

论著

维生素K₃对雄激素非依赖性前列腺癌PC-3M细胞的凋亡诱导作用

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摘要 目的: 观察维生素K₃对雄激素非依赖性前列腺癌细胞PC-3M的凋亡诱导作用。方法: MTT增殖抑制实验; 吖啶橙染色检测细胞凋亡; 流式细胞术检测细胞凋亡及周期变化; NAC抗氧化试验; DCFH-DA荧光分光光度法检测细胞内活性氧簇(ROS)水平; RT-PCR检测GSH-Px和CAT基因表达的改变。结果: 60 μmol/L剂量以上的VK₃均可以有效抑制PC-3M细胞的增殖, 并且呈时间剂量依赖性; 联合应用不同剂量NAC(5、10、20、40、80 μmol/L)与VK₃(60 μmol/L)共同作用于PC-3M细胞后, 结果显示与单独应用VK₃相比各浓度的NAC能不同程度增加细胞存活率; 吖啶橙染色证明在VK₃(60 μmol/L)作用12 h后, PC-3M细胞出现凋亡的形态学改变; 流式细胞计数结果显示VK₃(60 μmol/L)作用12 h后细胞出现凋亡峰, 细胞周期被阻滞于G₀/G₁期; DCFH-DA荧光染色, 在VK₃作用后1-2 h, 细胞内即出现了较强的荧光表达; RT-PCR结果显示, 在VK₃作用后细胞内的CAT和GSH-Px两种主要的抗氧化酶类表达降低。结论: VK₃可能主要通过引起PC-3M细胞内氧化应激诱导细胞发生凋亡。

关键词 [维生素K₃](#); [前列腺肿瘤](#); [细胞凋亡](#); [PC-3M细胞](#)

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Effect of vitamin K₃ on apoptosis induced by androgen-independent prostate cancer cell PC-3M

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Abstract

AIM: To study the effect of vitamin K₃ on the induction of apoptosis in androgen-independent prostate cancer cell PC-3M in vitro. **METHODS:** Cell viability was estimated by MTT assay. AO/EB staining was performed to detect apoptotic cells. Apoptosis and the changes of cell cycle were detected by flow cytometry. NAC was used to observe the effect of growth inhibition by VK₃. RT-PCR was used to confirm the changes in gene expression. Levels of intracellular peroxides were estimated by using an oxidation-sensitive fluorescent probe DCFH-DA. **RESULTS:** PC-3M cells growth was significantly inhibited by VK₃ (≥60 μmol/L, P<0.05). The inhibitory effect was time and dosage dependent. The result of AO/EB staining showed that apoptosis of PC-3M cells were induced by VK₃. A typical subdiploid peak before G₀/G₁ phase was observed after treated for 12 h with VK₃ (60 μmol/L) by flow cytometry. The effect of growth inhibition treated with VK₃ was antagonized by antioxidant NAC (5, 10, 20, 40, 80 μmol/L). An increase in the level of DCF fluorescence after PC-3M cells were treated for 1-2 h with VK₃ was observed. Antioxidase GSH-Px and CAT were run-down after treated with VK₃. **CONCLUSION:** The results indicate that apoptosis in PC-3M cells is induced through oxidative stress by VK₃.

Key words [Vitamin K₃](#) [Prostatic neoplasms](#) [Apoptosis](#) [PC-3M cells](#)

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