Announcer: Bulletproof Radio, a state of high performance.

Dave: You're listening to Bulletproof Radio with Dave Asprey. We're going to talk about mushrooms, but not the magic kind. We're going to talk about the other kind of mushrooms. The kind that has medicinal value, the kind that, depending on which species you use, can do almost anything a lot of the big pharmaceutical drugs can do as well as things that are really important for our soil, for our food supply, and things like that. It's going to be a fascinating episode. You're going to find some things you didn't know about some of the mushrooms you already eat. As well as some of the mushrooms you probably should be eating but aren't. And I'm also going to ask the hard questions about why mushrooms suck.

Dave: You guys ready for the show? I hope you are, because today's guests know an awful lot about this. Here with me in person today at Bulletproof Labs Alpha, up at my house at Vancouver Island, all the way here from New South Wales, Australia ... Wales, Wales, is there some proper way to say that?

Julian: New South Wales. That was good pronouncing.

Dave: All right so I did pretty good. I can almost say Melbourne.

Julian: Burn.

Dave: See there's bun, burn, I don't know. I appreciate your Australian-ness even though I can't speak it.

Dave: By the way, that was just a proof point that they're actually from Australia. We're going to talk about something else too, which is food security. And Julian Mitchell from a company called Life Cykel, C-Y-K-E-L. I've been working with them for the last several months and really testing out their species and their extracts. I actually became an investor and advisor in the company because I'm pretty excited about it. I found nothing else that increased my REM sleep as much as the specific extracts of one species, we're going to talk about which species that is later in the show.

Dave: And I've tried all sorts of different extracts of the same species, but maybe not the same strains. So there's some really special stuff here and I want you to be able to learn from their expertise here.

Dave: Julian is CEO and Julian you're a weird guy to get into mushrooms because Physiotherapy, elite sport's physiotherapist with high performance people at the English Premier Club. And you traveled around with basically soccer or football depending on what country you're in, players and now you're a mushroom guy. Transitioned from sports in the UK to mushrooms.

Dave: How the heck does that happen?

Julian: I try to explain that it's a natural progression or natural evolution, but it's definitely not. I guess my roots were growing up in the country in farming and agriculture, but understanding high performance comes alongside nutrition and understanding what tools we have in those nutritional realms coming across mushrooms is like you said earlier, there's so many applications that they have and so many properties that they can achieve for the desired outcomes of athletes as well as everyday people. So, that was I guess one reason why we got into mushrooms.

Dave: All right. You've got a personal interest in these things.

Dave: It seems like you made it pretty big in working with high visibility athletes into, you know, what's an emerging industry.

Dave: Was there a wake-up moment for you?

Julian: The wake-up moment was really what does the future of food look like and I guess understanding living a life out of passion and I enjoyed working with elite athletes and in those environments but it was really I guess thinking along the lines of what did I want to spend the rest of my life doing? And that was, I guess, looking at the future of food and then doing a little research and understanding mushrooms was almost an uncharted continent, with infinite applications not just in food but in biotechnology.

Dave: One of the things that scares the crap out of me frankly, is the centralization of food production. And I've been thinking about this a lot. I live on a small permaculture-based farm, we grow most of the food that we eat, at least we grow enough that we could live just off the land but I'd miss a few things like wasabi, but most people they don't have enough space, or maybe they do have enough space and they don't know it but if you look at the average city they run out of food within something like 16 hours of there not being trucks coming in because we're on this real-time delivery thing.

Dave: If we were to move from centralized food production to decentralized food production, I think you can do some of that with grass fed cows in fact you get much healthier soil, you do a lot of that with community gardens, we used to call them victory gardens in World War two which was, there are people alive today who planted victory gardens, it's not like it was that long ago. But they're mostly gone. And, what's left is pretty much well, you could have Tilapia in your garage with some algae sort of weird thing going on, there's aquaponics with some of that. And then there's growing mushrooms which seems to be the lowest common denominator. It's cheapest, they can be nutritional, they could also be harmful though.

Dave: Where do you see the future 20 years from now in terms of percentage of human diet from mushrooms versus algae versus some sort of cultured cellular product thing versus quote real food from soil.

Julian: First point is that mushrooms and mushroom based foods are going to play a huge role in the future of food. As they grow quickly requiring very little resources in terms of

water, power, and land, and the amazing nutritional profile that they have and of course being 100% natural.

Julian: As for the algae industry and algae, well actually our biotechnology engineer previously worked in this industry in Europe and moved across to mushrooms largely because the adoption was going to be very slow due its high energy inputs, its enormous use of water and limited applications due to its high unit economics and costs and so, less optimistic on algae and the future there.

Julian: But cellular-based meats that's, I guess there's a couple of questions around what are the key ingredients, how many ingredients are being used, preservatives and numbers, you know, are these ingredients GMO. So these are important questions I guess that come alongside cellular-based foods. And I've seen some great plant-based meat companies and well-being very good for the planet the real question I guess is what are those ingredients and are there inflammatory markers within those ingredients?

Julian: And I think it's safe to say soil-based foods, regenerative farming should take up to you 65% of our plate, grass-fed permaculture raised animal protein sources somewhere around 15%, same with mushrooms being somewhere around 15%, and cellular-based foods, somewhere around five%.

Julian: I think that kind of diet attached to asking the important questions, where was our food grown, how was it grown, this sets us up for a bright future of food and a healthier society.

Dave: Do you have a lot of Preppers who have become mushroom farmers?

Julian: Preppers?

Dave: Preppers, you know, end of the worlds coming, I've got a lot of machine guns, barbed-wire fences and I know I'm going have to feed myself when the Apocalypse happens.

Dave: It just seems like this is the ideal Prepper food.

Julian: We're prepping for that, no.

Julian: We didn't build them into the business plan or the business model the Preppers, but just understanding people have a yearning for local food for connecting to where their food comes from.

Dave: So, I'm thinking about how we're going to feed all the people on the planet, and I think mushrooms are a part of it. But I've been, call me highly skeptical about mushrooms, in fact, I've got a series of books from a W.H.O researcher with 17 years of research. It's called the Fungalbionic series and I bought these books 10-15 years ago when they were only printed in Germany and I spent 500 bucks on three books, but they were compendium of all the research on the effects of mold and mold toxins and fungal toxins on human health, and most of it is around mold because environmental mold and

mold in crops, mold from storing crops can completely wreck your health. But the majority of mushrooms out there are actually poisonous, so given that most plants make defense compounds to keep animals from eating them, this is why grains are bad for you, nightshades generally are bad for most people, probably everyone, and we have these things where it's a double-edged sword.

Dave: There were two studies in this book that I can remember that said white button mushrooms increased smooth cell proliferation in your Endothelial layer. So I'm like wow this seems kind of scary so I always put mushrooms in the, you know what, these are for medicinal use and using them for food is a little bit sketchy. On the Bulletproof Diet Roadmap, I put them in the kryptonite, or, not the kryptonite zone but in the suspicious zone where you need to decide, they're suspects, are they innocent or are they guilty. But that was, that was going back this research over a long period of time and the more I'm seeing about mushrooms the more open minded I am to it.

Dave: So my first question is, how do you know that all these species that we're using are actually completely safe for humans versus oh they're mostly good but they have these gnarly downsides to them.

Julian: Well that last cycle our processes for deciding what mushrooms we grow and put into our products stars firstly with a detailed scientific literature review, toxicology evaluations, and laboratory tests to get the data on DNA identification, heavy metals, microbiology and microtoxin testing. And so I guess that as a listener, hearing that medicinal mushrooms and functional mushrooms play a role may be a new concept but really there are 30,000 scientific medical articles out there, and their reviews. So this gives us a lot of science to work from. And so I guess it's important to realize the vastness of the fungi kingdom with mushrooms outnumbering plants six-to-one. So this means just like there are medicinal and harmful plants the same goes for mushrooms.

Dave: It's funny because Ergotamine is a compound much stronger than Glutathione which a lot of listeners know about because it's a Bulletproof product and I've talked about the detox pathways. And, you say all right mushrooms have this and just eating mushrooms can contribute that beneficial compound to your body which reduces cardiovascular risk, so, I'm still out on the fence. I do know from looking at things like fungal overgrowth in humans, Candida, or yeast over growth in that case, that, there are a whole bunch of people out there, including functional medicine doctors that I know and respect, who say that eating mushrooms makes people get yeast infections or at least, if you're not going to get a yeast infection you won't probably get one from eating mushrooms but if you eat mushrooms and you have a Candida problem it's going to get worse.

Dave: What's your clinical or anecdotal experience with that?

Julian: It's a very good question. We do hear often in the media of Candida issues, which is a yeast infection, and yeast is part of the fungi kingdom. So, does this mean if I eat mushrooms my Candida will get worse? Well, certainly we know eating sugar and yeast-based foods will make the Candida worse but I guess anyone suffering from these kind

of conditions definitely consulting a functional medical doctor is step one, but I guess, as general rules and theoretically not consuming raw mushrooms is a very good idea. And secondly, functional mushrooms, such as Turkey Tail, which we know possess high amounts of PSP which Polysaccharide peptide, which acts to support the growth and proliferation of good bacteria, it makes sense to incorporate these into maintaining and restoring good gut health.

Dave: That's one of the reasons that I'm advising the guys and investing is the level of science that you've gone through on that, even your answer to that question. So perhaps the two studies from the 80s around white-button mushrooms because they were slicing them on salads versus cooking them, because they didn't look at cooking techniques which absolutely matters. So cooked mushrooms are they going to do something different? Yeah.

Dave: I've also seen more recent studies around specific subspecies in fact Cordyceps I believe was one of them that actually have anti-Candida properties. So the deal is you should know what mushroom you're using and what you're using it for, but I've always, if you're a long-time listener, you might just say "Oh, Dave doesn't like mushrooms." No I've always said use them medicinally. And, I'm amending that to say use them for food if they make you feel good, and your food is your medicine anyway. So, if you can eat something that tastes good that also increases Ergotamine levels you may feel a kick from it right then, you probably won' from eating half a cup of cooked mushrooms but if you take a tincture you probably will, because I've noticed very, very profound effects from the tinctures that you guys make. And I did test them against a bunch of others and at least when I look at my sleep score, I get a lot more REM sleep with the specific strains of Lion's Mane in particular that you make.

Dave: I first tried putting Lion's Mane in my coffee oh somewhere around 2012 because I looked at the research on Brain Derived Neurotropic Factor which is really, really good for Lion's Mane. And what I found was that, when I put the powder in my coffee even at the Bulletproof Coffee shop, we offered Lion's Mane and some other stuff, it just doesn't taste good to put mushroom powder like that in coffee. So, I also wasn't getting much result from it. But, I tried before bed, didn't get much result, but when I tried a tincture dual-extract the way you guys are doing it, Omg, my REM sleep just dramatically went up. And it's very noticeable, I skip a night, I get half as much, I put back it back in and I get it again. So I've been able to really zoom in on that one effect from it.

Dave: However, I guess I wouldn't mind putting that tincture in coffee. Is there any reason to blend this tincture into a smoothie or any of your other stuff into a smoothie, into coffee, into anything else versus just put it under your tongue and swallow it which is what I've been doing?

Julian: It's about making it easier for the customer or the consumer in their everyday life and we're very focused on that and so having it as a tincture makes it very easy to add to a coffee, add to a tea, add to a smoothie. It's quite tasteless and at the same time micro-

dosing it in small amounts straight into your mouth is a great way to have it as well and absorb it straight into your blood system.

Dave: I do five dropper fulls of the Lion's Mane before bed and very reliably I have a lot more dreams than I normally did. That was an area of sleep improvement for me, and one that I feel like I've dominated that I'm getting an hour and a half to two hours of deep sleep every night and an hour and a half to two hours of REM sleep every night as long as I'm using the Lion's Mane. The deep sleep I get from glasses and sleep mode and the other stuff that listeners are all aware of. But this is a new addition and nothing else works to cause my dream levels to go up that much and I tried all the stuff except I could run an electrical current across my brain and induce dreaming but that's kind of work. So congrats on making an efficacious product there.

Dave: How did you guys get started, it's actually kind of a cool story, and not very long ago you started sitting around saying I'm working on this I want to crowdfund it. Just walk me through the history there, it's pretty neat.

Julian: Sure, Ryan my co-founder and I were working together as health consultants in Western Australia and we were comfortable in our jobs but as you know it's not necessarily about living a life of comfort. And so the question on how do we have a bigger impact on people's health and how can we live in a more sustainable way, in harmony with the planet, those were the kind of questions we were asking ourselves and so it seemed obvious that business was the best vehicle to achieve this. And this was three and a half years ago we researched different models of food production, technologies and just looking at where things were heading and what we believed in. And we certainly believed in the power of mushrooms and we believed in working with nature not against it. And so, as we researched more and more really mushrooms ticked so many boxes and so understanding they can be grown from coffee waste we pitched the idea of the world's first urban mushroom farm to our local city council and the mayor in Western Australia and we were able to win the pitch event and so adding to this we Crowd Funded and bootstrapped to get our first operation of sea containers that were fitted out to grow mushrooms off the ground.

Julian: And this idea, I think the timing really resonated with the people and so we got a lot of media exposure for the World's first ever mushroom farm in 2016.

Julian: And very quickly from there we learned the need for scientific expertise and so we brought on a biotechnology engineer, mycologist, and microbiologist.

Julian: Vertically integrating from growing the spawn to the mushroom to then carrying out the extraction process was very important to us and it enabled us to focus on making the highest quality and concentrated product we possibly could.

Julian: And I guess, technically to that, over the last couple of years by being a biotechnology company and focusing on innovation, we were able to see other solutions from the mushrooms themselves that could address global issues.

Julian: And so the story is really gone from Ryan and myself with an idea for our first mushroom operation and bootstrapping that to get it off the ground to then scaling it across Australia, the US, and now even having a base in Amsterdam, so, the key to the story has really been about bringing up into the family talented and aligned individuals who are committed to our mission. Which is to make an enriching range of extracts from a clean mushroom supply and using ancient Australian bush foods and so, you know, the goal really through this is to unlock humanity's potential.

Dave: Now, they're full of something called Beta Glucan, which is an interesting compound that can be immune stimulating it can feed good bacteria in the gut. It can also be something that if you have allergies you can have Beta Glucan allergies, what effect do you find that regularly eating has on, or regularly using mushrooms maybe has on allergies in general like Hay fever and things like that, have you noticed any changes?

Julian: On Hay fever specifically we haven't had any sort of testimonials on that I suppose, but consuming Beta Glucan is upgrading your immune software, which means when pathogens are coming in from the outside or you're having autoimmune or hypersensitivity issues with your immune system, you're just running a smarter, faster software that can address those issues.

Dave: So, they can act as signaling molecules on cell membranes for sure, and I think, this is one of those times where you look at the net science, I'm going to place mushrooms where I would something like Kombucha in my thinking if things work. It can be profoundly beneficial for you, however, you might be someone who no Kombucha works, there aren't that many people, you might be someone who can only drink this kind because the other kind makes you feel like crap and you don't know why, right and maybe if you kept drinking it, it would shift something and you wouldn't start feeling like crap.

Dave: I do believe that there's probably individual variation in your microbiome or even in your genetics that you might say, you know what, for your haplotype, you probably don't want Turkey Tail you probably want Cordyceps we have no data, no knowledge on that, but I want people listening to just have permission, if you try something and it doesn't work, try for a little while to make sure it really doesn't work it's not a confounding factor and then just stop. It's okay. And try something else, versus that it's supposed to work so I'm going to keep hitting myself over the head with it over and over and over which is a really common thing when people are working on either recovering from being sick or just I really want to lose that final 10 pounds I'm just going to do this because it's supposed to work. And then they find out two years later they just wasted a lot of time and money on it. So, it's okay to rotate your mushrooms and find the ones that work for you, but I am finding a lot of value in mixing and matching the different tinctures.

Dave: And the Beta Glucan thing is a part of that, different people have different sensitivities to those, so it's not good or bad, and so many people want to just bucket everything in good or bad. I think mushrooms are so nuanced that you probably can find a mushroom

that works for you that could be a substantial source of protein and carbohydrates and probably not fat, are there fatty mushrooms?

Julian: Well, Lion's Mane is the fattiest mushroom of them all with five grams out of 100 grams of dried mushroom being unsaturated fat for the most part, so, really though, the key nutrients for functional mushrooms such as your Lion's Mane your Reishi , Cordyceps, Turkey Tail, are the amino acids, the Beta Glucan, triterpenoids and the anti-oxidants.

Dave: What about fats, is there like a butter mushroom that grows fat inside of it? I want that.

Julian: A butter mushroom? Well there are 1000s of mushrooms out there yet to be identified but we're not aware of a butter mushroom even though we are commonly foraging on the weekends we haven't come across this one though as we know, you know, if we add some grass-fed butter or some Bulletproof MCT oil to mushrooms in the pan that makes for a pretty delicious meal.

Dave: You guys do some other weird stuff that may be why I get a stronger response from your alcohol-based extracts. You use something called Kakadu Plum that I was entirely unfamiliar with and this is a native heritage food from the Aboriginal people of Australia. I knew nothing about this and I knew all the weird stuff and you stumped me on that one.

Julian: Kakadu Plum is an incredible fruit that is wild harvested by Indigenous Australian communities in remote areas of the Outback, so, it's been shown to have the highest amount of vitamin C in the world, 100 times an orange, and so, it's very rich and rare carrying amazing properties including antiviral and anti-oxidants.

Julian: And so by mixing it with the mushrooms we've found it definitely heightens and amplifies the benefits of the mushrooms - particularly Lion's Mane as you've mentioned yourself.

Julian: Now we're incredibly grateful for the special friendships and partnerships we've been able to form with communities and a specific mention, a special mention to [Gombula 00:23:20] an amazing man, a dream-time leader from the Waka Waka community who introduced us to the healing and ceremonial ways in which this is consumed in Australia.

Julian: So, all of that with liquid extracts and powders have this amazing Kakadu Plum infused through the mushrooms, as well as our golden mushroom chai. And we're really getting some great testimonials about dreaming, REM levels, but also because of its Vitamin C content, what we're finding is that it helps your body recover, building immunity which means you have more energy and your body is less under trauma.

Dave: The sum of what you've put into the extracts seems to work way better for me, to the point where I was relatively skeptical on my medicinal mushroom thing, I had some from your Chinese masters, yeah that one worked but then this one doesn't but I've had pretty good results because it takes a lot for me to say I want to work with a company.

Dave: There are thousands in some of these Cordyceps there's subcategories of species even, where there's the Cordyceps that grows on an ant versus the ones that grow on a caterpillar versus all sorts of other things.

Dave: But let's go through, let's start with Oyster mushrooms and this is what you guys actually help people grow at home, these are the things you can eat whole but what are the what does the research show about when people eat Oyster mushrooms?

Julian: There are a number of different types of Oyster mushrooms which is the Pearl, the King, the Blue, the Pink, and the Yellow and we grow all of these in Australia at our farms and, they all have great compounds and nutrients from b vitamins, folic acid, calcium, iron, zinc and potassium.

Julian: Probably two amazing data points that of most interest there's one around the amazing anti-oxidant Ergothioneine and Ergothioneine is involved in the protection of mitochondrial DNA and chronic inflammation so this, I guess really lends itself to being a great mushroom as part of an anti-aging strategy, as it protects, using its anti-oxidant profile.

Julian: The second one would really be focusing on something called Shikimic acid, which there was a great study out of a university in Japan in 2014 that showed by growing Oyster mushroom, mycelium and mushrooms under blue light increased the expression of Shikimic acid by 200 fold and why that's important is because it helps inhibit the enzyme for Influenza A and B viruses, which are responsible for the flu. And so, eating Oyster mushrooms that are grown this way is a great strategy for staying healthy in winter and preventing those colds and flus.

Dave: So, I was looking at the research on Oysters and there's a lot of studies out there around having enough vitamin B6, Magnesium and I don't worry too much about protein compared to a lot of people, a lot of the vegetarian side of thing like oh you're not going to get enough protein you'll starve. You don't need that much protein to be particularly healthy, in fact you probably need less than you're eating if you even eat a vegetarian diet. However, you need the right kinds of amino acids and you need the right kinds of fats. So, from a protein perspective it's more the vitamin's but some of the other medical research just around oyster mushrooms in general are blocking cancer growth, lowering cholesterol levels, reducing inflammation, having lots of anti-oxidants. This is no anything to do with, this is, studies from other people talking about what happens when people just eat Oyster mushrooms, which is really interesting.

Dave: So there's something going on with these that's probably different than eating say a steak raised on an industrial farm.

Dave: No, how can you take Oyster mushrooms, you can eat them, is this appropriate for a powder or a tincture?

Julian: You can make them into tinctures absolutely, I guess that are a delicious mushrooms, so like some of the other mushrooms such as the Reishi or the Turkey Tail which are

inedible because they've got what's called [Kyatin 00:27:25] so they're very tough and fibrous they're not able to be cooked down, so the oysters can be put into risottos into breakfast dishes, into soups or broths or a great side to some vegetables and you know, some grass-fed steak or meat and so they are a delicious mushroom to consume, but they can be in a tincture as well, they can be in other powdered forms.

Dave: Just, to define that word for people who really haven't dug in on it, tincture. What is a tincture, what are the ways of making a tincture and what are the pros and cons?

Julian: Absolutely, tinctures are a, in our case we make a double extract which is a water ethanol extract, so that's the process where we're extracting the medicinal compound using water and ethanol as the process and so by doing the tincture processes with water and ethanol you're getting all of the medicinal compounds the Beta Glucan as you mentioned the Polysaccharides the Triterpenoids, the Terpenes, all these long winded names that are essentially the medicinal compounds come from that extract.

Julian: But you know, liquid form it's more bio-available than in a powder form, so that's why we're big believers of that and very passionate about making high quality tinctures. Just as you mentioned previously about the Kombucha space. Kombucha comes onto the market, there's some high quality products there and then the market gets flooded with a whole range of products and the quality goes down and so it's really a matter of keeping the quality high so people are getting those effects and of course then they're I guess becoming passionate about the brand and what we stand for which is high quality.

Dave: If you're listening to this and you're going oh tincture that sounds hard. No, you make a tincture every morning it's called coffee. It's a water, it's a hot water extract of arabica coffee beans at least if you're drinking good coffee it might robusta otherwise. So tinctures are nothing new. Tea is a tincture. So nothing amazing there. You can do a cold water extract or a hot water extract. And you'd want to do cold water if heat would damage compounds, you'd want to do hot water to get out more compounds. And then, if you were to make your coffee by pouring vodka in your coffee maker, the way some of my college friends would probably have made it, that would be a hot alcohol extract of coffee. So, it's really a pretty simple thing, and of course there are levels of agitation and time that it sits and whether you filter it etc. etc., but that's really the two main ways of getting an extract from a mushroom. And then, clearly you could eat it fresh or you could dry it up and then eat it or even make a tea out of it or something.

Julian: Well I guess it is common the word tincture and it's not something we necessarily refer to with our liquid extract range and that's largely due to a different production method and extraction method.

Julian: Ours involves pharmaceutical grade equipment and a more complicated purification process leading to a more concentrated end product. And so the pros with our liquid extract are certainly that it is more bioavailable than powders, it's easier to consume in many ways, the economics work out a lot better for the consumer. And I guess the cons, well funnily enough a lot of tinctures taste really bad and whether it's a mushroom or

other variety of tinctures but, something we've been really happy with, with our team of scientists, is they've made something that's not only high quality and concentrated but it tastes really good. And so this also lends itself to the Kakadu Plum, because not only adding that high Vitamin C potency it also adds an Australian sweetness to the extract.

Dave: Okay, so that's Oyster mushrooms, talk to me about Chaga.

Julian: Chaga is a fascinating one from a scientific point of view, we refer to it as a sclerotia not a mushroom as it is actually a compact mass of Mycelium growing on the outside of a tree.

Julian: And so this grows wild in climates of Russia, Northern Canada, parts of the US and China, typically growing on Birch trees over five to 15 year periods. And, so we don't have access to this in Australia.

Julian: In terms of its properties, it's well known for activating B cells and macrophages and so, these play a major role in an adaptive immune system by secreting anti-bodies, and secondary to this it also secretes metabolites which have potent anti-oxidant properties such as polysaccharides and Triterpinoids and this has been proven to provide and protect cells against oxidative stress.

Dave: That's one you can't really eat though you have to powder it or make an extract right?

Julian: It's a big woody chunk.

Dave: Yeah, it's a big hunk, I've tried and I didn't particularly enjoy the tea made out of it. I am for the record, the way I use most of my mushrooms if they're not culinary, is I prefer either taking capsules or in an alcohol and water based tincture the way you guys make it. I don't think it's worth choking down bad tasting tea. If you like it eat, but if you don't like is there any moral or health benefit to drinking a stinky tea versus taking capsule or dropper full?

Julian: Absolutely not, you're not going to absorb it as much in that case as well because it's not bioavailable so you're losing both ways.

Dave: So that's Chaga. And then, one of the things there that I found interesting, although I've never felt the effects from trying it, it helps with oxygen utilization especially during exercise, so there might be something to be said maybe for Chaga at high altitude mountaineering or something, I have never tested that, but I might test it.

Dave: I've been taking a lot of flights lately on a plane that only pressurizes to 9,600 ft so it's a little higher altitude than a typical one, so I've been playing with my pulse oximeter and different types of breathing and looking how to manipulate the oxygen in your blood. Okay I'm a geek right, but I'll try Chaga.

Dave: Interesting to date, the one thing I know does work is drinking carbonated water, that seems to help, because it increases CO2 in the body which then increases your body's

desire to pull oxygen in, so CO2 can attract oxygen which is counter intuitive, so maybe that plus Chaga, so sparkling Chaga water it's a product.

Julian: Absolutely.

Dave: You're making fun of me now.

Dave: All right, Lion's Mane, this is one of my favorites. I really have to say your Lion's Mane extract absolutely changes my sleep. So what's the deal with Lion's Mane, can you eat it? And how's it best taken? What does it do?

Julian: It's known as Lobster of the woods, but it's by far a very popular mushroom for its benefits for the fact that it stimulates nerve growth factor. And so, nerve growth factor stimulates Myelin reproduction and Myelin is what's around our nerve cells and our neurons and so as we're getting older, which occurs from pretty much our early 20s we're starting to decay slowly, it helps to remylinate the nerve cell and the nerve sheath.

Julian: And so what does that mean? Well in an elderly population or a more aging population it's where did I put my keys? What was I doing? What was on my checklist? It's just that mental sharpness and clarity starts to fade.

Julian: In the younger population it's really around memory focus, concentration, optimum performance. It's what we're seeing. So you take it either in the morning or in the evening it will affect your REM and your dreaming and it will also increase your ability to find clarity on a mental space and focus.

Dave: If you're listening to this and you've read “Headstrong,” my book about the brain and mitochondrial function, I write a lot about nerve growth factor and brain derived neurotropic factor, and there are studies out there of Lion's Mane, I believe blueberries are also out there, and exercises raises both of those compounds meaningfully.

Dave: And then there's another compound, something that we make at Bulletproof, something called Neuro Master, which has a couple of clinical stages it comes from coffee fruit, but not coffee beans. So, my typical, “I want to have a young person’s brain” stack includes Lion's Mane, it includes coffee, which actually has some effects if I'm remembering that stuff right, it includes Neuro Master which is the coffee fruit, it includes movement and exercise, including things like ping-pong and occasionally electrical stimulation which is something that use at 40 Years of Zen to run, we run a current across your brain we can actually raise BDNF levels as well, so it's entirely possible to do this in multiple ways. Stacking them for synergy matters if you're aging and you want to keep a young brain, you've got to do something for this. If you're dealing with Multiple Sclerosis or any other chronic neurodegenerative disease you've got to get on top of NGF and BDNF in every way possible. So one is speed learning get super powers, the other one is don't die, either side it's probably good and there's like the complete list, and I put Lion's Mane on my list there for sure.

Dave: All right, next up, Reishi , Reishi , how do I say it right?

Julian: Reishi mushrooms, that's how we say it, so this is an immunomodulator, a very intelligent, intuitive mushroom that can wind both up and down your immune system based on if there's a pathogen impending your body, or a bacterial viral it's very smart at addressing that, but also if there's a hyposensitive immune system from pollens or autoimmune conditions or issues then this mushroom is just very intelligent. It's just a building block of immunity, it's known as the mushroom of immortality, Lingzhi in Chinese medicine and is one of the most revered mushrooms over there if you go to China and the temples it's on all the artwork on the paintings.

Dave: I've got to say though, I haven't played around much with your specific Reishi extract, in fact, I should, but I guess I never have a hard time going to sleep or calming down when I want to it's just that when I want to part of it, because I have a lot of fun stuff I want to do, and usually I'm like how do I turn the volume up not turn it down. Do you find that it's highly effective for people before meditation or before sleep or both?

Julian: That's a great question. It's a calming mushroom so it subjectively induces that state of calmness so whether that's after a busy day in the office, or whether that's pre meditation or pre going to sleep it's just turning down that nervous system.

Dave: Man, I've been really studying this and finding all sorts of strange things it does for things like Mycoplasma, and TNF Alpha and inflammatory cytokines. What's the deal with Cordyceps and why is the species that you use special, because there are many different species.

Dave: By the way if you hear weird sounds that's me taking some of this as we're talking.

Julian: Absolutely. The Cordyceps mushroom has a compound called CDP, and so CDP is a Cordyceptin and so Cordyceptin is really the building block and the one doing some amazing work on oxygenation of cells, of allowing uptake of oxygen to the cells, decreasing the permeability of the cell wall there to enable that. It's also got the ability to disrupt the DNA and RNA synthesis of incoming pathogens, bacteria, viral infections, so that's the immune role it plays in terms of stopping viruses and bacteria from being able to duplicate or spread through the disruption of their DNA and RNA synthesis and so that's a very intelligent about them. Subjectively what we find is that it's a smoother ride all day in terms of your energy source, it's a slow release pieces that enables fatigue resistant to be at a higher tolerance.

Dave: Well, I just took six dropper fulls of it, so, I actually do that now every morning. And well, that was my second dose of six today, so am I going to start spreading spores or anything?

Julian: It's a great one pre-exercise, pre-activity. We've seen all of the David Attenborough videos and these things online and you see all of these mushrooms, the Cordyceps growing out of the bugs as it takes over the hosts.

Dave: It's pretty cool.

Julian: It's pretty cool.

Dave: Is that happening inside me right now, like alien?

Julian: Dave, it's an emergency, it's happening.

Dave: This is a real, deeper question, Cordyceps take over the ants brain, and it causes the ant to climb to the top of the tallest tree nearby and sit up at the top and freeze and then explode into spores that get distributed. Like that is some dark stuff, I just took six dropper fulls. Same species, different species?

Julian: The mushrooms are intelligent. It is a similar species, but [crosstalk 00:39:50]

Dave: This is a non-parasitic one through. That's the important thing here.

Julian: It's key to tell you that we're not growing off parasites.

Dave: Yeah, so what is this grown on?

Julian: This one we grow it off an organic brown rice substrate, we put some coffee through the formula and some sawdust through the formula.

Dave: Okay, got it, so it likes cellulose, that's the primary fuel for these things.

Julian: Mushrooms are natures recycler, decomposer, and that's the great thing that a lot of agricultural substrates can be used. But different one's have different qualities that come out in the mushroom, which is important as well.

Dave: So, when you use something like Cordyceps it turns out it inhibits many of the inflammatory pathways that bacteria use to attack your cells, to lice your cells, to break them down, so they can steal your zinc, they can steal your iron, they can steal your fatty acids, they can steal your amino acids, and then use them against you.

Dave: So, there's a first line of defense here and Cordyceps shine when you look at the data about this. So, one of the reasons that I've added Cordyceps into my regular regime now is very specifically that thing. I want to inhibit slow growing nasty bacteria that everyone picks up as a function of being alive, because I'm going to be here for at least 180 years and I'd like to be not 2/3rds mycoplasma by that time.

Julian: Cordyceps they're a part of the anti-aging strategy for sure going forward. And it's not something they're known for or revered for but, as you've said that research out there is exciting and points to that direction.

Dave: And I think, I've seen papers now on nine different inflammatory cytokines or other similar compounds that are turned down or mediated just by Cordyceps, which is pretty

cool. And these are not studies clearly cause we're talking about dozens of them, of extracts specifically, this is just medicinal use, mostly Chinese studies because it's been used in China for thou of years, saying what does this do in the body? Well, it's a pretty heavy duty herbal powerhouse, is my perspective. So, of the products that I've worked with personally, right now my number one would be Lion's Mane because of the very obvious sleep differences and it may be the Kakadu Plum you've got in there it's different than other Lion's Mane I've used, and Cordyceps I'm using for those reasons, I understand the science on it there.

Dave: Do you get a big energy hit when you use Cordyceps?

Julian: For me, it's Cordyceps and Lion's Mane in the morning.

Dave: Okay.

Julian: And that just enables a very smooth ride on an energy level and on a focus level, but it can be used in the evening the Lion's Mane. But the Cordyceps you will get a noticeable longer term energy supply in terms of that sort of peak and trough that you may find with other forms of energy it's a smoother ride for a long period of time. So endurance athletes are using it a lot, this kind of [crosstalk 00:42:31]

Dave: Lion's Mane?

Julian: Cordyceps.

Dave: Oh, from Cordyceps.

Dave: So, I took a relatively hefty dose of it right now. I think there's like 40 doses per bottle or something, I just took six of them. And I'm feeling a little bit hot, I've got a little bit of, I don't know if it's tension or a little bit of pressure kind of behind my forehead, I'm feeling a bit ampy. Not in a super aggressive way, but just kind of, I got a lot of energy I want to burn.

Julian: You want to compete or you want to do sport or you want to do something active taking a dose like that.

Dave: Talk to me about how to cook mushrooms.

Dave: What's the best way to cook them so that I get all of my bioactives?

Julian: First of all make sure you're consuming them cooked not raw. This way you're breaking down the skin of the mushroom known as [cartin 00:43:11] to avoid any digestive issues or discomfort and secondly cooking the mushrooms also kills the unwanted spores and compounds.

Julian: In terms of getting the most amount of nutrients and access to those bioactive compounds, well a liquid extract would be the number one preference for sure, and

recommendation but when cooking say the Oysters or the Shiitake's to maximize your Ergothioneine, it's important to pre-heat the pan, add some water and then cook on a high flame for a couple of minutes.

Dave: Do some of the compounds in mushrooms benefit from being cooked or eaten with fat or are these mostly water soluble and alcohol soluble it doesn't matter?

Julian: The extracts that we make are water and ethanol soluble so you can go down either path.

Dave: But I'm talking about in terms of cooking.

Julian: In terms of cooking, what compounds are you going to consume or make bioavailable? So if you're cooking in a fat then, you're going down the path of a fat soluble extract which means you only get your tritrepinoids and your terpenes. Whereas if you go down a water soluble cooking path then your Beta Glucans, your Polysaccharides is what's going to be more bioavailable to you.

Dave: So that means that I'll keep cooking my mushrooms and I won't cook them on a low temperature, so sous-vide mushrooms not a good idea.

Julian: Not a lot of temperature and not raw.

Dave: All right,

Julian: They're the takeaways.

Dave: Yeah, I think eating raw mushrooms doesn't seem like a good idea to me at all.

Dave: Now, I have two more questions. One of my favorite genres of reading, it's the cyberpunk literature. Guys like Neal Stephenson and Bruce Gibson, people who started writing in the 80s about what the world would look like today. And they were right.

Dave: And some of the more future looking ones, talk about, I remember this scene really vividly, there's a city where pretty much all of the buildings are made out of mushrooms. Like they've controlled the growth of this, and it's all edible. So you can literally walk down a hallway, grab a handful of wall and eat it, and you're completely fine. So people do graffiti in anti-fungals, cause you have to write on a living surface. That is such a radical way to think about, what a world of abundance looks like.

Dave: Ever going to happen?

Julian: The more we look to the natural world for solutions and now evolution, I think the better off we're going to be and so, mushrooms and the fungi kingdom are hugely important to our evolution. Right now, as we look forward using Mycelium and mushroom bio technologies to reform the future of medicine and health care, it'll be

used to re-awaken and expand our own consciousness which we are seeing in places like Colorado and Oakland leading the way.

Julian: Mushroom biomaterial for building materials is something that's going to be scaled over the next five to 10 years and you'll see this implemented.

Julian: Mushroom leather to replace animal leather.

Julian: And of course, functional mushroom foods.

Julian: All these, you know, lends itself to showing that a Utopian future is one that's interwoven with mushrooms and humans. And so, the future will largely be determined by biotechnology, and if we keep the greater good in mind and strive to reach our full potential that means working symbiotically with mushrooms.

Dave: I am actively working on living to at least 180. And, I think there's actually science that says this could happen.

Dave: My question for you, is how long do you want to live?

Julian: I think as a goal a high quality life somewhere around 120 - 130 I think at top quality.

Dave: A high quality life for 120-130 years means that you might want to clean up the sandbox every now and then because we have some problems there.

Dave: I do think mushrooms are a part of that solution.

Dave: And also, thanks for making some cool stuff that's very carefully developed. Stuff that actually works, because I've noticed a very noticeable, I've noticed a noticeable, just a very meaningful difference in my sleep quality, my REM amount is higher than it's ever been in my life, and I've been able to isolate that to your Lion's Mane in particular. So thanks for making stuff that works which is why I'm now a loyal supporter and investor.

Dave: Have a wonderful day, and if you like this episode you know what to do, try some mushrooms already. Life Cykel products, L-I-F-E-C-Y-K-E-L. The URL is lifecykel.com if you go to lifecykel.com/dave, you guys are going to get 20% off first the first 1,000 customers who come through, which is a great gift for people listening, I appreciate you doing that.