

Welcome to the Cutting Edge Health Podcast with Jane Rogers, where we discuss science to help prevent cognitive decline.

Jane Rogers: From putting a fire blanket on inflammation, to boosting your memory, to getting rid of sick cells in your body, the zombie cells, mushrooms rock. Both medicinal and magic mushrooms can have benefits for your brain, helping to keep it sharp and not plagued with memory issues. In this episode of the *Cutting Edge Health: Preventing Cognitive Decline* Podcast, one of our regulars, Dr. Lisa Broyles, shares her wealth of mushroom knowledge with us. Well, I would like to welcome back Dr. Lisa Broyles. Thanks for being with us.

Dr. Lisa Broyles: Thank you so much. I absolutely love the chance to talk to people through your podcast. Thank you.

Jane: You call me the other day and said, "I'm very excited. I found some mushrooms in the woods and they have properties that we really need to know about, especially for our brain health." What did you find?

Dr. Broyles: Mushrooms are one of my hobbies. I do grow mushrooms here locally. Shiitakes, oysters and I forage for mushrooms such as chanterelles, morels, chicken of the woods, hen-of-the-woods, all of the basic beginner mushroom hunter safe mushrooms. Spring and summer are so much fun for mushroom hunters. You always want to go looking for mushrooms a day or two after it rains because the rain makes the fruiting body pop-up out of the ground and beautiful mushrooms appear within a couple of days. That's what happened here.

We were in a drought here on the East Coast and then all of a sudden, the summer thunderstorms are back. The mushrooms are exploding. I have several mushrooms that we collected, we've been eating here at our home that I want to share with you, as well as some **[00:02:00]** medicinal mushrooms that I haven't personally found but I know a bit about

Jane: Before we get into all of these, you have seven mushrooms you want to talk about, about what they can do, how they can help us. You know this stuff. I only know morel mushrooms, and that's about it in the woods. I need to teach myself to learn more before I start going to pick.

Dr. Broyles: Sure, yes. Don't just go in the woods and pick a pretty mushroom up. General rule of thumb, the prettier the mushroom, the more toxic it probably is. A classic example is the Amanita which is the most poisonous class of mushrooms that there is, and that's the one that you see that's got the red cap with the white dots. That's a classic example of an Amanita with Mario Brothers mushrooms **[unintelligible 00:02:40]** don't eat those. Those will kill you.

Even mushrooms that are considered safe, like morels that you mentioned, if you go and pick morels from an apple orchard where they have for years sprayed arsenic, you're going to die of arsenic poisoning from that benign mushroom who has absorbed that arsenic from the soil. You have to be careful about the kind of mushroom and where you gather it. I took a class here locally with a mushroom expert. I highly recommend that you do that before you forage anything.

Jane: If you go all the way to growing your own mushrooms, you think mushrooms are really important for our health, don't you?

Dr. Broyles: I really do. Mushrooms are beneficial for us and the environment. I have my own homestead, we have our animals, and our ponds, and our bees, and the mushrooms, they all are part of the homesteading, trying to be a good steward of the land and our own bodies, because mushrooms do clean up damaged areas as well. Yes, we do have shiitake logs, you got to knock them down once in a while and just bang them around to stimulate, basically a tree falling in the woods. The little mycelium, the little spores in there that are colonizing those logs, they say, "Oh, the tree just fell, it's time to fruit."

When you knock them down and they get a little rain, then you get a nice burst of mushrooms from that. [00:04:00] We've done something similar with our oyster mushrooms as well. We do forage morels when we're that lucky. We don't have a ton here, but those are our absolute favorites and you cannot cultivate morels, so they're always a treat.

Jane: Let's jump into this. The first one you want to talk about is reishi, reishi mushrooms.

Dr. Broyles: Yes, reishi mushrooms. At first I want to say that all of these mushrooms play a role in cognitive health. You have to always think of your brain as attached to the rest of your body. If something is going to help the brain, there's often something in the rest of the body that that mushroom is also doing to help the brain, such as decreasing blood sugar and improving insulin resistance is going to help your cognitive health.

A lot of these mushrooms have both cognitive benefits and benefits to the body systemically. Just keep that in mind as we're going through. Reishi mushroom, the scientific name for that is *Ganoderma lucidum*. I'm going to try not to butcher these scientific names. The *Ganoderma* has been very well studied for its benefit for mitochondria. I think you're probably familiar with what the mitochondria do, but those are the little energy cells that are in every organ in your body. Mitochondria help your muscles to not hurt, help your heart to beat regularly, help your brain to think clearly.

We really need our mitochondria to be functioning effectively and of all the mushrooms, reishi are the most important for mitochondrial health. They also reduce stress on the

liver, they increase something called natural killer cell potential, which natural killer cells are your body's little soldiers that are going around and gobbling up viruses, bacteria, things that they don't like that happens while you're sleeping. That scavenging that the natural killer cells do is very important for the brain to clean up trash, dead cells, and to help the brain repair itself while you're sleeping.

The main ingredients of the reishi that are doing that is something called a beta-glucan, [00:06:00] they're called beta-glucan polyphenols. Those are in most of the mushrooms that I'm going to talk about. The beta-glucans are the most important for the immune modulating effects, which means that they improve the way in which your immune system can handle disease.

It helps your immune system to be stronger, but it also tamps down the, oh no, I'm on fire signal, which is called cytokine release. You've got different cytokines that the reishi addresses, the IL-6, there's an IL1B, there's multiple cytokines that have been demonstrated to be downregulated. Less of that massive inflammatory response when you have the reishi, and I'm going to go through the other mushrooms also affect the same area.

There's also something called a triterpene. Between the beta-glucans and the triterpenes, that's where you get your antioxidant effect, that's where you get your immune modulation. The reishi mushroom isn't one that you would just go out in the woods and pick and fry up, it's really inedible. It's a shelf-like mushroom, it's very hard. It's not one that you want to prepare and cook, it's better dried and powdered into a tea or a tincture or an extract. It's sold as capsules. All of these mushrooms can be made in different ways. I will identify which ones you should eat and which ones you should not.

Jane: We know that inflammation is really important when it comes to brain health. You've got to get your inflammation down. What you're saying is taking reishi mushrooms and maybe every day, do you cycle them and if you have Chronic Inflammatory Response Syndrome, CIRS, this would be a really good remedy for this, wouldn't it?

Dr. Broyles: Yes, I think any disease that affects mitochondrial health is going to benefit from a tincture of reishi. I have a friend that's gone out and gathered a lot of reishi in the woods and she's given me some reishi tincture. I also have some commercially prepared, especially if I'm feeling a little brain foggy, I'll just put a little bit of [00:08:00] reishi extract in a glass, add a little bit of water and swallow it down. You can take just a little reishi tincture each day. The dosing has varied. In all of these I'm not going to be listing specific doses because they tend to be more like grams. Some studies have two grams, four grams, five grams, and it all depends on the form in which you find your reishi.

The dosing very much depends. I do recommend mushroom blends, not necessarily just reishi, there's a lot of blends that have multiple of these mushrooms all in one package. The synergy of multiple mushrooms together is always going to be better. For example, with reishi it works very well with turkey tail. Here in North Carolina, turkey tail mushroom is our most proliferative mushroom. It's actually been studied in Japan, it helps breast cancer survivors and it increases the time before any kind of cancer comes back.

The turkey tail has been very well-studied. It's used medicinally in other countries, it works the best when combined with reishi. I'll go out in the woods, I'll gather turkey tail and I'll just brew it into a little tea for myself whenever I find it.

Jane: If you're making a tincture, is it okay to use alcohol to make the tincture?

Dr. Broyles: Yes, I have made my tinctures usually with vodka. The tinctures take time, you can do decoctions. I guess with the turkey tail and the reishi, if I found those in the woods and I wanted to make my own, then I would dry them, powder them, and cook them down in a crock pot or a tea pot for several hours until I've reduced the amount of liquid by about half. That's what called a decoction, and that can be taken more as a tea.

A tincture usually takes weeks to months of the mushroom sitting in an alcohol, like a tiny bit of vodka or something like that. Just depends on [00:10:00] how you make it.

Jane: Now next mushroom, chagas.

Dr. Broyles: Next mushroom, chaga. There is some argument as to whether chaga is actually a mushroom, it's technically a fungus, which a lot of mushrooms are similar to fungus, but they're not exactly. Chaga is actually a parasitic fungus that attacks the birch tree in high elevation locations. Here in the Appalachian mountains, you can only find it usually above 4,000 feet elevation, and it looks like a big, giant black scab on the top of a birch tree.

It's all lumpy, looks like a big black tumor. They're always very dark, very lumpy. Chaga, again, is not one that you would eat for breakfast or want for your kitchen table. Chaga is also found, of course, the colder you get, the easier it is to find. Siberia is very typical place to find chaga, but it is usually sold commercially as like a powder. I've gotten it from mushroom experts where they've dried it into a powder and then you can stew it in a crock pot.

A lot of them just keep a crock pot going of chaga and just add a little bit to their soups or their teas, just so that they get a little bit of chaga each day. The scientific name is *Obliquus*, which I don't know if that has something to do with the color, because it has a ton of melanin, but the melanin in the chaga is actually important for its antioxidant

effect. Again, this is another immune modulating mushroom, so it not only decreases that cytokine storm of the IL-6 that tell the Nfkb. It's immune modulating, just like the others, but it's an antioxidant.

Chaga also encourages cells that aren't doing well, cells that really need to die that are say deformed, cancer has damaged, it encourages those to die. That's called autophagy, and you want that to happen when a cell has been damaged. Chaga helps your cells to clean up and scavenge the ones that [00:12:00] aren't doing so well. Increasing the autophagy, the antioxidant.

There is a compound that's only found in chaga that they've identified and it's [unintelligible 00:12:10] that product along with the betulinic acid, these are for ingredients of chaga that create that powerful antioxidant immune modulating effect. It also improves insulin resistance. It doesn't directly control blood sugar, but it improves the way in which the body manages its insulin, which is important for cognitive health, because you really need your blood sugar to be regulated to keep those neurons happy. Chaga's got multiple uses for cancer too. We're not going to get into that, but a lot of cancer survivors that use chaga.

Jane: How about Lion's mane?

Dr. Broyles: Lion's mane is fun because if you've ever noticed a lot of mushrooms look like the organ that they're so good for. Lion's mane is the classic example. It looks like a brain, it's even got the little brainy ridges, it's white. It tends to grow high in Oak trees. Lion's mane you can sometimes find in a living tree, although it still likes to be up off the ground.

Most of what I've seen in the wild is 10 to 15 feet up. Lion's mane is probably the best studied and touted for cognitive health.

Lion's mane actually helps your brain and your neurons. It improves something called neurogenesis. It helps the nerve cells to actually regenerate after damage. There's some really good studies that have been done in mice where they'll damage certain nerves and then feed those mice Lion's mane and those nerves regenerate at a faster rate, a clinically significant improved rate. The Lion's mane not only helps with the neurogenesis, but also brain plasticity, helping the brain to make new connections where connections could have been damaged.

It's one of the only mushrooms that increases something called [00:14:00] BDNF, Brain Derived Neurotropic Factor. I think of BDNF as brain fertilizer, you sprinkle some of this on those synapses and neurons, and it helps them regrow and reconnect with the other neurons close to them. The brain plasticity is probably the most unique quality of the Lion's mane.

It also decreases glutamate, which is important for decreasing anxiety and a healthy brain. It also decreases amyloid production, which this is where we look and say, "Whoa, with Alzheimer's, dementia." Alzheimer's is where the brain is spraying this amyloid because it's on fire and it's saying, "I need a fire blanket." The brain is spraying this amyloid. Well, the Lion's mane helps to reduce the production of amyloid and in Parkinson's disease, it's been shown to reduce this synuclein protein that damages the neurons with Parkinson's.

Really interesting studies on the potential for Lion's mane between the recovery from traumatic brain injury and the neurogenesis neuroplasticity. Very, very interesting. It's got those same beta glucan polyphenols and triterpenes that the reishi has in it.

Jane: You think taking things like reishi and chaga and Lion's mane, and we'll get into the other ones, every day is that okay, or is that too much?

Dr. Broyles: There are products that you can purchase. I have the brand Host Defense, Myco Community makes something called Comprehensive Immune Support. It's a blend of multiple of those mushrooms to take if your immune system struggling or just on a daily basis. They've got a different one called Brain that has the Lion's mane, and they'll combine the Lion's mane with something like Ginkgo or Gotu Kola.

A lot of these mushrooms are available in supplement blends with supplements that aren't mushrooms to further synergistically improve their functions. Yes, I do have many patients over the years that I have put [00:16:00] on blends of Lion's mane with other supplements to improve their cognitive health.

Jane: Exciting. They don't have the same side effects, do they, as putting someone on a prescription drug?

Dr. Broyles: No, they do not. These mushrooms are very well tolerated and overall safe. Absolutely. The Lion's mane actually tastes good too. I will say you can actually eat Lion's mane. I've had it once or twice. It's more of the consistency of cauliflower. It falls apart easily, but it does soak up the flavors that are with it and it is tasty to eat.

Jane: Cordyceps.

Dr. Broyles: Okay. I have to say Cordyceps is the weirdest mushroom. I don't know if you've ever heard of it referred to as a zombie mushroom, but this thing is so much fun. Cordyceps is *Ophiocordyceps sinensis*. This is actually a parasite that burrows into caterpillars and ants, different species do different ones, so it hijacks the brain of the ant or the caterpillar and it forces the-- Let's say an ant. The Cordyceps burrows into the brain, hijacks it, keeps the ant alive, forces the ant to crawl up the highest tree that the mushroom wants it to grow in, and it forces the ant to bite onto the branch of a really tall

tree and stay there with its jaws locked on that branch, and then the Cordyceps burst through the skin and it grows up on the top of the head.

The mushroom is sticking up out of the top of the skull of the ant or the caterpillar and it feeds off of the body of the caterpillar or the ant. It basically becomes a living shell until it finally dies and then the mushroom releases its spores from that high tree and those spores trickle down and help you get more Cordyceps. Isn't that the most interesting and disgusting thing you've ever heard? [laughs] [00:18:00] That's why it's called the zombie mushroom.

Jane: Yes, but it makes me wonder what does it do for humans

Dr. Broyles: Don't be afraid of it. It can be cultivated, not from the caterpillars and ants. You can actually grow this stuff from sawdust and from kits, but Cordyceps is also one of those anti-aging turn and time back for your cells, for your mitochondria. It is an energizing mushroom, so it's used as an adrenal tonic to help people feel more energetic. Cordyceps is generally taken in the morning because you feel more energy, more focus. It's been studied in elderly people where it's really helpful in the elderly to improve their exercise performance.

This is where I feel like it's important for cognitive health because as we know, exercise increases oxygenation to the brain. You really need to exercise to help your cognitive function. Well, a lot of elderly people have trouble just being able to exercise and not feeling like they have the energy, being winded quickly. Well, Cordyceps improves exercise capacity and the ability to exercise for the elderly. That's really where Cordyceps shines, is the energy and the ability to aerobic exercise. It does have those same beta glucans, so that you're going to still get that immunomodulating effect that you saw with the reishi and the Lion's mane and the chaga.

Interestingly, the Cordyceps has a lot of adenosine, and adenosine is a nucleoside that our DNA is made from. When the body has adenosine and this stuff called Cordycepin, the body thinks of them both the same way, but those nuclides are what are the body is using to increase ATP production, so increasing energy and that's how those Cordyceps work.

Jane: Oh, that's important. Very important for mitochondrial health. Chicken of the woods. I love that name. Isn't that what you found in your woods? Did you find chicken of the woods just this week?

Dr. Broyles: Yes, [00:20:00] chicken of the woods. This is just a fraction of what I found. It's just beautiful. See how it's shelf like there. I found a log, but pretty close to my house. I was driving down the road I drive by every single day and I just see this brilliant orange out of the corner of my eye, and I turned and there's this gorgeous just shelves

and shelves of this. This is like 120th of what I found. It was the biggest hall I've ever found.

It's important if you do find a mushroom like this in the wild that you not take all of it, that you cut it and leave about this much of the mushroom sticking out of wherever you found it so that it can regenerate itself. You want to keep the base in the trunk, in the ground so that you can come back there next year and hopefully find this mushroom.

Jane: Beautiful.

Dr. Broyles: Chicken of the woods, such a great find. I don't think I found any last summer. My family immediately we started cooking. I had chicken of the woods on homemade pizza, we had chicken of the woods on pasta. I've got a little bit left. I've been giving it to my friends and my sister. Chicken of the woods it does taste like chicken. It's a much firmer mushroom than any of the others. You would marinate it just like you would chicken or pork or anything else. We tend to marinate it for at least 30 minutes before we cook to soften it, but it's absolutely delicious.

It's our second favorite mushroom to eat behind morels, but medicinally, chicken of the woods is really good, once again, as an antioxidant, immune modulating. It's actually got alpha glucans and beta glucans. Those are those polyphenols that are helping your immune system to fight off infection, but also to dampen the overactive immune response. The other thing that chicken of the woods does, it has antibacterial properties.

It helps your body fight off aspergillus, which is a nasty mold, candida, yeast, multiple different bacterias. [00:22:00] It also increases that autophagy that we talked about earlier, which is where cells that are unhealthy will go ahead and die, what's called apoptosis. It increases the cleanup of the damaged cells. It also improves insulin sensitivity. Again, that's really important for brain health. Antioxidant, immune boosting, blood sugar reducing, improving insulin resistance. You've got lots of general health benefits of the chicken of the wood mushroom, not to mention that it's really tasty.

Jane: Do these have much protein? Chicken of the woods makes me think it's high in protein.

Dr. Broyles: Yes, it is. They're high in protein, generally high in zinc as well. Well, they have zinc and copper. You need a balance of zinc and copper to have a healthy immune system. Mushrooms are a little more rich in the copper, but yes, they are very low fat, but very high in protein. They are a healthy form of a carbohydrate as well.

Jane: Chanterelles.

Dr. Broyles: Right before this podcast, I asked my daughter to go get some chanterelles from our woods. These are chanterelle mushrooms. These are the eastern variety. They look like a yellow little trumpet, and they grow under hardwoods, but they really like to be in pine forest. These are actually more populous just south of where I live, just over the border into South Carolina. Right along that North Carolina, South Carolina border. You find this time of year, July, these chanterelles, you can gather baskets of these things. These are probably my third favorite mushroom to eat, but they're really prevalent edible mushroom in the Eastern Appalachians definitely the whole summer.

You can eat chanterelles up until probably end of August, maybe even into September. Chanterelles, they're the *Cantharellus* if you want to know the scientific name. They're really rich in vitamin B and vitamin C. [00:24:00] As we've talked about on previous podcasts, the B vitamins are extremely important for cognitive health, for immune health. You really need to get that folate and the B12 and the B6. This mushroom, in particular, is a wonderful source of vitamin B and vitamin C. It has the same immunomodulating properties as we saw in the others, it's got those beta glucans, the triterpenes, which are all dampening that overactive cytokine immune storm.

One thing that is unique about the chanterelles is it's got this stuff called ergosterol, and the ergosterol is what helps it via a potent antioxidant. It does decrease those IL-6 cytokines, the IL-1 beta cytokines. It's got flavonoids, phenols. Basically, the chanterelles are just a wonderful antioxidant in general.

Jane: How about the next one? Oh, now we're for magic mushrooms. We knew we'd get to this.

Dr. Broyles: I just had to bring it up because I knew someone would ask, "What about magic mushrooms, the psilocybin?" Psilocybin is the active ingredient in over 100 species of mushrooms that can actually have psilocybin in them. There isn't truly just one magic mushroom per se, but psilocybin has been studied and there's a lot of interest in its benefit for cognitive. It helps people to stay focused, and it also increases creativity, and it's been shown to really help people that are struggling with addiction, both alcohol and other drugs to help them break through those addictions. That's pretty exciting as well.

The unique thing about psilocybin is it's an agonist of this receptor, this 5-HT_{2A} receptor. This receptor is really prominent in the prefrontal cortex and the hippocampus. The prefrontal cortex [00:26:00] and the hippocampus are the parts of your brain that are most damaged when you have dementia, when you have Alzheimer's. They're responsible for your short-term memory and your personality.

The psilocybin works in those areas, just a ton of receptors soaking up this psilocybin there, and there's been small double-blind placebo-controlled studies that have shown a

statistically significant improvement in memory, cognitive ability, ability to do mental status exams, things like that with the psilocybin. Some of the studies were double-blind, and then there was more studies that were on people that admittedly microdose psilocybin on a daily basis and anecdotally report how much that improves their memory, their focus, their sharpness.

I was in a lecture a few years ago about psilocybin as part of the whole integrative medicine lecture. He showed some pet scans of the brain of people before they took psilocybin and after, and there's so much of our brain that we never even use. When you take psilocybin, it lights up all these areas of the brain that weren't previously being used. There's some really exciting scientific potential with psilocybin in the future and I would say for that one, stay tuned.

Jane: It's a good comment. To close, you wanted to talk about how synergistically these mushrooms work together.

Dr. Broyles: Yes. If you go looking for a double-blind placebo-controlled randomized large population study, which that's the scientific golden standard, and if you look for that for individual mushrooms, even for individual supplements like glutathione, we've got lots of them that we talk about on this show, you run into several variables that you can't control for, and scientists really hate that. They want to be able to control all the variables and have everything very similar so that the one variable you are testing, **[00:28:00]** you can tell the difference.

When you take a reishi, for example, if you grow a reishi on sawdust, versus a reishi that's grown on a dead oak log, the one that's grown on the oak log is going to have 100 times more medicinal value than the one that was grown on the sawdust. How do you know in the studies how these mushrooms were grown? Were they in an area that was sprayed with a pesticide, and then you have to look at the person that took it, so the individuals in these studies are all of them following a healthy diet and lifestyle and exercise, probably not. You've got all of the variables of the people in the study and how healthy their immune system is, and then you've got how the mushroom is grown, the location, how it's processed.

If someone's trying to be cheap in the way they're producing their mushroom, they won't use just the fruit and body of the mushroom, they'll use the stems too just to increase volume. Well, the stem doesn't have as much of the active ingredients, generally, as the fruit and body. How do you know that? All of these variables are hard to control for in scientific studies.

I would say you have to think about that. Then you think about the synergy of the way our body works, that the brain isn't its own organism walking around. The brain needs the musculoskeletal system and the cardiovascular and the respiratory. Your body is a beautiful picture of synergy, and mushrooms work synergistically with the body. When I

was talking about chaga mushrooms, part of its medicinal properties comes from that birch tree that it's growing on, and only from the birch tree.

When the chaga parasite, fungus, infects the birch tree, that's where you get the synergy of the medicinal compounds. I would just encourage you to use medicinal mushrooms as blends. I definitely prefer taking them together with other things, and then cook with them with your olive oil [00:30:00] and your holy basil and your rosemary and oregano. Use your other anti-inflammatory herbs and products synergistically with your mushrooms to see the best results.

Jane: I want to come to your house for dinner this week. [laughs]

Dr. Broyles: Absolutely. We would love to have you, Jane.

Jane: Dr. Broyles. Thank you for your time. It is always a pleasure.

Dr. Broyles: Thank you so much, Jane. I appreciate it.

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