

Review of anticancer activities and its mechanisms of

Antrodia cinnamomea

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Antrodia. cinnamomea (AC) is a very popular and treasured Taiwanese medicinal mushroom endemic only to Taiwan, having orange to brownish orange fruiting bodies with irregular shapes named in Chinese as "Niu-Chang-Chih". Wild AC grows on the rotting inner heartwood wall of *Cinnamomum. kanehirai*, which is the only host tree in nature. AC has been applied by Taiwanese aborigines for sobering up, liver diseases and food/ drug intoxication for hundreds of years. Many scientific studies have demonstrated that AC crude extracts or pure compounds possess a variety of biological functions, such as anti-tumor, liver protection, anti-oxidant, anti-hypertensive, anti-hyperlipidemic, anti-inflammatory, and immuno-modulatory activities. This review focuses on the anticancer component, anticancer activities and its mechanisms of AC.

Triterpenoids, polysaccharides, antrocin, antroquinonols, benzenoids, maleic and succinic acid derivatives, and cyclohexenone compounds in AC exhibit cytotoxic effect against various cancer cells including leukemia, oral, breast, lung, liver, cervix, ovary, bladder, colon/rectum and prostate cancer cells, whereas antrodins and antrocamphins show anti-inflammatory effect which is correlated to anticancer activities. AC has also been found to exhibit selective inhibitory effect on cancer cells without toxicity to human normal cell lines.

The adjuvant effects of AC extracts from fruiting bodies, liquid or solid state cultures, combined with anti-tumor agents such as cisplatin, mitomycin, paclitaxel,

methotrexate, concanavalin A or trichostatin and other statin compounds were proven to have positive synergistic effect. The advantages of combination chemotherapy using AC combined with chemotherapy drugs are (1) suppression of drug resistance, (2) increased cancer cell kill, (3) reduced injury to normal cells, and (4) support immunity against infections.

AC causes cytotoxicity in cancer cells through apoptosis, inhibition of invasion and angiogenesis with a dose and time-dependent way mostly.

The anticancer effect of *Antrodia cinnamomea* and its application in combination chemotherapy is a new hope for anticancer treatment.

Keywords: *Antrodia cinnamomea*, anticancer, anticancer mechanism