

## Medicinal Mushrooms: a brief history and overview of principal species

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Medicinal mushrooms are gaining prominence in the United States and deserve a spot in the herbalist's repertory. They have always played a role for indigenous cultures: even Ötzi, a man from about 3300 BCE discovered frozen in an alpine glacier, carried with him two species of mushroom. One, the birch polypore, is still used to fight infections; the other, a tinder fungus, can safely cradle a warm coal for many hours, acting as both fuel and insulation. Varieties of the chaga fungus have been used across Siberia and North America for centuries. Chinese medicine gives written references for many different fungi by 100 BCE, detailing their use in respiratory ailments, debility, and cancer. Some claim that the fly agaric mushroom was the fabled *Soma* described in the Vedas of the Indian subcontinent, dating back to 1500 BCE. And it is undeniable that mushrooms played a vital part in the development of Mesoamerican cultures such as the Olmecs, Maya, Aztecs and Inca.

Modern research is just beginning to catch up with this long history. Mycologists are delving into the details of the structure and growth patterns of many different fungal species, and medical scientists are focusing on their therapeutic potential. Their fascinating discoveries add another layer to the breadth of traditional knowledge and confirm that (when using the right species!) mushrooms are very safe and well tolerated.

Members of the Kingdom Fungi participate in the web of life by decomposing organic material, in constant balance with bacteria and other microorganisms occupying the same niches. They secrete a variety of compounds that retard the growth and stunt the aggressiveness of their competitors. Many of these chemicals have pronounced effects in the human physiology as well, helping to repel bacteria, viruses, and other fungi (like *Candida* or *Tinea*), when taken internally or applied directly to wounds.

Fungal polysaccharides (long chains of simple sugars) have been linked to an immune-modulating effect involving the activation of defense cells such as macrophages and the reduction of damaging inflammation. They may accomplish this by mimicking markers found on the surfaces of hostile organisms, somewhat like a vaccine. Other compounds (phenolics and terpenoids) possess antioxidant activity and prevent the growth and division of cancer cells. Taken together, the chemical activity of many mushroom species points to a marked anti-pathogenic action coupled with the ability to modulate the human immune response: helping decrease it when it is overactive (as in allergies or autoimmune conditions), increase it when it is underactive (as in chronic debility and fatigue, or a pattern of recurrent infection), and stimulate it to attack cells that have mutated and are growing out of control (as in cancer).

Different species of medicinal fungi have different properties and applications, though they all share the basic qualities described above. When crafting herbal formulas, you can often include mushrooms as supportive elements to ensure maximum vitality and balanced immunity; or you can use them as centerpieces of herbal therapy, especially in

conditions of deep and chronic imbalance. Picking the specific species for an individual's constitution can make all the difference: to this end, we can explore some of the most available medicinal mushrooms on the market today.

**Red Reishi** (*Ganoderma lucidum*, *G. tsugae*)

This species is widely distributed across North American and Asia, and can be abundant here in New England where it favors old hemlock stumps. It is a polypore shelf mushroom, ranging in color from orange-white during development to the glossy red of its mature stage. Reishi has both a storied history and lots of modern research backing its use for a variety of conditions, ranging from chronic inflammation to cancer. Its powerful anti-oxidant and liver-protective effects help it slow the processes of aging, which may be why it was known as the “mushroom of immortality”. Its anti-cancer effects make it a useful adjunct for most malignancies, especially breast cancer and lymphoma, and recent research shows it has an amazing safety profile in these cases.

Reishi seems to have a specific affinity for the respiratory system, buffering the inflammatory processes at work in asthma and allergies. It is extraordinarily effective for seasonal allergies and sensitivities to pet dander, molds, and chemicals. In fact, it is for these uses that I most often reach for the extract, usually with herbal teas or tinctures that help thin mucus secretions (like goldenrod, nettle, catnip, or elder). The dose of extract is small – thirty to sixty drops once or twice a day – as too much may be overly drying to the upper respiratory passages.

**Maitake** (*Grifola frondosa*)

The “hen of the woods” is a culinary delight, with a subtle flavor and great texture. Many mushroom collectors bristle when I tell them how their precious harvest will be extracted, but its medicinal value exceeds even its deliciousness! Its primary indication is cancer of the reproductive and digestive organs, including breast cancer. It inhibits the growth and division of cancer cells, leading to regression of the tumor in many documented cases, and additionally activates the body's anti-cancer immunity. I recommend a good quality extract (often standardized for the D-fraction of the beta-glucans), at doses ranging from ½ to 2 tsp. daily depending on the severity of the condition.

Recent follow-up research conducted in the 1990s validates the use of maitake, along with herbs such as American ginseng (*Panax quinquefolium*), for controlling blood sugar levels in folks with Type 2 diabetes. In these cases, use ¼ to ½ tsp. of the extract twice daily before meals.

**Shiitake** (*Lentinula edodes*)

This gilled mushroom is available at many natural and oriental food markets, and makes a tasty addition to stir-fried vegetables or soup. Be sure to cook or dry shiitake, or any mushroom, before eating it: important chemical conversions take place during processing which help ensure not only medicinal potency, but also proper bioavailability.

Cooked or extracted shiitake mushrooms have decades of research backing their use as potent immune modulators and liver protectants. The body fights off viruses much more effectively when these fungi are added to the diet: their consumption increases interferon and activates the host immune response through stimulation of T and B cells.

This is an important medicinal effect in this age of powerful viruses, and also makes shiitake effective as a preventative for many types of cancers, especially ones linked to an initial viral insult (such as HPV and cervical cancer).

Specifically, I recommend these mushrooms as adjuncts in the management of hepatic viral infections, the most dangerous of which, hepatitis C, responds well to nutritional and herbal intervention. Also, it is one of the first to think of in very debilitated conditions where immunity is compromised. One should consume 4 to 8 whole caps daily, or use an extract at a dose of ½ to 1 tsp. twice a day.

### **Cordyceps** (*Cordyceps sinensis*)

This fascinating species has powerful anticancer properties, especially against leukemias, where it can stimulate the growth of tumor-fighting immune cells while retarding the division of the cancerous immune cells. Cordyceps also possesses strong antioxidant activity, which contributes to its anticancer effects.

While many mushrooms also have the ability to modulate cholesterol levels (oyster mushrooms for example), Cordyceps really shines. I recommend it if there is a history of elevated cholesterol or heart disease (such as hypertension, atherosclerosis, heart attack or stroke). Current research supports these uses by demonstrating how the extract not only reduces cholesterol, but also helps dilate the arteries and improve cardiovascular performance under stress.

This mushroom is a great performance enhancer for athletes of all abilities, strengthening the heart and blood vessels while improving endurance and reducing fatigue. For all of the above uses, I suggest starting with a dose of ½ tsp. twice daily of the extract. Traditionally, one to two grams a day of the powdered mushroom was used.

### **Chaga** (*Inonotus obliquus*)

A bizarre fungus that looks like a charred mass of wood, chaga grows almost exclusively on species of the birch tree (*Betula*). This tree has itself gained a reputation as a cancer-fighting plant, and it is interesting to note that traditional healers say that a chaga found on any other type of tree isn't very useful medicinally. The fungus may help process constituents in birch bark (such as betulin) making them more bioavailable and perhaps more powerful, too.

Its anti-cancer power is legendary. Native Siberian cultures made extensive use of this fungus, and Russian medical research has pointed to its effectiveness in lung, gastrointestinal, cervical and breast cancers for over fifty years. It was also used as a topical treatment for wounds, painful swellings, and visible tumors. Modern research reveals a mild blood-sugar-lowering effect as well. I use it primarily as an extract, added to most cancer blends, where it serves as a valuable lynchpin for the formula by ensuring that immunity is optimal and well-balanced. The dose is 1 to 2 tsp. daily of extract, or about three to five grams of the powder.

### **Turkey Tails** (*Trametes versicolor*)

These small, fan-like shelf mushrooms are present in almost every forest, and vary in shape, size and color. They have a characteristic iridescence, especially when fresh. There is a large body of research on their anticancer effects, especially for

gastrointestinal cancers, and a polysaccharide from the fruiting bodies is used extensively as an anticancer drug in Asia.

Due to all the positive research and relative abundance of this species, I try to introduce it to many folks I work with who are treating cancer. It is especially helpful for people who take an integrative approach to the disease, combining modern and traditional remedies, because turkey tails help buffer the harmful effects of chemotherapy and radiation while sensitizing cancer cells to these treatments. To this end I usually suggest four to six grams of the powdered fungus daily, combined with the powdered root of *Astragalus membranaceus*.

#### **A simple recipe for extracting medicinal mushrooms at home:**

Since the chemistry of medicinal mushrooms ranges between water-soluble sugars (polysaccharides) and less soluble molecules (phenolics and terpenoids), extraction needs to be done in two phases:

- Take your dry medicinal mushrooms. Divide them into two equal parts and chop them well.
- Using the first part, prepare a tincture by covering the mushrooms with a solvent made of 50% alcohol (100 proof vodka), 20% glycerin, and 10% water. The glycerin helps keep an emulsion when the next steps are taken. Set the tincture aside, and let steep for 4-6 weeks, shaking it occasionally. Then strain it.
- After you've strained the tincture, take the second part of mushrooms and simmer them for at least one hour, preferably 2 or more, in twice the volume of water than what you used for total solvent volume. Keep adding water if necessary.
- At the end of the simmering, strain the mushrooms out and reduce the volume of fluid you have left so that it equals the volume of strained tincture. Take this off the heat and allow it to cool completely.
- Combine the simmered broth and strained tincture, mixing well with a whisk. The final product should be roughly 25% alcohol by volume.