

论文

cDNA基因芯片技术分析三聚氰胺肾毒性的相关基因表达

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摘要:

利用基因芯片技术筛查不同剂量的三聚氰胺干预大鼠肾脏的差异表达基因, 并对筛查的差异基因进行生物信息学分析, 推测三聚氰胺肾毒性的分子作用机制. 结果表明, 高剂量三聚氰胺干预的大鼠肾脏差异表达基因数多于低剂量干预的肾脏差异表达基因, 并且涉及到更多重要的分子功能和代谢途径, 表明三聚氰胺肾毒性具有剂量依赖性, 相比低剂量而言, 高剂量三聚氰胺干预对肾脏的危害更为严重.

关键词: 三聚氰胺; 基因芯片; 肾毒性; 肾结石

Gene Expression Studies of Melamine-related Renal Toxicity Based on cDNA Microarray

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Abstract:

Nowadays, microarray technology has been used in toxicogenomics more and more often. In this paper, we applied it into the renal toxicity research of melamine, which is an intermediate of resin in chemical industry. The experimental, through microarray and bioinformatics, was designed to find the differences between two cases in which the rats independently intervened by high and low doses melamine, and then to interpret the molecular mechanism of renal toxicity. The result indicated that the number of differentially expressed genes intervened by high dose of melamine were more than that by low dose of melamine. Besides, the differential expressed genes interfered by high dose melamine have been proved to have close connection with some important pathways as follow: valine, leucine and isoleucine degradation, citrate metabolism, glutathione metabolism, fatty acid metabolism, and the molecular function such as mental binding, lyase activity, ligase activity, symporter activity, glutathione transferase activity, monooxygenase activity. Our research show the toxicity in kidney intervened by melamine, and demonstrated the special advantage of microarray technology in toxicogenomics.

Keywords: Melamine; Microarray; Nephrotoxicity; Nephrolithiasis

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参考文献:

[1]David D. L. Bowtell. Nature Genetics[J], 1999, 25(1): 145—146

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- [2]He Ji-liang, Chen Zhi. J. Environ. Health[J], 2002, 19(4): 291—294
- [3]ZHANG Hui-Liang(张会亮), ZHANG Rong-Li(张荣利), LUO Guo-An(罗国安), et al.. J. Med. Res.(医学研究杂志)[J], 2006, 35(5): 11—33
- [4]WANG Jin-Jin(王津金), QIAN Xi-Yuan(钱夕元), LI Xue(李雪), et al.. World Science and Technology /Modernization of Tradi-tional Chinese Medicine and Materia Medica(世界科学技术——中药现代化)[J], 2007, 9(3): 39—66
- [5]LIU Feng-Qi(刘凤岐), TANG Xin-Yi(汤心颐). Chem. J. Chinese Universities(高等学校化学学报)[J], 1989, 10(8): 878—880
- [6]WANG Shi-Zhong(王世忠), LU Rong-Zhu(陆荣柱), GAO Jian-Rui(高坚瑞), et al.. Foreign Medical Sciences(国外医学)[J], 2009, 36(1): 14—18
- [7]Nogales-Cadenas R., Carmona-Saez P., Vazquez M., et al.. Nucleic Acids Research[J], 2009, 37: 317—322
- [8]Lam Ching-wan, Lan Lawrence, Che Xiao-yan, et al.. Clinica Chimica Acta[J], 2009, 402: 150—155
- [9]Guan Na, Fan Qing-feng, Ding Jie, et al.. The New England Journal of Medicine[J], 2009, 360(11): 1067—1074
- [10]WANG Xiao-Qian(王晓谦). J. Henan Univ. Sci. Tech.(河北科技大学学报)[J], 2004, 22(2): 85—86
- [11]Lam H. S., Ng P. C., Chu W. C. W., et al.. British Medical Journal[J], 2008, 337: a2991
- [12]Muhammad H. Khaskhali. Urological Research[J], 2008, 36: 157—232
- [13]Kirsten Y. Renkema, Lee. Kyupil, et al.. Nephrology Dial Transplant[J], 2009, 24: 1919—1924
- [14]DENG Hui-Ping(邓穗平), ZHANG Sheng(张生), OUYANG Jian-Ming(欧阳健明), et al.. Chem. J. Chinese Universities(高等学校化学学报)[J], 2007, 28(2): 199—203
- [15]HU Peng(胡朋). Journal of Hebei Normal University(河北大学学报)[J], 2006, 30(2): 208—212
- [16]Yan Li, Kenneth E.. Am. J. Physiology Renal. Physiol.[J], 2009, 296: 1080—1087
- [17]Propiglia F., Ghignone G., Fiori C., et al.. J. Urol.[J], 2004, 172: 568—571
- [18]Chandhok P. S.. J. Urol.[J], 2002, 168: 937—940
- [19]Christopher J. Danpure. Biochimica et Biophysica Acta[J], 2006, 1763: 1776—1784
- [20]Michael P. S. Booth, R. Conners, et al.. J. Mol. Biol.[J], 2006, 360: 178—189
- [21]Lash L. H., Goldstein R. S.. Comprehensive Toxicology[M], Oxford: Elsevier Science Ltd., 1997: 403—428

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