

论著

岗田酸促癌作用过程中对Balb/c 3T3细胞凋亡的影响

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摘要 目的 初步探讨促癌物岗田酸(OA)在促进Balb/c 3T3细胞转化过程中对细胞凋亡的影响及其分子机制。方法 以N-甲基-N'-硝基-N-亚硝基胍(MNNG)为启动剂, OA为促癌剂, 建立Balb/c 3T3细胞转化模型。台盼蓝染色法检测OA的细胞毒性, Annexin V-FITC/PI双染色流式细胞术检测细胞凋亡率, 小鼠毒理基因芯片分析OA促癌作用过程中的基因表达变化, 同时采用荧光定量RT-PCR方法验证部分基因的表达情况。结果 MNNG 1 mg·L⁻¹启动后, 7.8 μg·L⁻¹ OA持续处理能促进Balb/c 3T3细胞的转化。OA处理3, 5和7 d后细胞存活率降低, 同时细胞凋亡率显著升高; 基因表达谱分析显示, *Bnip3*, *Cyca*和*caspase 3*等细胞凋亡相关基因以及*Gstp2*, *Txn1*和*Prdx1*等抗氧化基因的表达发生明显改变。RT-PCR检测显示OA处理3, 7 d时, *SPP1*和*Txn1*基因的表达变化与芯片检测结果相似。结论 OA在促癌过程能诱导Balb/c 3T3细胞凋亡, 影响线粒体凋亡通路相关基因和抗氧化基因的表达。

关键词 [细胞凋亡](#) [促癌过程](#) [岗田酸](#) [基因芯片](#)

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Influence of okadaic acid on apoptosis of Balb/c 3T3 cells during the tumor promotion stage

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Abstract

AIM To investigate the effects of okadaic acid (OA) on the apoptosis during the promotion stage of Balb/c 3T3 cells transformation, and to discuss the involved molecular mechanisms. **METHODS** The two-stage transformation test of Balb/c 3T3 cells was established with N-methyl-N'-nitro-N-nitrosoguanidine (MNNG) as initiator and OA as promoter. The cytotoxicity of OA was detected by trypan blue exclusion assay, and the cellular apoptosis was inspected by annexin V-FITC/PI staining and flow cytometry. Mouse toxicology gene chip was used to detect the gene expression of cells after OA treatment, and the expression of *SPP1* gene and *Txn1* gene was validated by real-time reverse transcription-polymerase chain reaction(RT-PCR) assay. **RESULTS** OA 7.8 μg·L⁻¹ could induce the transformation of Balb/c 3T3 cells after 1 mg·L⁻¹ MNNG initiation. The cell viability was decreased and the percentage of apoptotic cells was increased significantly after OA treatment. In addition, OA influenced the transcriptional expression of some genes related to apoptosis or antioxidation, and the expression level of *SPP1* and *Txn1* genes was confirmed by real-time RT-PCR method. **CONCLUSION** OA can induce apoptosis in Balb/c 3T3 cells during the promotion stage, the results suggest the possibility that the mitochondrial apoptosis pathway and oxidation stress may play important roles in the apoptosis.

Key words [apoptosis](#) [tumor-promoting action](#) [okadaic acid](#) [gene chip](#)

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