

Germacrone reverses Adriamycin resistance through cell apoptosis in multidrug-resistant breast cancer cells.

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Abstract

Multidrug resistance (MDR) is a major obstacle to the chemotherapeutic treatment of breast cancer. Germacrone, the main component of *Rhizoma Curcuma*, has been shown to possess antitumor, anti-inflammatory and immunomodulatory properties. The aim of the present study was to investigate the effect of germacrone on MCF-7/Adriamycin (ADR) multidrug-resistant human breast cancer cells. The treatment of MCF-7/ADR cells with a combination of germacrone and ADR resulted in an increase in cytotoxicity compared with that of ADR alone, as determined using an MTT assay. Flow cytometric analysis revealed that germacrone promoted cell apoptosis in a dose-dependent manner, whilst treatment with germacrone plus ADR enhanced the apoptotic effect synergistically. Furthermore, the results from the western blot analysis demonstrated that augmenting ADR treatment with germacrone resulted in a reduction of anti-apoptotic protein expression levels (bcl-2) and enhancement of pro-apoptotic protein expression levels (p53 and bax) in MCF-7/ADR cells compared with the levels achieved by treatment with ADR alone. In addition, germacrone significantly reduced the expression of P-glycoprotein via the inhibition of the multidrug resistance 1 (MDR1) gene promoter. These findings demonstrate that germacrone has a critical role against MDR and may be a novel MDR reversal agent for breast cancer chemotherapy.

KEYWORDS:

germacrone; human breast cancer; multidrug resistance