倍体毒剂诱导的环形微核率显著高于染色体断裂剂(分别为 33.8 ± 2.8 , 17.4 ± 8.3 ; $P=0.003$),而圆形微核率显著低于后者(分别为 51.6 ± 6.5 , 72.3 ± 9.1 ; $P<0.0001$),肾形微核率有高于染色体断裂剂诱导的微核的趋势,但差别无显著性(分别为 14.6 ± 6.7 , 10.2 ± 6.3 , $P=0.07$);两类诱变剂诱导的3种类别的微核95%可信区间差异很大,其中圆形微核率和环形微核率完全分离;得到通过微核形态区分两类诱变剂的判别方程。结论:微核的圆形、环形和肾形的发生率可用于区分非整倍体毒剂与染色体断裂剂的参考。

关键词:微核;非整倍体毒剂;分类法;判别分析

中图分类号:R991

文献标识码:A

STUDY ON THE FREQUENCIES OF MICRONUCLEUS MORPHOLOGICAL CLASS AS A MEANS TO DISTINGUISH ANEUGENS FROM CLASTOGENS

YANGLu - jun, CAO Jia

(Molecular Toxicology Laboratory, Third Military Medical University, Chongqing 400038, China)

Abstract: **Purpose:** To study the morphological method to distinguish aneugens from clastogens. **Methods:** According to the morphological criteria micronuclei were classified and quantitatively analyzed induced by six reference mutagens (aneugens: colchicine, vincristin; clastogens: cyclophosphamide, mitomycin C, ethyl methane sulfonate, gamma - ray). **Results:** In comparing with the results by clastogens, the frequency of circle micronuclei by aneugens was significantly increased ($P=0.003$), ring micronuclei remarkably decreased ($P<0.0001$), and crescent micronuclei did not change evidently ($P=0.07$). The 95% confidence intervals of the mean micronucleus frequencies in class between the two types of mutagens were different very much, of which circle and ring frequencies were completely separate. A discriminating function was acquired from the paper data. **Conclusion:** The frequencies of circle, ring and crescent micronuclei can be as a means to distinguish aneugens and clastogens.

Key words: micronucleus; aneugen; classification; discriminating analysis

非整倍体毒剂所致的非整倍体性疾病给人类健康造成严重的危害,如自发性流产等。近年来,大量

收稿日期:1999 - 11 - 12; 修回日期:2000 - 03 - 01

基金项目:国家自然科学基金资助项目(39400114)

作者简介:杨录军(1967 -),男,河南省辉县市人,实验师,硕士研究生,主要从事遗传毒理学和分子毒理学方面的研究。Tel: (023) 68752295, E-mail: yanglj @ yahoo.com

文章编号:1004 - 616X(2000)04 - 0200 - 02

· 论 著 ·

干细胞样肝原始细胞的分离和鉴定

苏娟¹,姚玉成¹,王忠华¹,王新民¹,马大烈²,余宏宇³,熊俊¹,訾晓渊¹,赵书民³,胡以平¹

(1. 第二军医大学细胞生物学教研室,上海 200433 2. 长海医院 3. 长征医院)

摘要:目的:证实小鼠胎肝中肝干细胞的存在。方法:小鼠胎肝细胞的分离培养和免疫细胞化学等。结果:从小鼠胎肝组织中成功地分离得到了 AFP、CD34 及 Albumin 等特异性分子标记阳性、并呈集落样生长的细胞系。结论:小鼠胎肝中存在具有干细胞特性的原始细胞,为肝干细胞生物学特性的进一步认识和利用奠定了基础。

关键词:肝干细胞;胚胎肝;分离培养;集落样生长

中国分类号:Q813.11 文献标识码:A

ISOLATION AND IDENTIFICATION OF HEPATIC STEM CELLS-LIKE

SU Juan, YAO Yu - cheng, WANG Zhong - hua, WANG Xin - min, YU Hong - yu, MA Da - lie, XIONG Jun, ZI Xiao - yuan, ZHAO Shu - min, HU Yi - ping

(Department of Cell Biology, Second Military Medical University, Shanghai 200433, China)

Abstract: Purpose: To isolate and identify hepatic stem cells from fetal liver of mice. **Methods:** Cells isolated from mouse fetal liver were cultured *in vitro* and liver specific markers were detected by immunocytochemistry on colonies randomly picked up. **Results:** Cell lines were obtained that grew like embryonic stem cells and expressed such hepatic specific markers as AFP, CD34 and albumin. **Conclusion:** There is existence of hepatic stem cells in mouse fetal liver.

Key Words: hepatic stem cell; fetal liver; cell culture *in vitro*; colony

收稿日期:2000 - 07 - 02;修订日期:2000 - 08 - 27

基金项目:国家科技部 95 攻关项目(TJ99 - LA01)和国家教育部高校骨干教师资助计划项目。

作者简介:苏娟(1973 -),女,山东济宁人,硕士研究生。

通讯作者:胡以平(1954 -),男,四川射洪人,教授,理学博士,研究方向:细胞生物学。

- cronucleus assay J. *Mutagenesis*, 1991, 6(3):193 - 198.
- 3 Yamamoto KI and Kikuchi Y. A comparison of diameters of micronuclei induced by clastogens and by spindle poisons J. *Mutat Res*, 1980, 71:127 - 131.
- 4 曹佳,卓鉴波. 微核实验中浮尔根染色法的应用 J. *中华预防医学杂志*, 1989, 23(3):178 - 178.
- 5 曹佳,卓鉴波. 不同致突变剂和纺锤体毒剂诱导的微核面积和 DNA 含量测定及其意义 J. *中国环境科学*, 1988, 8(5):69 - 71.
- 6 Miller BM, Werner T, Weier HU, et al. Analysis of radiation - induced micronuclei by FISH simultaneously using telomeric and centromeric DNA probes J. *Radiat Res*, 1992, 131(2):177 - 185.
- 7 曹佳,胡斌,程天民. 昆明山海棠在微核实验中非整倍体毒性的研究 J. *遗传*, 1997, 19(1):1 - 3.
- 8 Nusse M, Kramer J, Miller BM. Factors influencing the DNA content of radiation - induced micronuclei J. *Int J Radiat Biol*, 1992, 62(5):587 - 602.
- 9 Hayashi M, Sofuni T and Ishidate - Jr M. An application of acridine orange fluorescent staining to the micronucleus test J. *Mutat Res*, 1983, 120:241 - 247.
- 10 曹佳,程天民. 微核的染色体组成模型与微核实测 DNA 含量的比较研究 J. *第三军医大学学报*, 1996, 18(4):281 - 283.
- 11 郭祖超. *医用数理统计方法* M. 北京:人民卫生出版社, 1987. 458 - 500.