Comparative studies of various ganoderma species and their different parts with regard to their antitumor and immunomodulating activities in vitro.


Source

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Abstract

OBJECTIVES:

Ganoderma lucidum (Lingzhi or Reishi) has been commonly suggested in East Asia as a potential candidate for prevention and treatment of different diseases, including cancer. Ganoderma extracts, in particular Ganoderma lucidum (extracts or isolated components), have previously been shown to possess antitumor activities. The present study aimed at comparing three different species of Ganoderma, wildly grown versus cultivated, as well as the different parts of the fruiting body (whole fruiting body, pileus, and stipe), with regard to their antitumor effects in human breast cancer cells and immunomodulatory activities in mouse splenic lymphocytes in vitro.

METHODS:

The aqueous extracts (12.5-400 microg/mL) of G. lucidum, G. sinense, and G. tsugae were examined for their antiproliferative activities in human breast cancer cell lines, MCF-7 and MDA-MB-231, as well as in normal human mammary epithelial cells (primary culture). The immunomodulatory effects of the extracts were evaluated in mouse splenic lymphocytes. The proliferative responses of the mentioned cell types were determined by MTT [3-(4,5-dimethylthiazolyl)-2,5-diphenyl-tetrazolium bromide] assay.
RESULTS:

The present results demonstrated that the extracts of all tested Ganoderma samples could significantly inhibit cell proliferation in human breast cancer cell lines MCF-7 and MDA-MB-231, with G. tsugae being the most potent. The extracts, however, did not exert any significant cytotoxic effect on human normal mammary epithelial cells. Within the species G. sinense, the inhibitory effects of wildly grown samples were not significantly different from those of the cultivated samples, except at 400 microg/mL. Most of the tested extracts of Ganoderma stimulated mouse splenic lymphocytes proliferation. The extracts from the stipes of G. tsugae and wildly grown G. sinense showed much stronger inhibitory effects than the other parts of the fruiting body in both cancer cell lines, whereas the extracts from the stipes of G. lucidum and wildly grown G. sinense showed stronger immunopotentiating activities in mouse splenic lymphocytes.

CONCLUSIONS:

These results indicate that the aqueous extracts of these commonly available Ganoderma fruiting bodies, G. lucidum, G. sinense, and G. tsugae have antitumor activities in human breast cancer cells and immunomodulatory activities in murine lymphocytes. In addition, the present findings also suggest that the stipes of fruiting bodies of Ganoderma species should be included in the preparation of extract of these fungi in order to obtain the most comprehensive active ingredients. To the best of the authors’ knowledge, this is the first detailed comparison among the different parts of the fruiting bodies of Ganoderma.

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