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Abstract

Evaluation of Anti-proliferation Activities and Action Mechanisms of the Extracts from Two Species of *Ganoderma* on Tumoral Cells

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Ganoderma (*Ganoderma lucidum* and *Ganoderma sinense*) is the whole fruit body of *Ganoderma lucidum* (Leyss. ex Fr.) Karst. or *Ganoderma japonicum* (Fr.) Lloyd., Polyporaceae. It is a commonly used traditional Chinese medicine for cancer therapy. A few studies have indicated that *Ganoderma* could inhibit tumor cell growth. In this study, the anti-proliferation activities and action mechanisms of the extracts from two species of *Ganoderma*, *G. lucidum* and *G. sinense*, with different chemical characteristics on tumoral cells were evaluated. The results showed that chemical components in ethanol and aqueous extracts from the two species of *Ganoderma* were obviously different, though all the extracts had certain anti-proliferative activities on tumoral cells, namely human breast cancer (MCF-7 and MDA-MB-231), hepatoma (HepG2) and myeloid leukemia (HL-60) cell lines. Furthermore, the effects of ethanol extracts from the two species of *Ganoderma* on MDA-MB-231 cells were studied using JC-1 assay (mitochondrial membrane potential), Cytochrome C assay, TUNEL assay, Hoechst 33342 stained assay, and cell cycle analyses. As a result, both of ethanol extracts had apoptosis induction activities on the cells through the alternation of mitochondrial transmembrane

depolarization, increasing the release of Cytochrome C though no triterpenoids were detected in ethanol extract of *G. sinense*. In addition, ethanol extracts of both *G. lucidum* and *G. sinense* could arrest cell cycle, and the former arrested cells at G1 phase, while the latter arrested cells at G2 phase. This study showed that some components in *G. sinense* might contribute to its anti-proliferation activity on tumor cells besides triterpenoids and polysaccharides, two kinds of compounds usually considered as active ones, which need further study.

Key words: Ganoderma lucidum; Ganoderma sinense; anti-tumor; cell cycle; apoptosis