

## 论著

### 甲醛对雌性大鼠卵巢组织Fas凋亡途径相关基因表达的影响

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#### 摘要:

目的: 观察甲醛对雌性大鼠卵巢组织Fas, caspase-8和caspase-3表达的影响, 探讨甲醛对雌性大鼠卵巢毒性的分子机制。方法: 将40只雌性SD大鼠随机分为正常对照组和3个不同浓度甲醛处理组, 腹腔注射甲醛, 剂量分别为20.0, 2.0和0.2 mg/kg, 每天1次, 连续14 d后处死所有大鼠后取卵巢组织, 用RT-PCR检测Fas和caspase-8 mRNA表达, Western印迹检测Fas蛋白表达, 分光光度法检测caspase-8和caspase-3的活性。结果: 甲醛染毒组动物卵巢组织Fas与caspase-8 mRNA表达以及caspase-8和caspase-3活性明显高于对照组, 且随剂量的增加而增加(P<0.05)。结论: Fas基因表达与caspase活性的增强可能是甲醛诱导雌性动物卵巢毒性的重要机制。

关键词: 甲醛 大鼠 卵巢毒性 Fas caspase

### Effect of formaldehyde on expressions of Fas apoptosis pathway-related genes of ovary tissues in female rats

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#### Abstract:

Objective To explore the mechanism of formaldehyde inducing ovarian toxicity in female rats by observing the effect of formaldehyde on the expression of Fas and caspase-8 mRNA, and the activity of caspase-3 and caspase-8 of ovary tissues in female rats. Methods Forty female Sprague-Dawley (SD) rats were randomly divided into a control group and 3 formaldehyde groups at different concentrations. The rats in the formaldehyde groups were intraperitoneally injected different doses of formaldehyde (20.0, 2.0 and 0.2 mg/kg) continuously for 14 days. After 14 days, all rats were sacrificed and their ovaries were collected for detecting the expression of Fas and caspase-8 mRNA with RT-PCR, the protein expression of Fas with Western blot, and the activities of caspase-8 and caspase-3 with spectrophotometric method. Results Compared with the control group, the expression of Fas mRNA and its protein and caspase-8 mRNA and the activity of caspase-8 and caspase-3 of ovary tissues in the rats treated with formaldehyde significantly increased with dose (P<0.05). Conclusion The increase of Fas gene expression and the activity of caspase-8 and caspase-3 may be the important mechanism of ovarian toxicity induced by formaldehyde in female rats.

Keywords: formaldehyde; rat; ovarian toxicity; Fas; caspase

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#### 参考文献:

- [1] Kupczewska-Dobecka M. Assessment of carcinogenicity of formaldehyde based on the newest literature data [J]. Med Pr, 2007, 58(6): 527-539.
- [2] Tang X, Yang B, Anh D, et al. Formaldehyde in China: production, consumption, exposure levels, and health effects [J]. Environ Int, 2009, 35(8): 1210-1224.
- [3] 王伟, 唐明德, 易义珍, 等. 甲醛对雌性小鼠动情周期及卵巢的影响 [J]. 实用预防医学, 2002, 9(6): 641-643. WANG Wei, TANG Mingde, YI Yizhen, et al. The effects of formaldehyde on estrous cycle and ovary of female mice [J]. Practical Preventive Medicine, 2002, 9(6): 641-643.
- [4] 刘丹丹, 王博. 气态甲醛致雌性小鼠生殖细胞DNA-蛋白质交联的研究 [J]. 生态毒理学, 2006, 1(3): 249-253. LIU Dandan, WANG Bo. Study on DNA-protein crosslinks of reproductive cell of female mice induced by formaldehyde [J]. Asian Journal of Ecotoxicology, 2006, 1(3): 249-253.
- [5] 彭国庆, 钟才高, 张琼, 等. 甲醛对雌性大鼠卵巢储备功能的影响 [J]. 癌变·畸变·突变, 2010, 22(1): 32-34. PENG Guoqi, ZHONG Caigao, ZHANG Qiong, et al. Effects of formaldehyde on ovarian reserve function in female rats [J]. Carcinogenesis, Teratogenesis & Mutagenesis, 2010, 22(1): 32-34.
- [6] 谢颖. 甲醛的生殖毒性 [J]. 工业卫生与职业病, 2002, 28(2): 118-120.

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XIE Yin.Reproductive toxicity of formaldehyde [J] . Industrial Health and Occupational Diseases, 2002,28(2): 118-120.

[7] Mor G, Straszewski S, Kamsteeg M. Role of the Fas/Fas ligand system in female reproductive organs: survival and apoptosis [J] . Biochem Pharmacol, 2002, 64(9):1305-1315.

[8] Porter D A, Vickers S L, Cowan R G, et al. Expression and function of Fas antigen vary in bovine granulosa and theca cells during ovarian follicular development and atresia [J] . Biol Reprod, 2000, 62(1):62-66.

[9] Porter D A, Harman R M, Cowan R G, et al. Relationship of Fas ligand expression and atresia during bovine follicle development [J] . Reproduction, 2001, 121(4):561-566.

[10] Jian X, Cheng G, Tang H F, et al. Ardipusilloside I induces apoptosis in human glioblastoma cells through a caspase-8-independent FasL/Fas-signaling pathway [J] . Environ Toxicol Pharmacol, 2009, 27(2): 264-270.

[11] Glamoclija V, Vilovi K, Saraga-Babi M, et al. Apoptosis and active caspase-3 expression in human granulosa cells [J] . Fertil Steril, 2005,83(2):426-431.

[12] Uchida K, Nishizuka M, Ohmori D,et al. Follicular epithelial cell apoptosis of atretic follicles within developing ovaries of the mosquito *Culex pipiens pallens* [J] . J Insect Physiol, 2004, 50(10): 903-912.

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