中国中药杂志
China Journal of Chinese Materia Medica

小白菊内酯对白血病K562细胞及其干细胞的作用

投稿时间： 2009-03-12 责任编辑：张宁宁 点此下载全文

引用本文：易娟,陈静,孙静,魏虎来,石建功.小白菊内酯对白血病K562细胞及其干细胞的作用[J].中国中药杂志,2010,35(2):219.

DOI：10.4268/cjcmm20100223

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基金项目：甘肃省自然科学研究基金项目(096RJZA034);中草药物质基础与资源利用教育部重点实验室(北京协和医学院)开放课题(0801);甘肃省新药临床前研究重点实验室(兰州大学)开放课题(GSKFKT-0802)

中文摘要：目的: 研究小白菊内酯(parthenolide, PTL)对白血病K562细胞及其白血病干细胞(leukemia stem cells, LSC)的作用。 方法 :以白血病K562细胞为靶细胞,四氮唑蓝(MTT)比色法测定细胞增殖活性,Annexin Ⅴ/PI染色法测定细胞凋亡;流式细胞术检测LSC相对含量,甲基纤维素集落形成法检测细胞的自我更新和增殖能力。 结果 :PTL显著抑制K562细胞的增殖,24,48,72 h的IC_{50}分别为17.1,8.67,9.42 μmol·L^{-1}。5,10 μmol·L^{-1} PTL处理48 h,K562细胞的凋亡率分别为(49.56±5.11)%,(71.88±2.12)%。结合干细胞免疫标志分析,K562细胞中LSC样($CD34^+CD38^-$)细胞的凋亡率分别为(52.63±4.14)%,(57.50±4.47)%。K562细胞中LSC的相对含量仅轻度增高,但高浓度(15 μmol·L^{-1})PTL 处理,LSC含量则增高15倍。0.5~4.0 μmol·L^{-1} PTL显著抑制K562细胞的集落形成能力,集落数降低24.1%~89.2%;5~15 μmol·L^{-1} PTL预处理,存活K562细胞的集落形成数增高5.0%~50.0%。 结论 :小白菊内酯可抑制K562细胞及其干细胞的增殖活性,并诱导其凋亡。

中文关键词：白血病干细胞 小白菊内酯 集落形成 凋亡

Effect of parthenolide on leukemia K562 cells and its leukemia stem cells

Abstract: Objective : To investigate the inhibitory and apoptosis-inducing effects of parthenolide (PTL) on human leukemia K562 cells and its leukemia stem cells(LSC). Method : MTT assay was used to detect the proliferating activity of K562 cells, and the cellular apoptosis was assayed with Annexin V/PI double staining. Flow cytometry (FCM) was employed to determine the relative proportion of LSC in K562 cells. The self-renewal and proliferating potential were examined with methylcellulose colony-forming units(CFU) assay. Result : By use of MTT assay, we found PTL had significant inhibitory effect on the proliferation of K562 cells, the 50% inhibitory concentration (IC_{50}) values were 17.1,8.67,9.42 μmol·L^{-1} for 24, 48 and 72 h, respectively. After administration with 5 μmol·L^{-1} and 10 μmol·L^{-1} PTL, the apoptotic rate of K562 cells was (49.56±5.11)% and (71.88±2.12)%, and (52.63±4.14)% and (57.50±4.47)% in LCS-like ($CD34^+CD38^-$) cells in K562 cell population, respectively. A slightly increase of relative content of LSC in K562 cells was observed. There was an 15-fold increase in the higher concentration of the PTL-treated cells. The methylcellulose colony-forming units assay showed a 24.1% to 89.2% decrease in the CFU of K562 cells administrated with 0.5 μmol·L^{-1} to 4.0 μmol·L^{-1} PTL, and the CFU of the surviving cells increased by 5.0% to 50.0% on condition that K562 cells were pre-treated with 5 μmol·L^{-1} to 15 μmol·L^{-1}PTL for 48 h. Conclusion : PTL eminently inhibits proliferation of K562 cells and LSC in K562 cells, and induces the cell apoptosis.

keywords:leukemia stem cells parthenolide colony formation apoptosis

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