Alpha-Phellandrene-Induced Apoptosis in Mice Leukemia WEHI-3 Cells In Vitro

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ABSTRACT

Although reports have shown that α-phellandrene (α-PA) is one of the monoterpenes and is often used in the food and perfume industry, our previous studies have indicated that α-PA promoted immune responses in normal mice in vivo. However, there is no available information to show that α-PA induced cell apoptosis in cancer cells, thus, we investigated the effects of α-PA on the cell morphology, viability, cell cycle distribution, and apoptosis in mice leukemia WEHI-3 cells in vitro. Results indicated that α-PA induced cell morphological changes and decreased viability, induced G0/G1 arrest and sub-G1 phase (apoptosis) in WEHI-3 cells. α-PA increased the productions of reactive oxygen species (ROS) and Ca²⁺ and decreased the levels of mitochondrial membrane potential (ΔΨm) in dose- and time-dependent manners in WEHI-3 cells that were analyzed by flow cytometer. Results from confocal laser microscopic system examinations show that α-PA promoted the release of cytochrome c, AIF, and Endo G from mitochondria in WEHI-3 cells. These results are the first findings to provide new information for understanding the mechanisms by which α-PA induces cell cycle arrest and apoptosis in WEHI-3 cells in vitro.

Keywords: α-phellandrene (α-PA); WEHI-3 cells; cell cycle arrest; apoptosis; in vitro

REFERENCES


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