



MUSHROOM POWERED®

The History, Science, and Benefits
of the World's Most Fantastic Fungi

In depth
coverage of the
5 most powerful
mushroom types



FRESHcap



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INTRODUCTION

Mushrooms as medicine is not a new concept.

In fact, functional mushrooms have been used by some cultures for centuries, being revered for their ability to energize, boost immunity and provide a foundation for overall health.

And that's just a start.

Today, people just like you are starting to discover how functional mushrooms may

help improve cognition and brain health, aid with getting better sleep, ease anxiety and stress and even reduce allergies.

Mushrooms really are changing lives!

Functional mushrooms have also taken center stage at laboratories and clinics around the world—and more research is being done all the time to determine the science behind the reported benefits.

FUNCTIONAL MUSHROOMS THROUGHOUT HISTORY

In 1991, scientists discovered the body of an ancient man-mummified under ice on the border between Italy and Austria. He was later given the name “Otzi” and was thought to have lived around 3300 BC.

Otzi was a traveller- and wouldn't have wanted to burden himself by carrying anything unnecessary.

That's why it is so interesting that among his few possessions were not one, but two species of mushrooms!

The first was Tinder Fungus (*Fomes fomentarius*), a mushroom traditionally used to help start fires – quite practical for an alpine traveller!

But the other mushroom found in his pouch was a Birch Polypore (*Piptoprus betulinus*)- a powerful functional mushroom known for its powerful anti-parasitic, anti-inflammatory and antibiotic properties.

It's very likely that Otzi was actually using this functional mushroom to rid himself of whipworm.

This shows that even 5000 years ago, people were aware of—and



using—functional mushrooms.

This tradition has carried on throughout history, as many cultures around the world have a reputation of using functional mushrooms for therapeutic benefit.

Mushrooms are especially prevalent in Traditional Chinese Medicine, with uses of Reishi dating back 2000 years. China still plays a central role in bringing these amazing functional mushrooms to the world and is where the vast majority of functional mushrooms are expertly grown.

BENEFICIAL COMPOUNDS: MUSHROOM POWER!

Of course, behind the “magic” of these functional mushrooms are the beneficial compounds, the actual molecules that interact with the cells in your body and make it all happen.

There are an incredible array of compounds that can be found in functional mushrooms—and research is uncovering more all the time. Even within these sub-groups of compounds, each mushroom species can produce molecules with slightly different shapes, which affect our systems in different ways.

That’s why different mushrooms seem to have their very own “superpowers”—different beneficial effect they can have on our health.

1. Beta-Glucans

Beta-glucans (or beta-d-glucans) are some of the most well-known and well-studied compounds in mushrooms. It’s also easy to test for the presence of fungal beta-glucans in mushroom extracts, and you will often see it printed in the nutrition facts of any mushroom supplement.

Beta-glucans are a type of water-soluble complex carbohydrates

called polysaccharides that also function as fermentable fiber, meaning they survive digestion and are broken down by gut microbes in the colon.

These molecules are immunomodulators and can support both overactive and underactive immune systems. It's possible their medicinal potency could be related to the degree of molecular complexity.

Beta-glucans' complexity is due to their molecular structure, which consists of carbon chains sporting branches or side chains. Differences in side chain arrangement may be the reason why beta-glucans found across the fungal kingdom appear to have different functions.[1] When beta-glucans are linked to proteins, they form polysaccharide peptides.

2. Terpenoids

Terpenoids aren't soluble in water; instead, they require alcohol or fat for the body to break them down and extract the benefits. These complex molecules—which are made up of carbon, hydrogen, oxygen and sulfur atoms[2]—come in various types and have been studied for their antiviral, antibacterial and anti-inflammatory abilities.

3. Sterols

Mushrooms also contain a variety of sterols, hormone precursors that become functional hormones when activated.[3]

In humans, cholesterol is the most well-known of these molecules, but ergosterol is the most commonly studied sterol in mushrooms. When exposed to UV light, ergosterol is converted into vitamin D2. That's why some commercial mushrooms are treated with UV light before being sold in the supermarket.

Ergosterol extractions have been studied for anti-tumor activity and are thought to have anti-aging properties, as well.

EXTRACTION METHODS: GETTING THE MOST OUT OF MUSHROOMS

Your body can't break down the tough cell walls of mushrooms to access the beneficial compounds locked inside. In order to be most effective, mushrooms need to go through an extraction process.

This is typically done using hot water or alcohol. In some cases, these processes are done in sequence, producing a product that is dual-extracted.

Extraction method is important because it determines which compounds are most bio-available—and the benefits you get from the final product.



Hot Water Extraction

Hot water extraction is the traditional method of processing functional mushrooms because one of the most heavily studied and important compounds in mushrooms—beta-glucan—is water soluble.

Before modern processing facilities, hot water extraction would be made simply by brewing a tea. The mushrooms were sometimes ground into powder or torn into many pieces to provide more surface area for extraction before being steeped in hot water for several hours.

The same process takes place today on a much larger scale. Mushroom fruitbodies are simmered in hot water for several hours, but since liquid isn't a great method of distribution, the extract is usually "spray dried." This turns it into a fine powder, which can be encapsulated or added to food, tea, coffee or smoothies without the need for further processing.



Alcohol Extraction

Some compounds—such as triterpenes and sterols—are not soluble in water. In order to make them more bio-available, an alcohol extraction must be performed.

To do this, mushrooms are soaked in large vats of alcohol, and then the liquid is dried into a fine powder. Alcohol extracts are sometimes also sold as tinctures.

There is some concern that alcohol extraction can actually alter some of the other beneficial compounds and may not be as effective as water extracts; more research on the effectiveness of different methods is needed.

Dual Extraction

Dual extraction is done by performing both a hot water extraction and an alcohol extraction. Two separate processes can be used, or the process can be reduced to one step using a mixture of water and alcohol. The final product is combined and sold as powder or tincture.

Dual-extracted supplements make all the beneficial compounds in functional mushrooms bio-available.

Understanding Extraction Ratio

Often, functional mushroom products will also highlight the level of concentration with a ratio on the label like 1:1 or 8:1.

Be careful though, because these concentrations are sometimes dubious claims (100:1??), making it seem like the product is more powerful or concentrated than it really is.

All this ratio means is how much actual mushroom was used to make the final product. A 1:1 extract ratio means that 1 pound of mushrooms was used to make 1 pound of extract. An 8:1 would mean that 8 pounds of mushroom fruit body was used to make 1 pound of extract. Poor processing methods will usually lead to higher extraction ratio, solely because the extraction is less efficient. Hot water extraction will always attempt to get as much of the beneficial compounds out of the mushroom as possible, which will be different depending on the mushroom.

Reishi, for example, has a hard fruitbody and not that much material can be extracted into hot water. That is why Reishi has a natural hot water extraction ratio of around 16:1. Lion's mane, which has a much softer

fruit body, has a natural extraction ratio of around 4:1.

It's more important that the supplement facts table actually lists the percentage of active compounds in the product, which can be tested for after extraction.

Supplement Facts	
Serving Size 1 scoop (1g) Servings Per Container 60	
Amount Per Serving	% Daily Value
Organic Lion's Mane Extract (standardized to contain 31% Beta Glucan) (<i>Hericium erinaceus</i>) (Fruiting Body)	1 g ††
†† Daily Value not established	

MUSHROOM SUPPLEMENTS: WHAT YOU NEED TO KNOW

The world of mushroom supplements can be confusing to newcomers.

That's because there are so many different methods to make them—and different methods to take them. And unfortunately, many supplement manufacturers aren't upfront about what they're selling.

Without a doubt, it can be a little overwhelming when just learning about it all. How are you supposed to know what's right for you?

The truth is, different things work for different people, and the efficacy of the product is really

what matters most. So, if you decide to use a mushroom supplement, you should probably know exactly what you're taking!

The two most important things to understand are:

- How the mushrooms are produced (if at all)
- What extraction method is used (if any)

MUSHROOM SUPPLEMENTS PRODUCTION METHODS

Whole Fruiting Body



The term “Whole fruiting body” refers to what most people think of when they think of mushrooms.

It's the actual “mushroom” that grows out of the tree, log, or stump- and likely what you'd expect most mushroom supplements would be made from.

The fruiting body contains the highest concentration of active compounds that give functional mushrooms their beneficial properties. Traditionally, this is the part of the mushroom that has been used for functional purposes.

Before lab cultivation was possible, medical practitioners would harvest fruiting bodies from the wild, and use them to make a tea. Making a tea is a method of hot water extraction that makes the beneficial compounds more bio-available. Other extraction methods (such as alcohol extraction) can be used to further pull out more beneficial compounds from the tough cell walls of the mushroom fruiting body.

Growing fruiting bodies at scale is expensive and hard to do, but it is worth it considering it does justice to the power of mushrooms and makes a huge difference in the resulting benefits.

Myceliated Grain

The other part of the mushroom is known as “mycelium”, and some people refer to it as the “roots” of the mushroom. It's a white stringy substance that expands relentlessly looking for nutrients, until it decides to produce an actual mushroom.

You can kind of think of it like an apple tree. If the “fruiting body” is the apple, then the “mycelium” would be the rest of the tree. Of course, we generally would prefer to consume the apple!

If you ever want to see mycelium, peel back some moss, or dig about an inch into the ground next time you are in the woods. You’ll almost certainly see the thin threads of mycelium spreading across the forest floor.

Mycelium can also propagate rapidly under sterile conditions in the laboratory. Some manufacturers have taken advantage of this by producing huge quantities of mycelium that has been grown on wheat, oats, rye, sorghum, brown rice, or other grain. The grain starch provides a perfect nutrition for fast mycelial growth.

This is why you sometimes see the term “mycelium on grain” when researching mushroom supplements. It means the product was made from mycelium that has grown out on grain, and no actual mushrooms were fruited.

This is a much cheaper method of production and there are many supplements available that use it. That is why you’ll often see things like “myceliated brown rice” or “myceliated oats” on the ingredient list.

These powders will also taste and smell the same no matter which “mushroom” was used. That is because the majority of the final product is grain starch.

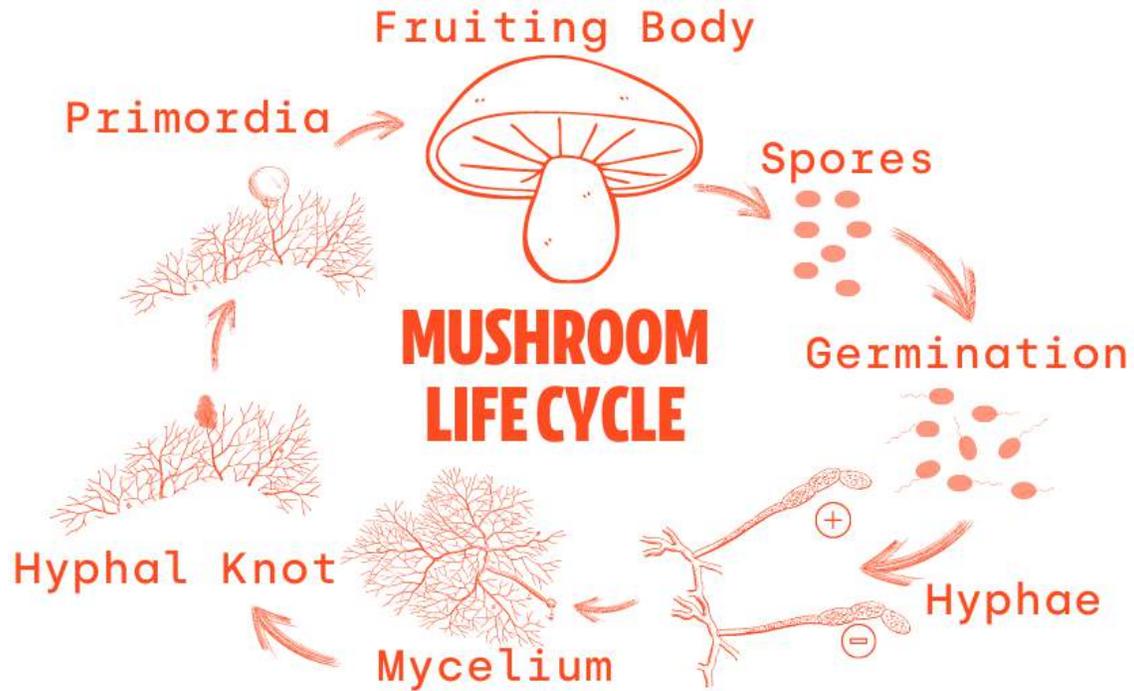


Pure Mycelium

Mycelium doesn’t necessarily have to be grown on grain. It can also be grown in “liquid culture,” large vats of nutrient-rich liquid. The mycelium floats in suspension and happily grows throughout the liquid.

This pure mycelium can be filtered out, dried and turned into mushroom supplements. The result is a highly concentrated form of mushroom mycelium without the starchy fillers you get with mycelium on grain.

It sometimes makes sense to do this. For example, some mushrooms are difficult or impossible to grow, even though propagate in liquid.



Full Spectrum

The term “full spectrum” is more of a marketing term.

It seems to mean that the whole mushroom organism is used- fruiting body and mycelium. The problem is, it is not clear what is actually meant by this term- and even some manufacturers seem to use the term without really explaining what they mean by it.

Often what is the case with “Full Spectrum” supplements is myceliated grain will be left long enough to form primordial fruiting bodies. Even though they are not full sized, they are still technically fruiting bodies.

Full spectrum supplements are often high in grain starch.

Spores and Spore Oil

Instead of seeds, mushrooms use spores to reproduce. The spores are almost always released from gills or pores on the underside of the mushroom fruit body. If processed correctly, these spores can have remarkable beneficial properties.

Reishi is a common source for mushroom spores. The spores are typically collected by placing a cardboard tube around the fruit body when it is ready to release spores. Once collected, the spores are “cracked” by heating or by forcing through polished rollers to make the beneficial compounds bio-available.

Cracked spores can be purchased in pure powder form,

but sometimes you'll see them suspended in oil and sold as "spore oil."

HOW TO TAKE FUNCTIONAL MUSHROOMS

There are a whole whack of different ways to take your functional mushrooms, with each one having its own advantages and disadvantages.

What's right for you might not be right for someone else.

That being said, it's important to understand what options are available so you can choose what works for you.

Extract Powders

Powders are one of the purest, most versatile and most effective ways to take functional mushrooms. They're also usually the most economical—giving you the most benefits for your buck.

Powders are easy to add to coffee, tea, smoothies or your favorite recipes. Many functional mushrooms have a neutral or "earthy" flavor and are easily palatable. Some species, such as Cordyceps or Reishi, can have very distinct flavors that can be off-putting for people with sensitive palates, but the "mushroomy" taste can be easily masked.

Extract powders also make it

easy for you to titrate your dose and mix whatever combination of mushrooms suits you best, creating your own multi-species "stack".



Powder Pros:

- Easy to add to different foods and beverages
- Fun and creative way to consume your supplements
- No additives, only natural goodness
- Easy to mix mushrooms and customize your supplementation

Powder Cons:

- More time consuming to prepare
- Might be difficult to measure the right dose



Capsules

If you have no trouble ingesting capsules, then this is a really convenient and accurate way of getting your daily mushroom dose—especially if you don't have time to make coffee or a smoothie in the morning. They're convenient, require no extra preparation, and are easy to travel with.

The highest quality capsules will contain nothing but pure mushroom extract powder, but some use fillers or “flow aids” to make the manufacturing process easier. If you can avoid taking capsules with extra ingredients, it's probably worth it. You should also consider what the capsule shell is made from. Look for natural capsules; veggie or “pullulan” capsules are the best option.

Capsules don't have a distinct taste, so they're more friendly to sensitive palates. Although they're the most convenient mushroom delivery method, they're not the most versatile

Capsule Pros:

- Convenient for those on the move; just pop your capsules, and you're good
- You get an accurate dose, every time
- No taste, so it's great if you have a sensitive palate

Capsule Cons:

- Might be tough for those who have trouble swallowing pills/capsules
- May contain additional ingredients, both fillers and capsule material

Tinctures

Tinctures are basically liquid extracts, usually in alcohol, that you ingest orally.

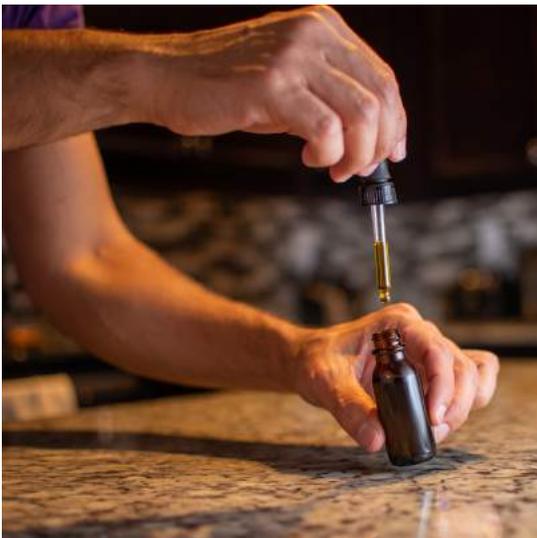
Tinctures are an easy way to ingest mushrooms on the go, especially if you can't swallow capsules. Just keep in mind when mushrooms are tinctured in pure alcohol, they do not release their water-soluble compounds.

Tincture Pros:

- Easy and convenient to take, just a few drops under the tongue.
- Great for those who have trouble swallowing capsules or pills.

Tincture Cons:

- Pure alcohol extractions will not release water soluble beta-glucans.
- Hard to measure the right dose, so it won't be as accurate as the capsule or powder.
- Loses the natural fiber of the mushroom that you may find in powdered extracts.



WHAT ABOUT EATING (AND DRINKING) MUSHROOMS?

Some functional mushrooms are also tasty culinary mushrooms!

Others, such as Reishi and Chaga, are too hard to eat but can be incorporated into food and drink in other ways.

Cooking Whole, Fresh Mushrooms



Fresh mushrooms like Lion's Mane, Oyster and Shiitake are great additions to many dishes. They're easy to prepare and taste delicious sautéed, stir fried or in soups. That being said, without thorough cooking or extraction, you're less likely to get the full medicinal value of these mushrooms.

Mushrooms should not be eaten raw since they have tough cell walls that your body can't properly break down. Grilling them seems to be the best way to preserve the nutrients and make them bio-available.

Using Dried Mushrooms

Many mushrooms can also be purchased as dried fruiting

bodies.

The best way to use dried mushrooms at home is to prepare a hot water extraction by making tea. You can also make an alcohol or dual extraction by soaking the fruiting bodies in alcohol for a number of days.

Simply ingesting dried mushrooms without extraction (in whole form or powder) will not give the maximum health benefit, since the compounds are still "locked" inside the cells.



Mushroom-Infused Products

Mushroom coffee, mushroom protein powder, mushroom collagen, mushroom elixirs—the list goes on and on. There are more ways than ever to get mushrooms in your life!

Just make sure that the products actually contain enough properly extracted mushrooms so that you can get the maximum benefit.



THE BEST TIME TO TAKE MUSHROOMS

In general it doesn't seem to matter what time mushrooms are used. The major benefits of mushrooms come from taking supplements consistently over long periods of time, no matter the time of day.

However, some mushrooms—like Reishi, Cordyceps and Lion's mane—can have acute sedative or energizing effects for some, so it makes sense to consider if this is going to be a concern for you and time your doses accordingly.

MUSHROOM EXTRACT DOSE

The proper mushroom species and dose depends on what you want to achieve.

If you're looking to treat a specific condition, it's best to reach out to a medical doctor or other health practitioner that can assess your specific needs and offer a program that works for you.

Maintenance Dose for Healthy People

Healthy people just looking to benefit from the immune-, cognitive- or energy-boosting benefits of mushrooms should aim for 1 to 2 grams per day. This can be increased or decreased depending on what's working for you.



Higher Dose for a Specific Condition

Specific conditions typically require higher doses of mushrooms for maximum effectiveness. This is often seen in scientific literature and may be in the range of 3 grams to 9 grams per day.

As mentioned above, it's best to

consult with a qualified health practitioner or other medical professional if you're considering this level of dose.

Potential Mushroom Side Effects

Mushrooms are generally recognized as safe, which means that they are not likely to cause harm when used as intended. That being said, it is possible for certain individuals to have adverse reactions—or even allergic responses—to functional mushrooms.

As with any health product or new substance, it's best to introduce functional mushroom supplements into your daily routine slowly.

TALKING MUSHROOMS: KNOW YOUR 'SHROOMISMS!

There are a lot of terms and words that get thrown around when talking about functional mushrooms. Knowing what they mean can help you understand how mushrooms work—and how to get the most benefit from supplementing.

Chitin

Chitin (pronounced kai-tin) is a tough substance made of natural polysaccharides that forms the outer cell walls of fungi. Chitin

is also found in the exoskeleton of arthropods like lobsters and crabs.

It's really hard for humans to break down chitin. That's why mushroom fruiting bodies need to be processed through extraction: to pull the beneficial compounds out and maximize the benefits.

Substrate

You can think of substrate as the "soil" mushrooms grow in.

For gourmet or functional mushrooms, the substrate is typically hardwood, with some sort of nutritional booster like wheat bran or oat bran. Sometimes mushrooms are grown on logs, in which case the substrate is just the log itself.

Some mushrooms, like the common button mushroom, are "primary decomposers", meaning they're grown on a substrate of compost.



Adaptogens

Adaptogens are substances that are able to naturally help the body deal with, or "adapt," to

stressors like lack of sleep or a tough work schedule.

Being called an adaptogen is a high bar to pass! The name is given to some mushrooms, but also some herbs like ginseng and eleuthero.

Certain mushrooms, such as Reishi and Cordyceps have a long history of use as adaptogens. This means they give our body and mind exactly what it needs to adapt to the stress and get back into balance.

Immundomodulator

Our immune system really is the foundation for overall health.

If it's underactive, we become susceptible to colds, flu, and other diseases. On the other hand, if the immune response is overactive, we begin to attack our own bodies through inflammation or autoimmune disorders.

Perhaps the most well-known benefit of functional mushrooms is their ability to modulate the immune system, and so they're often called "immunomodulators." It's a similar concept to an adaptogen: Mushrooms can boost your immune system when it's underperforming and dial it back when it gets out of control.

MEET YOUR MUSHROOMS



We've already talked a lot about what makes mushrooms so special, and some of the best ways to get them into your life.

But not all mushrooms are created equal!

In fact, there are an estimated 1.5 million species of fungi on the planet, accounting for more than 25% of the world's biomass.

Out of that abundance of mushrooms however, only about a dozen or so species have been seriously researched for their medicinal benefits. That's an elite group!

Without a doubt, getting the honor of being called a "functional mushroom" is an exceptionally high bar to pass. It's a term reserved for the best of the best, the cream of the crop, the true "champignons"!

And although the benefits and science behind these superstar mushrooms can be multifaceted, each of them can be characterized as having their own special super power:

Reishi (aka "The Spirit Mushroom")

Scientific Name: *Ganoderma lucidum*

Superpower: Calm and Wise

Turkey Tail (aka "The Defender")

Scientific Name: *Coriolus versicolor*

Superpower: Bullet-proof Immune Support

Chaga (aka "The King Of Functional Mushrooms")

Scientific Name: *Inonotus obliquus*

Superpower: The All-In-One Sidekick

Lion's Mane (aka "The Brain Mushroom")

Scientific Name: *Hericium erinaceus*

Superpower: Focused and Sharp

Cordyceps (aka "The Energy Mushroom")

Scientific Name: *Cordyceps militaris*

Superpower: Energy and Endurance

In this next section, we take a deep dive into these 5 elite mushrooms. These are some of the most widely used and well researched mushrooms in the world. They have also stood the test of time, having been used for hundreds or even thousands of years for their beneficial effects.

So without further ado, let's dive into the mushrooms!



CHAGA

THE KING OF MEDICINAL MUSHROOMS

CHAGA: THE KING OF MUSHROOMS

Chaga is a unique functional mushroom used for centuries by cultures around the world as a remedy for a wide range of ailments.

With a nickname like the "king of mushrooms," Chaga has a lot to live up to. Historical and modern anecdotes abound claiming this mushroom can **boost immunity, prevent cell damage, reduce inflammation, promote healthy skin** and **soothe digestive conditions**.

How did a weird mushroom (that essentially grows inside-out) get these superpowers? The answer is downright fascinating—but it can be complex, so we combed through the science and broke it down for you to share everything you need to know about Chaga mushrooms.



WHAT IS CHAGA MUSHROOM?

The scientific name for Chaga, *Inonotus obliquus*, means "to penetrate at an angle." It's an apt designation for a fungi that grows at a 20- to 30-degree angle relative to the surface of the trees it infects.

Yes, believe it or not, Chaga mushroom is actually a tree disease. Instead of growing on dead or dying wood, this member of the *Hymenochaetaceae* family of fungi^[4] makes itself at home on live trees and behaves like a parasite throughout its lifecycle.

Most of this activity goes on underneath the tree bark where the fruiting body hides out.

The part of Chaga that emerges from the tree contains a combination of mycelium and wood and holds a reserve of food for the mushroom.

Called a sclerotium, this dark

mass has earned Chaga such designations as:

- Birch canker
- Black gold
- Black mass
- Cinder conk
- Clinker polypore
- Conk rot[5]
- Sterile conk trunk rot[6]

It's also called *Kabanoanatake* in Japan and either *Bai Hua Rong* or *Hua Jie Kong Jun* in China!

Chaga mushroom sclerotia are most often found on birch trees in cold climates throughout the Northern hemisphere, including Eastern Europe, Russia, northeastern China and the northeastern U.S.

Occasionally, it may also be spotted on alder, spruce, beech, oak or poplar trees in these regions.



What Chaga Looks Like

When compared to other functional mushrooms, Chaga is in a category of its own. Although technically a bracket fungus, it lacks the "shelf" shape characteristic of other mushrooms in this group, such as Turkey Tail and Reishi. Instead, the sclerotium is more like a conk than a bracket and appears as a large dark blob emerging from the bark of infected trees.

It's easy to spot because it even *looks* a bit parasitic, although it can be mistaken for rot or a tree burl at first glance.

What distinguishes Chaga mushroom from other tree diseases and deformities? The exterior of the mycelium mass ranges from brown to black in color, but breaking off a hunk reveals an almost orange interior shade. The sclerotia may be up to 48 centimeters (around 19 inches) in height and protrude from trees as much as 30 centimeters (just shy of 12 inches)!

History and Use

Chaga's functional mushroom roots reach back into the histories of a diverse range of indigenous people around the world. Some early records suggest it may have been used in ancient Rome, but most of what's known about the mushroom's cultural role comes from Eastern European, Russian and Native American sources.



Chaga in Russia and Siberia

Early records show the Khanty people in Russia and western Siberia relied on Chaga for natural healing as far back as the 1200s. In addition to medicinal uses, the mushroom also appeared in cleansing rituals.

In Russia and Slavic countries, the mushroom has long been used as a folk remedy for just about every conceivable ailment, including skin diseases and lung problems.[Z] People across

Siberia have also turned to *Inonotus obliquus* to address liver conditions, stomach disorders and even tuberculosis.

Native American Chaga Mushroom Use

For indigenous populations across northern Canada, chaga held a special place in mythology, ritual and medicine.

The Cree, Ojibway and Denesuline people used the mushroom to address multiple ailments—including pain—and burned it to produce a sweet smell during pipe ceremonies.

Both the Ojibway and Denesuline people also consumed chaga mushroom tea as an antiviral remedy.

Chaga coals were associated with rheumatic pain relief among the Gitksan and Wet'suwet'en people, and the Cree also attributed healing powers to the mushroom.

But *Inonotus obliquus* wasn't just prized for its medicinal benefits. Strangely enough, some believed it could predict the future! The Denesuline would sometimes lay out two rows of powdered chaga, each representing a potential upcoming event. Each line was lit on fire simultaneously, and whichever one finished burning

first was thought to determine the event that would take place.

Other Traditional Uses for Chaga Mushroom

In several countries—including Russia and Poland—Chaga was used to address various forms of cancer, including breast, hip, gastric, lung, stomach and skin, although no evidence exists to support this use.

However, it's generally considered safe to do what the Finnish army did in World War II: Use Chaga as a coffee substitute. When soldiers were running low on coffee, they harvested sclerotia from the forests around them and drank Chaga tea instead!



Practical Use as "Tinder" Fungus

Chaga mushroom can also come in handy when camping or hiking. One of its nicknames, tinder fungus, comes from its uncanny ability to catch fire with just a spark and remain smoldering for anywhere from four to five hours. [8]

This makes for a reliable fire starter in just about any outdoor environment.

HOW CHAGA WORKS: THE KEY COMPOUNDS AND ACTIONS

Why have Chaga mushrooms enjoyed such fame and attention throughout history? It all comes down to science.

Functional mushrooms contain a range of compounds that give them their unique properties. These are generally isolated and studied, either to test a hypothesis as to a compound's role in the mushroom's health effects or to reveal specific ways in which a given compound works.

This method has led to some interesting discoveries about how and why functional mushrooms like *Inonotus obliquus* appear to have so many benefits.

Chaga Mushroom Active Compounds

Several compounds have been associated with Chaga's effects, and others are being investigated as potential mechanisms behind the mushroom's power as a remedy. These include:

- Terpenoids
- Sterols
- Melanin
- Polyphenols

- Polysaccharides, most notably beta-glucans
- Oxalic, gallic, protocatechuic and p-hydroxybenzoic acids

Specific terpenoids known as triterpenoids—such as betulin, betulinic acid and inotodiol—have shown promise in scientific studies and may hold the keys to some of the most powerful benefits of Chaga mushrooms.

Why is Chaga on Birch Better?

Inonotus obliquus gets some of its beneficial compounds from the trees on which it grows.

White birch trees in particular provide a source of betulin, which winds up in the sclerotium along with the mushroom's other food reserves. This doesn't mean that Chaga growing on other trees has no benefits; however, the composition isn't the same as Chaga on birch.



This also explains why "cultivated" Chaga mushrooms

have largely failed in reproducing the chemistry of wild mushrooms.

To say cultivated is a bit of a stretch. Chaga that is not wild-harvested from birch trees is usually "mycelium on grain". These Chaga substitutes contain very low levels of beneficial compounds when compared to mushrooms grown on trees—because they are mostly rice!

CHAGA MUSHROOM BENEFITS: HOW CHAGA AFFECTS HEALTH

All available research on Chaga mushrooms to date has been performed *in vitro* (test tubes and petri dishes) or using animal models. Although data from such studies can't be directly extrapolated to humans, the discoveries are useful in understanding the actions of the mushroom's compounds and how these might be harnessed to develop treatments in the future.

Chaga's long history of use—along with significant anecdotal evidence of its benefits—suggest human trials would be beneficial. If this "king of mushrooms" truly *can* do everything proponents claim, the implications for science, health and medicine are staggering.

So, what *does* the current science have to say about Chaga mushrooms?

1) Contains High Antioxidant Levels

Despite abundant praise from the natural health community, antioxidants still remain somewhat controversial. Scientific evidence is unclear as to whether high antioxidant levels have any actual benefits on human health.

The problem may be due in part to antioxidants being studied in isolation or in supplement form, which takes them out of context and eliminates the synergistic effects of eating whole foods. Antioxidant activity also tends to be tested *in vitro*, not in people, often using much higher levels than are possible to obtain from food sources.[9]

However, high-antioxidant foods are still associated with positive health outcomes. There is some research to show Chaga in particular packs some serious protective power.

The ORAC Value of Chaga Mushroom

ORAC—oxygen radical absorbance capacity—is a measurement of how effective a food or substance is at neutralizing free radicals in the body.[10] Values are determined in test tube environments by observing a food's ability to

protect molecules from oxidation.

Inonotus obliquus has one of the highest ORAC values in the world.

How high is high? It's hard to pin down the *exact* level, but it appears to range from 52,000 to 146,000 micromoles per 100 grams. (For comparison, açai berries have around 102,700 micromoles per 100 grams.)[11] Colder growing conditions correlate with higher ORAC values in Chaga mushrooms.

Protecting DNA from Damage

Oxidation occurs when free radicals damage molecules, including DNA. Damaged DNA results in cellular mutations, which can lead to premature aging and cancer if left unchecked. Some oxidation is a normal part of being alive, but external factors like poor dietary choices and environmental chemicals can put additional oxidative stress on the body—which may overwhelm natural repair mechanisms.

How might Chaga mushrooms help? In one study, lymphocytes from 20 people with irritable bowel disease were treated with hydrogen peroxide to induce oxidative stress. Cells that received subsequent Chaga alcohol extract treatment had a

54.9% reduction in DNA damage compared to 34.9% in the control group.[12]

In another study, researchers treated zebra fish embryos exposed to UV rays with Chaga polysaccharides and observed a regulating effect on genes responsible for DNA repair, which reduced overall DNA damage.[13]

Antioxidants and Anti-Aging

Because aging results from accumulation of cell damage over time, the aging process appears to speed up when cells are exposed to dietary and environmental oxidants. It's possible that the high antioxidant levels in Chaga mushrooms could prevent this by combatting some of the most common foes of cellular health.

It's a hugely complex process involving DNA, RNA and other factors influencing cell division, so more studies are needed to know for sure. However, correlations between antioxidant intake and reduced signs of aging show promise for Chaga and other high-antioxidant foods as aids in the quest for healthy longevity.



2) Studies on Cancer Growth and Development

In Norway, *Inonotus obliquus* has been nicknamed kreftkjuke, the "cancer fungus." Poles and Russians have also turned to this functional mushroom as cancer remedy over the years.

So why isn't everyone rushing off to grab some Chaga as a cancer remedy? Why haven't doctors tapped into this amazing superpower to try and end the 'war on cancer'?

Because cancer is more complicated than that. Numerous processes are involved in both the development and treatment of cancerous conditions, and so far, no single remedy has been able to address every facet of the disease.

Can Chaga "Cure" Cancer?

In one word: *no*. There is no scientific evidence to show that Chaga mushrooms cure cancer.

The idea may have arisen from an old Russian story claiming that 12th-century healers were able to successfully eradicate Tsar Vladimir Monomakh's lip tumor using the functional mushroom as a remedy, but this doesn't take the place of solid research.

So, despite the claims and anecdotes, Chaga mushrooms should not be considered an alternative to traditional cancer treatment. Memorial Sloan Kettering notes on its website, "To date, no clinical trials have been conducted to assess Chaga's safety and efficacy for disease prevention or for the treatment of cancer."



Chaga Mushroom Cancer Research

No human studies exist to show correlation between Chaga mushroom intake and improved cancer outcomes; so far, all studies on living organisms have been performed largely in rodent models. Some studies have examined Chaga's effects on human cancer cells *in vitro*, but full clinical trials are needed to determine if these effects can be replicated in actual cancer patients.



3) Supporting The Immune System

When it comes to immunity, Turkey Tail is usually the top pick among functional mushrooms.

But Chaga's betulinic acid and polysaccharide content gives it appreciable immune-boosting power, as well.

Chaga polysaccharides may stimulate immune activity by upregulating production and expression of specific immune cells and proteins, including IL-1beta and IL-6. These proteins, known as cytokines, can act as either pro- or anti-inflammatory cytokines, suggesting *Inonotus obliquus* produces a modulating effect.

Research looking at specific Chaga mushroom compounds and immune reactions also shows:

- An isolated polysaccharide called IP3a can upregulate immunomodulating cytokine activity and improve the ability of macrophages ("defensive" white blood cells) to clear out invading pathogens[14]

- Hot water extracts can reduce the expression of immunoglobulin E (IgE) in allergic reactions, as well as balance pro- and anti-inflammatory cytokines[15]
- Water extract may be able to increase red blood cell precursors, immune cells and immune compounds in models of immunosuppression[16]



Antiviral Properties of Chaga Mushrooms

Some studies also show Chaga extracts exhibit activity against viruses, including HIV, herpes simplex and hepatitis C.

In a study on herpes, water extract blocked the virus from fusing to cellular membranes, thereby preventing infection.[17]

Another study using cell models of feline diseases associated with urinary tract infections and gastrointestinal problems showed similar activity. Polysaccharides from Chaga were able to prevent viruses from binding with and entering cells.[18]

Both the HIV study[19] and the

study on hepatitis C[20] indicated Chaga may be useful as a preventative or therapy based on results seen using cell cultures.

4) Inflammation

Although *Inonotus obliquus* has been shown to stimulate some types of immune activity, it also appears to modulate inflammation.

The way Chaga affects production and expression of immune cells and compounds suggests its modulatory effects prevent inappropriate inflammatory responses while allowing beneficial inflammation to occur. Such balancing effects are the hallmark of adaptogenic foods, herbs and functional mushrooms.

In the study on immunosuppression mentioned above, Chaga maintained TNF-alpha levels while increasing IL-6—a prime example of the natural balancing act between pro- and anti-inflammatory activities.

Another study examined how Chaga affected mice with chemically induced colitis and showed the mushroom was able to lower levels of pro-inflammatory compounds, as well as IgE antibodies.[21]

5) Cholesterol

High cholesterol is one of many factors that contributes to heart disease.

Oxidized cholesterol can be particularly damaging because the body may mistake it for a pathogen and unleash an immune response, resulting in inflammation that can contribute to atherosclerosis.[22]

Chaga mushroom has the potential to combat this problem by:

- Improving the way the liver transports cholesterol for better distribution and elimination, which can increase HDL ("good") cholesterol and lower LDL ("bad") cholesterol[36]
- Lowering overall levels of lipids in the blood—including fatty acids, cholesterol, triglycerides and LDL cholesterol—while increasing endogenous antioxidant levels[23]
- Offering possible protection against cholesterol oxidation via antioxidant activity



Plant sterols, known as phytosterols, may be one mechanism behind these benefits. Wild-harvested Chaga contains numerous sterols,[24] known as phytosterols.

Phytosterols' similar shape to cholesterol means they compete for absorption in the body,[25] but unlike animal-derived cholesterol, these compounds appear to *lower* blood cholesterol instead of raising it.

6) Blood Sugar

Uncontrolled or imbalanced blood sugar can signal a problem with insulin sensitivity, which is associated with both metabolic syndrome and type 2 diabetes. When blood sugar levels remain high for too long, organ and nerve damage can result.

Specific compounds in *Inonotus obliquus*, most notably polysaccharides, may prove to be powerful allies in the quest to prevent, control and reverse diabetes and pre-diabetic conditions.

Researchers who administered an isolated Chaga polysaccharide complex with added chromium to diabetic mice observed healing of damaged tissues, and even high doses of the complex appeared to have no toxic effect when

experimentally administered to normal mice.[26]

In another study involving rats with pancreatic damage resulting from oxidative stress, administering Chaga polysaccharides over time was able to restore partial beta cell function—and therefore improve insulin production.[27]

Chaga mushroom polysaccharides may also be able to:

- Restore balanced body composition
- Lower fasting glucose
- Improve glucose tolerance and insulin sensitivity
- Make it easier for the body to move sugar from the blood to the liver for storage

The fact that these effects were seen in diabetic mice fed high-fat diets [28] suggests chaga could be useful in addressing and correcting issues arising from poor lifestyle choices. It's likely the effects would be even more pronounced if the mushroom was administered as part of a regimen involving positive dietary changes.



7) Skin And Hair Health



Chaga gets its dark exterior—and "black gold" nickname—from melanin, the same pigment that gives skin and hair its color.

While there's no evidence to show consuming melanin affects melanin levels in skin, the compound does exhibit antioxidant properties.

In combination with this mushroom's nutrient content, the antioxidant benefits may help protect and heal skin. The robust amino acid profile[29] provides building blocks for proteins, which aid in repair and maintenance. A range of vitamins and minerals complement melanin to provide support for healthy skin. (For more on this, see "Is Chaga a 'Superfood?'" below.)

A study investigating the effect of pre-treating cells with Chaga mushroom showed protection

against premature cell death and UV damage, including "skin thickening and wrinkle formation," suggesting potential anti-aging properties.[30]

Interestingly, one study on human follicle dermal papilla cells—involved hair's growth cycle—showed Chaga extract fractions promoted activity that could stimulate new hair production.[31] It's not surprising, then, that Chaga mushroom is a traditional shampoo ingredient in Mongolia and now appears in a range of other skin and hair products around the world.



Will Chaga Help Psoriasis?

Chaga soaps and creams are gaining popularity, but concrete scientific evidence doesn't yet exist to determine whether they work to improve skin conditions like psoriasis.

One Russian study did show Chaga extract was about to heal psoriasis in patients with chronic

inflammatory GI issues after nine to twelve weeks of consistent supplementation.[32]

Unfortunately, the study wasn't well controlled, and there's no way to know if the improvement in psoriasis was a direct effect or a result of simultaneous improvements in GI function.

8) Digestive Health

A firm belief in Chaga mushroom's ability to address digestive problems has prompted Russia to license an alcohol extract product called Befungin for the treatment of stomach and intestinal disorders.

Research shows they may be on to something.

Chaga contains antimicrobial melano-glucan complexes, and melanin itself appears to boost beneficial gut bacteria[34] while reducing populations of microbes that thrive in pro-inflammatory environments.[35]

Taken together, these actions have the potential to prevent or reverse dysbiosis, an unhealthy imbalance in gut microflora that can accompany or lead to a range of digestive conditions.

Chaga may also keep bad gut

bacteria in check by decreasing levels of TNF-alpha and TGF-beta—both of which are involved in inflammation—while increasing antioxidant capacity.

In a study on mice with chronic pancreatitis, these changes occurred along with a reduction in lipase and increases in glutathione peroxidase (GSH), which breaks down oxidized lipids.[36]

Simultaneous improvements in gut microbiome composition suggest a correlation between Chaga's anti-inflammatory and antioxidant activities and better gut health.

What's more, Chaga polysaccharides were shown to exhibit beneficial effects as they were broken down into monosaccharides in a simulated model of human digestion.[37] Antioxidant activity fluctuated depending on the stage of digestion, but inhibitory effects on carbohydrate breakdown increased, pointing to a possible mechanism behind why this mushroom may improve blood sugar levels.

Other studies have shown Chaga mushroom exhibits antiulcer activity without any signs of toxicity[38] and may help prevent pancreatic cell destruction in chronic pancreatitis.[39]

9) Mood and Cognition



Inflammation is increasingly being cited as a possible contributor to neurological disorders like depression and dementia. In Alzheimer's, for example, inflammatory processes have been linked to the buildup of the "junk" proteins characteristic of disease progression; all other types of dementia also appear to involve inflammation in the brain, known as neuroinflammation.[40]

Additionally, people suffering from depression tend to exhibit increased immune activity,[41] which suggests immunomodulation could lead to better overall mental health.

Where does Chaga mushroom come into all this? Mouse studies have shown it may:

- Improve cognition
- Reduce activity related to beta-amyloid protein deposit formation[42]

- Improve learning and memory[43]

These effects have the potential to keep mental activity sharp as people age, as well as improve quality of life for those suffering from specific neurological problems.



Stress, Anxiety and Chaga Mushrooms

What about the almost universal plague of stress? The adaptogenic characteristics of *Inonotus obliquus* may be able to help there, too.

Adaptogens are associated with lower stress and better balance both mentally and physically. They appear to work by helping the body adapt to emotional and environmental stressors and maintain the harmonious internal balance known as homeostasis. [44,45] Many functional mushrooms provide these benefits—without the unpleasant side effects of prescription stimulants and depressants.

Because adaptogens can improve mental performance and increase stamina, Chaga

mushrooms may also improve focus in times of heightened stress or provide a boost when sluggishness hits.[46]

10) Endurance

Only one study exists to show a potential connection between Chaga intake and exercise endurance. In it, researchers divided 64 mice into four groups of 16 and administered polysaccharides at doses of zero, 100, 200 and 300 milligrams per kilogram across the groups every day for 14 days.[47]

At the end of the study, eight mice from each group were given an endurance swimming test in which they swam while carrying an added weight amounting to 5% of their bodyweights. The mice that got the Chaga were not only able to swim longer but also produced less lactic acid and urea nitrogen and had higher levels of glycogen in their livers and muscles. (The other eight mice, acting as controls, swam for 30 minutes.)



What does it all mean?

Polysaccharides from Chaga appear to have allowed the mice to extend their swimming times without using up as much stored fuel or creating as many metabolic byproducts as the control mice. And none of the mice in the polysaccharide groups experienced any toxicity from the treatment.

If these results could be duplicated in future studies (preferably on humans), Chaga may join Cordyceps as a new superhero mushroom for athletes!

11) Pain

Because pain and inflammation often go together, *Inonotus obliquus* offers promise in addressing conditions in which pain is a prominent symptom.

One way Chaga mushrooms may reduce pain is by inhibiting pro-inflammatory pathways and affecting nuclear factor kappa B (NF-κB) binding, thereby positively regulating the way the body reacts in inflammatory conditions.[48]

Rheumatoid arthritis provides a good model for Chaga's potential use in pain management. In this autoimmune disease, pro-inflammatory cytokines are elevated to the point where the

body's natural anti-inflammatory processes can't overcome them effectively.[49]

The mushroom's modulating effects on a number of pro- and anti-inflammatory cytokines—as well as nitric oxide, which can reduce or prevent sensations of pain[50]—make it a candidate for further study in this area.

12) Liver Health

Studies on Chaga and liver health are limited, but there are some that stand out:

- Researchers tested the effectiveness of polysaccharides against liver injury in mice resulting from a parasitic infection. The polysaccharides reduced pro-inflammatory compounds, decreased markers of liver damage and increased levels of superoxide dismutase (SOD) and glutathione (GSH)—both powerful antioxidants. [51]
- In a study of rats with oxidative liver injury, a low concentration of Chaga mushroom water extract reduced the release of compounds associated with damaged liver cells. Levels of malondialdehyde, a marker of oxidative stress, also came down.[52,53]

IS CHAGA A "SUPERFOOD"?



The term "superfood" has been used so often as a marketing gimmick that it's starting to become nebulous and suspect. When it comes to Chaga, though, the science suggests this functional mushroom could be even *more* super than other so-called superfoods!

Why? In addition to its active compounds and a wide range of phytonutrients, chaga mushroom is also a source of:[\[54\]](#)

- B-complex vitamins
- Vitamin D
- Fiber
- Calcium
- Copper
- Iron
- Magnesium
- Manganese
- Potassium
- Zinc

Many of these nutrients are key players in some of the body's most important functions—particularly zinc, which is

required for over 100 enzymatic processes throughout various organ systems. The full range of nutrients is also beneficial for bone health, immune activity, heart health and proper muscle function.

Chaga's rock-hard texture means it will never find a place among culinary mushrooms, but its benefits are readily available from high-quality supplements.

HOW CHAGA MUSHROOM GROWS

Anyone wondering where to find the wonderfully bizarre *Inonotus obliquus* sclerotium should look to nature first. So far, both science and tradition point to birch trees as the best source for specimens with a full complement of beneficial compounds.

"Cultivation" methods using mycelium on grain haven't been able to produce Chaga with the same level or balance of compounds as mushrooms growing in the wild. Therefore, the best way to get access to the benefits is to pull on some hiking boots and hit the deep woods (or purchase some Chaga chunks from a local forager).

Chaga Conk Formation

To people whose main exposure to mushrooms is the "cute"

button variety at the grocery store, the way Chaga forms on trees may seem almost horrifying. But it's a perfectly natural process with a rather unusual twist.



It starts with an unhealed gap or "wound" in the bark of a tree. These gaps are prime real estate for any Chaga spores traveling through the area. Once they take up residence, the spores begin to develop into a full mushroom from inside the tree. The parasitic process causes heart rot, which literally eats away at the heartwood over time.

Trees with visible Chaga formations may appear healthy until the heart rot becomes more invasive. This is because the decay remains concentrated around the sclerotium at first but can eventually spread throughout the tree, causing it to die.^[55]

The Reproductive Cycle of Chaga Mushrooms

Inonotus obliquus won't

reproduce until heart rot has set in on the host tree—and when it does, things just get weirder.

Most mushrooms flaunt their fruiting bodies out in the open as brackets, stems and caps or funky cascades of hair-like tubes, but Chaga's fruiting body tucks itself away underneath the tree's bark and rarely sees the light of day. This strange "inside-out" growing process is another unique feature setting this mushroom apart from the rest of the fungal kingdom.

Instead of a classic mushroom structure, the fruiting body consists of a network of tubes that house Chaga spores while they mature. When the tree dies, the fruiting body releases spores into the air, where they travel to nearby trees to start a new lifecycle.

Not much is known about how Chaga sporulation works, but whether or not the trunk remains standing, the host tree's bark is always split in the process.

Chaga Fruiting Body

Though it's not as easily identifiable as the hard, dark sclerotium, the fruiting body of a Chaga mushroom does have some distinguishing characteristics. It consists of thin layers, which can be white,

gray or brown and features a lengthy network of pores.

True to its scientific name, Chaga's pores begin to form above the sclerotium and angle slightly upward (hence "*obliquus*"). This tubular structure puts the mushroom in the polypore category with other fungi that rely on pores instead of gills for spore release.

The porous tubes in any given fruiting body can be up to four meters (about 13 feet) long and 50 centimeters (about 19.6 inches) wide and may take one to two years to form.

Chaga products listing "fruiting body" as an ingredient don't actually contain the mushroom's fruiting body. However, the term may be used to distinguish wild mycelial sclerotia from mycelium cultivated on grain.



WHAT ARE THE SIDE EFFECTS OF CHAGA?

Natural remedies aren't free from side effects. Just like regular

medications, any functional mushroom or natural product has the potential to cause unwanted symptoms.

However, most people tolerate *Inonotus obliquus* well at typical supplemental doses. Taking too much may cause stomach upset, digestive discomfort or diarrhea.

Precautions

Because Chaga mushrooms haven't been tested in human clinical trials, no side effects have been officially documented. However, there are a few important precautions to keep in mind:

- Until there are trials to show it's safe, women who are pregnant or breastfeeding should avoid supplementing.
- People with mushroom or mold allergies may experience reactions.
- The high oxalate content may make the mushroom unsuitable for people with liver or kidney problems, particularly kidney stones. In one case, a 72-year-old Japanese woman suffered acute kidney injury from ingesting 4 to 5 teaspoons of Chaga powder per day for six months, far in excess of the recommended dose.^[56]

The biggest consideration of all

is to be sure that what looks like Chaga is actually Chaga! When foraging for birch-grown sclerotia, cut off a small piece of the mass to check for the telltale orange interior. If it's not there, it's probably not the right mushroom.

Chaga Supplement Interactions

Due to some of the effects Chaga mushrooms exhibit in *in vitro* and animal studies, it's best to pass on supplementation when:

- Taking antiplatelet or anticoagulant medications
- If you have a bleeding disorder
- Are Planning to have surgery
- Taking hypoglycemic drugs
- Dealing with an autoimmune condition

Use caution when taking Chaga in combination with other herbal supplements, especially those used to address similar health concerns.



Is Chaga Psychoactive?

Nope. Chaga mushrooms are considered adaptogens and immunomodulators and may have a positive effect on mood, but they're far from trippy.

All of their "magic" comes from non-psychoactive compounds that balance and boost body systems—no magical mystery tour required.



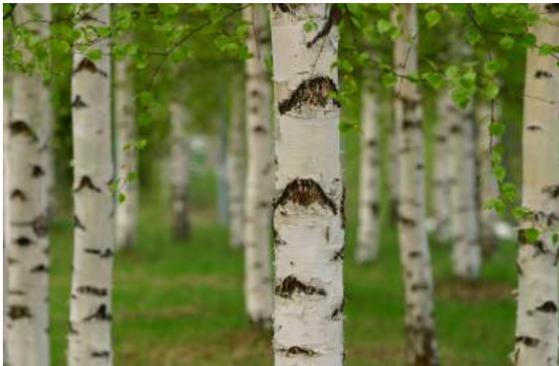
HOW TO HARVEST AND PREPARE CHAGA MUSHROOMS

Enthusiastic mushroom hunters say the best way to harvest Chaga is to hit the woods in the coldest months of the year. The lack of foliage makes sclerotia easier to spot, but getting them off trees may be a challenge if the masses are frozen!

Look for secluded areas to avoid mushrooms that may be contaminated with environmental pollutants, such as vehicle exhaust fumes.

Although this powerful mushrooms can be found on a variety of hardwoods, focusing on birch trees has two benefits:

- Chaga on birch is the most common, so confusing it with other fungi or deformities is less likely
- Birch-grown Chaga appears to offer the most benefits



A sclerotium is always darker in color than the host tree, while burls and other deformities are usually the same color as the bark. And it almost goes without saying (but is important enough to say anyway): **When in doubt, don't harvest or consume!**

Harvesting Chaga Conks Safely and Sustainably

Sustainable harvesting is a big deal in the foraging community, and for good reason. Walking into the woods and hacking a hunk of Chaga off a birch tree with no regard for the tree's health or the lifecycle of the mushroom can damage both organisms and rob

people of the chance to experience the mushroom's benefits.

Inonotus obliquus takes three to five years to fully form, so the smartest thing to do is harvest only what will be used and leave the rest. This requires a sharp blade—like a knife, hatchet or axe—and a good deal of care to avoid harming the tree. In some cases, it's possible to separate the sclerotium from the tree by hand, but this method makes it more difficult to take smaller pieces.

Will Chaga Grow Back?

A good rule of thumb is to leave at least one-third of the sclerotium behind to ensure more remains available to other foragers. Avoid harvesting from small Chaga mushroom formations; instead, look for large, mature mushrooms further along in the growth process.



But regrowth isn't the only reason for partial harvesting.

Detaching the entire sclerotium can leave an open hole in the host tree's trunk, making it susceptible to other diseases and further damage. So be smart and courteous when gathering Chaga mushrooms!

Why Dry Chaga?

Right after coming off the tree, a Chaga sclerotium feels like cork. It's not unusual for the orange interior to be spongy; that's a sign there's water in the mushroom, which needs to be removed before storing.

Why? Because moisture can quickly become an invitation for mold. And moldy Chaga is bad Chaga, fit only for the trash. Drying the mushroom helps it avoid this unfortunate—and sad!—fate.

Of course, fresh Chaga can be used immediately to make tea or tincture. Drying is only required when preserving chunks for later.



To prepare the sclerotium for drying, clean remove debris and break it down into smaller chunks. (This may require putting it in a towel or cloth bag and using a hammer to break it apart.) Dry the chunks using one of two methods:

- Let sit indoors in a warm, dry area for up to eight weeks
- Place in a dehydrator or oven at 110°F to 112°F (43°C to 49°C) for around 24 hours

Make sure the Chaga is completely dry before storing in an airtight container.

CHAGA MUSHROOM FOR SALE: HOW TO CHOOSE A CHAGA SUPPLEMENT

Not everyone has the time to go foraging for *Inonotus obliquus* in the wild, or to properly prepare their own chaga. Supplements are a convenient alternative as long as they come from a reputable source.

Here's how to find a Chaga mushroom supplement that has all the benefits that make this mushroom so famous.

What's the Best Chaga Mushroom Extract?

Research suggests the water- and fat-soluble compounds in Chaga—polysaccharides and terpenes—may both have positive effects on health.

Taking either water or alcohol extract should provide beneficial compounds. (Chaga tea, after all, is essentially a water extract, and people have been singing its praises as a tonic for thousands of years!)

Dual extraction, which combines water and alcohol extracts in one product, delivers the highest concentrations of beneficial compounds. However, the quality of the supplement also matters. A dual-extracted powder from Chaga mycelium cultivated on grain and touted as "high polysaccharide" may be more grain than mushroom and offer few to no benefits.



Is Wild Chaga Really Better than Cultivated?

Some research suggests cultivated Chaga mushrooms do exhibit some beneficial effects. One study of mycelium was grown on brown rice showed a measure of antioxidant activity

and anti-inflammatory properties, but the researchers apparently didn't compare this to wild-harvested Chaga.[57] Another study confirmed the possibility that rice-grown mycelium may exhibit anti-inflammatory activity. [58]

While it's understandable that people want to find a way to bring Chaga's benefits to a wider audience, the science doesn't yet show that cultivated forms deliver the same level of health-boosting compounds.

Chaga Tincture vs. Capsules vs. Powder

Properly extracted Chaga supplements are beneficial in any form. The best option differs according to personal needs and tastes:

- Tinctures are quick and easy to take but can leave an alcohol aftertaste
- Powders add an earthy flavor to beverages and foods
- Capsules are flavorless but not suitable for people who have difficulty swallowing pills

As with any functional mushroom supplement, content matters more than form! Choose Chaga that comes from a clean source—and avoid powder or capsules with added fillers.

Where to Buy Chaga Mushroom

Look for quality over price when searching for supplements. Some companies, like FreshCap, have their products tested to confirm levels of compounds like beta-glucans, which can be helpful when comparing options.

Before making a purchase, read reviews. Research company reputations. Ask how the mushrooms are grown and the supplements are made. If anything seems sketchy, move on!

Chaga chunks for tea can be sourced from reputable foragers. Don't know where to find one? Look for a local mycological society, or check out nearby natural food stores and co-ops for locally harvested specimens.



USING CHAGA SUPPLEMENTS FOR HEALTH

Ready to give the "king of mushrooms" a try? The benefits may not be felt right away, but consistently incorporating Chaga capsules, powder or tea into a daily routine can deliver results over time.

To stick with a regimen, choose a supplement form that's convenient to take and easy to incorporate into existing health routines.

How Much Chaga to Take

A good starting point for Chaga supplementation is about 1 gram of dual-extracted powder or the equivalent in capsule form. (Check product labels for the recommended dose.)

When drinking Chaga tea, aim for one to two 6-ounce cups per day. Typically recommended to not exceed three 6-ounce cups.

Chaga tincture can be taken in 2 to 3 milliliter doses two to five times per day. You could also spread multiple doses of tea or tincture throughout the day.

Start with the smallest dose and work up to larger amounts until the desired effect is achieved. Remember to be consistent! Sometimes "unseen" benefits—

like reduced inflammation or enhanced immunity—aren't as obvious right away and can only be noticed after taking a break from routine supplementation.

When to Take Chaga Supplements or Drink Chaga Tea

Any time of day is a good time to supplement with Chaga or enjoy a Chaga-infused beverage. Taking this mushroom in the morning can also bring balance to the day thanks to its adaptogenic properties.

Taking a supplement at night, on the other hand, can aid in getting a more restful sleep, particularly when consumed as a warm, comforting tea!

And, of course, taking Chaga mushrooms regularly—regardless of the time of day—may support stronger immunity and protect against seasonal illness.



CHAGA MUSHROOM RECIPES: HOW TO EAT CHAGA



While nobody would actually want to eat a chaga mushroom—the sclerotium far too hard for that—there are plenty of tasty ways to enjoy this unusual mushroom.

What does Chaga taste like? In many ways, the flavor is similar to the appearance: earthy and dark with a deepness reminiscent of coffee but without bitter overtones. It's a classic "mushroom" flavor with loads of rich umami!

How to Make Chaga Tea

One of the most accessible ways to add Chaga to a daily routine is to make Chaga mushroom tea. While its possible to purchase pre-prepared Chaga tea bags, making the tea from chunks isn't difficult—and it helps ensure the mushrooms come from a reliable source.



To make tea from Chaga chunks:

1. Obtain Chaga mushroom chunks online or harvest some in the wild.
2. Wrap about 3 ounces of the chunks in towel.
3. Place the bundle on a hard surface that isn't easily damaged, and use a hammer to smash the chunks into small pieces.
4. If desired, grind the resulting bits into a powder using a strong blender or mortar and pestle. (Warning: *Do not* use a coffee grinder—Chaga is so hard, it's likely to break the blade!)
5. Add the pulverized chunks to 2.5 to 4 liters (about 10.5 to 17 cups) of water, bring to a boil and reduce the heat to a low simmer.
6. Simmer the mixture for 3 to 4 hours, or until the mushroom bits sink.
7. Strain the liquid through a tea towel, nut milk bag, fine mesh strainer or coffee filter, and store the tea in jars in the fridge.

A quick and lazy alternative (no hammer required): Place the Chaga chunks and water in an Instant Pot or slow cooker and cook on low for 6 to 8 hours.

Chunks can be reused for three to four batches of tea, although subsequent batches may require a longer cooking time.

Making tea from Chaga mushroom powder:

1. Add 1 gram of Chaga powder to a cup.
2. Boil about a cup of water.
3. Combine the water with the powder, mix it up and enjoy!

Note that this only works with Chaga powder that's been through a proper extraction process. Simply mixing ground Chaga with water isn't enough to draw out the beneficial compounds and make them available for the body to use.





Baking and Cooking with Chaga

Chaga mushroom powder is versatile enough to use in other recipes, including desserts, baked goods and even savory dishes. Here are a few FreshCap recipes for inspiration:

- [Almond Butter Stuffed Chaga Chocolates](#) (Makes great gifts!)
- [Chaga Mushroom Brownies](#) (Gluten free!)
- [Chaga Summer Rolls](#) (Includes a plant-based option!)

Of course, it doesn't have to stop there—feel free to get ambitious and try Chaga in any dish that could benefit from a burst of 'shroomy umami!

FEEL THE CHAGA MUSHROOM DIFFERENCE

Whether you brew up a tea, mix some powder in your coffee or add capsules to your supplement regimen, Chaga has the potential to transform your health routine. Remember to check with your doctor before supplementing if you have any health conditions or are taking prescription medications.

Otherwise, Chaga's low incidence of side effects make it a safe functional mushroom to experiment with. Try it, and see how it makes you feel. You might just find yourself getting sick less, performing better and even feeling happier as you go about your day!





What About Chaga Mushroom Coffee?

Chaga can be a great coffee substitute for people looking to cut down on caffeine without losing the rich, deep flavor of their daily cup of joe.

For everyone else clutching their coffee cups and vowing *never* to cross over to the caffeine-free dark side, it's easy to make Chaga mushroom coffee at home by adding about a gram of Chaga powder or combining prepared Chaga tea and strong coffee in the same cup.

Drinking Chaga and coffee together probably won't enhance the mushroom's beneficial effects, but it can help power up the day with an extra antioxidant boost!

Be cautious when considering commercially prepared mushroom coffee drinks and mixes. Some mixes contain additional ingredients, such as

sweeteners, which add empty calories and make the beverages less healthful. In some cases, the quality of the coffee is poor and makes the whole drink less than satisfying. Low-quality coffee may also be a red flag for an overall low-quality product.

Other Tasty Chaga Mushroom Drinks

Not satisfied with simple Chaga mushroom coffee? Chaga powder can be added to a variety of inventive drinks to deepen the flavor and infuse the mixture with added health benefits.

Try these delicious ways to turn functional mushrooms into treats:

- [Chagaccino](#)
- [Chaga Chai Smoothie](#)
- [Chaga Chocolate Smoothie](#)
- [Chaga Pumpkin Spice Latte](#)





CORDYCEPS

THE ENERGY MUSHROOM

CORDYCEPS: ENERGY-BOOSTING POWERHOUSE

Cordyceps is a unique (and kind of weird) mushroom prized for its positive effects on energy, immunity, lung health and exercise performance.

Everything about Cordyceps mushroom sets it apart from its fellow medicinal fungi—from the way it grows to its anecdotal fame as an athletic performance enhancer.

But is any of the Cordyceps lore true?

Well, we can tell you right off that it *isn't* a worm (although worms may be involved; more on that later), but the rest requires a little more detail. Take a deep dive into this next section to discover the history and benefits of Cordyceps and how to use it to boost health.



GETTING TO KNOW CORDYCEPS MUSHROOM

The name "Cordyceps" comes from Latin and means "club head," which is an appropriate description.^[59] But around the world, it's known by plenty of other names like:

- Caterpillar fungus (in English)
- Dong Chong Xia Cao (China)
- Tochukas (Japan)
- Yarza gunbu (Tibet)
- Hsia Ts'ao Tung Ch'Ung
- Yarsa gumba
- Champignon chenille
- Vegetable caterpillar

So far, over 700 species of Cordyceps mushroom have been identified, most of which originate in Asian countries. Two in particular—*Ophiocordyceps sinensis* and *Cordyceps militaris*—are highlighted for their medicinal properties; others are being investigated for potential benefits.

Translating the Chinese and Tibetan names for Cordyceps hints at a unique characteristic of the mushroom: "winter worm, summer grass" and "summer grass, winter bug." Another designation in Chinese medicine, chon cao or "insect plant," points to the rather bizarre origins of *O. sinensis*.^[60] (Hint: This is where the worms come in.)

What Does Cordyceps Look Like?



As the name suggests, Cordyceps mushrooms grow in long, spindly shapes with a small "club" at the top. They can be brown or bright orange in color and are fairly strange-looking at far as mushrooms go.

The stalks of Cordyceps are called the "stroma" and are sometimes listed this way on Cordyceps supplements instead of "fruiting body," which is the more common term.

TYPES OF CORDYCEPS

Cordyceps mushroom supplements are made from either *O. sinensis* or *C. militaris*. Although often used interchangeably in traditional Chinese medicine, the two have different origins and have been studied separately for their medicinal qualities.

Ophiocordyceps sinensis (formerly Cordyceps sinensis)

The rarest and most expensive

of all Cordyceps mushrooms, wild *O. sinensis* is rarely found in supplements but may be purchased in its whole form in some Asian countries. This species grows to be between 4 centimeters and 10 centimeters (about 1.5 to 4 inches) and can have a yellowish color when fresh, which deepens to brown or black as the mushroom dries out.

It's interesting to note that this ancient mushroom had a bit of an identity change in 2007. Some scientists performed what's called a phylogenetic analysis, in which sequences of genetic nucleotides and amino acid are analyzed along with structural features of proteins to determine genetic relationships. [61]

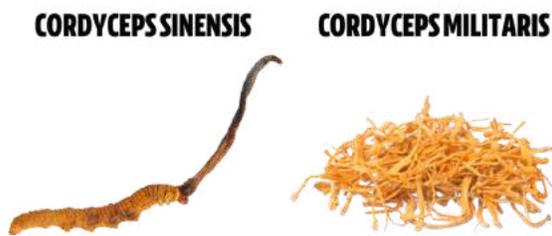
This deep dive revealed **Cordyceps sinensis—**as it was then called—lacks a close relationship to the majority of other cordyceps varieties, so the mushroom was reclassified as *Ophiocordyceps sinensis*. However, for all practical purposes we can just call it *Cordyceps sinensis*. (Latin names are tough enough!)



Cordyceps Militaris

Sometimes called the "Cordyceps flower," *Cordyceps militaris* does produce a fruiting body—and it's pretty easy to cultivate on a large scale.

This variety of Cordyceps is bright orange and bears a striking resemblance to Cheetos. The stroma can grow to be between 20 millimeters to 50 millimeters (about 3/4 of an inch to 2 inches) tall and may contain higher amounts of beneficial compounds than Cs-4.



What about CS-4?

Cs-4 (which stands for *Cordyceps sinensis* 4) is a strain of Cordyceps that is cultivated in liquid fermentation. If you see "sinensis" sold in a functional mushroom product, this is likely what is inside.

Because Cs-4 is only capable of producing mycelium, it's known as an anamorph: a vegetative or "asexual" form of the mushroom that doesn't generate spores.

There's actually a bit of a debate over whether Cs-4 is even a "true" anamorph of *C. sinensis*. Although other strains, particularly *Hirsutella sinensis*, show a greater genetic similarity to Cordyceps, Cs-4 is still the most-used strain and is likely the source in the majority of supplements listing *Cordyceps sinensis* on the label.^[62]

More research needs to be done to determine if other known and potential anamorphs have the same medicinal properties and beneficial compounds as Cs-4, or if Cs-4 itself is anywhere near as beneficial as other strains of Cordyceps.

HOW ARE CORDYCEPS MUSHROOMS GROWN?

Growing Cordyceps is a bit different than growing other functional mushrooms. Cultivation—either as Cs-4 or *Cordyceps militaris* is the preferred method; in fact, almost no Cordyceps supplements contain wild-grown mushrooms.

Why? The answer is more than a little weird...



Cordyceps in the Wild: The Parasite Factor

Most mushrooms grow on dying trees or decaying matter. But not *O. sinensis*. It prefers to grow on insects.

Yes, insects.

It's called being an endoparasitoid or entomopathogenic fungus, and its hosts are mainly arthropods—bugs and other invertebrates with exoskeletons.



Ghost moth larvae (*Hepialus armoricanus*) are the most common hosts. When Cordyceps spores infect a ghost moth caterpillar, they essentially take over its body, using the internal tissues as fuel. When caterpillar dies, and the Cordyceps stroma grows out of its head.[63]

The textured surface on the club of the stroma releases spores, which are distributed into the

surrounding environment to colonize new larval hosts.

Wild Cordyceps are mostly found at higher elevations—between 3,500 and 5,000 meters (about 11,500 to 16,400 feet)—which makes the Himalayan mountains a popular harvesting spot.

Due to the relative rarity of *C. sinensis* in the wild and concerns about overharvesting, researchers are looking into the possibility of replicating the mushroom's parasitic lifestyle for large-scale cultivation—but there's an easier way to go about growing Cordyceps for supplements.

Cordyceps Mycelium in Liquid Culture

Interestingly, Cordyceps is one mushroom whose cultivated mycelium appears to have some benefits that are similar to the wild harvested variety.

The most common way of achieving mycelial growth on a large scale is in a liquid culture. This method is often used in China, where the Cs-4 Cordyceps anamorph is grown in giant fermentation tanks.

The sterilized liquid culture contains all the nutrients the mycelium needs to grow, and strands of mycelium suspended

in the culture expand at a rapid pace.

When it can't grow any more, the mycelial mass is removed from the tank, dried and pulverized into powder. Some of the active compounds produced outside the mycelial cells, known as extracellular compounds, may be lost when the spent culture broth is discarded, but concentrations in the mycelium are still very close to those in wild-harvested *O. sinensis*.



Growing Cordyceps Fruiting Bodies

Cordyceps militaris is grown a different way: on solid substrates.

In this process, soy or rice is sterilized and placed in growing containers like jars or plastic bags before being inoculated with Cordyceps mycelium. A filter is added to prevent contamination as the mushrooms grow slowly at low temperatures.



Growing Cordyceps this way increases the concentration of beneficial compounds.

It takes about a month to get a *C. militaris* harvest, the final product of which is the full fruiting bodies that appear in the majority of Cordyceps supplements.

Cordyceps Mycelium on Grain

The third option for cultivating Cordyceps for supplements is to grow mycelium on grains like rice, wheat or rye. Unlike cultivating fruiting bodies, this method results in a mass of mycelium that's also full of grain substrate.

Some evidence suggests using this method can capture some of the extracellular compounds lost in liquid culture cultivation and that grain-grown products may have higher levels of compounds like cordycepin when compared to Cs-4.

However, a great deal of grain gets mixed in when the mycelium is harvested and processed, so

the ratios of beneficial compounds are likely to be lower overall.

Ants: True Cordyceps Mushroom "Zombies?"

One last thing of note: Bullet ants can also get "taken over" by Cordyceps. But it's a different species—*Ophiocordyceps unilateralis*.

Once the spores enter the ant's bodies, the insects climb up stems or branches and cling there. The Cordyceps then grows out of the ant's head, which can take up to three weeks. (You can [watch the process here](#), but be warned—it's a little gross.)

This isn't as unique or bizarre as it may seem. Each type of wild Cordyceps uses a specific species of insect to reproduce. But Cordyceps *can't* make the jump to humans (no matter video game creators may have you believe).



Cordyceps as Medicine in History

Cordyceps sinensis was officially recorded as a herbal drug in China in 1964, but its history may go back as much as 1,500 years!

It's hard to know exactly when Cordyceps was first used. But records suggest it was in use in China as far back as 620, and it made an appearance in the *Essentials of Materia Medica* in 1694. In 1757, the first scientific description was included in the *New Complication of Materia Medica*, and the mushroom was finally dubbed *Cordyceps sinensis* in 1878 by Saccardo, an Italian scholar.

What made the mushroom so popular as part of Chinese medicine? It was believed to possess properties that could "replenish the kidney, soothe the lung, stop bleeding, and eliminate phlegm."^[64]

Cordyceps also has a history of use in the Indian state of Sikkim as an aphrodisiac, as well as for numerous diseases and ailments, including:[65]

- Poor appetite
- Fatigue
- Chronic pain
- Tuberculosis
- Liver & kidney diseases

The mushroom has been used alone and in combination with other herbs in traditional preparations to produce the desired effects.

Cordyceps didn't start gaining popularity with the general public until around 1995. The increasing interest in its potential benefits has led to issues with overharvesting—and some pretty hefty price tags.



HOW CORDYCEPS WORKS (IT'S SCIENTIFIC!)

What causes the effects for which Cordyceps mushrooms are so celebrated? Several active compounds work together to

influence numerous systems and processes throughout the body.

Polysaccharides, including beta-glucans, are found both inside and outside the cells of Cordyceps and make up 3% to 8% of the mushroom's weight. [66] These complex carbohydrate chains are actually strings of smaller carbohydrate molecules; in Cordyceps, these include the monosaccharides mannose, glucose and galactose.[67] Numerous polysaccharides have been extracted from these mushrooms and tested for their specific benefits.

Nucleoside analogues are a unique component of Cordyceps. These molecules contain a nucleic acid analog, a sugar and a phosphate group made up of one to three phosphates.[68] Why is this important? True nucleosides are found in DNA and RNA. The analogs in Cordyceps have a different structure but function similarly, [69] which can affect processes involving DNA replication.

The most notable nucleoside analog in Cordyceps is called cordycepin, or 3-deoxyadenosine, the highest concentrations of which are found in *C. militaris* fruiting bodies.

Other notable Cordyceps

mushroom compounds include:

- **Lipids** (fats), including unsaturated fatty acids and sterols[70]
- **Amino acids**, the building blocks of proteins, including ring-shaped chains known as cyclic peptides and pairs of amino acids called polyamines[71]
- **Antioxidants** like carotenoids and superoxide dismutase (SOD)[72]
- **Cordycepic acid**, or d-mannitol

From a nutritional standpoint, Cordyceps is a source of a range of vitamins and minerals, which is pretty common among both functional and culinary mushrooms!



WHAT ARE THE BENEFITS OF CORDYCEPS MUSHROOMS?

Cordyceps' active compounds have been studied both in isolation and as a complete package, usually in animal (*in vivo*) or cell (*in vitro*) studies. The results don't necessarily mean that Cordyceps has the same effects in humans, but these studies do provide insight into how the mushroom's active compounds interact with the body.

By examining at the way the active compounds behave in lab environments, scientists get an idea of the potential reasons behind why Cordyceps has been prized as a medicine—and how the mushroom could best be used to address illness in humans.

Here are 13 ways *O. sinensis* and *C. militaris* appear to improve health, according to science.

1) Immune Support

Beta-glucans are the most notable polysaccharides found in functional mushrooms and are often cited for their ability to balance and support immune function. The beta-glucan concentration in Cordyceps is likely a factor in the numerous

effects the mushroom has on the immune system.

The interesting thing is that Cordyceps isn't necessarily an immune "booster;" rather, it's known as a bidirectional modulator because it either stimulates or suppresses immune responses depending on what the body needs. This effect works on both types of immunity to give the body extra ammo for immediate defense against infections (innate immunity) and provide support for more targeted responses (adaptive immunity).^[73]

This balancing act involves several related processes:

- Increased production of pro- and anti-inflammatory cytokines, including tumor necrosis factor alpha (TNF-alpha)
- Increased production of nitric oxide, which is toxic to bacteria^[74]
- Macrophage activation, which increases the body's ability to get rid of pathogens
- Stimulation of phagocytosis—the engulfing and destruction of pathogens^[75]
- Enhancement of natural killer (NK) cell activity

Together, these effects of Cordyceps may increase the body's ability to kill invading

bacteria and viruses or destroy and remove damaged cells.

How does it work? Cordyceps mushroom appears to influence signaling between immune cells in a way that promotes appropriate immune responses and tamps down excessive inflammatory reactions. It also helps with the maturation of dendritic cells, the cells responsible for presenting foreign substances—called antigens—to the immune system so that the body can decide whether a defense is necessary.

Cordyceps also may improve the health and function of the kidneys, spleen and thymus, all of which are key players in immunity. The thymus is particularly important—it's where T-cells, one of two primary types of immune cells, go to mature after being produced in the bone marrow.

Cordyceps and Gut Immunity



Special immune tissue in the gastrointestinal tract, known as gut-associated lymphoid tissue (GALT), could play a role in how

Cordyceps regulates immunity. A study on chicks showed hot water extract from *O. sinensis* improved the balance between harmful and beneficial bacteria in the gut, which may improve gut-related immunity.[76]

Cordyceps also appears to:

- Stimulate macrophages in GALT to promote antibacterial action
- Increase the release of immunoglobulin A (IgA), which improves gut immune defense[77]
- Reduce inflammation by eliminating antigens

2) May Boost Athletic Performance

In 1993, the Chinese Olympic women's track and field team stunned the watching world by breaking multiple records—and attributed their success, at least in part, to supplementing with Cordyceps. Since then, the mushroom has enjoyed a popular reputation as a performance booster.

Animal studies show that the mushroom does, in fact, appear to increase endurance. It may also increase oxygen capacity—the amount of oxygen the blood can absorb—which in turn has the potential to improve muscle function and endurance.[78]

In one study, mice treated with *C. militaris* polysaccharides were able to swim longer without fatiguing. This may have been due to a reduction in byproducts like lactic acid and an increase in serum levels of antioxidants. Glycogen concentrations in both the liver and muscles also increased, suggesting the mice had more fuel available to power their swimming.[79]

Similar results were seen in rats given an *O. sinensis* supplement: Compared to control groups, the rats receiving Cordyceps exhibited a greater increase in endurance when swimming. The mushroom appeared to increase the level of metabolic regulators in skeletal muscle, which helped the muscles use more glucose and lactate as fuel for exercise. Researchers also noted increased development of muscle capillaries, which could allow more oxygen to reach muscle tissue.[80]



Does Cordyceps Increase Athletic Performance in Humans?

Some small human studies appear to support Cordyceps' performance-enhancing effects:

- A study of 20 healthy people ages 50 to 75 showed taking a Cs-4 supplement three times a day for 12 weeks increased the amount of time it took for lactic acid to build up in the muscles and allowed participants to exert themselves more before getting out of breath. However, there was no effect on the maximum amount of oxygen their bodies could use during exercise, known as VO₂ max.[81]
- Another study suggests VO₂ max may be improved by supplementing for more than three weeks, allowing for better oxygen use and therefore more endurance. [82]
- Supplementing with Cordyceps appears to improve energy output in sedentary and/or elderly people but not in high-performing endurance athletes, which could mean the mushroom has more potential for people who haven't yet achieved peak performance.[83,84]



Why does Cordyceps provide an exercise boost? It appears to work in several ways, including increasing energy, reducing exercise byproducts, increasing availability of oxygen and fuel and reducing inflammation through increased antioxidant capacity.



3) Inflammation

Cordycepin and other compounds in Cordyceps mushrooms exhibit anti-inflammatory properties when tested on cells *in vitro*:

- Human blood cells treated with extracts of *O. sinensis* had lower natural killer cell activity and produced less of the pro-inflammatory cytokine interleukin-2 (IL-2).[85] The extract also reduced production of TNF-alpha, a protein called a cytokine that acts as one of the main regulators of the inflammatory response.[86] This beneficial immunosuppression could have powerful implications for addressing a number of conditions in which inflammation is a key factor.

- In a model of inflammation induced in macrophages, Cs-4 reduced numerous compounds associated with the inflammatory response, including nitric oxide and pro-inflammatory cytokines. It appeared to work by inhibiting nuclear factor kappa beta (NFk-B), which is involved in cytokine production, and AP-1,[87] which can control genetic expression in response to cytokines, stress and infections.[88]

Cordyceps' anti-inflammatory effect may be one of the reasons this mushroom is beneficial for immunity. Reducing inflammation helps restore balance in the immune system, allowing for more effective and appropriate responses to pathogens. Less inflammation can also mean less pain, making Cordyceps a potential option for pain relief. [89]

Antioxidants

Oxidative stress can cause cell damage that contributes to inflammation, but Cordyceps shows promise as an antioxidant. Extracts are not only able to reduce the presence of the free radicals that cause oxidative damage but may also prevent cholesterol from oxidizing, which is the first thing that happens

when plaques form in blood vessels.

Polysaccharides and polyphenols in cordyceps seem to exhibit the most antioxidant power. The strength of the response to oxidative stress varies depending on the variety of Cordyceps and the type of molecule.

Anti-Aging

Both anti-inflammatory and antioxidant activity can slow the effects of aging, suggesting that cordyceps could be a good choice for promoting healthy longevity. One study showed CS-4 can improve oxygen uptake, aerobic capacity and fatigue resistance in artificially aged mice.[90]

But there was an additional benefit: improved memory and brain function. The possible mechanism? A reduction in monoamine oxidase (MAO), which is responsible for breaking down the neurotransmitters brain cells use to communicate.



4) Heart Health



Because both inflammation and oxidative stress are causal factors in heart disease, reducing these factors prevent several potential complications, including oxidation of LDL.

Oxidized LDL prompts an immune response, which triggers a series of events that lead to plaque formation. Plaquing narrows blood vessels over time, reduces blood flow and increases the risk of heart attacks and strokes. The immunomodulating, anti-inflammatory and antioxidant benefits of Cordyceps may work together to protect against all factors involved in plaque formation.

Cordycepin may offer additional anti-plaquing benefits by acting on specific adenosine receptors called A(1) and A(2).^[91] When cordycepin interacts with these receptors, it appears to prevent cells in blood vessel walls from

migrating and proliferating, which reduces scar tissue formation.

Does Cordyceps Lower Cholesterol?

Several rodent studies suggest additional benefits of Cordyceps for heart disease may come from the mushroom's ability to improve cholesterol profiles:

- Hamsters and rats fed high-fat diets and treated with cordycepin for four weeks wound up with lower total cholesterol, triglycerides, LDL, VLDL, as well as better ratios of LDL to HDL and total cholesterol to HDL. These effects may have been the result of an increase in lipases, which break down fats in the body.^[92]
- Another study of hamsters fed high-fat diets showed similar results along with a reduction in visceral abdominal fat.^[93] In this case, Cordyceps may have worked by activating 5'-AMP-activated protein kinase (AMPK) and increasing phospho-acetyl-CoA carboxylase, both of which play roles in the way the body processes fatty acids.

These benefits may not be universal, however. Scientists studying the effects of *O.sinensis* hot water extracts in mice found

that the animals on higher-cholesterol diets showed the greatest improvement in blood cholesterol levels,[94] so Cordyceps may not have any significant effects when cholesterol intake or blood cholesterol is already low.

5) Gives an Energetic ATP Boost

One of the reasons Cordyceps mushroom is associated with better athletic performance may be due to its unique enhancing effect on adenosine triphosphate (ATP).

ATP is the "energy currency" of the body. After food is broken down into simpler components, some of these molecules go through a complex cycle of chemical reactions called the Krebs cycle (high school biology, anyone?).

ATP produced during this cycle powers cells and builds up the body.

Because this process is so complex, it's no surprise that the way Cordyceps may boost ATP is also a bit complicated. Studies suggest the mushroom has a direct effect on how much ATP is generated, perhaps by increasing enzyme levels during the Krebs cycle.[94,95]

These effects were shown in a study on mice given an extract from *C. militaris* fruiting bodies for two weeks. The mice had more ATP in both their livers and muscles than control mice, and they were able to recover better from fatigue.

-So, rather than reducing muscle fatigue, Cordyceps may improve endurance and energy by acting directly on the processes by which the body makes energy. [96]



6) Lung Health

Practitioners of traditional Chinese medicine believed Cordyceps mushrooms could clear excess phlegm, leading to better respiratory function. Because of this, the mushroom has been used traditionally to address respiratory problems.

Studies on inflammation, lung scarring and lung injury offer some support for this historical application. Both the potential anti-inflammatory

and immunomodulating effects of Cordyceps could have benefits for respiratory ailments involving inflammation and infection.

In a mouse model of acute lung injury, which involves an acute inflammatory response, cordycepin appeared to prevent or block inflammation and reduce oxidative stress by regulating specific genes and proteins.[\[97\]](#) Extracts from *O. sinensis* may also reduce the inflammatory immune response in this condition.[\[98\]](#)

Cordyceps shows promise for decreasing changes in tissue that can lead to scarring in lung fibrosis.[\[99\]](#) It's possible that cordycepin plays a role here. As an adenosine analog, it can interact with adenosine receptors in the lungs to potentially regulate inflammation to prevent scar tissue formation.[\[100\]](#)



Cordyceps and Asthma

The effects of Cordyceps on inflammation may be useful in addressing asthma. A human



trial investigated this potential by splitting 120 people into two groups. One group received *O. sinensis* capsules for 3 months along with their regular asthma treatments as needed; the other group just used their regular treatments.

At the end of the study, the group that took Cordyceps reported better quality of life, and their lung function had improved. They also had fewer inflammatory markers and high levels of immunoglobulin-G (IgG), suggesting a more balanced immune response.[\[101\]](#)

Polysaccharides from *C. militaris* appear to suppress pro-inflammatory compounds in a mouse model of asthma, including a very powerful cytokine called transforming growth factor beta 1 (TGF- β 1). Cordyceps also reduced immunoglobulin-E (IgE), which can be elevated in asthma and is associated with allergic reactions.[\[102\]](#) Water extracts of Cs-4 show similar anti-inflammatory activity and may reduce airway hypersensitivity associated with asthma.[\[103\]](#)

7) Fertility

Both men and women can suffer from problems with infertility. According to the U.S. Centers for Disease Control and Prevention (CDC):

- 12% of women under 44 have a hard time getting pregnant or having a full-term pregnancy
- 6% of married women under age 44 struggle to get pregnant even after trying for a year
- About 8% of infertility cases among couples result from male infertility[104]

Although there are many potential causes, Cordyceps show potential to be able to address infertility resulting from hormonal imbalances.

In vivo research shows *O. sinensis* can increase the most bioactive form of estrogen, 17beta-estradiol (E2). In premenopausal women, E2 regulates the female reproductive cycle, maintains egg health and prepares the uterus to nurture fertilized eggs, all of which are essential for successful pregnancy.[105] Cordyceps appears to regulate E2 by increasing steroidogenic acute regulatory protein (StAR) and aromatase, both of which

are involved in the production and regulation of steroid hormones like estrogen.[106]

For male fertility, *C. militaris* and cordycepin show some promise. "Subfertile boars" given *C. militaris* for two months produced more and healthier sperm. These effects continued for two weeks after stopping treatment.[107] Middle-aged rats given cordycepin experienced similar results.[108]

As of yet, it's unknown whether Cordyceps supplements can offer the same benefits for human fertility.

8) Blood Flow

In addition to showing promise for reducing inflammation and preventing the formation of plaques inside blood vessels, Cordyceps mushroom may also help blood vessels relax and open up by boosting both nitric oxide and endothelium-derived hyperpolarizing factor.[109]

The result? Less pressure inside blood vessels and better overall blood flow.

Does Cordyceps Really Works for Libido?

It's a delicate question, but Cordyceps has historically been seen as a solution for low libido,

for which poor blood flow is only one of many potential causes.

In fact, loss of libido can accompany or indicate other health problems, including heart disease, hormonal imbalances, depression, medication reactions, diabetes, reproductive disorders and drug abuse. Age is also a contributing factor.

In cases where hormones are the culprit, Cordyceps may be able to help. The mushroom apparently works by affecting the process the body uses to turn cholesterol into testosterone. [110] *O. sinensis* and several of its isolated extracts were able to boost testosterone in both mouse cells and actual mice of various ages, indicating there could be some truth to the anecdotal stories linking Cordyceps and libido. [111,112]



9) Blood Sugar

Compounds in Cordyceps have shown promise as anti-hyperglycemic agents—that is,

the mushroom might improve both glucose tolerance and glucose control, leading to lower blood sugar levels.

When scientists treated diabetic rats with Cordyceps fruiting body extract for four weeks, the animals gained less weight than the control group, and their bodies responded better to glucose. [113] Rats given Cs-4 had lower levels of blood markers associated with excess insulin release, suggesting their cells were more sensitive to insulin and needed less of it to balance blood sugar levels. [114,115]

Cordycepin's similarity to adenosine may come into play here. Adenosine receptors are found throughout the body, and the nucleoside has an effect on insulin signaling in muscles, fat and the liver. [116] As a stand-in for adenosine, Cordyceps could be thought to help regulate insulin activity.

Adenosine is also important in regulating inflammation, immune response and oxidative stress. Because both fat and immune activation are pro-inflammatory, these combined effects could be of particular interest when diabetes is accompanied by obesity.

Chronic inflammation could have a negative effect on

pancreatic function, which directly influences insulin production and release.[117,118] But *C. militaris* polysaccharides exhibit lipid-lowering effects in models of diabetes, leading to less fat in the blood and less fat oxidation. Even in mice fed high-fat diets, the mushroom reduced insulin resistance, lowered blood sugar levels and reduced liver, kidney and pancreas injuries associated with diabetes.[119]

10) Liver Health

Liver fibrosis, or scarring of the liver, can interfere with liver function and cause complications that are fatal in some people. Could Cordyceps be able to protect against scar tissue formation?

Studies support this clinical application. *O. sinensis* has been shown to relieve induced liver fibrosis rats by increasing the activity of an enzyme involved in collagen breakdown, effectively preventing scar formation.[120]

In another study, Cordyceps was able to not only prevent scarring but also reverse existing damage.[121]

What gives Cordyceps its anti-

fibrotic benefits? Both cordycepic acid and cordycepin appear to inhibit the boost in collagen production associated with liver scarring to reduce fibrous tissue formation.[122] Ergosterol may also be involved.[123]

Does Cordyceps Protect Against Fatty Liver?

In a study of 14 people, supplementing with *O. sinensis* for 90 days appeared to reduce liver enzyme levels twice as fast as simply abstaining from alcohol.[124] *C. militaris* lowered total lipids and triglycerides in the livers of mice with non-alcoholic fatty liver disease, suggesting better liver function. [125]



11) Kidney Function

Traditional healers may have been on to something when they turned to *O. sinensis* to address problems with kidney health. A quick breakdown of the science shows:

- *O. sinensis* can reduce gene expression related to inflammation and cell death in kidney injuries caused by loss of blood flow, known as ischemia-reperfusion injuries. [126]
- *C. militaris* may improve markers of kidney health while reducing enzyme activity associated with damage from kidney injuries, perhaps by prompting the body to make more of its own antioxidants. [127]
- Both types of Cordyceps mushrooms appear to interfere with the way LDL cholesterol can promote excessive growth of mesangial cells, which are found in the kidney's filtering units. This in turn can prevent LDL-related kidney injury or failure. [128]

12) May Have Calming Effects



Like other functional mushrooms, Cordyceps is an adaptogen, meaning it can have positive effects on hormones related to

stress. These hormones, including adrenaline and epinephrine, are produced by the adrenal glands in response to stress and regulated by both the hypothalamus and pituitary gland.

Cordyceps may be able to balance the stress response by affecting the way the hypothalamus and pituitary stimulate hormone release and may help the adrenal glands be more effective. [129,130] This can improve stress tolerance and reduce fatigue, as well as increase tolerance for physical and mental fatigue when it does occur.

Although most functional mushrooms share these properties, Cordyceps appears to exert its benefits specifically by affecting nitric oxide production. Because nitric oxide increases in stressful situations, regulating its release could help the body react and recover more efficiently.

Antioxidants may also have beneficial effects for people prone to high stress levels or anxiety. When people with anxiety disorders are given antioxidant nutrients, their condition appears to improve. [131] This hasn't been directly tested with Cordyceps yet, but it's possible the mushroom could have similar effects due to its

antioxidant properties.[132]

13) Virus Replication

Cordycepin's status as a nucleoside analog gives it a pretty cool superpower: It could interfere with viral DNA and potentially stop viruses from making copies of themselves.

If this sounds super nerdy, that's because it is.

The reason cordycepin is only *similar* and not *identical* to adenosine is because it lacks an oxygen atom in one part of the molecule. But it's similar enough that it can replace adenosine during DNA replication and actually stop the process.

This is much less likely to happen in normal cells, so there's little risk of Cordyceps affecting healthy tissues. But in cells weakened by viruses or cells that divide quickly, this mushroom may have the ability to prevent damage or stop infections from spreading.

Nucleoside analogs have already been used this way to combat diseases like HIV and hepatitis via drugs called reverse transcriptase inhibitors. While these drugs don't contain cordycepin, they have the same

function, which makes Cordyceps mushroom a good candidate for study in this area.

The general immunomodulating properties of Cordyceps may also have an anti-viral effect, perhaps by boosting key immune compounds that help the body defend itself.[133]

CHOOSING THE BEST CORDYCEPS MUSHROOM SUPPLEMENT



Functional mushrooms are usually sold as pills, powders or liquid extract tinctures.

Dual-extracted cordyceps are considered the gold standard, but since many of the important compounds in Cordyceps are water-soluble, water extracts can also provide powerful benefits.

Most Cordyceps supplements contain *C. militaris* unless the label specifies Cs-4 mycelium was used. It's incredibly rare to find a supplement made from wild-harvested *O. sinensis*; such supplements either carry huge price tags or don't actually contain what they claim.

Why is Cordyceps So Expensive?

The weird (and slightly creepy) life cycle of wild Cordyceps coupled with demand for its medicinal properties makes *O. sinensis* one of the priciest mushrooms in the world.

In 2007, the cost hovered around \$25,000 for 1 kilogram, or about \$11,365 per pound—and the highest-quality Cordyceps can cost even more. These rare wild specimens are only found for sale in Asia. As prices continue to rise, researchers are looking into more options for cultivating the mushroom at scale.

Cordyceps Mycelium on Grain vs. Liquid Culture vs. Fruiting Body

To date, *C. militaris* is still the best option when growing Cordyceps for supplements. It's easy to produce full fruiting bodies that contain the best mix of beneficial compounds and a

higher level of cordycepin than mycelium.

The same compounds are found in Cs-4, but there's a question as to how many compounds outside the mycelial cells are discarded along with the liquid culture used in production.

Mycelium grown on grain and harvested without producing a fruiting body also contains active compounds, sometimes even at concentrations similar to those achieved by other growing methods. However, because the Cordyceps mycelium can't easily be separated from the grain, high levels of grain-based starches dilute the final product.

How Supplements are Made from Cordyceps

Cordyceps mushrooms get turned into supplements one of two ways:

- Cultured Cs-4 mycelium is removed from the fermentation tanks, dried and turned into powder; no extraction process is necessary
- *C. militaris* fruiting bodies may be processed through water extraction or dual extraction before being spray-dried and turned in to powder

Both methods result in Cordyceps supplements that contain polysaccharides, lipids, cordycepin and the range of other compounds that give the mushroom its health-promoting properties.

Cordyceps Supplement Red Flags

Unfortunately, not every functional mushroom product on the market is high quality—and quality is essential for good results. To get the greatest benefits from taking Cordyceps:

- Avoid cheap products that claim to contain wild *C. sinensis*
- Check ingredient lists for any mention of grain
- Choose companies that can provide proof of the active compound content

You should also look for Cordyceps that is certified organic.



Where to Buy Cordyceps Mushroom

Cordyceps supplements are available online, as well as at some supplement and natural food stores. They can also be purchased directly from companies with solid reputations for quality and safety.

It's best to avoid buying wild Cordyceps online, no matter how tempting it might be. Verifying the source and safety is difficult, and even if it's 100% legitimate, the same benefits are available from *C. militaris* without the risk of overharvesting.

FreshCap Cordyceps powder and capsules are made from *C. militaris* fruiting bodies. Every product is tested to guarantee the levels of beta-glucans and cordycepin for best results.

HOW TO TAKE CORDYCEPS MUSHROOM SUPPLEMENTS

Capsules are the easiest, most convenient way to power up with Cordyceps since they can be taken as-is any time.

Tinctures are also convenient but may have a strong flavor if they contain alcohol.

The taste of Cordyceps powder is milder, so it can be easily added to meals, dressings, sauces, smoothies and beverages without much effect

on taste.

When to Take Cordyceps for Best Results

Because Cordyceps is known for being energizing, it's best to take it in the morning or before a workout. It can also be taken after a morning workout for more energy throughout the day.

For some, Cordyceps supplements aren't generally a good idea before bed, although consistent supplementation may lead to better sleep and improved sleep rhythms.

That being said, some do not get an acute energizing effect from Cordyceps, so it depends on your individual reaction.

Cordyceps Dosage

In human studies, the benefits of Cordyceps mushrooms have been tested at doses of 1 to 3 grams per day. One gram of powder—or the equivalent in capsule or tincture form—is a typical dose.

Some recommendations suggest taking Cordyceps supplements only one or two times per week to enjoy the benefits for immunity and overall health.^[134] However, the best results for both energy and specific health effects are typically achieved by taking the mushroom every day.



As with any natural supplement, Cordyceps shouldn't be used to treat a health condition or in conjunction with prescription medications without the advice of a doctor or other knowledgeable health professional.

CORDYCEPS MUSHROOM SIDE EFFECTS TO KNOW

Cordyceps supplements are generally considered safe and have few potential side effects. As with any natural supplement, there can be some who experience digestive discomfort, or other individual responses.

Does Cordyceps Interact with Medications?

As with any natural supplement, it is important to first check with a doctor or natural health care practitioner if taking Cordyceps along with other medications.

CAN YOU EAT CORDYCEPS?

Although it's not the most obvious choice for a culinary mushroom, *Cordyceps militaris* is, in fact, edible!

(But not like Cheetos. That would be weird.)

These mushrooms have an earthy flavor similar to that of other mushrooms and provide a burst of "umami" in soups and salads. Recipes may call for "Cordyceps flower," referring to the fruiting bodies of *C. militaris*, which are usually sold dried. As with supplements, it's important to vet the source first to ensure it's reputable. (Buying from a local mushroom grower is the best option!)

To cook with Cordyceps, soak dried fruiting bodies in hot water to rehydrate, and cook according to recipe instructions. The soaking water can be added to the dish or saved to drink as tea.



Brewing Cordyceps Tea

Dried *C. militaris* fruiting bodies can also be used primarily for tea and saved for use in recipes. To make a cup (or more):

1. Measure out 4 to 5 grams of cordyceps per 8 ounces of water.
2. Bring the water to a boil.
3. Reduce the heat to a simmer and add the mushrooms.
4. Simmer for 15 minutes with the lid on the pan.
5. Strain out the fruiting bodies and set them aside.

The resulting brew has a strong "mushroom-y" flavor; adding natural sweetener or a combination of ginger and lemon takes the edge off.

For a quicker tea, add 1/2 to 1 gram of cordyceps mushroom powder to 12 ounces of hot water. Sweeten or flavor as desired, stir and enjoy up to two cups per day.

Tasty Cordyceps Powder Recipes

Here are a few other creative ways to add the power of Cordyceps to snacks and meals:

- [Cordyceps Energy Bar](#)
- [Cordyceps Energy Balls](#)
- [Energy-Boosting Hero Smoothie](#)
- [Anti-Inflammatory Energy Smoothie](#)
- [Best Vegan Cheese Sauce](#) (no one will know it has mushrooms)
- [Mushroom Powered Macaroons](#)
- [Miso Mushroom Kale Chips](#) (a true superfood treat!)



CORDYCEPS FOR THE WIN!



Behind its rather weird façade, Cordyceps has a lot of power as a functional mushroom. The science to support some of its most famous effects is still in the early stages but shows a lot of promise. Its low incidence of side effects in most people make it a safe option for improving immunity, boosting endurance and combatting fatigue.

Taking a Cordyceps supplement probably won't turn you into a supercharged Olympian (although you can get there with practice). But making this mushroom a consistent part of your regimen can supercharge your routine!



LION'S MANE

THE BRAIN BOOSTING MUSHROOM

LION'S MANE: THE BRAIN MUSHROOM

Lion's Mane is a powerful functional mushroom with promising benefits for brain health, gut health and nerve regeneration.

How can a mushroom once used by monks as a concentration aid help with modern maladies? Can something with a bizarre moniker like "monkey head mushroom" actually improve brain function, boost mood, promote gut health and encourage nerve growth?

Whether it reminds you of a Muppet, a truffula tree or an actual lion, this quirky tooth fungus packs much more of a punch than meets the eye. Keep reading to discover how lion's mane mushroom can benefit your health on multiple levels.

WHAT IS LION'S MANE MUSHROOM?

Although its scientific name is *Hericium erinaceus*, Lion's Mane has several nicknames in countries around the world. In Japan, it's known as Yamabushitake, or the "mountain priest mushroom;" in China, it's Ho Tou Gu, the "monkey head mushroom."

Lion's Mane's shaggy



appearance has also earned it titles like:

- Bearded tooth mushroom
- Bearded hedgehog mushroom
- Bearded tooth fungus
- Satyr's beard
- Pom pom mushroom

These names all point to the unique puffball shape characteristic of Lion's Mane mushrooms—which makes them easy to recognize in the wild, at farmers markets or on the rare occasion some pop up at a natural grocer.

This functional mushroom shares traits with several edible and non-edible mushrooms known as "tooth fungi." Although not recognized as a separate scientific category, all tooth fungi grow and reproduce in ways that set them apart from other culinary and functional mushrooms. They have no caps or gills but instead distribute spores through long, hair-like "tooth" formations.

A Historical Look at Lion's Mane Mushroom

Like most functional mushrooms, Lion's Mane has a long history of use in Asian cultures, including traditional Chinese medicine. It's still used in China today in pill form as a remedy for gastritis, as well as ulcers of the stomach, esophagus and duodenum.

According to Chinese records, lion's mane mushroom cultivation didn't begin until 1988.

Modern cultivation practices vary, with some growing through the entire life cycle and harvesting the whole mushroom, and others skipping a step allowing for cheap, scalable production—often at the expense of quality. (More on this later.)



Traditional Lion's Mane Mushroom Benefits

Hericium erinaceus' claim to fame throughout the centuries was its apparent ability to soothe membranes in the digestive tract.

Traditionally used to combat digestive distress, stomach problems and other problems Lion's Mane mushroom was also recognized as a restorative agent for overall health.

The healing, regenerative nature of Lion's Mane was believed to help support:[\[135\]](#)

- Liver
- Spleen
- Heart
- Lungs
- Kidneys

Any "deficiency" within the body—believed to manifest outwardly with symptoms like insomnia, weakness and loss of strength—was a candidate for treatment with *Hericium erinaceus*.

Of course, Lion's Mane also has a long tradition of use for brain health. Some cultures recognize the mushroom as an aid for memory, concentration and overall mental function; others point to Lion's Mane mushroom for bolstering nerve growth and repair, as well as bringing clarity and focus.

How to Identify Lion's Mane Mushroom

All the "beard" references in nicknames for lion's mane provide a nearly perfect

description; they're not hard to recognize! However, since several species of tooth fungus exist (and not all of them are tasty), it helps to know what makes Lion's Mane unique.



Lion's Mane Fruiting Body

Hericium erinaceus grows to be 8 to 16 centimeters (around 3 to 6 inches) in size with fluffy "spines" 1 centimeter (just under 0.4 inches) long.[136] The mushrooms grow in single clumps, with the dangling spines creating a "snowball" appearance.[137] These spines continue to grow as the mushroom ages.

Color

Fresh, healthy lion's mane specimens are white in color. Browning can be an indication of damage, but it doesn't always mean the mushroom is no longer edible. (It just might not taste as good.)

Hericium Varieties

Several other mushrooms keep Lion's Mane company in the *Hericium* genus:

- *Hericium americanum*, characterized by longer spines
- *Hericium coralloides*, which grows in "branches" with dangling "hairs"
- *Hericium abietis*, found in the Pacific Northwest
- *Hericium alpestre*, a native of Europe
- *Hericium cirrhautum*, a shell-like variety

All are edible, but Lion's Mane is most commonly studied for its health benefits and cultivated for culinary and medicinal use.

Where to Find Lion's Mane Mushroom in the Wild

For aspiring mushroom foragers, *Hericium erinaceus* is an easy target. Hairy specimens pop up in the late summer and early autumn in North America, Europe and Asia.

Where does Lion's Mane mushroom grow?

Look for dead and dying hardwood, particularly fallen logs. Maple, beech, oak, walnut and sycamore can all act as natural substrates.

Where Can I Buy Lion's Mane Mushroom?

Those who prefer to "hunt" for mushrooms at the grocery store may be able to find fresh lion's mane mushroom for sale at farmers markets, Asian markets and neighborhood co-ops. Local growers are also good sources—and, of course, anyone who knows how to forage and is willing to share.

Sourcing mushrooms locally provides the best guarantee of peak freshness, flavor and nutrition. The farther they have to travel, the older they are by the time they hit the shelves, and the more likely they are to be bruised or not in great shape.

Can You Grow Lion's Mane Mushroom at Home?

Learning how to grow Lion's Mane solves the problem of trying to find this often-elusive specimen. Although *Hericium erinaceus* can take an entire year to come to full maturity in the wild, but it's possible to grow the mushroom at home in a matter of weeks.

A mushroom growing kit is the easiest way to start growing Lion's Mane. Because the process doesn't need anything special aside from humidity, beginners won't feel

overwhelmed by a bunch of complicated cultivation doesn't need anything special aside from humidity, beginners won't feel overwhelmed by a bunch of complicated cultivation instructions. All that's needed is to set the kit on a countertop and watch the mushrooms grow!

Advanced mushroom growers (and anyone up for a little more of a challenge) can start with Lion's Mane mushroom spawn and a hardwood sawdust substrate.



Harvesting Lion's Mane Mushrooms

Home-grown specimens are ready for harvest when they've become full "snowballs." All that's needed is to cut them off at the base and brush away any substrate before cooking.

One caution: Lion's Mane mushrooms bruise easily. Handle with care to avoid damaging the beautiful white fruiting bodies!

HOW LION'S MANE MUSHROOM WORKS

Lion's Mane contains a variety of functional compounds, but two main players stand out:

- Aromatic hericenones
- Diterpenoid erinacines

No other food contains this powerful duo—which is what makes lion's mane so special.

The chemical structures of these compounds are a bit complicated. Aromatics are made up of loops connected by covalent bonds (shared electrons). This adds a measure of stability known as aromaticity, hence the name. [\[138\]](#)

Diterpenes—naturally produced by plants, animals and fungi—have four isoprene units. An isoprene consists of two or more hydrocarbon units with specific arrangements of carbon atoms. [\[139\]](#) Non-erinacine diterpenoids appear in other functional mushrooms and exhibit both anti-microbial and anti-inflammatory activity. [\[140\]](#)

But erinacines can do something particularly unusual that non-erinacines can't: cross the blood-brain barrier. (Hericenones may share this ability; further study is needed for confirmation.) This stealthy superpower is what

gives Lion's Mane mushroom its reputation as a brain booster.

Of the numerous types of erinacines that have been identified, lion's mane fruiting bodies contain two, which are dubbed erinacine A and B. Why is this important? Both of these erinacines have been shown to promote the synthesis of nerve growth factor (NGF)—which has potential applications in addressing a host of neurological conditions and injuries. [\[141\]](#)

Other erinacines may be found in the mushroom's mycelium, but erinacines don't operate alone. The dual action of erinacines and hericenones is most likely the fuel that powers the many benefits of lion's mane mushrooms. Four of the 11 types of hericenones currently known to science also boost NGF, and all four can be found in lion's mane fruiting bodies. [\[142\]](#)

Overall, more than 70 compounds have been identified in *Hericium erinaceus* and more are being discovered. It may be that these new discoveries will help uncover some of the mysteries as to what makes Lion's Mane so mighty.



LION'S MANE MUSHROOM BENEFITS: FROM BRAIN HEALTH TO BETTER AGING

Okay, so there's a lot of amazing chemistry "behind the scenes," but what is Lion's Mane mushroom actually *good* for?

Science appears to support several traditional uses for the shaggy mushroom, and research is ongoing. Although the majority of studies have been performed on animals or on cells in petri dishes (*in vitro*), the results show promising potential for ways Lion's Mane can benefit human health.

Take a look at what research has revealed about the power of *Heridium erinaceus*.

1) Brain Health

The unique ability of erinacines to cross the blood-brain barrier and promote regenerative activity within the brain is the most-cited perk of using Lion's Mane mushroom.

Why is this such a big deal? It all comes down to NGF.

Nerve growth factor functions exactly as the name would suggest: It regulates nerve cell growth and reproduction, maintains cellular health and

prevents cell death.[143] NGF is a part of a family of molecules known as neurotrophic factors, which support both mature and developing neurons.[144] Neurotrophic factors make it possible for the brain to heal and repair itself after injury and maintain what's known as "plasticity" throughout life.

In other words, NGF is one of the reasons why you *can* teach an old dog (or, in this case, human) new tricks. Your brain never stops responding to information, thought patterns and outside stimuli, and NGF helps to strengthen—or even create—important neural pathways in the brain.[145]

But there's a weird catch. NGF itself isn't capable of crossing the blood-brain barrier; the molecule is too big. This isn't a problem in healthy individuals whose brains make enough NGF. When the brain begins to age, however, levels of NGF and other neurotrophic factors decline.

That's where *Heridium erinaceus* comes in. Extracts from the mushroom have the potential to enhance the growth of neurites. These projections grow out of nerve cells and become either axons or dendrites—the parts of neurons that allow the cells to communicate with each other.

More neurite growth (or regeneration) means better communication and better overall brain function.

Lion's Mane and Dementia

Problems with cognition can arise when the brain fails to keep up with growing and forming new connections as people age. The resulting cognitive decline can manifest as varying degrees of memory loss or dementia.



Several studies have shown the potential of Lion's Mane for dementia prevention and cognitive support:

- A group of 30 older adults with "mild cognitive impairment" were split into two groups and given either lion's mane or a placebo. Those supplementing with Lion's Mane performed better on cognitive tests at week 8, 12 and 16 of the study.[146]
- In studies on PC12 cells—used to study brain health and function—Lion's Mane appears to prevent damage and reduce the occurrence of cell death.[147,148]

- Even in healthy subjects, [149] mushroom supplementation may enhance the ability to recognize and recall previously learned information ("recognition memory") by exerting activity similar to brain-derived neurotrophic factor (BDNF). [150] BDNF supports neuronal plasticity, making learning, memorization and recall easier.[151]

Lion's Mane and Alzheimer's

Currently, no human studies have been done to examine the effects of *Hericium erinaceus* on Alzheimer's patients. In mouse studies, however, extracts of the mushroom were able to reduce symptoms of memory loss and prevent beta-amyloid (β -amyloid) plaque damage. [152] Since β -amyloid buildup is a key factor in the development of Alzheimer's, this activity could have significant implications for preventing or even treating the disease.

Other studies reveal additional ways Lion's Mane could help prevent damage associated with both dementia and Alzheimer's:

- *Hericium erinaceus* extracts improved memory and reduced Alzheimer's symptoms in rat studies[153]

- This mushroom may up-regulate an anti-inflammatory molecule known as lipoxin A4 within the brain, leading to a reduction in inflammation-related damage suspected of playing a role in cognitive decline[154]
- In a mouse model of Alzheimer's, erinacine-A-enriched Lion's Mane mycelia showed anti-plaque activity and promoted both NGF and its precursor, leading to neurogenesis (nerve growth) in the hippocampus[155]



Lion's Mane Nootropic Properties

Nootropics, sometimes called "smart drugs," are natural or synthetic substances with beneficial effects on the brain. Lion's Mane mushroom falls into the natural category, making it particularly popular among biohackers looking for an extra mental edge.

Lion's Mane's stimulating effect

comes without the buzz or crash of some other nootropics, most notably caffeine. It also doesn't share the potential negative side effects of some prescription nootropics. Instead, the mushroom is touted for its ability to safely enhance cognition, improve memory and support learning.[156]

Focus and Productivity

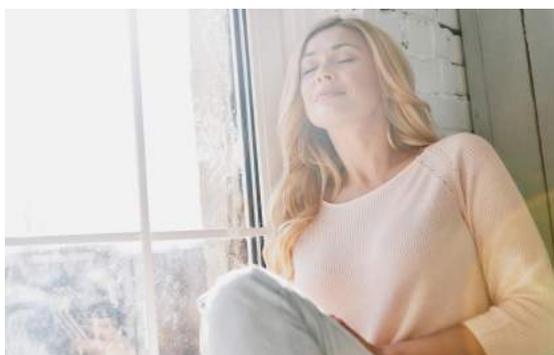
These nootropic properties—along with benefits related to improving mood and reducing anxiety—could account for why many people report better focus and productivity when supplementing with Lion's Mane. The active compounds appear to address the root causes of brain fog, which is a common complaint among those struggling with their attention spans. For this reason, Lion's Mane coffee has been gaining popularity as a way to enjoy an extra morning "boost."

2) Depression and Anxiety

Lion's Mane isn't only a powerhouse for memory—it may also help with mood. Extracts of *Hericium erinaceus* appear to regenerate cells in the hippocampus, the area of brain responsible for emotional response and memories.[157] In a mouse model, the mushroom showed potential to support

neurogenesis, the process of growing new nerve cells.

The practical daily benefit of all this can be seen in studies relating to anxiety and depression. A four-week trial involving a group of 30 post-menopausal women found that cookies made with Lion's Mane won out over placebo cookies for reducing anxiety and irritability. [158]



Lion's Mane extracts have been shown to block the signaling power of nuclear factor kappa beta (NF- κ B), a protein complex responsible for promoting inflammation by inducing synthesis of pro-inflammatory compounds. Lion's Mane can also reduce elevated levels of two pro-inflammatory cytokines known as IL-6 and TNF- α . [159]

Because inflammation may play a role in some mood disorders, these actions could offer significant benefits for people struggling with anxiety and depression.

One other thing of note: Lion's Mane mushrooms contain GABA, an inhibitory neurotransmitter that induces relaxation and may have anti-depressant effects. [160] Concentrations can be increased by boiling the mushroom and fermenting the resulting liquid. [161] However, this particular property hasn't yet been tested in relationship to mood disorders.

3) Heart Health

Studies have shown that Lion's Mane may be able to increase HDL cholesterol, lower both LDL and triglycerides *and* reduce the amount of cholesterol the body makes. In addition, a natural polymer from the mycelium appears to be able to lower the atherogenic index, an indicator of overall cardiac risk. [162]

In an *in vitro* study, one specific *Hericium erinaceus* fraction out of five was shown to be "the most potent" inhibitor of LDL oxidation and cholesterol synthesis. This suggests the potential to reduce cholesterol oxidation that leads to plaquing—and, therefore, prevent blood vessels from narrowing. [163] Lion's Mane may even prevent metabolizing fats from high-fat foods. [164]

Taken together, these activities could provide protection against

some of the most significant drivers of heart disease, a malady so prevalent in developed nations that arterial plaques have been discovered in babies *prior to birth*.[\[165,166\]](#)



4) Inflammation

Inflammation is coming to the forefront as a prominent factor in numerous chronic diseases. This is likely due to the slow, steady damage induced by inflammation at a cellular level. In cases where ongoing low-grade stress is an issue, this damage can affect any system in the body, thus setting the stage for disease.

Lion's Mane fruiting body extracts have demonstrated potent antioxidant activity, which is just what the body needs when faced with chronic inflammation. [\[167\]](#)

Antioxidant Power of Lion's Mane Mushrooms

When the body is stressed or exposed to chemicals—whether in the environment or food—compounds known as free radicals form. Free radicals are lacking electrons and will "scavenge" electrons from

healthy cells to achieve stability, which touches off an inflammatory cascade that can lead to damage. Over time, this damage causes changes associated with aging, which often include chronic disease.

Antioxidants like those found in Lion's Mane have the ability to "donate" electrons to free radicals, which neutralizes the compounds while protecting healthy cells. The result? Less inflammation and a lower risk of cellular damage.[\[168\]](#)

According to research, lion's mane may have specific benefits related to this anti-inflammatory activity, including:

- Reducing skin aging by boosting levels of skin antioxidants and collagen proteins[\[169\]](#)
- Reducing pro-oxidant reactive oxygen species (ROS) and increasing antioxidant levels in the brain[\[170\]](#)
- Boosting antioxidants and reducing lipid peroxidation in diabetic rat models,[\[171\]](#) which suggests potential applications for managing diabetic neuropathy.

Lion's Mane and Metabolic Syndrome: The Inflammation Connection

Inflammation is also a significant

concern in obesity—and together, they're a dangerous duo of risk factors for metabolic syndrome and full-blown diabetes. Fat cells naturally release pro-inflammatory compounds called cytokines, so being obese increases the likelihood of suffering from chronic inflammation and its consequences. *Hericium erinaceus* can exert a protective effect by reducing or preventing this inflammation.[172]

In addition, lion's mane could potentially reduce the expression of pro-inflammatory cytokines, even when a high fat, high sugar diet is consumed, thereby lowering the risk of metabolic syndrome.[173] This isn't a free pass to eat a bunch of junk food, but it *does* show just how powerful this mushroom can be, even when the metabolic odds are stacked against it.



5) Lion's Mane and Diabetes

What about Lion's Mane for diabetes? The current body of scientific evidence suggests this

mushroom has benefits beyond its anti-inflammatory activities in cases of metabolic syndrome. Research in diabetic animal models shows:

- Potential anti-hyperglycemic effects[174]
- The ability to increase insulin levels and reduce lipids in the bloodstream[175]
- Antioxidant activity; reduced inflammation; and regulation of HbA1c, insulin and plasma glucose levels[176]

6) Immune Activity

Lion's Mane is associated with stronger immune system activity, a characteristic it shares with several other functional mushrooms. It appears to affect immunity by:

- Boosting innate immune activity to protect against bacterial pathogens[177]
- Boosting natural killer cell activity, enhancing antibody-mediated (humoral) and cell-mediated immunity and improving the ability of macrophages to ingest and destroy pathogens[178]
- Upregulating secretory immunoglobulin A (SIgA), which protects against toxins and pathogens in the intestine[179]

How Lion's Mane Could Improve Gut Health

SIgA secretion is just one of a range of Lion's Mane's gut benefits. Since nearly 70% of immune tissue is located in the gut,[\[180\]](#) anything that supports a healthier internal ecosystem can directly benefit immune function.

Gut inflammation and an imbalance in gut bacteria (dysbiosis) are two major factors in poor gut health—and, by extension, inadequate or inappropriate immune responses. Lion's Mane mushroom has the potential to reverse dysbiosis, ease inflammation in diseases like colitis and maintain a strong intestinal barrier to prevent pathogens from passing into the bloodstream.[\[181\]](#)



Lion's Mane may also modulate microbial balance to bring about positive effects on the immune system as a whole, such as:

- Better T-cell proliferation and differentiation, which allows the body to properly target and attack invading pathogens[\[182\]](#)
- Accurate "training" for the immune system to recognize and eliminate antigens instead of attacking body tissues[\[183\]](#)

Additional prebiotic properties of the complex carbohydrates in Lion's Mane mushrooms may allow the body to recover from microbial imbalances due to inflammatory bowel disease (IBD) or antibiotic use, leading to a reduction in IBD symptoms and better immune system control. [\[184\]](#)

7) Gastric Ulcers

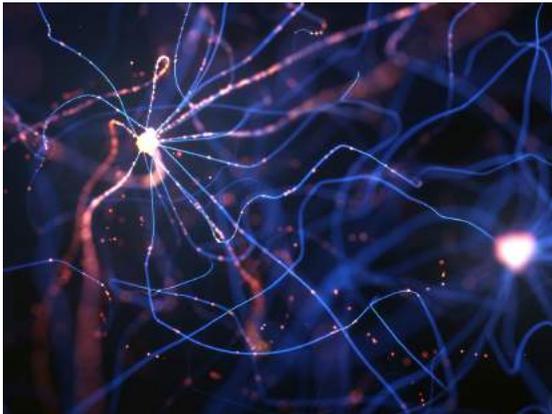
Here's one traditional use for *Hericium erinaceus* that gets the thumbs-up from science. More than one study has shown treating gastric ulcers with Lion's Mane appears to reduce their size.[\[185\]](#) The mechanisms behind this may include:

- Increasing antioxidant activity to protect the gastric mucosal lining from damage[\[186\]](#)
- Preventing the growth of *H. pylori*, commonly associated with ulcer formation

Lion's Mane's antioxidant effects may also offer help in cases of

colitis. Alcohol extracts of the mushroom appear to minimize the consequences of inflammatory and autoimmune damage by suppressing pro-inflammatory compounds and upregulating natural antioxidant activity in the body.[187]

8) Damaged Nerves



Some of the same properties that make Lion's Mane mushroom good for brain health may explain why it's been shown to help with recovery from nerve injury, nerve pain (neuropathy) and strokes.

For example, one *in vitro* study showed Lion's Mane extract was able to speed up development of the protective myelin sheath around nerves in cultured brain cells while promoting "normal" cell growth.[188] In another study using animal cells, extracts promoted neurite growth in both brain and spinal cord models. [189]

A study directly addressing nerve

injury in rats indicated lion's mane mushrooms have the ability to regenerate nerves and improve recovery, possibly by promoting relevant nerve signaling pathways and axon protein synthesis.[190,191] Other research using erinacine-enriched lion's mane mycelia to address neurodegeneration in an animal model demonstrated a delay in neuronal cell death and suggested potential for improving recovery from both hearing loss and pain associated with nerve damage.[192]

Demyelination

By promoting normal nerve cell growth and supporting myelination, it's possible that extracts from Lion's Mane mushroom fruiting bodies could help.[193] This hasn't officially been studied, but other properties of the mushroom—including its anti-inflammatory activity and ability to promote NGF production—also suggest potential applications in treating or improving this condition.



9) Longevity

For centuries, Eastern cultures have recognized functional mushrooms' ability to improve overall health—and many believed these powerful fungi could also lengthen life.

Sounds like the dream of a mystical fountain of youth, right?

There might be more to it than that.

Oxidative stress from any source creates free radicals in the body. Free radicals running amok leads to cell damage, and cell damage is a big culprit in the aging process.

And then there are telomeres. Telomeres are specific sequences at the ends of DNA strands. They can be thought of somewhat like the plastic tips that keep shoelaces from unraveling—because it's the job of telomeres to protect DNA strands from damage.[196] Every time cells divide, though, telomeres get shorter, a process that limits how many times a particular cell line is able to replicate.



Oxidative stress can speed up this natural shortening process. [197] (That might explain why it seems like stress accelerates aging—science is starting to show this could actually be the case!) Antioxidant compounds like those found in lion's mane, however, have the potential to modulate these effects.[198]

The key here appears to be brain-derived neurotrophic factor. BDNF is known for its role in promoting learning and memory,[199] but it can also regulate telomerase, the enzyme involved in maintaining telomere length.[200] Lion's Mane may promote telomerase activity by:

- Exerting BDNF-like effects[201]
- Regulating natural BDNF levels
- Correcting BDNF deficiencies[202]

Along with the numerous other known and emerging benefits of the mushroom, these factors suggest *Hericium erinaceus* can make it possible to enjoy a healthy, vibrant life at any age.

WHAT IS THE BEST LION'S MANE SUPPLEMENT?



Choosing supplements should always be a careful process. Because natural supplements, including functional mushrooms, aren't specifically regulated, not every manufacturer is honest about what's in their products.

For *Hericium erinaceus* supplements, it's important to look for products made from pure mushroom or mycelium. Avoid artificial ingredients, binders, fillers, grains and starches.

If grain is listed on the label, it's likely the

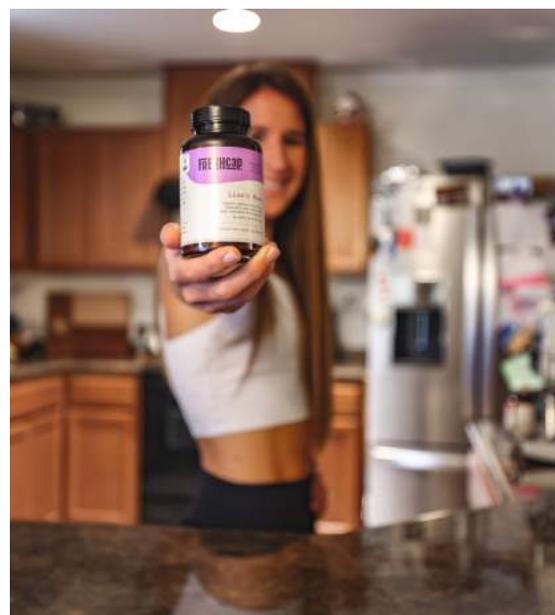
supplement contains more starch than actual Lion's Mane.

How Lion's Mane Extract is Made

Functional mushroom extracts and powders are made using one of three processes: water extraction, alcohol extraction or dual extraction.

In *water extraction*, mushrooms are simmered in vats of hot water to make a decoction, sort of like strong tea. *Alcohol extraction* involves soaking mushrooms in alcohol for several weeks.

Performing both processes separately and combining the result creates a dual extract, which contains both the water soluble and fat soluble compounds.



Here's what it looks like step by step:

1. Harvest and dry whole Lion's Mane fruiting bodies.
2. Mill the dried mushrooms into a fine powder.
3. Perform a hot water extraction or an alcohol extraction.
4. Use spray drying to turn the extracted liquid into a powder.
5. Combine the powders if dual extraction was performed.

How Much Lion's Mane Does it Take to Make a Mushroom Extract?

It typically takes 12 kilograms (about 26.5 pounds) of lion's mane to make 1 kilogram (2.2 pounds) of water extract—that's a 12:1 ratio. Alcohol extracts are closer to 10:1, but ratios can vary.

Either way, it's a lot of powerful mushroom compounds in a small amount of extract!

Lion's Mane Mushroom Capsules vs. Powder

Lion's Mane is available in capsules, powders and tinctures. The mushroom also appears in functional foods like coffee, elixirs and drink mixes. Dried lion's mane can be brewed into tea.



The "best" form of lion's mane supplement is whatever form makes sense for a person's lifestyle. Each type has its benefits:

- Tinctures are quick and easy to take
- Capsules fit easily into existing supplement regimens
- Powders can be incorporated into a variety of drinks and foods

As long as the supplement is adequately extracted and of high quality, form should have no impact on benefits.

Hericium erinaceus supplements are available at natural supplement stores and online. FreshCap offers dual-extracted lion's mane powder and capsules made from fruiting bodies with no grain or fillers.

Does Mushroom Coffee with Lion's Mane Work?

Mushroom coffee is a popular item and growing in use. But is it really worth the hype?

There's no specific science to support any potential benefits of combining functional mushrooms with coffee in particular, but given that both Lion's Mane and caffeine are natural nootropics, it makes sense that putting the two together could have a compound effect on energy and focus.

Dose, extraction process and the purity of the mushrooms could all influence how well this brain-boosting combination may work.



HOW TO GET ALL THE BENEFITS OF LION'S MANE MUSHROOMS

Natural supplements work best when used consistently over time—and functional mushrooms are no exception. That means supplementing with *Hericum erinaceus* requires a little

patience to see all the benefits.

If positive effects don't seem evident after taking lion's mane supplements for a while, stop for a short time to see if there's any noticeable difference. The best results usually come when lion's mane is part of a regular routine.



Lion's Mane Mushroom Uses

Brain health, mental clarity and focus are the top reasons why many people reach for Lion's Mane mushrooms. In addition to improving mental function, *Hericum erinaceus* is also used for:

- Reducing stress
- Improving sleep
- Increasing productivity
- Supporting gut health (and, by extension, immunity)

Remember that no natural supplement should be used in place of professional medical attention. If physical or mental symptoms persist or worsen, get evaluated by a doctor.

When to Take Lion's Mane



Is there a best time to take Lion's Mane mushroom? It depends on the desired outcome.

Putting mushroom extract powder in a morning cup of coffee or post-workout smoothie can provide a brain boost to jump start the day. Supplementing in the middle of the day can help overcome the dreaded "mid-afternoon slump"—without caffeine or sugar!

Paradoxically, this brain-enhancing mushroom can also be beneficial when taken before bed. Some people find *Hericium erinaceus* relaxing and are able to sleep better thanks to its stress-reducing effects.

When taking Lion's Mane more than once per day, space the doses out. Experiment with different times to test the effects and find the most beneficial pattern for supplementation.

How Much Lion's Mane Mushroom Should I Take Per Day?

Functional mushroom dosage varies by type and form. Suggested daily doses for lion's mane are around .5g-3 grams of extracted powder.

Start with small, consistent doses, and monitor the results before deciding whether to take more, and work with a natural healthcare practitioner if you're unsure of the best way to incorporate lion's mane into your regimen.

Consistency is key. Taking mushroom extract or powder every day provides the best results. And feel free to use fresh Lion's Mane as a culinary mushroom any time!



LION'S MANE MUSHROOM SIDE EFFECTS

To date, there haven't been any human studies on whether or not *Hericium erinaceus* can have negative effects. The only reported symptoms are likely the result of rare mushroom allergies.

Animal studies show supplementing with Lion's Mane is apparently safe at high doses for up to one month and low-to-moderate doses for up to three months. As a dietary supplement, the mushroom is considered safe for humans for up to 16 months. [204]



How Safe are Lion's Mane Mushroom Supplements?

When obtained from reputable sources and used as advised, Lion's Mane is a safe and natural sidekick. However, there are a few important considerations:

- Don't supplement when pregnant or nursing
- Consult with a doctor when taking medications or dealing with specific health conditions
- Avoid taking Lion's Mane prior to surgery or if a bleeding disorder is present since the mushroom can slow clotting
- Monitor blood sugar for hypoglycemia when supplementing in conjunction with diabetes treatments

Is Lion's Mane Addictive?

It's reasonable to wonder if a natural "brain enhancer" has any potential addictive properties. But rest assured, it's not like a drug! Lion's Mane mushroom, with its low risk of side effects, is a much safer choice than synthetic nootropics.



LION'S MANE MUSHROOM RECIPES

Because Lion's Mane isn't bitter like some other functional mushrooms, it works well as a versatile ingredient. Lion's Mane powder incorporates easily into smoothies, energy bars and other homemade "functional foods" without impacting the flavor.

Of course, there's no treat like fresh *Hericium erinaceus*, whether foraged, homegrown or store bought. It's simple to prepare and makes a delicious addition to a variety of dishes.

What Does Fresh and Cooked Lion's Mane Taste Like?

Ask most people this question, and you'll get a common answer: "Seafood."

The light, sweet flavor of this mushroom has been likened to shellfish like crab, which explains its popularity as an ingredient in vegan "crab cake" recipes. It's not an overly *fishy* seafood taste—but it's just enough to fool the brain without overpowering the taste buds.

Because Lion's Mane is soft and somewhat spongy or springy, it's great in saucy, savory dishes that have lots of spices. The mushroom soaks up the flavor and becomes even more delicious as it cooks.



Is Lion's Mane Mushroom Healthy?

It's hard to find exact nutrition information for *Hericium erinaceus*, but the available data is similar to other culinary mushrooms. Sources show somewhere between 35 and 50 calories per 100 grams of raw mushrooms, two to four grams of protein and around seven grams of carbs (some of which is fiber) As far as the nutrient profile goes, Lion's Mane is a source of:

- Zinc
- Potassium
- Selenium
- Polysaccharides (complex carbs with additional health benefits)

Lion's Mane mushroom don't usually provide specific nutrients and shouldn't contribute a significant amount of starch to the diet if no fillers are present. But they *are* great sources of the compounds that give Lion's Mane its health-boosting power!



How to Cook Lion's Mane Mushroom

No special culinary prowess is

required to make tasty Lion's Mane mushroom dishes. Here's how to have them come out perfect every time:

1. Brush off any dirt or gently wash and squeeze out all the excess water.
2. Pull apart or chop into bite-sized pieces.
3. Drop into a hot pan along with some onions and garlic to sauté or brown.
4. Add seasonings like thyme, parsley, rosemary and/or lemon—but no liquid, or the mushrooms will get soggy.
5. Cook longer for a chewier texture.



Enjoy the finished mushrooms as a side dish, on top of pizza, mixed into mac and cheese, on top of salad or incorporated into a brain-boosting burger. It's also great with pasta or as a seafood substitute in traditional shellfish recipes.

These are just a few ideas. Experiment to discover and create tasty new favorites.



Fresh Ways to Use Lion's Mane Mushroom Powder

Prefer to make Lion's Mane a daily habit instead of an occasional treat? Try these recipes to power up your brain with supplemental powder:



- [Lion's Mane Energy Balls](#)
- [Lion's Mane Matcha Latte](#)
- [Lion's "Manego" Smoothie](#)
- [Brain Boosting Lion's Mane Smoothie](#)
- [Dairy-Free Queso Sauce with Lion's Mane](#)
- [The Ultimate Coffee Smoothie](#)
- [Supercharged Chocolate Bark](#)

TRY LION'S MANE FOR YOURSELF!

The Lion's Mane mushroom is not only beautiful and delicious; it's also supercharged with compounds that have the potential to improve your brain. These claims are backed up with both anecdotal evidence and thorough scientific research, which is more than can be said for a lot of brain-boosting tricks.

Since there is no known harm from ingesting Lion's Mane at supplemental doses, it's worth it to give the mushroom a try and see if it works for you.

No matter our age, occupation, goals or dreams, we could all benefit from a mental boost, right? And you can't really go wrong with a mushroom that looks like a Muppet (or a beard, or a monkey head...).





REISHI

THE MUSHROOM OF IMMORTALITY

REISHI: THE MUSHROOM OF IMMORTALITY

Reishi mushroom is a rich source of natural compounds with the power to boost immunity, smack down stress and cool inflammation.

Known by some cultures as the "mushroom of immortality," Reishi mushroom has been used for thousands of years to increase vitality, bolster the immune system, support cardiovascular health and promote longevity.

Does it live up to its reputation? Can taking Reishi mushroom supplements really promote internal balance and turn the immune system into an unstoppable powerhouse?

We combed through the history and science of Reishi to unlock its secrets—and we'll walk you through our discoveries in this next section!



WHAT IS REISHI MUSHROOM?

Ganoderma lucidum — commonly known as Reishi — is a beautiful, unique specimen among fungi. Also called lingzi (the divine or spirit mushroom) in China and mannetake (the mushroom of immortality) in Japan, Reishi has long been revered for its medicinal properties.



Reishi in Medicine: A Brief History Lesson

Asian cultures have used Reishi mushroom in medicine for thousands of years. In traditional Chinese medicine (TCM), it's part of a group called "Fu Zheng," which includes herbs and foods considered to be some of the most powerful for improving strength, health and longevity.^[205]

The Classics of the Materia Medica—written in the Eastern Han dynasty (25-220AD)—references the mushroom, and it's still listed in the *State Pharmacopoeia of the People's Republic of China* as a remedy for several conditions.

Before major supplemental cultivation began in the 1970s, Reishi was relegated to the realm of nobility. Its relatively uncommon appearance in the wild made the mushroom a prized commodity, giving it an almost mystical halo and a price point only the rich could afford.

Today, functional Reishi mushrooms are available in a variety of forms, including supplements, beverages and functional foods.



Traditional Benefits of Ganoderma Lucidum

What was Reishi traditionally used for? Most of the purported medicinal properties stem from a belief that the mushroom can create balance by influencing energy and vitality.

Referred to as "tonifying" in TCM, *Ganoderma lucidum*'s balancing properties were believed to positively affect heart health, improve memory, ease stress, heal respiratory problems and even combat aging.

There are several other *Ganoderma* species, including *G. applanatum*, *G. curtisii*, *G. Oregonese*, *G. Sessile*, *G. Tsugae* and more.

Each mushroom grows well in different areas and on different types of wood. Although *Ganoderma lucidum* is the main species used in supplements and research, science is beginning to reveal potential health properties in other types, as well.

What Does Reishi Mushroom Look Like?

You won't find Reishi poking out of the ground in a typical stem and cap shape. Instead, they grow on dead or dying hardwood trees in either "antler" or "conk" form. These growths are known as the fruiting body of the mushroom.



Because Reishi mushrooms grow out and not up, they're known as bracket fungi or shelf fungi (although when cultivated, they can definitely be made to grow "up").

The mushroom is also classified as a "polypore," meaning that, rather than gills, the underside is composed of thousands of pores and is lined with cells called basidia that make spores.

When it's time for reishi mushrooms to reproduce, the basidium release the spores into the air for dispersal to new areas.

The Shiny Specimen

Young Reishi starts off white, and the underside retains this color. The kidney-shaped conk, however, turns red or orange and develops a sheen as it grows.

In fact, Ganoderma means "shiny skin," and the wet or painted appearance has earned the mushroom the nickname of "varnished conk."

The sheen fades as the mushrooms age, making older specimens look dull. Dullness may also indicate recent spore release; some spores settle pretty close to home!

How big can Reishi get? It's normal for conks to be 1 to 2



inches thick and less than 12 inches across, but they can get much larger under certain conditions.



HOW ARE REISHI MUSHROOMS GROWN?

Ganoderma lucidum appears in the wild between May and early autumn, "feeding" on wood and playing an active role in the natural process of decay.

Compounds in the wood can directly influence concentrations of active compounds in mature mushrooms,^[206] which may result in unique combinations and variations from one location to another.

However, most Reishi used in supplements are cultivated on outdoor farms, in shade houses or in greenhouses, using either logs or sawdust fruiting blocks.

Cultivated Reishi starts out in the antler form before maturing into conks. The mushrooms love

warm weather, so summer temperatures between 70 F and 80 F are optimal for growth.

Fully grown Reishi mushrooms provide the greatest health benefits, which means waiting about nine months to harvest fruiting bodies grown on wood. The reishi must be kept warm and moist throughout the process to ensure a successful harvest.



WHAT COMPOUNDS ARE IN REISHI?

Researchers have extracted and identified two major beneficial components from Reishi mushrooms: beta-glucans and triterpenes.

Beta-Glucan Basics

Beta-glucans (or beta-d-glucans) are found at high levels in Reishi fruiting bodies. They're a type of water-soluble complex carbohydrates called polysaccharides that also function as fermentable fiber, meaning they survive digestion and are broken down by gut microbes in the colon.

Beta-glucans' complexity is due to their molecular structure, which consists of carbon chains sporting branches or side chains. Differences in side chain arrangement may be the reason why beta-glucans found across the fungal kingdom appear to have different functions.[207]

When beta-glucans are linked to proteins, they form polysaccharide peptides like those found in Reishi mushrooms. It's possible that medicinal potency could be related to the degree of molecular complexity.

Triterpene Traits

Triterpenes aren't soluble in water; instead, they require alcohol or fat for the body to break them down and extract the benefits.

Ganoderic acid is the main triterpenoid found in *Ganoderma* species and is responsible for the mushrooms' bitter flavor.

So far, research has uncovered over 100 triterpenes in Reishi alone, at least 50 of which aren't found in other fungi.

These complex molecules—which are made up of carbon, hydrogen, oxygen and sulfur atoms[208]—come in various types and have different functions. Specific ganoderic

acids, such as ganoderic acid A[209], have been associated with beneficial activities.

Sterol Strengths

Sterols act as hormone precursors—inactive compounds that become functional hormones when activated.[210]

In humans, cholesterol is the most well-known of these molecules.

Reishi produces numerous sterols, including ergosterol, the precursor to vitamin D. The diverse sterol content is still being studied in relation to its effects on human health.[211]



HOW ARE ACTIVE REISHI COMPOUNDS ISOLATED?

Breaking through the tough cellular walls to release beta-glucans and triterpenes requires a specialized extraction process.

Reishi mushroom supplements are made using alcohol extraction, water extraction or a

combination of both (known as dual extraction).

Alcohol extraction is sort of like a steeping or tincture-making process in which Reishi is soaked in alcohol for several weeks; the triterpenes come out in the alcohol. In water extraction, dried whole Reishi is simmered in vats for a few hours to draw out the beta-glucans.

Combining the resulting extracts creates a final product in liquid or powder form that contains as many beneficial Reishi compounds as possible.

Using the fruiting body ensures the highest concentration of beta-glucans and triterpenes.

WHAT ARE THE BENEFITS OF REISHI MUSHROOMS?

Reishi's reported health benefits are nothing short of impressive.

That's why it is the most commonly used functional mushroom in the world.

Research into the purported health effects is ongoing as scientists seek to uncover the exact mechanisms of action that make *Ganoderma lucidum* so powerful.

There's plenty of information out there touting what Reishi

mushroom is good for, but what does the science say? A growing body of rigorous studies is available evaluating Reishi's reported health benefits.

Here's what the research shows on 10 potentially powerful effects of functional Reishi mushrooms on health.

1) Immune Health

Reishi's immunological effects are one of its most cited and celebrated properties and can be thought of as the core or foundation of the mushrooms other benefits.

Studies show Reishi may support the immune system by:

- Affecting white blood cell genes to increase production of natural killer cells
- Increasing T cell and B cell counts to strengthen cell-mediated immunity and improve antibody response[[212](#)]
- Activating interleukin gene expression to regulate immune responses
- Boosting tumor necrosis factor production to regulate cell cycles, including cell death[[213](#)]
- Reducing the inflammatory responses involved in allergic reactions

2) Inflammation

Inflammation gets a bad rap, but it's actually a beneficial process.

When an injury occurs or pathogens invade, the body sends out an army of immune cells to address the problem. The resulting inflammatory cascade can cause symptoms like pain, swelling and redness.

The process is supposed to stop once the trigger is taken care of. When it doesn't, a chronic inflammatory reaction develops. The resulting damage appears to play a role in a significant number of chronic and age-related conditions.

One animal study showed a specific protein from Reishi can help modulate the immune system's response by increasing anti-inflammatory cytokine and regulatory T-cell production.[[214](#)] Some studies on cancer [[215](#),[216](#)] show terpenes may also have anti-inflammatory effects.[[217](#)]

However, not all Reishi research agrees on these benefits:

- One study on healthy subjects receiving commercially prepared Reishi capsules showed no changes in biomarkers related to inflammation.[[218](#)]

- Another study revealed a marked increase in plasma antioxidant capacity after supplementing with Reishi. [219]

It's possible some of these conflicts may be due to how different Reishi preparation methods can affect levels of beneficial compounds.

3) Heart Health

Any weapon that could be added to the arsenal in the fight against the world's number one killer—heart disease—is worth investigating. Research into this aspect of Reishi mushroom health benefits is mixed but shows some promising effects.

According to studies:

- Reishi may positively affect blood lipid levels, [220] although results may differ for people with other chronic conditions like diabetes [221]
- Antioxidant activity could reduce or prevent lipid peroxidation, which is the first step in plaque formation [222]
- Taking Reishi mushrooms could favorably influence blood pressure
- Reishi has the potential to prevent heart damage from chronic disease and unhealthy lifestyle factors [223]

Some evidence indicates these mushrooms may also offer additional benefits by lowering LDL and total cholesterol levels, reducing triglyceride production and increasing HDL. [224, 225]

The mechanism of action here isn't clear, but researchers think the collective effects of beta-glucans and triterpenes may play a role by mediating oxidative stress, thus decreasing the risk of cellular damage.

4) Sleep



According to the American Sleep Association, 37% to 40% of adults ages 20 to 59 say they don't get enough sleep.

Sleep deprivation can have some serious side effects, including reduced productivity, a greater likelihood of getting in accidents and increased risk of developing chronic diseases.

Taking Reishi mushroom for sleep could help prevent these

problems. Triterpenes appear to have positive effects on sedation,[\[225\]](#) which can:

- Make it easier to fall asleep
- Improve sleep quality [\[226,227\]](#)
- Provide the body with more opportunities for repair and recovery

That's why some people swear by having some Reishi Mushroom Tea before bed!

5) Stress



Some of the same properties that make Reishi good for sleep may also reduce overall stress, allowing for a better response to emotional triggers.

Animal studies suggest potential anti-depressant activity, which in turn may reduce or protect against symptoms of anxiety. [\[228\]](#)

One study of breast cancer patients showed those receiving Reishi mushroom spore powder

reported “less anxiety and depression and better quality of life.”[\[229\]](#) This suggests additional benefits of Reishi mushrooms for those experiencing disease-related struggles with mood and mental well-being.

6) Brain Health

Brain aging and beta-amyloid plaque formation appear to go hand in hand.[\[230\]](#)

Buildup of these proteins is thought to be the first step in cognitive decline and is a major characteristic of Alzheimer's.

Reishi may help in this fight by:

- Protecting neurons from dying
- Reducing or preventing beta-amyloid-induced inflammation
- Inhibiting the toxic effects of beta-amyloid on synapses [\[231\]](#)
- Reducing brain inflammation to prevent cell alterations associated with brain aging[\[232\]](#)

It's likely these effects are associated with Reishi's overall anti-inflammatory activity.



7) Hormones

Because hormones are involved in everything from metabolism and appetite to sleep cycles and temperature,[233] keeping everything in balance is critical.

What do Reishi mushrooms do for hormones? It appears the active compounds have a normalizing effect on hormone levels. '

Studies show this may give Reishi the ability to:

- Improve the state of the lymphatic system and endocrine organs in immunocompromised patients[235]
- Reduce 5-alpha-reductase levels to prevent testosterone from converting to dihydrotestosterone (DHT), a stronger form which is sometimes associated with increased risk of prostate disease[236,237]
- Reduce prostate-specific antigen (PSA) levels in cases of benign prostatic hyperplasia (enlarged prostate)[238]
- Support health by exhibiting estrogen-like activity in individuals with low estrogen levels, such as post-menopausal women.[239]



8) Liver Health

Data on Reishi mushroom and liver health is conflicting.

Research in this area indicates potential benefits in people suffering from liver injuries or hepatitis B, possibly due to positive effects on the immune response.[240]

9) Blood Sugar

When tested in diabetic mouse models, Reishi mushroom beta-glucans appeared to have beneficial effects.

However, human research results are mixed. As of yet, science hasn't been able to pinpoint a clear benefit for blood sugar control in diabetics or people suffering from metabolic syndrome.[241]

10) Gut Health

Research into *Ganoderma* benefits for the gut microbiome is still in its infancy, but one mouse study showed potentially positive results. Giving a water-extracted Reishi preparation to mice fed high-fat diets reversed gut dysbiosis and protected against metabolic endotoxemia.[242]

In other words, Reishi may restore gut balance and prevent bacterial toxins from ending up in the bloodstream. These results suggest Reishi could be a helpful ally in the fight against obesity and insulin resistance, but more studies are needed to know for sure.

REISHI MUSHROOM SPORES: A HIDDEN POWERHOUSE

Spores are to mushrooms what seeds are to plants. Instead of stems giving rise to flowers and flowers producing fruits, an underground network of rootlike fibers called mycelium gives rise to the fan-shaped fruiting body and its basidia cells.

But the fruiting body—which is essentially a reproductive organ— isn't the only place where mushroom magic happens.

Spore Science

Reishi spores are widely used in

Asian medicine but haven't yet been the subject of extensive study in Western cultures.

Current research shows spores contain both polysaccharides and triterpenes, including ganopsoronic acid and multiple types of ganoderic acids.[243]

Scientists are continuing to isolate and analyze additional compounds for potential health benefits. Harnessing the antioxidant activity of known compounds along with new discoveries could yield novel treatments for common medical conditions.



Unlocking Spore Benefits

Getting beneficial compounds out of Reishi mushroom spores is a little trickier than making extracts from the fruiting body. To reap the health benefits, spores must be "cracked" using methods like fermentation, ultrasound or milling. Spores can be made into a powder or processed further to extract spore oil once the skins have been removed.

Although Reishi spores are touted for their high potency and health benefits, low extraction rates often translate into high price tags for spore-derived products, making them less accessible than fruiting body extracts.

HOW TO USE REISHI MUSHROOM

There's a reason Reishi isn't found with other mushrooms in the produce department: The conk is tough and woody, and the taste is extremely bitter, making the mushroom inappropriate for culinary use.

Using Reishi mushroom extract powder, capsules or tinctures is the easiest way to get past these characteristics. Extracted powders are especially versatile; they can be used in recipes or combined with other mushrooms for additional benefits.

Beware of commercially available functional food products claiming to contain Reishi. Some manufacturers "fairy dust" their products, without adding enough of an ingredient to be able to tout special benefits.

These products may taste good, but they can't match the power of supplementing with Reishi mushroom at supportive or therapeutic levels.

How to Make Reishi Mushroom Tea



Tea is another popular delivery method for the magic of Reishi.

It's similar to a hot water extract, which delivers the medicinal benefits of the mushroom fruiting body in a bitter tasting tea. It can be "enjoyed" hot or brewed in large batches and placed in the fridge for use throughout the week.

To brew Reishi mushroom tea at home:

1. Start with fresh or dried Reishi fruiting bodies (antlers or conks).
2. Carefully cut the mushrooms into strips or pieces.
3. Boil four cups of water for every 5 grams of dried or 25 to 30 grams of fresh Reishi.
4. Add the cut Reishi, reduce the heat and simmer for 2 hours.
5. Remove the pot from the heat, and cool the tea to room temperature.
6. Strain and drink up to 8 ounces per day.

Reishi tea is definitely an acquired taste, but it's worth acquiring to get all the benefits of this powerful mushroom!

Can't get past the bitterness? Try mixing prepared Reishi tea into your daily cup of coffee or experimenting with add-ins like honey, ginger and/or turmeric, or switching to a Reishi capsule.

HOW MUCH REISHI MUSHROOM SHOULD I TAKE?

A general rule of thumb for how much Reishi to take is somewhere between 500 milligrams and 2,000 milligrams per day, but the ideal amount depends on a variety of factors, including the extraction method and form.

Dual-extracted Reishi mushroom supplements have higher concentrations of beneficial compounds, making them effective at lower doses. Using both water and alcohol extraction also ensures the final preparation contains both beta-glucans and triterpenes.

As with any natural supplement, a word of caution: Because research is ongoing and studies don't always agree, it should never be used to "treat" a medical problem.

Avoid self-diagnosing, especially if symptoms could indicate a serious condition.

Reishi may also cause physiological changes that can be dangerous when taken in conjunction with certain medications. Consult a doctor or natural health care practitioner for guidance on making this mushroom part of the regimen for any specific condition.



What Time of Day Should I Take Reishi?

Since Reishi mushroom doesn't need to be taken with food, it's suitable for any time of day. The choice is largely up to personal preferences and desired

outcomes.

Here are a few optimal times to try Reishi for best results:

- On the morning of a busy day to tackle work with less anxiety
- Every morning during allergy season to minimize symptoms
- Before traveling for extra immune support
- As a tea before bed to promote a good night's sleep

Consistency is the key to reaping the greatest *Ganoderma lucidum* benefits. The body needs time to react to the bioactive compounds, so effects may become more noticeable over time.



HOW LONG DOES IT TAKE REISHI MUSHROOM TO WORK?

Functional mushrooms aren't "quick fix" solutions; they act as ongoing support for the body.

The full spectrum of benefits might not be apparent right away, especially since many are internal.

While some perks—like better sleep—may be felt right away, the effects of damaged cells being cleared and reduction of oxidative stress can take longer to manifest.

What to Expect from *Ganoderma Lucidum* Supplements

Regular users of Reishi mushroom may:

- Feel more relaxed
- Be better rested
- Get sick less often
- Have fewer allergy symptoms
- Feel more balanced emotionally

Unless it causes side effects, the mushroom can be a regular part of a natural health regimen.



CAN REISHI MUSHROOM HAVE SIDE EFFECTS OR INTERACTIONS?

Reishi supplements are generally regarded as safe when taken at typical doses for up to one year. However, not everyone reacts the same, and supplementing with this mushroom may not be suitable in some cases. As with any natural supplement regime, it may be best to first talk to your doctor or natural health care practitioner before taking Reishi.

Is There Anyone Who Shouldn't Take Reishi?

Taking Reishi isn't recommended for those who:

- Are pregnant or breast feeding
- Have low blood pressure
- Suffer from a bleeding disorder
- Are planning to have surgery

Children shouldn't take Reishi supplements, either, due to the difficulty in administering an appropriate dose.

WHAT IS THE BEST REISHI MUSHROOM SUPPLEMENT?

Not all Reishi supplements contain what's listed on the label. According to one study, nearly three-quarters of the supplements tested didn't contain the bioactive compounds that give Reishi its benefits.^[248]

And that's not the only potential problem. Because dietary supplement regulations differ by country, some products may not be pure or even safe. Obtaining Reishi mushroom from uncertain sources carries a risk of exposure to pesticides, heavy metals and other toxins, which can cause detrimental health effects.

To avoid these problems, research the available options to find a reputable source before purchasing any functional mushroom supplement.



Reishi Mycelium vs. Fruiting Body



Whether a supplement contains Reishi fruiting body or only mycelium is another important consideration. Both the mycelium and the fruiting body contain Reishi's beneficial compounds, but the fruiting body has much higher concentrations.

What about supplements that use both fruiting bodies and mycelium? Putting the two together can have its own benefits, but a lot of the mycelium in commercial products is grown on grain. This creates two problems:

- Grain-grown Reishi mycelium has much lower concentrations of bioactive compounds
- Grain winds up mixed into the final Reishi supplement formulation, greatly increasing the ratio of starch

In both cases, the resulting product is far less potent—and far less effective—than a supplement produced from Reishi fruiting bodies.

What to Look For in a Reishi Supplement

For best results, choose reishi supplements that are:

- Organic
- Non-GMO
- Made with fruiting bodies
- Dual-extracted

Supplements containing Reishi mushroom spores may offer additional benefits. Some brands, like FreshCap, list guaranteed beta-glucan and triterpene levels on the labels to provide assurance of the contents.



CAN YOU EAT REISHI?

Reishi is not a culinary mushroom.

Unlike “fleshy mushrooms” which are easy to chop and fry, Reishi is tough, thick and woody.

(Imagine chewing on wood chips... yuck)

It’s also quite bitter.

But that doesn’t mean you can’t enjoy Reishi as part of a complete breakfast, lunch or dinner.

Extracted Reishi powder can easily be added to food and drinks. No further processing is necessary. You’ll get the same benefits adding it to a cold smoothie as you would adding it to a hot tea.

In fact, because Reishi has a strong flavor, most people enjoy the fact that the bitterness can be easily masked by adding it to other recipes.



Here’s some example reish-cipes to get you started:

- [Quick and Easy Reishi Chocolate Milk](#)
- [Reishi Yakitori Skewers](#)
- [Gluten Free Chocolate Coconut Reishi Mug Cake](#)

If none of these tantalize your taste buds, check out some of the dozens of recipes on our website Reishi can be substituted to any recipe that uses “mushroom extract” as an ingredient.

TAKE REISHI FOR YOUR HEALTH!



With all the potential benefits of Reishi mushrooms, it’s worth trying along with other healthy diet and lifestyle habits. Supplement regularly with a high-quality product to start busting through the barriers of stress, fatigue and illness to reach your full potential.



TURKEY TAIL

THE ULTIMATE DEFENDER

TURKEY TAIL: THE MUSHROOM FOR DEFENSE

Turkey Tail mushroom is a functional powerhouse that has long been prized for its effects on immunity, inflammation, infections and more.

It's not hard to find the eye-catching fan-shaped formations of Turkey Tail mushroom when you're out on a hike. But this mushroom is far more than an interesting natural specimen. Inside its striking exterior, Turkey Tail is hiding unique compounds with the potential to boost your immune system, fight fatigue, zap invading pathogens—and maybe even make your gut healthier.

There's quite a bit of science to support Turkey Tail's benefits and functions. Before we put on our lab coats and break it all down (and show you how to get those benefits yourself), let's get to know this mushroom a little better.



MEET THE TURKEY TAIL MUSHROOM

Turkey Tail's scientific name, *Trametes versicolor*, translates to “one who is thin” and “of several colors.” It's a perfect description that was originally assigned to the mushroom in 1939 by Czech mycologist Albert Pilát; before that, Swedish naturalist Carl Linnaeus had called it *Boletus versicolor*.^[249]

Turkey Tail is also known as *Coriolus versicolor* and *Polyporus versicolor*. In China, it goes by the name Yun Zhi, which means “cloud fungus;” the Japanese call it Kawaratake, or “mushroom by the riverbank.”

What Do Turkey Tail Mushrooms Look Like?

Every name for Turkey Tail refers to the same mushroom: A bracket fungus that grows in clusters of fan-like, stemless conks sporting numerous concentric rings of different

colors, which can include brown, cream, white, red, orange, blue and black.[250] Each individual conk, also known as a fruiting body, is only 1 to 3 millimeters (~0.04 to 0.12 inches) thick and 2 to 8 centimeters (~0.7 to 3.93 inches) across, but the mushrooms can grow together in clusters that span much larger areas.



Similar to Reishi, Turkey Tail mushrooms are polypores, which means they have no gills. Instead, a network of tubes on the underside serves as the delivery system for spores when the mushrooms to reproduce. Both the *Boletus* and *Polyporus* genus names describe this characteristic.[251,252] The spore side of the mushroom can be white, cream or light brown with between 3 and 8 pores per millimeter.[253]

Turkey Tail mushrooms are pliable when young and become tough and woody as they mature. Cutting or breaking one of the

conks reveals a white, rubbery interior surrounded by a surface that's just a little fuzzy to the touch. Interestingly, *coriolum* means “small piece of leather” in Latin, which is another apt description![254]

Sound a little technical? It's important to know all these details when identifying the mushroom. (More on that later.)

Where Do Turkey Tail Mushrooms Grow?

Clusters of Turkey Tail can be found pretty much anywhere around the world. The mushroom grows on dead or decaying wood in the U.S., U.K., Europe, Asia and Russia. It's so common that it's been reported to grow on over 70 types of hardwood in the U.S. alone—and it may also pop up on coniferous trees, which is unusual for mushrooms.

Like other fungi, Turkey Tail mushroom can either take up residence by depositing spores into fallen wood like logs or branches or invading a living tree that's been damaged or stressed in some way. Decaying stumps are also fair game.

Living trees colonized by Turkey Tail develop a condition known as white rot, which occurs as enzymes from the mushroom break down lignins in the wood,

leaving behind the cellulose. [255] Lignins are responsible for keeping trees rigid, so as the mushrooms transform them into sugars for food, the wood becomes soft and spongy. [256]

Turkey Tail is usually found in groups of fan formations of varying sizes, which can look like layers of clam shells or small, rounded shelves. But—true to its name—this mushroom most closely resembles the shape and color of a turkey’s tailfeathers.



TURKEY TAIL MUSHROOM: TRADITIONAL MEDICINAL USES

Mentions of Turkey Tail appear in *The Divine Husbandman’s Classic of Materia Medica* (also called *Shen Nong Ben Cao Jing*), a classic book of Chinese pharmacology compiled almost 2,000 years ago. Some of the material in it may date back as far as 476 BC! [257] The text confirms that Turkey Tail was used as a folk treatment in Asia for centuries. [258] Other sources

point to Turkey Tail’s use in Native American herbalism, as well.

Practitioners of traditional Chinese medicine believed this colourful mushroom could replenish “essence,” an energy or life force they thought was stored in the kidneys, as well a “universal” life force they dubbed “qi.” It was also believed to clear a pattern of symptoms associated with inflammation, known in TCM as “heat.” [259]

Turkey Tail was commonly used to reduce fatigue, boost stamina, relieve joint pain, balance blood sugar, relieve coughs and asthma [260] and improve problems believed to be associated with spleen dysfunction—such as bloating vomiting, weakness and diarrhea. Its association with spleen health may be one of the reasons why Turkey Tail was also considered to have beneficial effects on immune function.

Today, TCM practitioners still use Turkey Tail mushroom to treat hepatitis, liver scarring, kidney inflammation (nephritis) and chronic fatigue syndrome. Purified hot water extracts are used in combination with regular cancer treatments in Japan and may aid in combatting the unpleasant side effects of both chemotherapy and radiation,

leading to better quality of life for cancer patients.

What Makes Turkey Tail Mushrooms so Powerful?

There are at least five beneficial types of nutrients and active compounds that give Turkey Tail its medicinal characteristics:

- **Polysaccharides**—including beta-glucans—known as immunomodulators due to their balancing effects on the immune system
- **Triterpenes**, which are part of the mushroom membrane and act as precursors to natural steroids[261]
- **Sterols**, hormone precursors that include ergosterol and fungisterol; ergosterol is converted to vitamin D2 when exposed to sunlight
- **Polyphenols**, such as flavanoids, produced in response to environmental stressors and associated with positive benefits when consumed[262]
- **Vitamins and minerals**, including selenium, vitamin B3 and vitamin D—although the selenium content depends on how much selenium is available in the environment where the mushrooms grow



If these were the only compounds and nutrients in turkey tail, it would make for a pretty amazing combination. But there are two standout compounds that elevate Turkey Tail mushroom to superhero status: **polysaccharide krestin (PSK)** and **polysaccharide peptide (PSP)**. Both PSP and PSK are polysaccharide-protein complexes: chains of many sugars bound to proteins at specific places in their molecular structures.

PSK was first isolated in Japan in the late 1960s from a strain of Turkey Tail known CM-101. The compound contains about 28 to 35% protein and 34 to 35% carbohydrates.

PSP, isolated in China in 1983 from the COV-1 Turkey Tail strain, is about 31% protein and 46% carbohydrates.

Both PSP and PSK contain alpha- and beta-glucans, as well as numerous amino acids like

glutamine, which gives mushrooms their distinct “umami” flavor.[263] Both compounds are also associated with enhanced immune activity, although PSK usually gets more attention for its use as an adjunct treatment in cancer research.

TURKEY TAIL MUSHROOM BENEFITS

Turkey Tail stands out among functional mushrooms as one of the few that’s been used in multiple human clinical trials. In fact, PSK is approved in Japan for clinical use alongside traditional cancer treatments; the Chinese FDA has also approved the compound as a treatment for several conditions.[264]

Western science is beginning to catch up by conducting both human and animal studies of Turkey Tail’s key compounds. The research has uncovered at least 10 ways this mushroom could benefit health.

1) Cell Health

Like plants, mushrooms produce compounds called polyphenols as a natural defense mechanism. Polyphenols provide protection from UV rays, pathogens and other potential sources of attack or damage.[265] When people consume mushrooms or mushroom extracts, these same polyphenols can act as

antioxidants.

Antioxidants prevent cell damage and inflammation by neutralizing free radicals in the body. When unstable free radicals interact with healthy cells, it results in oxidative damage, which can cause signs of aging and increase the risk for age-related diseases. Antioxidants intercept this process and restore stability before damage can occur.



2) Stimulates and Balances Immune Responses

Many compounds in Turkey Tail mushroom exhibit immunomodulatory effects, including polysaccharides and triterpenes. PSP and PSK in particular have both been associated with better immune activity.



Research shows several possible ways these compounds may improve the body's natural immune response:

- PSK can activate natural killer cells, leading to more effective clearing of pathogens.[267]
- PSP can help immune cells recognize invaders and cell abnormalities, as well as activate beneficial pro-inflammatory responses to eliminate pathogens and keep cells healthy.[268]
- Turkey Tail extracts can increase specific markers indicating an immune response—like tumor necrosis factor alpha (TNF-a), interferon gamma (IFN-y) and interleukin 12 (IL-12)—which may help the body defend against pathogens.[269]
- Polysaccharides from Turkey Tail can activate antibody-producing B-cells and increase production of two specific antibodies: immunoglobulin M (IgM), which is made when fighting new infections, and immunoglobulin G1 (IgG1), which controls immune responses against viruses. [270]

- Turkey Tail may activate pro-inflammatory Th1 cytokines, which can cause autoimmune responses in some cases. However, these same cytokines can be beneficial players in immune defenses when activated appropriately. [271]

But Turkey Tail's effects aren't all about firing up the immune system. Like other functional mushrooms, *Coriolus versicolor* can promote balance. One study showed cultivated Turkey Tail mycelium and its fermented substrate could increase both pro- and anti-inflammatory cytokines, possibly by activating a protein called CD69 involved in signaling between immune cells. [272]

These immune system benefits appear to help healthy individuals, as well as people with low immune function.[273] It's also interesting to note that some effects on immunity differed between studies done in petri dishes (*in vitro*) and those conducted on animals or humans (*in vivo*), which suggests the holistic benefits of turkey tail may be greater than those observed in isolated environments.





3) Inflammation

Because they may prevent damage to cells and tissues, antioxidants in Turkey Tail mushroom can reduce the potential for inflammation. Reducing inflammation may also protect against conditions like heart disease, which is believed to be associated with chronic inflammatory responses.

Turkey Tail's main medicinal compounds—beta-glucans, triterpenes and sterols—have also been shown to exhibit anti-inflammatory effects. Both isolated compounds and extracts from the mushroom appear to reduce production of pro-inflammatory cytokines like TNF- α , nitric oxide (NO), and interleukin-6 (IL-6).^[274] When cells are in pro-inflammatory environments, extracts may also lower the levels of compounds associated with the stimulation of inflammatory responses.^[275]

One interesting study illustrated

another potential benefit by looking at arthritic rats with morphine tolerance rats treated with PSP didn't develop dependence on the painkiller as easily and experienced less intense withdrawal symptoms. The morphine also appeared to be more effective overall.

How did it work? It seems the Turkey Tail activated a specific cannaboid receptor while increasing beta-endorphins. Together, these effects can change the way the body perceives pain. Additional reduction of pro-inflammatory compounds also played a role.^[276]

However, some studies on Turkey Tail show opposite effects. At certain doses, compounds from the mushroom may increase pro-inflammatory responses.^[277] This indicates a potential balancing effect similar to the way Turkey Tail acts on the immune system and suggests different doses may be required to address specific conditions.

4) Cholesterol

In a study on mice with high cholesterol, extracts from Turkey Tail mushroom lowered total blood cholesterol levels, including triglycerides and LDL. The effect may be due, at least

in part, to an increase in lipoprotein lipase, an enzyme that breaks down triglycerides in the body.[278]

Other evidence suggests a compound called protein-bound beta-glucan (PBG) might help prevent weight gain by increasing levels of *Akkermansia muciniphila*, a bacterium that lives in the gut. The presence of *Akkermansia muciniphila* is correlated with lower levels of inflammation, which could play a role in creating a healthier gut barrier and preventing proteins or pathogens from crossing into the bloodstream and triggering immune responses. The bacterium is also associated with better insulin sensitivity, which seems to be an important factor in weight management.[279]

The study that examined PBG's effects showed that transplanting the microbiomes of mice treated with PBG into the guts of mice fed high-fat diets appeared to make the gut environment friendlier to *Akkermansia muciniphila*. PBG also had an effect on genetic responses related to metabolism, which led to better weight control.[280]



5) Exercise Endurance

When scientists gave mice an extract from the mycelium of Turkey Tail mushroom for four weeks, the mice showed improvements in several markers related to exercise fatigue. Three byproducts of exertion—lactate, ammonia and creatine kinase—were lower in treated mice than in controls. Mice receiving the Turkey Tail extract also exhibited stronger grip strength.[281]

These results suggest the treated mice experienced less muscle damage during exertion and may also have been able to use oxygen more efficiently. No toxicity was observed despite the high dosage, which was about the equivalent of 4 to 21 grams of Turkey Tail per day for a person of average weight. However, more research is needed to know whether the same effects can be replicated in humans.

6) Fatigue

Chronic fatigue syndrome (CFS) is an idiopathic condition with a wide range of symptoms, which can include lack of refreshing sleep, problems with memory, difficulty concentrating, muscle and joint pain, headaches, dizziness, moodiness, swollen lymph nodes and exhaustion after mild exertion.

Although the exact cause of CFS remains unknown, suggested causes include viral infection, immune disorder, extreme stress and hormonal abnormalities.[282] The condition officially qualifies as “chronic” if symptoms persist for a month or more.

A study in the Journal of Integrative Medicine examined whether Turkey Tail mushroom could provide relief from CFS. In the study, 36 people with the condition took an extract from a turkey tail strain called CV-OH1 for two months. At the end of the study, levels of natural killer (NK) cells increased by 45%, and participants also exhibited



various levels of T-cell activation and suppression. Low NK cell levels and low T-cell activation have been found in some CFS patients,[283] so the turkey tail extract may have been working to balance the immune system.

Since both infection and autoimmunity have been suggested as potential causes of CFS,[284] the results of this study could mean Turkey Tail mushroom has a potential role to play.

7) Liver Health

Turkey Tail’s antioxidant and immunomodulatory effects suggest it could guard against alcohol-induced liver injury.[285]

PSP may also protect liver cells by helping the body maintain its own levels of an antioxidant called glutathione. This was shown in a model of liver injury in rats where those receiving PSP had lower levels of two blood markers indicating liver cell damage: serum glutamic pyruvic transaminase (SGPT) and glutamic oxaloacetic transaminase (SGOT).[286]

Another study on a rodent model of liver cancer showed fractions from Turkey Tail mushrooms were able to inhibit cancer cells while restoring and stimulating

the recovery of normal liver cells.
[287]

What About Turkey Tail and Hepatitis?

It's possible that Turkey Tail mushroom could be beneficial in addressing liver damage from hepatitis, as well: PSP has been used in China for years to treat hepatitis shows promise when combined with other treatments from traditional Chinese medicine.[288]



8) Has Antibacterial and Antiviral Properties

Compounds in Turkey Tail can interact with the immune system and may provide protection against bacteria and viruses in several ways:

- Beta-glucans may kill bacteria by boosting the body's production of nitric acid[289]
- Alcohol extracts from cultivated Turkey Tail may damage bacterial cell membranes or prevent bacterial cell division to stop bacteria from multiplying[290]
- PSK can boost antibody-producing B-cell activity and improve survival rates even when white blood cell counts are low[291]

9) Gut Health

A handful of studies suggest supplementing with Turkey Tail mushroom could improve gut health by combatting inflammation and supporting beneficial bacteria.

One study looked at how PSP affects the microbiome when compared to the antibiotic amoxicillin.[292]. Twenty-four people were randomized into three groups—PSP, antibiotics and control—for eight weeks. Stool analysis showed that PSP had prebiotic effects, which can include increasing “good” microbes in the gut.[293] The amoxicillin group, on the other hand, had an increase in pathogenic bacteria that persisted for 42 days after they stopped taking the antibiotic.

Similar results were seen when PSP was combined with a type of complex carbohydrate called fructooligosaccharides (FOS) in a culture medium along with microbes commonly found in the human gut:[294]

- Beneficial Bifidobacterium and Lactobacillus species increased
- Pathogenic Clostridium, Staphylococcus and Enterococcus bacteria decreased
- More short-chain fatty acids (SCFAs) and lactate were produced, which can feed “good” gut bacteria[295] and keep the gut lining healthy[296]

Mice with ulcerative colitis given extracts from the mushroom had lower levels of inflammatory cytokines like TNF-a and IL-6. The extracts also appeared to interfere with the production of IFN-y and IL-4 cytokines.[297]



Taken together, these studies suggest the antibacterial, antiviral and immunomodulatory activities of Turkey Tail could improve the gut microbiome and help maintain a healthier gut environment.

10) Cancer Research

Although PSK from *Trametes versicolor* has been used in Asia alongside traditional cancer treatments for decades, it hasn't yet been incorporated into mainstream clinical use in the Western world. But studies continue to be conducted, some of them in humans, which is an exciting development given that most functional mushroom research to date has focused only lab animals or isolated cell cultures.

In some of the studies, Turkey Tail mushroom appears to work as a biological response modifier (BRM), literally modifying the immune response to better equip the body to target certain cells.

It's also possible that the mushroom's anti-inflammatory and antioxidant activity may prevent cellular damage.

The current body of research suggests several potential mechanisms of action to explain the correlation between Turkey Tail and better outcomes for cancer patients:

- PSK appears to improve the immune response by increasing white blood cell activation and upregulating key cytokines while also interfering with enzymes involved in the process of metastasis[298]
- Antioxidants may protect tissues against initial damage from carcinogens and from the secondary effects of chemotherapy and radiation
- PSP could improve the body's natural defenses against cancer by improving how immune cells work, increasing both chemokines and cytokines and helping dendritic cells and T-cells eliminate cancer cells[299]
- PSP may increase macrophage function to better clear tumor cells when used in conjunction with other cancer treatments[300]

- PSK appears to prevent cancer cells from dividing out of control by interfering with early stages of the cell cycle, resulting in cancer cell death[301]
- A unique lipid in Turkey Tail mushroom may work with PSK to increase its uptake and also positively interact with toll-like receptor 2 (TRL2) proteins,[302] which help the body recognize pathogens and can prompt the immune system to attack cancerous cells[303]

These effects may explain why one meta-analysis of people receiving turkey tail along with traditional cancer treatments in clinical trials had a 9% reduction in five-year mortality rates—particularly those with breast, gastric and colorectal cancers. [304]

However, not every study involving Turkey Tail mushroom and cancer shows beneficial results. Continued research is needed to determine the best ways to prepare and administer the active compounds for optimal outcomes.



IDENTIFYING AND HARVESTING WILD TURKEY TAIL

The ubiquity of *Trametes versicolor* means it's not hard to find. Anywhere with fallen wood and dead or decaying trees is fair game. If the mushrooms have been growing for a while, it's possible to find *huge* clumps covering stumps or fallen logs.

Autumn and winter are the best times of year to seek out wild Turkey Tail mushroom. This is when the mushrooms release their spores, so it gives them time to reproduce before being harvested. To get the best specimens, look for white or cream-colored rings at the edges of the conk.

(Remember to leave some behind for other foragers!)

Is It Really a Turkey Tail Mushroom?

There are three main ways to tell Turkey Tail apart from other wild mushrooms:

- **Color.** Other species in the *Trametes* genus lack clearly separated, contrasting zones of color on top of the conk.
- **Pore size.** Turkey Tail mushroom pores are very small and harder to distinguish than those of similar mushrooms.

- **Fuzz.** Turkey Tail should look just a little hairy and feel velvety to the touch.

Use these cues to find the *right* polypore when trekking through the woods on a mushroom hunting expedition. As always with wild mushrooms, you want to be 1000% sure you know what you have identified, especially if you are planning to ingest it in any form. If you have doubt, throw it out. Best bet is to go with someone you trust that knows how to find them, or go on an expedition with your local mycological society.



5 Types of False Turkey Tail

These “fraternal twins” of Turkey Tail can cause confusion for budding foragers:

- *Stereum ostrea*, the unofficial “false Turkey Tail,” is a type of mushroom called a crust fungus with color bands on top but no pores. Instead, the underside is flat and has a red, tan or brown color, and the top tends to curl more than true Turkey Tail.

- *Trametes hirsuta*, the “hairy” bracket fungus, is white or gray, lacks distinct color bands and has quite a bit of fuzz.
- *Tremetes pubescens* sports concentric rings of color, but they’re much less striking than *Trametes versicolor*; this mushroom also doesn’t grow on soft wood.[305]
- *Trichaptum biforme*, a fan-shaped fungus that grows in clusters and has a violet tinge around the edge and on the underside. The top is slightly fuzzy with areas of white, brown and black,[306] and fully grown specimens tend to be smaller than *Trametes versicolor*.
- *Trametes ochracea* becomes hard when it’s still small, whereas Turkey Tail retains some flexibility.



Fortunately, none of these lookalikes are poisonous. Some simply taste bad, and it’s not known whether they have any of Turkey Tail’s benefits. However, it’s still best to be cautious and not consume or use any mushroom that hasn’t been

positively identified as edible or medicinal.

GROWING TURKEY TAIL AT HOME



Because Turkey Tail mushroom grows just about everywhere, most supplements are made from wild-harvested specimens. But aspiring mushroom hunters who don’t have access to good foraging spots can grow Turkey Tail using a kit or substrate and spawn. Common substrates include grain and sawdust, although it’s also possible to start with a log.

You can use many of the other strategies for gourmet and functional mushrooms that will work well for Turkey Tail. If you are interested in growing yourself, check out our [guides to growing mushrooms](#).

Trametes versicolor likes moderate temperatures and high humidity and takes one to two months to grow to maturity. Once fully grown, the conks can be used to make tea, broth or tinctures.

TURKEY TAIL DOSAGE AND USE

Turkey Tail is a pretty easy mushroom to incorporate into a daily routine, whether by tossing some powder into a smoothie or brewing dried conks to make a relaxing cup of tea.

A good starting dose is 1-3 grams of powdered Turkey Tail supplement per day. Capsule and tincture doses vary and can be found on the manufacturer's supplement facts panel.

Note: Remember that Turkey Tail mushroom isn't a treatment. Research on its benefits is still underway. Always check with a doctor prior to supplementing, especially when taking other medications.



Choosing Turkey Tail Supplements: Mushrooms Made from Mushrooms



Quality directly influences how effective a Turkey Tail mushroom supplement will be. Supplements made from wild-harvested or cultivated fruiting bodies offer the highest amounts of beneficial compounds.

Another common way to make Turkey Tail supplements is to grow just the mycelium on grain. The resulting product usually costs less, but it also lacks the potency of a fruiting body supplement. Any medicinal compounds in the mycelium get diluted by the high ratio of grain that winds up in the supplement during processing.

For Turkey Tail, it's also important to look for supplements that have undergone extraction. This unlocks all the medicinal compounds from the cells of the

mushroom to deliver the full spectrum of effects.

Supplements are available in health food and natural product stores, as well as online. Read reviews and check company reputations before purchasing to ensure the product contains what it claims.

TURKEY TAIL MUSHROOM SIDE EFFECTS AND RISKS

Supplementing with Turkey Tail is considered safe and causes few or no side effects in most people. PSP and PSK extracts have been used in cancer patients without a problem at levels of 1 gram or more per day for as long as 10 years. No data is available to indicate what, if any, dose may cause toxicity.

Some people may experience rare but mild side effects when taking turkey tail mushroom, including:[308]

- Heartburn
- Constipation
- Nausea
- Chest pain
- Symptoms similar to cold or flu

Others have reported diarrhea, dark stool and darkened nails. [309]



Patients using PSK in combination with chemotherapy may experience nausea, vomiting, low white blood cell counts and liver problems.[310] However, these may also be side effects of the chemotherapy itself, which makes it difficult to know if PSK plays a role.

When *Not* to Take Turkey Tail

People with mushroom allergies and women who are pregnant or nursing should avoid Turkey Tail mushroom supplements. And although there are no known drug interactions, it's important to discuss any potential concerns with a doctor before combining functional mushrooms with prescriptions.

Is Turkey Tail Safe for Dogs?



Many dog owners swear by Turkey Tail to boost their furry friends' health. And there is one study to suggest they might be on to something.

In 2012, the makers of a PSP

supplement called funded a double-blind randomized study that assigned dogs with a blood vessel cancer called hemangiosarcoma to receive either 25, 50 or 100 milligrams of the supplement per day.

At the end of the study, the highest dose delayed the progression of metastasis compared to lowest dose, and there was a dose-dependent increase in survival time compared to previously recorded median survival times for dogs with this type of cancer.[\[311\]](#)

Because the study was funded by the supplement maker and there was no placebo group, it's difficult to know how reliable these findings are. However, since PSP has exhibited the ability to boost immunity and interrupt the lifecycles of cancer cells in other studies, it's possible these effects were at work in the dogs.

IS TURKEY TAIL AN EDIBLE MUSHROOM?

Turkey Tail's tough texture makes it less than appetizing as a culinary mushroom. Technically it *can* be eaten since it's not poisonous, but there are easier—and less rubbery—ways to get the benefits.



How to Prepare Turkey Tail Mushrooms

Wild-foraged mushrooms need to be cleaned before using or storing.

Start by brushing the dirt off using a soft kitchen brush, toothbrush or damp paper towel. Check each mushroom for mold and cut away anything that doesn't look right, including bits of bark or wood still clinging to the conk.

Clean mushrooms may be used immediately or dried for storage. To dry:[\[312\]](#)

- Place Turkey Tail mushrooms on dehydrator trays and dehydrate at 35 to 38 C (95 to 100 F) for 24 to 36 hours. Rotate the trays approximately every eight hours to ensure even drying.
- Alternatively, set the oven at 77 to 93 C (170 to 200 F). Arrange the mushrooms on baking sheets and dry for 24 hours, leaving the oven door cracked and rotating the trays occasionally.

Dried mushrooms can also be purchased online from reputable sources. Look for wild-harvested or organic specimens—or contact a local mycological society to see if any foragers in the area have some for sale!

Store dried Turkey Tail in an airtight container away from light and heat.

Making Turkey Tail Mushroom Tea

Turkey Tail has a milder flavor than other functional mushrooms, which makes it a good candidate for tea. To brew a batch from fresh or dried mushrooms:

1. Measure out 5 cups of water for every 1 cup of turkey tail.
2. Place the water in a large saucepan, and bring it to sub boiling temps (80 degrees C is best).
3. Reduce the heat to a simmer before adding the mushrooms.
4. Simmer for at least an hour (several hours is preferable).
5. Remove the tea from the heat, and cool completely.
6. Strain out the mushrooms, and store the tea in a jar in the fridge.



For a “set it and forget it” tea: Place dried Turkey Tail and water in a slow cooker or Instant Pot and cook on low for 6 to 8 hours before cooling and straining.

Preparing Turkey Tail this way basically results in a homemade water extract that contains beneficial mushroom polysaccharides. Enjoy a cup every day hot or cold, with or without natural sweetener. Adding other ingredients, such as turmeric, may boost the anti-inflammatory and immunomodulatory effects.

Turkey Tail tea also makes a great broth for soups and stews, particularly dishes that can benefit from a boost of umami flavor.





Turkey Tail Mushroom Recipes

The mild flavor of a Turkey Tail powder or extract makes it easy to “hide” this mushroom in a variety of tasty dishes. Give it a try with these recipes for breakfast, snacks and refreshing beverages:

- [Immunity Pumpkin Waffles](#)
- [Immune Supporting Turkey Tail Granola Mix](#)
- [Turkey Tail and Brazil Nut Immunity Booster](#)
- [Turkey Tail Turmeric Lemonade](#)
- [Coconut Mushroom Rice](#)
- [Immune Shots](#)
- [Herbal Mushroom Salt](#)



MAKE TURKEY TAIL MUSHROOM PART OF YOUR DAY

With its low risk of toxicity and unique effects on both pathogens and cancerous cells, Turkey Tail has a lot of potential as a future treatment alongside traditional therapies.

Science is only beginning to uncover the possibilities this mushroom has to offer. PSP and PSK may only be the tip of the iceberg; it’s possible other compounds in Turkey Tail may work together with these special polysaccharides to produce even greater effects.

So go ahead, check out a nearby forest or park to see if you can spot some colorful Turkey Tail mushrooms sprouting on a log. Bring a few home for making tea, or try a daily supplement for a supercharged wellness boost.



MAY THE POWER OF MUSHROOMS BE WITH YOU

Congratulations if you read it all from the top to get to this point! It was a ton of information, but I really hope you learned something new and interesting about mushrooms. Hopefully you now think of mushrooms in a whole new way!

If you're looking to improve your life with mushroom supplements, it can be incredibly hard to know what might be best for you.

Mushrooms are fascinating, but they can also be really confusing, and there is so much information out there. If you go to Amazon right now and type in "mushroom supplement" for example, you are likely to get thousands of results.

FreshCap originally started as a small mushroom farm, selling fresh gourmet mushrooms locally. Through that experience, we learned intimately what it takes to grow a mushroom- and all the steps involved in the mushroom growing process.

So, are all mushrooms created equal?

Not at all... which is why we started FreshCap.

As we learned more about the powers of functional mushrooms, we also noticed that many of the products available didn't actually contain any. They were instead made from "myceliated grain", which is basically rye, oats, or rice that has been used to grow mushroom mycelium. In mushroom farming, this is called "grain spawn" and it is an intermediary step in the mushroom growing process.



Although mycelium itself can be beneficial, there is no way to remove the mycelium from the grain- so the final product is something that is really high in starch, and really low in the beneficial compounds that you'd expect to get.



Even worse, these myceliated products are not always extracted, meaning your body has an even harder time making use of the beneficial compounds mushrooms are so famous for. It was hard for us to see mushrooms- the most powerful superfood on the planet- being represented in such a way!

We wanted to do something different. We wanted to make good mushrooms easy to find, and for people like you to actually get the benefits that you'd expect.

Our first product was a blend of 6 powerful mushrooms: Reishi, Chaga, Turkey Tail, Cordyceps, Maitake and Turkey Tail made from whole fruiting body (the actual mushroom part) that is thoroughly extracted and scientifically tested to ensure high concentrations of mushroom goodness.

And people loved it! Since then, we have continued to create and launch more products with the goal of bringing you the best mushrooms in the world. Our mushrooms will always be:

- Made from organic whole fruiting body
- Free from grain, starch, or other fillers
- Tested to contain high levels of beneficial compounds

This might not seem like a big deal- but to us (and hopefully you after reading this!) it's a HUGE deal. Mushrooms can be magical, and we want to make sure that everyone can benefit from them- which is why we are so obsessed with quality and integrity when it comes to mushroom products.

If you want to learn more about FreshCap, and what we can do for you, check out our website at freshcap.com.



MEET THE TEAM



Tony Shields

Co-Founder, CEO

Compelled by the power of mushrooms.



Tegan Shields

Co-Founder, COO

Fascinated by fungi and the powers within.



Carla Jans

Customer Experience Specialist

Mushrooms are the answer!



Ariana Whitlow

Social Media Manager

Mushrooms are the most important meal of the day 😊



Jesse Bulman

Video Producer

Harnessing the heroic power of mushrooms.



Nova

Head of Security and Product Tester

Picky eater that helped us perfect Shroomies.



Otis

Chief Eating Officer and Product Tester

Known for enjoying the odd bowl of Cordyceps and all mushroom capsules.

FRESHcap.