

Review Article

Lion's Mane for Your Brain and Body

Mike Amaranthus* 

Department of Forest Science, Oregon State University, Corvallis, the United States

Abstract

Lion's mane (*Hericium erinaceus*) is a unique and fascinating mushroom species. Lion's mane is saprophytic, meaning it feeds on decaying organic material, particularly dead trees, fallen logs and wounded trees. Native to both North America and Eurasia, lion's mane mushrooms are easy to identify and are most commonly foraged during late summer and autumn on hardwood trees. They are also cultivated and available as supplements year-round in markets, health food stores and online. Lion's mane is a versatile ingredient in the kitchen, perfect for marinating, sautéing, barbecuing, stir-frying, or baking. Lion's mane taste and texture is often compared to crab or other seafood, which makes it a highly sought-after edible mushroom species. Lion's mane has a long history of medicinal use in Asian cultures, dating back millennia. Recent research indicates potential health benefits include avoiding dementia and improving cognitive function; easing depression and anxiety; reducing risk of heart disease; diminishing diabetes symptoms and improved immune system function. Evidence of improved cognitive function has been particularly significant and well documented. Certain individuals should avoid consuming lion's mane mushrooms or supplements due to potential health risks. This includes individuals with bleeding disorders or taking blood thinners and people with diabetes taking blood sugar-lowering medications. While published peer reviewed scientific studies of lion's mane mushrooms effects continues to grow, much of the current evidence is based on non-human animal and laboratory studies. More human research is needed to determine the full extent of its health benefits for a growing interested public. Nonetheless, the identification of specific lion's mane bioactive compounds, hericenones and erinacines, has sparked significant interest in both research and medical communities, paving the way for future applications in brain, heart, blood, and overall health.

Keywords

Lion's Mane Mushroom, *Hericium erinaceus*, Distinguishing Features, Edibility, Supplements, Improving Brain Function, Easing Depression and Anxiety, Heart Health, Diabetes Management

1. Introduction

The lion's mane mushroom, with its striking white appearance and dangling spines, is a truly magnificent sight. When you gaze at this mushroom, do you see an old man's beard or the mane of a lion? What you don't see, however, is the wealth of unique compounds it contains, many of which have the scientific community buzzing. Recent studies have revealed that consuming lion's mane offers a variety of sig-

nificant health effects and contains over seventy beneficial metabolites. Lion's mane mushrooms are unique and one of the most desirable mushrooms in terms of their culinary and health benefits. In the past two decades, research surrounding lion's mane and its medicinal properties has expanded greatly. The bottom line? It's great for your brain, your heart, your blood, and your overall health.

*Corresponding author: drmickeamaranthus@gmail.com (Mike Amaranthus)

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Lion's mane has a long history of use, dating back millennia. It was a staple in traditional Chinese medicine and was praised by the Greek physician Hippocrates for its health benefits as early as 450 BCE. Use includes during Tang Dynasty in China (618-907 AD), where it was believed to promote longevity and enhance brain function. Additionally, it was used in traditional Korean and Japanese medicine. Globally, in recent years, there has been a resurgence of interest from the modern medical community, particularly regarding brain function, cognitive health, heart health, diabetes management, and immune system enhancement.

This article will explore how to identify lion's mane, where to find it, how to consume it and the specific ways it affects the body, including its medicinal properties. I'll answer several key questions: What exactly are lion's mane mushrooms? Where can they be found? What health benefits do they offer? How can you incorporate lion's mane into your diet? And are there any individuals who should avoid consuming lion's mane?

2. Getting to Know Lion's Mane

What Are Lion's Mane Mushrooms and Where Can I Find Them?

Hericium erinaceus, the scientific name for the fungus known as lion's mane, is a unique and fascinating mushroom species. It's also referred to as "old man's beard," "bearded tooth," and "pom pom du blanc" due to its resemblance to a cheerleader's white pom-pom. Lion's mane grows in clusters of cascading spines.

Distinguishing Features

Lion's mane mushrooms typically grow in a single, dense clump, with spines that hang down between ½ to 1½ inches. These mushrooms are white in color, often with a pinkish hue when young, and can develop a yellowish to orange-brown tinge as they age. Depending on its growth, the clump can be medium to large, reaching several pounds in weight.



Figure 1. Lion's mane, bright white with icicle-like spines, growing on a hardwood log.

Habitat and Growth Patterns

Lion's mane is saprophytic, meaning it feeds on decaying organic material, particularly dead trees and fallen logs. It can also be found on living trees, often in areas with visible wounds. Take a deep breath once you have collected your lion's mane specimen, you may notice a faint fishy scent, resembling shellfish. As for the taste and texture, it's often compared to crab or other seafood, which makes it a highly sought-after edible mushroom species.

Native to both North America and Eurasia, lion's mane mushrooms are most common during late summer and autumn on hardwood trees. In North America, they are especially abundant in the Pacific Northwest, including Northern California, Oregon, and Washington, where they thrive on oaks, maples, and other hardwoods. They can also be found in regions of Russia, China, Japan, Korea, and Europe.

Foraging Tips

Lion's mane is an excellent choice for beginner mushroom foragers because of its distinctive appearance and the absence of poisonous look-alikes. Lion's mane has a shaggy, bright white appearance with long, cascading spines that resemble a lion's mane, giving it its name and essentially looking like a cluster of dangling, icicle-like spines growing from a central mass, often described as "fluffy" or "bearded." It has the added benefit of fruiting in the same location year after year, often at about the same time. If you find a spot where lion's mane is fruiting, it's worth revisiting annually for your own "happy lion's mane day." To harvest simply use a knife or hatchet to remove the fruiting body at its base from the log or tree stem. Place in a bag or basket with good ventilation and store in the refrigerator until ready to eat.

When foraging, pay attention to signs of aging: overripe specimens may become yellow or brown, feel soft or slimy, and exhibit signs of rot. These should either be left in the woods or discarded.

Cultivation and Versatility in the Kitchen

In recent years, the availability of lion's mane mushrooms has expanded far beyond foraging. Lion's mane is one of the most cultivated mushrooms, typically grown commercially on hardwood logs or sawdust. It is relatively easy to grow and can now be found in many grocery stores, grower's markets, restaurants, and as growing kits.



Figure 2. Young lion's mane fruiting bodies cultivated on hardwood sawdust in grow bags.

Lion's mane is a versatile ingredient in the kitchen, perfect for marinating, sautéing, barbecuing, stir-frying, or baking. It's an excellent addition to stews, soups, stir-fries, or can be enjoyed on its own. You can also add sliced lion's mane to meat, fish, pasta. With a mild, slightly sweet flavor resembling crab or lobster, lion's mane mushrooms become tender when cooked and are often used as a substitute for meat or seafood.

For storage, fresh lion's mane can last about a week in the refrigerator. To ensure the mushrooms stay fresh, avoid washing them until you're ready to use them, as moisture speeds up spoilage.



Figure 3. Lion's mane with vegetables sauté a healthy and tasty dish.

Nutritional Value

Lion's mane mushrooms are not just delicious but also nutritious. They are a great source of protein, essential minerals like manganese, zinc, and potassium, as well as B vitamins (thiamine, riboflavin, and niacin). Additionally, lion's mane is an excellent source of vitamin D, which has been shown to help prevent osteoporosis and support bone health. Mushrooms are one of the few natural foods that contain significant amounts of vitamin D.

Supplements and Other Products

The popularity of lion's mane has also extended to supplements and other products. Capsules, powders, and tinctures are now widely available in health food stores and online. You can also find lion's mane in various drinks such as ground coffee, tea, and cocoa, as well as in workout supplements.

For therapeutic benefits, make sure your product contains at least 500 mg of lion's mane per serving. With so many available options, you can easily find the lion's mane delivery

method that suits your lifestyle and dietary needs.



Figure 4. Lion's mane fruiting bodies, powder and capsules provide a variety of consumption options.

When Should I Take Lion's Mane? How Much Should I Take?

Many people take lion's mane to boost cognitive function, particularly memory and mental performance. Given this purpose, it makes sense to take it in the morning or early afternoon. Consistency is key when incorporating any new supplement, as it can take several weeks to experience the full effects.

How much lion's mane should I take daily?

There are no absolute guidelines for lion's mane dosage, but research suggests that taking 1 to 3 grams (1000-3000 mg) per day is safe, well-tolerated, and typically has minimal side effects. Additionally, lion's mane mushrooms have been consumed in Asian cuisine for thousands of years without any major issues. It is useful to note that while lion's mane has been used traditionally without significant issues, universal dosage guidelines are still unclear and users should consult healthcare providers, especially when combining with blood thinners and blood sugar lowering medications.

3. Related Species

Several species closely related to lion's mane also thrive in similar forest environments and may have comparable medicinal properties. These include bear's head (*Hericium abietis*) and comb hericium (*Hericium coralloides*). These "sister" fungi to lion's mane are also non-toxic, delicious, and contain many of the same beneficial compounds.

Bear's Head (*Hericium abietis*):

Although it resembles lion's mane, bear's head grows on conifer trees rather than hardwoods. It is often larger and more open, with multi-branched clusters of spines that hang from several branches. The bear's head, like lion's mane is white to beige and does not have a cap, instead featuring cascading clusters of spines. It can reach sizes from medium to very

large, sometimes weighing as much as 30 to 40 pounds. The spines range from one-quarter to one inch in length.



Figure 5. Bear's head (*Hericium albieta*) grows on conifers and has a more open form than the more compact lion's mane.

Comb Hericium (Hericium coralloides):



Figure 6. Comb hericium (*Hericium coralloides*) grows on hardwoods and unlike lion's mane has a long-branched clusters of delicate spines.

Comb hericium is more delicate and open than both bear's head and lion's mane. It resembles a Christmas tree dusted with snow, making it visually striking. This species is also a great option for beginner foragers since it also has no poisonous look-alikes. Like lion's mane, it is white, lacks a cap and has long-branched clusters of delicate spines that form a branching network. The spines are typically one-half to two inches long. Comb hericium fruits on dead or dying hardwood trees and is sometimes called coral hedgehog, *Hericium ramosum*, or *Hericium americanum*.

4. Medicinal Benefits of Lion's Mane

Avoiding Dementia and Improving Cognitive Function

As we age, the brain's ability to grow and form new connections typically declines, often leading to cognitive decline in older adults. However, studies suggest that lion's mane mushrooms may help counteract this process. These mushrooms contain two unique compounds—hericenones and erinacines—that stimulate brain cell growth. Found specifically in lion's mane and its close relatives (such as bear's head and comb hericium fungi), these compounds promote the synthesis of nerve growth factor, which plays a crucial role in maintaining sensory neuron function (Phan et al., 2014) [1].

Research indicates that these low molecular weight compounds in lion's mane contribute to brain and nerve health, with several studies linking them to improved cognitive function in individuals with mild dementia and other neurological conditions. While these investigations are still in their early stages, the results so far are promising.

Bizjak et al. 2024 [2] studied lion's mane supplementation on cognitive function and serum levels of brain-derived neurotrophic factor and neuropeptide Y. The study was an 8-week double-blind comparative study involved 33 subjects, randomly assigned to a lion's mane group and a placebo group. Cognitive function was assessed using two non-verbal speed tests. In the lion's mane group, a significant improvement in cognitive ability compared to the placebo was observed.

Additionally, animal studies [3-5] suggest that lion's mane may help protect against dementia and Alzheimer's disease, a degenerative condition that causes progressive memory loss. Research on mice has shown that lion's mane mushroom and its extracts can reduce memory loss symptoms and prevent neuronal damage caused by amyloid-beta plaques, which accumulate in the brain during Alzheimer's disease. Its ability to promote nerve growth and protect against Alzheimer's-related damage may explain some of its cognitive benefits. However, most studies have been conducted on mice, rats or in test tubes, highlighting the need for more human research.

A 2020 study on individuals with mild Alzheimer's disease found that supplementation with 1 gram of lion's mane mushroom improved cognitive test scores compared to a placebo. Li et al. (2020) [6] investigated the efficacy and safety of three lion's mane mycelia capsules (350 mg/capsule; 5 mg/g erinacine A) per day in treating mild Alzheimer's. The study included a 3-week no-drug screening period followed by a 49-week double-blind trial, where participants were randomized into either a treatment or placebo group. Throughout the study, cognitive assessments, ophthalmic examinations, biomarker collection, and neuroimaging were conducted. Results showed that three 350 mg lion's mane capsules daily for 49 weeks led to higher cognitive scores and improved contrast sensitivity in treated patients compared to the placebo. These findings suggest that lion's mane is safe, well-tolerated, and may provide neurocognitive benefits. However, these studies are preliminary and there is the need for larger human trials to confirm findings.



Figure 7. Studies of lion's mane and protection against mild dementia and Alzheimer's disease are still in their early stages.

Easing Depression and Anxiety

According to current research, lion's mane mushroom may help reduce symptoms of anxiety and depression. Studies show promising results, particularly due to its ability to stimulate nerve growth factor (NGF), which plays a role in brain cell health and mood regulation. Lion's mane contains compounds like hericenones and erinacines, believed to promote NGF production, a protein crucial for nerve cell growth and function, potentially contributing to improved mood. Animal research has shown that lion's mane extracts exhibit anxiolytic (anti-anxiety) and antidepressant-like effects, with some studies indicating increased neurogenesis (new brain cell growth) in the hippocampus, a region linked to emotional processing. However, human studies remain limited and small-scale, requiring further investigation to establish clear efficacy and dosage recommendations.

Chui et al. (2017) [7] found that mice given lion's mane mycelium orally for four weeks had lower levels of depression indicators. Depressed mice exhibited higher levels of interleukin (IL)-6 and tumor necrosis factor- α , whereas mice fed lion's mane had increased levels of norepinephrine (NE), dopamine (DA), and serotonin (5-HT), neurotransmitters associated with mood improvement. The authors concluded that erinacine A-rich lion's mane mycelium could be a promising agent for the treatment of depressive disorders.

Lion's mane also shows promise in improving cognitive function and mood in humans. While previous human research has primarily focused on cognitively compromised individuals, Docherty et al. (2023) [8] examined its effects in healthy young adults. This pilot study used a randomized, double-blind, placebo-controlled design to investigate the acute (60 min post-dose) and chronic (28-day) effects of 1.8 g of lion's mane in 41 healthy adults aged 18–45 years. The study found that a single dose led to faster performance on the Stroop task, a cognitive test measuring attention and executive function. After 28 days of supplementation, participants also showed a trend toward reduced self-reported stress. These findings suggest potential benefits for cognitive speed

and stress reduction in young, healthy individuals. However, due to the small sample size, further research with larger groups is needed to confirm these results.

Vigna et al. (2019) [9] found that taking three 400-mg capsules daily for eight weeks helped relieve depression, anxiety, and sleep disorders in 77 overweight or obese individuals. Supplementation with lion's mane improved mood disorders of a depressive-anxious nature, enhanced sleep quality, and increased circulating brain-derived neurotrophic factor (BDNF) levels.

While existing research highlights the potential of lion's mane in reducing anxiety and depression symptoms, these studies rely heavily on animal studies and small-scale human trials, further large-scale human trials are necessary, recognizing placebo effects, to establish definitive conclusions regarding its efficacy and optimal dosage.

Immune System Booster

Lion's mane mushroom is well known for enhancing memory and concentration, but it also possesses strong immune-boosting and antioxidant properties. The primary compounds in lion's mane mushroom that support immune function are beta-glucans and polysaccharides; these compounds stimulate the immune system by activating immune cells like macrophages, promoting a healthy gut microbiome, and potentially helping regulate immune response. A robust immune system protects the body from bacteria, viruses, and other disease-causing pathogens, while a weak immune system increases susceptibility to infections.

Ren et al. (2017) [10] found that lion's mane polysaccharides exhibit significant biological activity, enhancing immune function by promoting macrophage production and immunomodulation. Additionally, animal research [11] indicates that lion's mane mushroom boosts immunity by stimulating the intestinal immune system and gut bacteria, which play a crucial role in defending against pathogens that enter the body through the mouth or nose.

Kim et al. (2012) [12] demonstrated that daily supplementation with lion's mane extract nearly quadrupled the lifespan of mice injected with a lethal dose of salmonella. The extract also protected against liver damage by stimulating innate immune cells. While the immune-boosting effects of lion's mane mushroom are promising [13], further human studies are necessary to develop practical health applications for its use in immune support.

Reducing Risk of Heart Disease

Lion's mane mushroom has been shown to reduce the risk of heart disease through multiple mechanisms. First, it helps lower cholesterol levels, particularly LDL cholesterol and triglycerides. Second, it reduces cholesterol's ability to attach to artery walls, preventing plaque buildup and arterial hardening. Third, it decreases the likelihood of blood clot formation, which can lead to heart attacks and strokes.

Choi et al. (2013) [14] found that lion's mane extracts significantly lowered total cholesterol, LDL cholesterol, and triglyceride levels in rats compared to a control group on a

high-fat diet. Similarly, Hiwatashi et al. (2010) [15] demonstrated that rats on a high-fat diet given daily doses of lion's mane extract exhibited 27% lower triglyceride levels and 42% less weight gain over 28 days. Since obesity and high triglycerides are both major risk factors for heart disease, these findings highlight the cardiovascular benefits of lion's mane.

Rahman et al. (2014) [16] discovered that lion's mane extract can prevent cholesterol oxidation in test tubes. Oxidized cholesterol is more likely to adhere to artery walls, contributing to plaque formation and increasing the risk of heart attack and stroke. Additionally, lion's mane contains hericenone B, a compound that reduces blood clotting, thereby lowering the likelihood of thrombosis. Mori et al. (2010) [17] further confirmed that lion's mane reduces platelet aggregation, decreasing the risk of blood clot formation. While these studies suggest that lion's mane supports heart health in multiple ways [18], more human research is needed to confirm its effectiveness and applications in cardiovascular disease prevention.



Figure 8. Heart disease is very common in the United States, killing about 700,000 people each year. It's the leading cause of death for most Americans.

Diminishing Diabetes Symptoms

Diabetes is a condition characterized by consistently elevated blood sugar levels due to the body's impaired ability to regulate glucose. This disease increases the risk of complications affecting the eyes, kidneys, nerves, and heart and has also been linked to certain types of cancer. Taking proactive steps to prevent or manage diabetes can help reduce the likelihood of developing these health issues. Emerging research suggests that consuming lion's mane mushrooms may support diabetes management by improving blood sugar regulation and mitigating some of its complications.

Animal studies indicate that lion's mane mushrooms can lower blood sugar levels. Laing et al. (2013) [19] conducted a study on diabetic rats and found that a water extract of lion's mane significantly reduced serum glucose levels after 28 days of daily treatment. The mushroom proved effective even at low daily doses of 2.7 milligrams (mg) per pound of body

weight. For a 200-pound person, this equates to approximately 5.4 grams per day, or about 1-2 tablespoons. Similarly, Zang et al. (2017) [20] examined diabetic mice and discovered that lion's mane extracts reduced blood glucose levels and improved abnormal enzyme levels associated with pancreatic, liver, and kidney damage. The researchers concluded that lion's mane is a valuable functional food for preventing diabetes and its complications.

Lion's mane helps lower blood sugar by inhibiting the enzyme alpha-glucosidase, which breaks down carbohydrates in the small intestine. Blocking this enzyme reduces carbohydrate digestion and absorption, leading to lower blood sugar levels. Lee et al. (2020) [21] purified lion's mane components and assessed their anti-hyperglycemic effects by measuring their inhibition of alpha-glucosidase. Key compounds unique to lion's mane, including erinacenol, hericene A, hericene D, and hericenone D, significantly inhibited alpha-glucosidase activity, highlighting a potential mechanism for its role in managing diabetes.

Another well-known benefit of lion's mane is its ability to alleviate diabetic nerve pain. Yi et al. (2015) [22] studied mice with induced diabetic neuropathy and found that six weeks of daily lion's mane extract significantly reduced pain, lowered blood sugar levels, and increased antioxidant levels. The researchers concluded that these effects, particularly the increase in antioxidant activity, likely contributed to the relief of diabetic nerve pain. While lion's mane shows promise as a therapeutic supplement for diabetes, further research is needed to determine its efficacy and optimal use in humans.



Figure 9. Summary of the potential medicinal benefits of lion's mane.

Who Should Not Take Lion's Mane?

Certain individuals should avoid consuming lion's mane mushrooms or supplements due to potential health risks. Below are specific groups who should exercise caution or avoid use altogether:

Individuals with Bleeding Disorders or on Blood Thinners. Lion's mane has blood-thinning properties, which can increase the risk of bleeding. Those with bleeding disorders or taking anticoagulant/antiplatelet medications such as aspirin,

warfarin, or clopidogrel should avoid lion's mane. Combining lion's mane with other blood-thinning medicines, herbs or supplements may further elevate this risk. If you have a scheduled surgery, consult your healthcare provider before using lion's mane, as it may slow blood clotting and increase the risk of excessive bleeding and bruising.

Individuals Taking Medication for Mood, Anxiety, or Depression. If you are considering lion's mane for managing mood disorders, anxiety, or depression, consult your doctor first. Lion's mane may interact with medications used for these conditions, potentially causing unwanted side effects.

People with Diabetes on Blood Sugar-Lowering Medications. Lion's mane can lower blood sugar levels. Individuals taking diabetes medications should be cautious, as the combined effects could lead to dangerously low blood sugar levels.

People who are Pregnant or Breastfeeding. There is a lack of information about the safety and efficacy of lion's mane mushroom during pregnancy and lactation.

People who have received transplants of organs, cells, or tissues. Lion's mane mushroom may increase the immune system response and counteract the medications designed to suppress the immune system response.

5. Conclusions

Lion's mane mushrooms, known for their distinctive shaggy appearance, have a long history of human use and have more recently gained popularity for their culinary and medicinal benefits. They contain unique bioactive compounds, such as hericenones and erinacines, which have been shown to stimulate brain cell growth. Studies suggest potential cognitive benefits, particularly for individuals with mild Alzheimer's disease and dementia, as well as improvements in mood and overall well-being. However, further research with larger sample sizes is necessary to confirm these effects.

Beyond cognitive health, lion's mane exhibits strong immune-boosting and antioxidant properties. Research also indicates potential benefits in managing heart disease and diabetes risk factors, including reductions in cholesterol, triglycerides, and blood sugar levels. Despite these promising findings, certain individuals—such as those who are pregnant, breastfeeding, undergoing surgery, taking blood thinners, or receiving organ transplants—should avoid lion's mane.

While scientific interest in lion's mane mushrooms continues to grow, much of the current evidence is based on non-human animal and laboratory studies. More human research is needed to determine the full extent of its health benefits for a growing interested public. Nonetheless, the identification of specific lion's mane bioactive compounds has sparked significant interest in both research and medical communities [23-26], paving the way for future applications in brain, heart, blood and overall health.

Abbreviations

mg Milligram
g Gram
ngf Nerve Growth Factor

Author Contributions

Mike Amaranthus is the sole author. The author read and approved the final manuscript.

Conflicts of Interest

The author declares no conflicts of interest.

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