

FABULOUS FUNGI

Harnessing the Medicine in Mushrooms

Rebecca Roentsch Montrone, BS – Wondrous Roots, Inc



Fungi in Focus

Reishi (*Ganoderma lucidum*)

Chaga (*Inonotus obliquus*)

Cordyceps (*Cordyceps sinensis*)

Lion's Mane (*Hericium erinaceus*)

Reishi



Chaga



Cordyceps



Lion's Mane



Mushroom:

“the conspicuous umbrella-shaped fruiting body (sporophore) of certain fungi, typically of the order Agaricales in the phylum Basidiomycota but also of some other groups. Popularly, the term mushroom is used to identify the edible sporophores; the term toadstool is often reserved for inedible or poisonous sporophores. There is, however, no scientific distinction between the two names, and either can be properly applied to any fleshy fungus fruiting structure.”



Reishi



(*GANODERMA*
LUCIDUM)



What is reishi?

Reishi is a type of mushroom that grows on live trees. Scientists may call it either *Ganoderma lucidum* or *Ganoderma sinense*. In traditional Chinese medicine, this group of mushrooms is known as Ling Zhi. In Japan, they are known as Reishi. In China, *G. lucidum* is known as Chizhi and *G. sinense* is known as Zizhi. There are many other types of *Ganoderma* mushrooms, and it is hard to tell the medicinal mushrooms from the other types.

Reishi has been used as medicine for a very long time in East Asia. It was thought to prolong life, prevent aging, and increase energy. In China, it is being used to strengthen the immune system of cancer patients who receive chemotherapy or radiation therapy.
Source

Benefit #1 – Boosts the Immune System

One of the most important effects of the reishi mushroom is that it can boost your immune system [\(2\)](#).

While some details are still uncertain, test-tube studies have shown that reishi can affect the genes in white blood cells, which are critical parts of your immune system.

What's more, these older studies have found that some forms of reishi may alter inflammation pathways in white blood cells [\(3\)](#).

One 2006 study found that reishi could increase the number of other white blood cells in those with colorectal cancer [\(4\)](#).

In another older study, the fungus improved the function of lymphocytes, which help fight infections and cancer, in athletes exposed to stressful conditions [\(5\)](#).

However, more research is needed, as some other studies have found no effect of reishi extract on immune function or inflammation [\(7\)](#).

Benefit #2 – Anti-Cancer Properties

Many people consume reishi due to its potential anticancer properties ([8](#), [9](#)).

In fact, several test-tube studies have shown that it can lead to the death of cancer cells ([10](#), [11](#), [12](#)).

Some research has also investigated if reishi could be beneficial for prostate and colorectal cancer due to its effects on inflammation and certain signaling pathways involved in cancer development ([13](#))

What's more, one review indicated that the mushroom could benefit people with cancer when used alongside traditional treatment by increasing the activity of white blood cells and improving quality of life ([14](#)).

Still, more research on the effects of reishi on cancer development in humans is needed.

Benefit #3 – Could Reduce Fatigue & Depression

Though reishi's effects on the immune system are often most emphasized, it may also reduce depression and fatigue.

One older study examined its effects in 132 people with neurasthenia, a condition associated with aches, pains, dizziness, headaches, and irritability ([18](#))

The researchers found that fatigue was reduced and well-being was improved after 8 weeks of taking the supplements.

Another 2012 study on people with breast cancer found that taking reishi powder reduced fatigue, anxiety, and depression and improved quality of life after 4 weeks ([19](#)).

Benefit #4 – Heart Health & Blood Pressure

A number of studies looking at people with both healthy and unhealthy levels of blood sugar and lipids found that reishi mushroom may help decrease blood sugar, increase HDL (good) cholesterol, and decrease triglycerides (20).



Chaga

(Inonotus obliquus)

What is Chaga?

Chaga is a strange-looking parasitic fungus, resembling a chunk of burnt charcoal, that's usually found growing on the side of birch trees in cold climates.

When it comes to medicinal fungi, chaga mushrooms stand out for their antioxidant content and long history of use dating back thousands of years.

Traditional healers in Eastern Europe documented using chaga to treat cancer and other ailments in the 12th century, but modern research into the health benefits of chaga only began in the 1950s.

Chaga is a functional medicinal mushroom and adaptogen that's best known for its immune-boosting and cancer-fighting properties, but it has so much more to offer.

Chaga mushroom: a super-fungus with countless facets and untapped potential

Abstract *Inonotus obliquus* (Chaga mushroom) is an inexpensive fungus with a broad range of traditional and medicinal applications. These applications include therapy for breast, cervix, and skin cancers, as well as treating diabetes. However, its benefits are virtually untapped due to a limited understanding of its mycochemical composition and bioactivities. In this article, we explore the ethnobotany, mycochemistry, pharmacology, traditional therapeutic, cosmetic, and prospective agricultural uses. The review establishes that several secondary metabolites, such as steroids, terpenoids, and other compounds exist in chaga. Findings on its bioactivity have demonstrated its ability as an antioxidant, anti-inflammatory, antiviral, and antitumor agent. The study also demonstrates that Chaga powder has a long history of traditional use for medicinal purposes, pipe smoking rituals, and mystical future forecasts. The study further reveals that the applications of Chaga powder can be extended to industries such as pharmaceuticals, food, cosmetics, and agriculture. However numerous publications focused on the pharmaceutical benefits of Chaga with few publications on other applications. Overall, chaga is a promising natural resource with a wide range of potential applications and therefore the diverse array of therapeutic compounds makes it an attractive candidate for various applications such as plant biofertilizers and active ingredients in cosmetics and pharmaceutical products. Thus, further exploration of Chaga's potential benefits in agriculture and other industries could lead to exciting new developments and innovations.

Some Chaga Health Benefits

1. REDUCING INFLAMMATION
2. HELPING TO PREVENT & TREAT CANCER
3. LOWERING BLOOD SUGAR
4. PROTECTING THE LIVER
5. PROMOTING HEART HEALTH
6. BOOSTING THE IMMUNE SYSTEM
7. IMPROVING GUT HEALTH & DIGESTION
 - Modulating gut microbiota
 - Preventing gastric ulcer
 - Treating inflammatory bowel disease
8. FACILITATING HEALTHY SKIN
9. HELPING TO FIGHT VIRUSES
 - Hepatitis C
 - Covid-19
10. IMPROVING PHYSICAL ENDURANCE
11. ENHANCING BRAIN FUNCTION
12. REDUCING STRESS & IMPROVING MOOD & SLEEP
13. COMBATING AGING

Cordyceps

(Cordyceps sinensis)

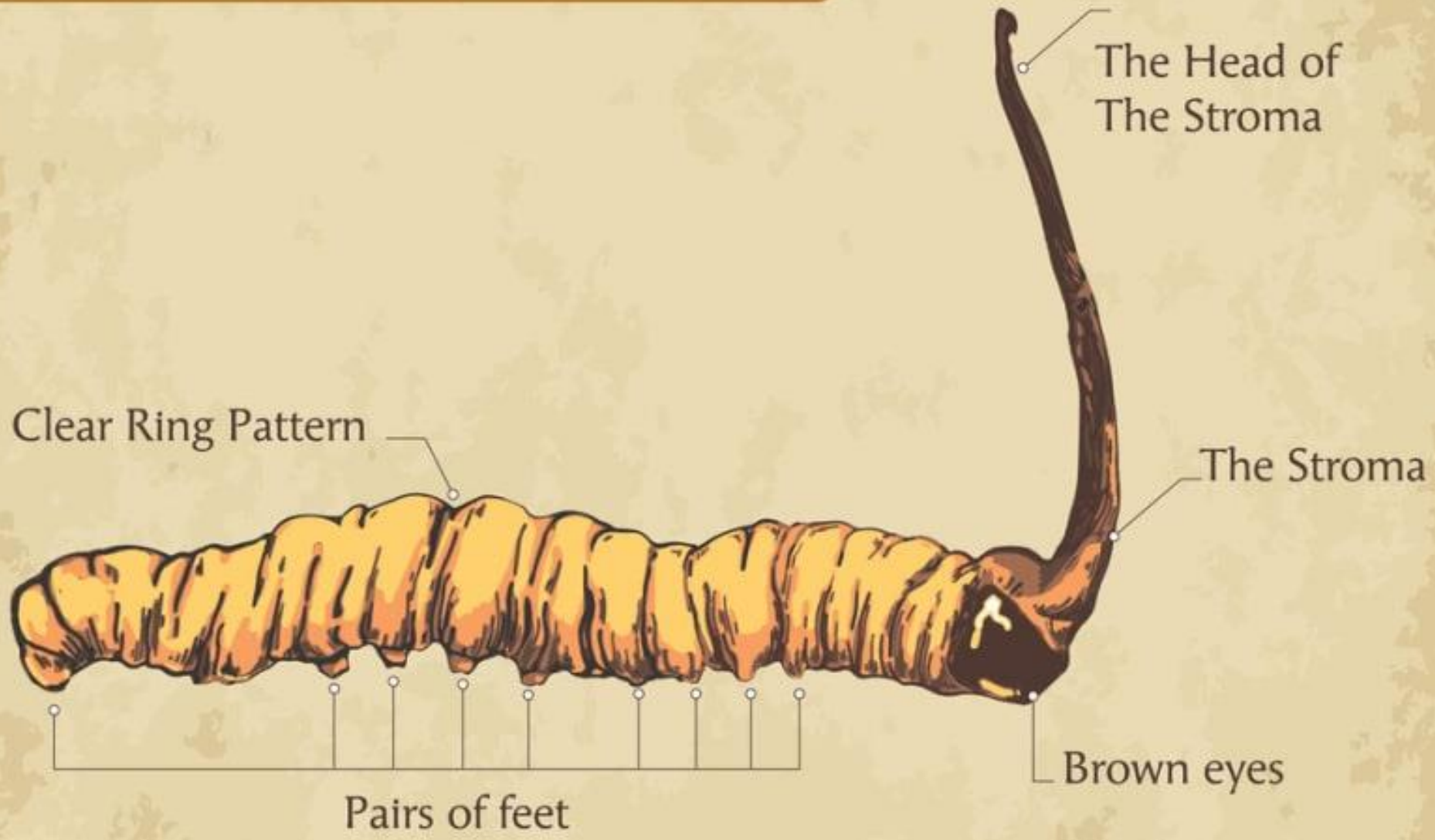


What are Cordyceps?

Cordyceps are parasitic fungi that typically grow on the larvae of insects, though they can also infect insects after they have reached adulthood. The fungus penetrates and invades its host insect, replacing the existing tissue and sprouting elongated fruiting bodies, which eventually emerge from the larva or insect's body.

“Cordyceps are an adaptogen, meaning they have a number of health benefits based on the needs of the body using them. They can have varying effects on different people and essentially ‘adapt’ to one’s needs,” says Danielle Ryan Broida, a registered herbalist, certified holistic nutritionist and head of education and innovation at Four Sigmatic, a functional foods company providing mushroom and adaptogen blends, such as coffees and supplements. [Source](#)

CORDYCEPS SINENSIS



Cordyceps fungus is sometimes called the caterpillar fungus. It's parasitic in nature because it grows on a type of caterpillar and then winds up eating its own host!

The base of the mushroom forms from the insect's larva and is dark brown to black, attaching itself to the organism and growing about six inches long. Once it fully matures, it actually consumes more than 90 percent of the infected insect.

These shrooms then swell up and enlarge to become about 300–500 milligrams in weight.

Two of the most common species of cordyceps include *Cordyceps sinensis* and *Cordyceps militaris*.

- *Cordyceps sinensis* is one of the most frequently used traditional Chinese herbal medicines. It's often found at high elevations in China, although the yield of naturally occurring *Cordyceps sinensis* has drastically decreased in recent years due to over-harvesting.
- *Cordyceps militaris* of both wild and cultivated varieties are main substitutes for *Cordyceps sinensis*. They offer similar benefits to *Cordyceps sinensis*, such as enhancing physical endurance and supporting respiratory health.

Some Health Benefits of Cordyceps

Increases Immune Function:

Some studies suggest that consuming cordyceps benefits immune function and can help optimize the health of the cardiovascular, respiratory, endocrine and reproductive systems. This is because they contain anti-inflammatory compounds like polysaccharides, modified nucleosides and cyclosporines.

Taking cordyceps may be especially beneficial in the treatment of inflammatory-related conditions, such as Crohn's disease, arthritis, leaky gut and asthma. In fact, one animal model conducted by the Chung Shan Medical University Hospital showed that they were effective at reducing inflammation in the airways of mice, potentially aiding in the treatment of asthma.

Slows Aging and Promotes Mental Clarity

Cordyceps are jam-packed with antioxidants that can help fight free radical damage, prevent oxidative stress and help slow the signs of aging to optimize your health. Although research on the anti-aging effects of this medicinal mushroom is primarily limited to animal studies, research shows that it can boost brain function, enhance memory and even extend longevity.

For example, one animal model in the journal *Phytotherapy Research* showed that taking cordyceps extract increased the activity of antioxidants like superoxide dismutase and glutathione peroxidase in the blood. Not only that, but it also helped boost brain power and enhance sexual function in aging rats.

Similarly, another animal study out of China found that administering cordyceps extract to fruit flies significantly prolonged their life spans by blocking oxidative stress to the cells, confirming their potent anti-aging properties. Source

Improves Athletic Performance

A 2010 study published in the Journal of Alternative and Complementary Medicine demonstrated that supplementation with Cs-4 (Cordyceps sinensis) improved exercise performance and contributed to overall markers of wellness in older adults. Considered an energizing adaptogen like other superfood herbs such as maca or cacao, cordyceps are often used to help fight fatigue, treat muscle aches and prevent weakness.

Several studies suggest that they can boost athletic performance — improving physical abilities, endurance and stamina — partially because they boost the body's supply of ATP, one of the primary sources of energy during exercise. Cordyceps contains adenosine, a type of nucleic acid that is needed to make ATP, an “energy carrier” that is depleted in the muscles during physical activity. Source

Regulates Blood Sugar Levels

Two active constituents in cordyceps, d-mannitol cordycepin and 3'-deoxyadenosine, are partially responsible for various physiological actions that help control insulin and blood sugar levels. In animal models, cordyceps supplements have helped combat high blood sugar levels while also reducing insulin levels to protect against insulin resistance.

Supports Heart Health

Recent research has found a strong link between cordyceps and heart health, with studies showing that they could help protect the heart against damage and lower cholesterol levels to prevent coronary heart disease. For instance, one animal study in *Acta Pharmacologica Sinica* showed that cordyceps extract helped reduce damage to the heart and liver in rats with kidney disease.

Plus, other research in animals shows that cordyceps could help lower levels of bad LDL cholesterol to prevent arteriosclerosis, a condition characterized by plaque buildup in the arteries and an increased risk of heart attack and stroke. Other animal models show that they may also reduce high triglycerides, another major risk factor for heart disease.

May Help Fight Cancer Cells

Several promising in vitro studies have found that cordyceps could possess powerful anti-cancer properties and may help block the growth and spread of several different types of cancer. In particular, in vitro studies show that cordyceps extract may be effective at reducing the growth of liver, lung and colorectal cancer cells.

However, the anti-cancer effects of cordyceps extend beyond stopping cancer growth. Animal studies also show that these medicinal mushrooms could reduce the risk of side effects caused by cancer treatment, including leukopenia, a condition sometimes caused by chemotherapy or radiation that results in a decrease in the amount of white blood cells in the body and a higher risk of infection and illness.

Combats Stress and Supports Mental Health

Research published in journal *Molecules* examined the many therapeutic effects of these medicinal mushrooms. What researchers found was that cordyceps can act as nutraceuticals that can support mental health by both fighting environmental stress and oxidative stress in the body.

Promotes Restful Sleep

A study out of Asia looked at the effects of cordycepin, which naturally occurs in cordyceps, to see if it'd help increase natural sleep in rats. Researchers determined that cordycepin increases nonrapid eye movement sleep in rats.

That's not all. According to the authors, "... this experiment can provide basic evidence that cordycepin may be helpful for sleep-disturbed subjects."

Lion's Mane

(Hericium erinaceus)



About Lion's Mane

Lion's mane mushrooms are shaggy white mushrooms that get their name from their appearance. As they grow, they resemble a lion's mane. Lion's mane mushrooms have both culinary uses and medical uses.

You can eat them raw or cook them in various ways. Some people also enjoy lion's mane tea. In addition, many studies have shown potential health benefits of lion's mane mushrooms.

The bioactive substances in lion's mane mushrooms are responsible for their benefits. These compounds target the gut, heart, and brain.

[Source](#)

Chemistry, Nutrition, and Health-Promoting Properties of *Herichium erinaceus* (Lion's Mane) Mushroom Fruiting Bodies and Mycelia and Their Bioactive Compounds

The culinary and medicinal mushroom *Herichium erinaceus* is widely consumed in Asian countries, but apparently not in the United States, for its nutritional and health benefits. To stimulate broader interest in the reported beneficial properties, this overview surveys and consolidates the widely scattered literature on the chemistry (isolation and structural characterization) of polysaccharides and secondary metabolites such as erinacines, hericerins, hericenones, resorcinols, steroids, mono- and diterpenes, and volatile aroma compounds, nutritional composition, food and industrial uses, and exceptional nutritional and health-promoting aspects of *H. erinaceus*. The reported health-promoting properties of the mushroom fruit bodies, mycelia, and bioactive pure compounds include antibiotic, anticarcinogenic, antidiabetic, antifatigue, antihypertensive, antihyperlipodemic, antisenescence, cardioprotective, hepatoprotective, nephroprotective, and neuroprotective properties and improvement of anxiety, cognitive function, and depression. The described anti-inflammatory, antioxidative, and immunostimulating properties in cells, animals, and humans seem to be responsible for the multiple health-promoting properties. A wide range of research advances and techniques are described and evaluated. The collated information and suggestion for further research might facilitate and guide further studies to optimize the use of the whole mushrooms and about 70 characterized actual and potential bioactive secondary metabolites to help prevent or treat human chronic, cognitive, and neurological diseases.

Benefit 1 - Can Improve Immune Health

Speaking of [immune health](#), hedgehog mushrooms are effective at keeping our immune systems strong and functioning optimally. This is due, in part, to their bioactive plant compounds and zinc, both of which are antioxidants that help reduce inflammation in the body and fight off disease-causing free radicals. When it comes to lion's mane, its protein and carbohydrate content also amplifies its immune-boosting powers.

While more human studies are needed to confirm, emerging research also suggests that these nutritional components add up when it comes to fighting off some of the scariest of illnesses, like cancer. One in vitro and animal study, for example, found lion's mane extract to be effective against liver, colon, and even gastric cancer cells. Further studies and reviews echo these findings when it comes to this fungus' potential to stand up to cancer. [Medicinal Mushrooms and Cancer](#)

Benefit 2 – Boosts & Protects Brain Health

Where these mushrooms really shine, and what they're most known for, is their ability to positively impact our brain health. This is primarily due to the neurotrophic factors and bioactive compounds found in this functional fungus. Neurotrophic factors are biomolecules made of protein that promote the growth and differentiation of neurons, the nerve cells in the brain that send and receive information.¹⁰

Lion's mane has also been associated with reduced brain inflammation, offering neuroprotective benefits.¹¹ Some of these benefits include symptom improvement of sleep disorders, Alzheimer's, and Parkinson's disease.¹²¹³¹⁴ One animal study even found lion's mane to assist in neurotransmission and recognition memory.¹⁵ Brandalise F, Cesaroni V, Gregori A, et al. [Dietary Supplementation of *Herichium erinaceus* Increases Mossy Fiber-CA3 Hippocampal Neurotransmission and Recognition Memory in Wild-Type Mice](#). Evidence-Based Complementary and Alternative Medicine. 2017;2017:1-13. doi:10.1155/2017/3864340

Benefit 3 – Boosts & Protects Gut Health

As already mentioned above, this edible fungi is also a champion for gut health. Many of the functional mushrooms, including lion's mane, are excellent sources of beta-glucan, a kind of soluble fiber that benefits our health in a number of ways beyond just gut health, including immune, heart, and metabolic health.

It also has a prebiotic effect in the microbiome, serving as food for our healthy gut bacteria. Beyond its beta-glucan content, animal studies suggest lion's mane may potentially be beneficial in treating inflammatory bowel disease and ulcerative colitis. [Extracts from Hericium erinaceus relieve inflammatory bowel disease by regulating immunity and gut microbiota](#)

Benefit 4 – Promotes Heart Health

Lion's mane mushrooms can even help support heart health. Similar to other soluble fibers, their beta-glucans also bind to cholesterol in the small intestine and move it through the rest of the digestive tract for disposal. This means that cholesterol literally goes down the drain instead of being absorbed into your blood. Beta-glucans are also associated with reduced blood pressure levels and together, cholesterol and blood pressure make up some of the key conditions needed for heart disease to arise.

Various studies reiterate these impacts, with one in vitro showing lion's mane's ability to help reduce bad cholesterol (or low-density lipoprotein, LDL) levels. While another review found edible plants, including lion's mane (though it's technically a fungus), to help promote healthy blood clotting in humans, another contributor to heart disease if functioning improperly. [Hypolipidaemic Effect of Hericium erinaceum Grown in Artemisia capillaris on Obese Rats](#)

Benefit 5 – May Help Regulate Blood Sugar

These fungi also impact metabolic health, including the ability to regulate blood sugars. While this makes sense given this mushroom's fiber content, there's budding research to back it up. In one animal study, lion's mane was found to help reduce blood sugars to normal levels while also providing a protective effect on the pancreas, liver, and kidneys.

Another found this mushroom to help relieve diabetic nerve pain in animal subjects. [Antihyperglycaemic and organic protective effects on pancreas, liver and kidney by polysaccharides from Hericium erinaceus SG-02 in streptozotocin-induced diabetic mice](#)

Benefit 6 – May Alleviate Anxiety & Depression

Early research indicates that several of the chemicals in lion's mane mushrooms boost the regeneration of brain cells and improve the performance of the hippocampus, the part of the brain that regulates emotional response.

Studies also show that individuals with depression and anxiety have lower nerve growth factor (NGF). NGF helps nerve cells regenerate and remain healthy, which are factors in mood regulation. Lion's mane mushrooms promote these factors, which indicates that it could be a potential alternative medication for depression in the future. [Therapeutic Potential of Hericium erinaceus for Depressive Disorder](#)

Benefit 7 – May Help with Nervous System Recovery

Individuals who have had an injury to the brain, spinal cord, or nervous system may benefit from lion's mane mushrooms. Lion's mane has the ability to aid in the regeneration of peripheral nerves.

Because of these properties, scientists are looking into using lion's mane to treat a number of illnesses and injuries, including traumatic brain injuries, stroke, multiple sclerosis, and Creutzfeldt-Jakob disease, among others.

[Hericium erinaceus, a medicinal mushroom, activates peripheral nerve regeneration](#)

Benefit 8 – Guards Against Stomach Ulcers

As mentioned earlier, lion's mane can help with gut health and certain intestinal disorders. But it also fights against stomach ulcers through a couple of mechanisms of action. Ulcers are usually caused by one of two things: first, by overuse of NSAIDs like ibuprofen, which eat away at the mucus lining of the stomach; second, through the presence of a bacteria called *H. pylori*.³² Lion's mane has been shown to thicken the mucosal lining of the stomach, fighting against ulcers caused by NSAIDs and slowing the growth of *H. pylori*.³³ Wang G, Zhang X, Maier SE, Zhang L, Maier RJ. [In Vitro and In Vivo Inhibition of Helicobacter pylori by Ethanolic Extracts of Lion's Mane Medicinal Mushroom, Hericium erinaceus \(Agaricomycetes\)](#) IJM. 2019;21(1).

Benefit 9 – Reduces Systemic Inflammation

According to the NIH, chronic inflammatory diseases are the leading cause of death worldwide. Chronic inflammation is associated with diabetes, cardiovascular disease, arthritis, allergies, COPD, autoimmune disorders, and more.³⁴ Studies have shown that lion's mane mushrooms contain anti-inflammatory compounds that can lessen the impact of these conditions.

[Structures, biological activities, and industrial applications of the polysaccharides from *Herichium erinaceus* \(Lion's Mane\) mushroom: A review](#)

Fabulous Fungi Products Available at Wondrous Roots!



Reishi Mushroom
Extract



Chaga Mushroom
Extract



Cordyceps
Extract



Lion's Mane
Extract

Summary

Mushrooms are rich in nutrients, are delicious and versatile foods, and their medicinal qualities can be further enjoyed through the use of supplements. Like all “root” medicines, the fungi we have examined today all help prevent and even treat the common chronic health diseases of our times.



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REBECCA ROENTSCH MONTRONE, BS WONDROUS ROOTS



Thank you!

Rebecca Roentsch Montrone

WONDROUS ROOTS

Rebecca@wondrousroots.org

wondrousroots.org

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