



Mushrooms as a Potential Defender for Cancer Cells

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The scientific community is always looking for natural materials, like fungus and plants, that may boost the immune system, help the body fight cancer, and lessen the negative effects of medical treatments. Numerous fungal species belonging to the upper basidiomycete group have garnered significant attention in scientific circles due to their potential therapeutic benefits against cancer. Cancer is one of the leading causes of mortality worldwide and falls under the category of non-communicable diseases and disorders (NCDs). Over 100 illnesses with various aetiologies and prognoses are linked to the high occurrence. Evading apoptosis is one of the cellular processes in cancer that leads to resistance to treatment. Moreover, two coupled strategies that promote additional cancer growth and metastatization are ineffective activation of the apoptotic pathway and proliferation. Novel apoptosis-targeted medicines, such Bcl2-inhibitors, are being tested in clinical trials and are being used in the front lines of breast cancer treatment; further drugs are required. Over time, significant harm to cells and tissues may result from the persistence of oxidative states and inflammation. Cells may activate a variety of defensive mechanisms in an adaptive response to damage, including elevating antioxidant enzyme levels and initiating pathways leading to programmed cell death. In order to investigate the possibility of such a postulated adaptive mechanism, the results gathered by examining certain molecules as particular indicators of cell death pathways are reported in the following sections.

Mushrooms are only one of the many natural resources that nature has provided us with to help us live healthy lives. For thousands of years, people have used mushrooms for food and healing. The edible, meaty fruiting bodies of macrofungi belonging to the ascomycota and basidiomycota families that are cultivated above

ground on soil or other substrates are known as mushrooms. Just 100 of the 1600 species of mushrooms found in the globe are edible, and only 33 of them are farmed globally. Of those 33, only three are often grown: oyster, paddy straw, and white button mushrooms. It is thought that some of the mushroom's anti-tumour effect is related to its interaction with various cytokine networks, supporting modification of both the innate and adaptive immune systems. There are a plethora of bioactive phytoconstituents found in mushrooms, relatively few of which have been described and many more of which are yet unknown. Numerous clinical studies have been carried out to determine the effectiveness of the same; yet, there is still not enough evidence to support its use as the first-line therapy for cancer, necessitating additional advancements in clinical research and methodological quality. Although there are a number of mushroom products on the market that purport to have strong anti-cancer properties and contain extracts or their bioactive phytoconstituents, none of them are currently being sold as anti-cancer medications. This is especially true of food supplements.

In addition to reporting some notable advances in the development of anti-cancer drugs and the anti-cancer activity of mushrooms, our team also attempted to highlight the molecular mechanisms of cancer genesis and conventional anti-cancer therapy. More recently, we have seen the anti-cancer efficacy of some metallic nanoparticles loaded with mushrooms.