Benefits of mushrooms

Consumed for millennia and long appreciated for their attractive culinary attributes, mushrooms are now gaining recognition for their many beneficial, health effects and usefulness in the treatment of certain diseases. Widespread and intensive studies of the health-promoting benefits of many species of mushrooms are currently underway all over the world. Mushrooms are vegetables rich in many vitamins and minerals, including but not limited to vitamin B complex, vitamin C, selenium, zinc, iron, potassium and manganese. Mushrooms are the only vegetarian food that can produce vitamin D when exposed to the sun's ultraviolet (UV) radiation. This process is similar to how our skin synthesizes vitamin D in response to sun exposure. The difference is that the form of vitamin D produced in mushrooms D2, differs from the D3 we humans produce ourselves or those found in a few animal foods. However, most commercially cultivated mushrooms are grown indoors in dark environments, so they usually have negligible amounts of vitamin D. If you can find mushrooms labeled "UV-treated", then they might have a higher vitamin D content.

Mushrooms also provide a beneficial amount of dietary fiber and are low in carbohydrates. Dietary fiber can lower cholesterol by binding to it in the small intestine, thus preventing it from entering your bloodstream and instead causing the cholesterol to exit the body through the feces. A 2016 animal study in the Journal of Nutrition found that a regular intake of shiitake mushrooms appears to have cholesterol-lowering effects. Dietary fiber can also help our body regulate blood sugar, thereby reducing the risk of type 2 diabetes.

In addition to the nutritional components found in edible mushrooms, some species have been found to contain important amounts of nutraceutical bioactive compounds. Some species of edible, wild-grown mushrooms possess a unique arsenal of anti-infective and immuno-modulating agents. These special agents include polysaccharides, glyco-proteins, ergosterols, and triterpenoids. They are precursors to the more complex compounds, β-glucans, also known as "biological response modifiers" (because of their unique side-branching patterns and ability to activate the immune system). Different mushroom species contribute a variety of β-glucan molecular structures and utilize different pathways to modulate the immune system. By combining several species in one's diet, multiple immune cell, receptor sites and different pathways may be activated.

Because mushrooms have such powerful immune-boosting effects, it is no surprise that certain species have great potential for battling cancer. Cancer cells are notorious for "hiding" from the immune system and anti-cancer drugs. New research has shown that certain mushroom extracts help immune cells or drugs better locate and identify cancer cells by "uncloaking them", thereby making immune system or anti-cancer drugs more effective to eliminate cancer cells.

Immune Modulation from Five Major Mushrooms

1 ***Caterpillar fungus:*** Found only in high-altitude regions (3800 m above sea level), in cold alpine meadows the caterpillar fungus has an enduring history in both traditional Chinese and Tibetan medicine. Research has demonstrated that taking caterpillar fungus results in the development of resistance to fatigue and an enhanced exercise ability and endurance. It exhibits very broad biological and pharmacological actions in hepatic, renal and cardiovascular diseases. It also affects immunological disorders including cancer. The pharmacological actions of caterpillar mushroom are primarily due to bioactive polysaccharide and modified nucleosides, called adenosine and cordycepin. A study also found that caterpillar fungus extract can decrease vascular endothelial growth factor, which decreases the blood supply to the cancer cell while simultaneously increasing the ability of chemo drugs to exert cytotoxic effects.

2 ***Reishi:*** Known as Lingzhi (spirit plant) in China, and incorporated medicinally in Asia for thousands of years, reishi consists primarily of polysaccharides, triterpenoids, proteins and amino acids. One of its major active ingredients, ganoderic acid, is used to treat lung cancer, leukemia, sarcoma, and other cancers. Research found reishi extract can inhibit cancer cell proliferation, adhesion and increase cell suicide by increasing Natural Killer cell activity.

3 ***Shiitake:*** A popular culinary mushroom world-wide, contains a number of compounds having the natural ability to reduce inflammation, tumors, harmful bacteria, viruses and fungi. The most important compound from shiitake is Lentinan, a polysaccharide that possesses immune-modulating properties. Several studies have shown the benefit of shiitake, including a reduction in the rate of tumor development after oral treatment with lentinan; a reduction in the negative effects in the progression of HIV; and an ability to inhibit leukemia cell proliferation.

4 ***Maitake:*** Maitake is a large mushroom native to Japan, North America and Europe. Scientific studies show that Maitake extract may have potential benefits for cholesterol and blood sugar levels, immune function, cancer treatment and prevention, while also relieving certain cancer treatment side effects.

Maitake exerts its immune benefits by binding to the cell membrane of white blood cells such as macrophages and modulating cytokine release to activate the immune response.

5 ***Turkey Tail:*** Known as the "cloud mushroom", Turkey Tail contains two protein-bound polysaccharide complexes, PSK and PSP, which are currently undergoing extensive research in large scale clinical trials.

A seven-year, $2 million NIH-funded clinical study in 2011 found that Turkey Tail improves immune function in a dose-dependent manner for women with stage I–III breast cancer with no adverse effects. In addition to breast cancer, Turkey Tail has been found to hold promise for other cancers, including stomach, colorectal, lung, esophageal, nasopharyngeal, cervical, and uterine.