Introduction to Dr. Becker's Background

– Hi and welcome to another episode of Reversing Inflammaging Summit Body and Mind Longevity Medicine. And I'm very pleased today in this session to have with us, Dr. Jeffrey Becker. He's known as for his focus on whole health integration. And he's been a leader in developing protocols and methodology in the in the world. His leader in developing the methodology and both functional psychiatry and consciousness medicine.

And is known also for his neurobiology of ketamine and psychedelic transcendence. And I'm looking forward to getting into all of these concepts. Jeff, it's a pleasure to have you here. – Thank you, Stephen. Thank you for the invitation.

It's a pleasure. – Great. And to get started, I would love to get a sense of what got you into this area. What inspired you to go into this, into this area? – When I look back, I was quite naive.

When I was in medical school, I thought that if I went into psychiatry and I learned how to use all of these medicines that touch these receptors, that I would be somewhat of a shaman, and I'd be able to heal people by, you know, giving the right amount of medicine and the, uh you know, give them a little bit of this and a little bit of that at the beginning of, of kind of it was, it was that kind of expansion of poly pharmacy.

When I was in my training, I had studied in undergrad, I had studied biology of course, or premed and biology, but also studied mysticism and had felt that transcendence and kind of spontaneous religious experience was, was quite healing. I found the psychedelics very healing to myself personally. And I thought, okay, well, here's this space in the middle. This is amazing we can play.

And uh then I found out in medical school residency, but really in private practice, really working with people how underwhelming the results were with medications that we could help people feel less bad.

But we didn't necessarily help people feel good. We didn't help them feel well, we didn't necessarily make them well with the medication, we could resolve, uh we could resolve acute extreme suffering. I think a lot of times, but what we didn't know how to do was help people expand and become who they are with. The kind of medical toolbox.

From Psychiatry to Functional Medicine

I think that the, you know, the psychological toolbox of therapy toolbox, in some sense, you know, some of the spiritual concepts I learned in undergrad, I think there are a lot of tools out there. But the medical toolbox seem to be uh again underwhelming. And that's when I really dived into the functional world. I loved biochemistry.

I loved path of physiology and the combination of the two. Uh for some reason I've always had, I've always had an ability to kind of see, you know, as above, so below kind of thinking like the fractal nature of, of, you know, microscopic patterning all the way to macroscopic patterning has always been just something kind of intuitive to me. And so I just a lot of basic principles regarding fundamental molecules and health uh really got plugged in in medical school. And I got to, I got, I think I had that, I got, I had the benefit of having that understanding all the way through my training.

So that, you know, when I learned about the breakdown product of dopamine being peroxide, which turns very commonly into hydroxy cell in the presence of iron.

Then the next step is, well, maybe it would be good if we didn't break down dopamine as much with M A O M A O B to be specific. And you know, that caused me to look that up and this was, we barely had the internet was running, but it was, it was not um you know, it wasn't full blown.

But then I found the papers on selegiline and all of the uh kind of animal data showing improved lifespan and, and uh you know, a kind of anti aging effect from selegiline.

And so I dive deeper into that, like what are the mechanisms. Well, it turns out it's not just that it's also that it seems to increase catalyst levels, you know, an endogenous and antioxidant. And these are the, it was just, it was so fun, it was so much fun and, and then it was a lot of fun to start to put these, put these principles into play in medical care in psychiatry. Because in some ways, again, another aspect of this, that I think was interesting was that the brain is really in very much, very much, I mean, the metaphor of it being a black box, it still is really, I mean, we really have very little way of of probing the brain in terms of its metabolic state in, especially in, in patient care, maybe university labs and things like that. But um we have to use extrapolation, we have to use intuition and we have to use patterning.

Now, we can use genetics actually, which are just, you know, the pricing of genetics has come down to where it's just astounding what you can get uh for for $99 now. Um so, um it allowed me to play with natural molecules. I always felt like if you're not, if you really can be pretty sure you're not going to hurt somebody and you think you might be able to help and you're actively engaged and you have and your and you are engaged in clinical correlation, you've identified signs and symptoms and, and a reasonable guess at path of physiology and there's literature to support it, do something about it and then check up with the patients, see if they get better. And over time you really learn what works and what doesn't. – That's great.

And I can really resonate with what you said really at the beginning, which is how there's a leap between just trying to get people okay versus really feeling well Because my experience is that most people, if we break the whole range of experience, most people typically living in the bottom half and their goal each day is I want to make sure nothing bad happens today.

Let's hope everything is okay at the end of the day. So it fits with exactly what you're, what you're saying. What would you say is your perspective on aging and longevity.

– It's, you know, it's a really, it's a complex question because you've got a lot of different layers to what that means. If you look at, you know what Erick Erickson was getting at in the eight stages of man, you know, non inclusive language, but strange is of the human being.

A lot of what that middle stage of life is about is basically solving a specific problem kind of maintaining generative itty, creativity versus despair.

You know, being able to, being able to stay engaged and, and repeatedly reinvent oneself and reinvent the sources of meaning when we find that things have changed or we've graduated, we've actually developed past where that particular form of meaning was sustained, was sustainable, was nourishing. Now it might.

Aging, Longevity, and Quality of Life

And, and when you, if you, if you do this properly, you move up a letter that's still there, but you, you want more, right? You're looking for more. So I think this is the kind of spiritual aspect of development and I think this is why it's been so exciting to see the acceptance of psychedelics in terms of kind of care of the soul and, and staying kind of openhearted. I think that it's very easy to get smaller as we get older, more fearful, more rigid, more constrained, less comfortable with being uncomfortable. And so, you know, these things can help to kind of push those boundaries open and hopefully open ourselves up.

But also on the molecular side, I mean, if you are getting older and your deep sleep is you know, harder and harder to get as we get older as the colon ergic tone in our brain goes downhill. And you don't get that growth hormone pulse and that kind of nice, clean hypothalamic pituitary axis kind of symphony tuning up that is occurring during deep sleep in the first phase of sleep at night.

It's no wonder we don't feel so as well in the morning or we don't recover. So that's maybe at the, you know, at the lowest level. So addressing again, I think that we have to think in terms of body, mind and soul or spirit and really

be thinking about all these things.

If we're talking about what is anti aging, take care of the molecular. It's really the foundation. If you don't do that, it's kind of it's a bit silly in the sense to think that just expanding the mind is gonna fix everything. If the metabolism and the tissue in the brain which burns 20-25% of our calories every single day in a very small space. – Yeah, so – That tissue can't support, you know, an expanded consciousness, then, then we're not, we're not doing our patients, you know, a proper in that sense, – Right? And I, what I appreciate in, in what you just said is you're really talking about the quality of aging, the quality of life in the process of aging.

And which ties into the next question, Jeff, which is how does the mind and mental health conditions impact aging and longevity? – Well, we see this in so many ways, it's almost, you know, you might ask, how doesn't, how does it not, uh you know, we constrictive beliefs, can constrict behavior and can constrict opportunity or recognition of opportunity.

And so, you know, that kind of inquisitiveness that we see in the young where they explore their environment, right? And they discover new things and there's no things lead to you know, excitement and a kind of leaning into life and, and, and all of that, you know, if there's a use it or lose it kind of quality both to the body and to the neurons in the brain and the mind.

You know, that that process I think is very important. And I have been deeply fascinated by a particular set of a particular aspect of control over consciousness actually, which is the gaba ergic interneuron net that actually both constricts and stereotypes the way that we think and comes on substantially in, in the Tween years and kind of kind of is mostly finished with its, its pruning and kind of conducting of the kind of ego, the everyday, the everyday perception of ourselves internally by the time we're about 30 and we know this from – That's a neurotransmitter system you're referring. – Yeah, it's called the gabba ergic interneuron net. And it's not, it's not attract like everybody else about the way that we think of the Cata Cola means it's not a, it's not like the dopamine track that starts one place and projects out and does certain things. It's kind of like a plastic, almost a plastic matrix kind of controlling our thinking. And it's very specific in this, in this sense, there's a cell called the Chandelier cell that actually has a Chokehold on pyramidal cell activity. It's got its axon which is inhibitory around the axon of a pyramidal cell.

Mental Health, Brain Flexibility, and Ketamine

It is literally the arbiter of whether a pyramidal cell can fire or not. And these interestingly, these are the cells that ketamine preferentially gets, gets onto in low doses and inhibits. So ketamine inhibits that inhibitor.

And what you see is this blooming of interactions across neurons. These neurons are allowed to share information with each other where normally they would be shut down. It would be, you know, that Chandelier cell says, no, you know, you don't share information with that neuron, you share information with this, this set of neurons, you know, the default mode network and executive network and salience networks.

We know that there is there is a stereotyping of interaction and so breaking that up, kind of dissembling that I think can be very helpful for people to kind of crack out of you know, the kind of straitjacket of their own conception of who they are. It can lead to kind of deep creativity that leads to, you know, entire new chapters. I've watched it.

I've done 20 years of using ketamine and clinical practice in mental health applications and it's just been astounding to see what it can do for people.

– So, are you suggesting that the use of low doses of ketamine um creates greater integration in the brain? Would you, would you characterize it that way? – That's almost perfectly said.

And this is not, this isn't, this isn't, you know, really up for debate. We see this in functional imaging, we see that when a depressed subject or even just subject that's not depressed is under kind of sub anesthetic ketamine doses, the kind of 0.5 mg per kilogram dozing that we use so much in treating mental health disorders, PTSD, treatment resistant depression. What we see in the brain is that the nodes that normally are interacting with each

other with stereotyped kind of relationships like the default mode network. As an example, those relationships fall away that those areas are talking less to each other.

But we also see weirdly and, and really, I think it explains a lot, we see the areas that are anti correlated to those nodes. Now speaking with those nodes, it's as if it's as if every area of the brain is always been allowed to talk with other areas of the brain more easily that the rule set of like you only you and you get to get to share information and then we make a decision based on that. All of sudden, there's all kinds of information coming in that leads to, you know, a sense of something.

And if you, if you work with people with Ketamine, and what's very interesting is how deeply symbolic and meaningful the experiences that they, they will, they'll use these words of like there's this wholeness to it, there's this integration, it's so large, it's so meaningful, it's so beautiful. And a lot of what I think they're getting at is that there's a wholeness to what they've experienced, what they're experiencing some aspect of who they are.

It's pulling from memory from, from intellect and the conceptual from, you know, the emotional. And even a lot of times even with eyes closed from the kind of visual cortex, I think we store a lot of information in, in memory and pictures as well.

The so the the evocative nature of that all kind of comes together and people feel like they've rediscovered themselves. Maybe it's the deep self, I think in a sense – That's amazing.

– It's amazing to watch. It's so fun. – I can imagine. Yes. Would you also say that it, it's increasing like the flexibility of the brain, like it's taking the brain out of its rut because a lot of emotional disability is really part of it is that the brain is just kind of stuck in a pattern. Would you say that it's kind of freeing the brain from that stuck nous? – Absolutely. Absolutely.

We know that, you know, complex systems tend to tend to fall into patterning and that patterning ends up in some ways creating its own grooves that repeat that patterning more easily over time, right? That's we just see this all over the place.

So finding a way to break, to crack through that actually is really um well, it's, you know, it's very heartening to the patients when they rediscover aspects of themselves or rediscover aspects or discover aspects that they didn't even know were there.

And there's this kind of recruitment of old, old forms of joy and meaning that feels particularly holistic for patients. I mean, I'll give you just really easy, quick examples.

Young woman in her thirties who uh feeling that estrangement in her thirties that a lot of people feel like. Is this it, you know, I used to feel like life, there was adventure, there was something, There's something I was looking towards where I was going towards.

And then now it just feels like each day is a day and it ends and then it's the next day is the same. And she found, you know, she remembered just this very simple, but it just was such a, such a big thing.

How much she loved the violin. She used to be an incredible violin player. And one day in her late 20s, she put the violin in the closet and forgot about it.

That weird. It's very weird actually, we become so um so driven towards goals or towards kind of proxy markers for, for, for goals or for where we want to get or who we want to be.

That we forget about what we are actually that she's a beautiful violent pianist, violinist and that, that's something that gave her, gave her joy and meaning and, and also helped her escape from, you know, music is so transcendent for, for people. It helps us, I think it helps elevate as well. Uh So I've seen so many amazing transformations like that, that I, I don't even know where to start.

But I mean, I can give you, I give you another one. If, if I can, I can give you another quick quick story just to explain. Okay. This was an amazing story.

I was working with a woman. She was in her about, she was about 50 and she had a deep, deep kind of kind of almost a character traits like a sorrow, just a deep sorrow.

And I have, I have a lot, I can go there really too as well. I have, I grew up with a lot of kind of a key, a key pain that, that I really, when I studied mysticism really realized that a lot of it was just kind of um maybe C S Lewis's concept that is pain per se that, that if you really are in touch with it, it's, it's hard to be here. It's hard to just see the suffering and you know, we connected on that and, and what was interesting about her is that she, she ran away from this in particular as you know, it was very scary how intense, how intense it was, how much that pain was so intense.

And she would describe to me that she, um, she ended up in graphic arts and which was, you know, interesting to go into the visual uh in the artistic world.

But she found that repeatedly she would be at people's beds and she would be the one that would be there when they would die. And, you know, maybe the family's gone down to dinner and, and, you know, she decides to stay and that's the moment the person in the hospital bed decides I'm out of here and she's holding the hand, I took note of this.

Spiritual Experiences and Healing Stories

And anyway, we, we moved into her using a Ketamine and it was almost like a trip pick for her the first time she came out, she was just really gloriously just expressing how she felt like she had been held by God, like she'd finally really returned to a state. So it's kind of resolution of estrangement, right? Like why this, this question of like, why did you put me here?

Why did you put me here to be in so much pain for a whole lifetime? Right? I mean, what, what is this about? Right? The second session she actually came, she was crying and it was, you know, I was kind of quietly quiet but, you know, hoping, hoping to understand what was going on.

And she really expressed that she, she really realized that she did not, had not known what she was. And I had a hint of what was going on here. But the third time she comes out and she says, I know what I need to do.

I mean, it's just, could you ask for any more of like, these things fall so nicely into these kind of spiritual? Yes, it's just amazing. And she said I should have been a nurse and then, you know, mind you, she's 50, she didn't do any hard science in her undergrad.

She went back to undergrad to city college and she took core science. She got a scholarship to a nursing program. She ended up going into hospice and into nursing leadership.

And her life is, you know, she still feels the pain, but now she's using it, she's, you know, this is, this is her gift, right? And it's been, it's just these, these are, it's I'm so excited that we're in a new era where, where we can talk about this in medicine that this is these, these, these are very, very real, you know, aspects of healing that if we don't address as doctors, you know, we're gonna get left behind.

– Yeah. You know, some of the research shows that what makes a difference in these journeys or these experiences is whether the person going through it has a spiritual experience is that what you find also?

– Definitely, in fact, there's even specific research, it's not, they're not as I wish there were more, but there is, there are good studies, two of them that I can think of off hand that have shown that the response to the drug is correlated to the basically the spiritual quality of the experience, you know, the magnitude and the quality of the experience.

And that's why the people that know, really know what they're doing in the field we dose to effect, you know, properly, properly delivered for a patient.

It's not, there's no fixed dose. You, you start with basic principles, but you do need to move the dose up until a patient kind of experiences that expanded state.

I think for them to have, have the full, receive the full potential healing that the that the that ketamine can offer for sure. – So you use the term consciousness medicine, Jeff, can you explain what you're referring to with that term? – Well, you know, this is a messy field.

Nobody likes no. There there are a bunch of words out there for, for the psychedelics and for ketamine. And then there's this debate is ketamine psychedelic and are psychedelics, you know, fundamentally different, all that absolutely fundamentally different in mechanism of action.

But there's a convergence of effect. And what I'm getting at with this in terms of consciousness medicine is that consciousness per se, you know, its its size, its scope, its quality, the stereotype, the stereotype is that are involved, you know, is a is a potential target for treatment and that understanding what it is and and, and having, you know, working paradigms and knowing how to apply, you know, the psychedelics, ketamine, other molecules that actually have consciousness expanding effects for even for tonic tonic daily use.

Is a very important aspect. I think of what psychiatrists should be thinking about. I think this is and they are and, and that's what that's, that's again why it's been, it's been such a wonderful decade here.

I think the re emergence of this interest. But again, I will always say, and this is one of the things that, you know, don't forget if you're a doctor to do your labs.

And remember that if somebody has a low B 12 level or they have low glutathione levels or their magnesium is in the, is that, you know, the lowest fifth percentile because they're a drinker, you know, they're not gonna feel well, if you put, if you have a psychedelic experience, they're gonna, they will often feel quite wrecked afterward actually. And this happens out there a lot and, and doctors therapists and underground, you know, practitioners kind of root around thing.

You know, what is this? And I will say it's, it's something that you can probably figure out you need to do. You need to do your labs and your genetics. – Can you give us a little bit of your thought process as you do a work up on one of these complex cases, – I think at the, at the, so at the base level, if you think of, of kind of brain if it's mental health or brain and body.

They're in typical psychiatry often. Actually, it's not, it's not a typical in psychiatry that there are zero lab strong. A lot of times labs are thought of as the internist job or the internist has done enough labs and the psychiatrist looks at them and says, okay, there's nothing going on, you know, at a metabolic level, internist has signed off. Now it's time for me to do to apply my behavioral patterning signs and symptoms, right? And, and define the disease, just define the disorder and then offer a treatment.

I think that this is, this is a mistake in psychiatry because my psychiatry should think of it as tertiary care. And should remember that the internists often did not get very much training in terms of the brain as an actual organ, as a metabolic organ, like how it works and remembering the biochemistry of the brain. I mean, again, I would just point out that it burns 20 to 25% of the calories in a given day. That's, that's a big deal.

You know, it's similar to the heart in that sense that, that its metabolic requirements are both quite demanding and also create a burden, a substantial burden of oxidative molecules, you know, reactive oxygen species and basically just garbage that needs to be processed properly.

And if people don't have the basic molecules, they need to do that, their brain is not going to function very well as an organ. So, I do a deep uh my functional work up.

It starts with a lab review and I ask patients to get every single lab they can get their hands on. I tell them if you can find childhood labs, I want to see them. I ask them to put them in in temporal order.

Save them as one single document so that I can spin through and, and it works as a, you know, it's a timeline and now I have a bit and a lot of people have a lot of labs. And you know, if you do this a lot as a doctor, you can spin through them pretty quickly.

And what you're seeing is a movie play out, you're not seeing a single snapshot in time. Then I and then I also have my, their questionnaire which is fairly granular.

My questionnaire I think is probably a lot more specific and granular than the average psychiatric intake. Partly because I'm really looking for signs and symptoms of specific nutrient deficiencies.

Consciousness Medicine and Clinical Workup

B 12 zinc, magnesium, copper zinc, you know ratio, high, high copper zinc ratio. I look a lot at syndromes like Polycystic Ovarian syndrome, small intestinal bacterial overgrowth that can really, really these kinds of things that can affect the brain very specifically.

Yes, technically, it's a G I syndrome but it, you know, SIBO just ravages the brain. So does small. So does Polycystic Ovarian syndrome gets very commonly misdiagnosed as depression, atypical depression and A D D.

When in reality, it's really, in some ways it's a, it's an insulin, it's an insulin insensitivity, kind of a type two diabetes light. So gathering signs and symptoms, gathering labs And then also doing genetics and, and truth be told, I just used the 23 and me panel.

It's $99, you get 650,000 snips for $99. And I've had my own reader program that I've got the snips that I'm interested in. I follow about 300 of them. But there are a lot in there that are, that are, they're really worth, you don't have to follow 300.

I mean, I think if you follow, even if you just only follow like 15-20 on a given patient, you can, you can really discern a lot about what might be going on with them.

Some of these snips are so specific. I mean, one of the like methane in Cynthia's for duct a snip. There's a version of it. Very, very common, very common in Caucasian Caucasian Americans. And if you have two copies of it, you're four times more likely to have a child with cleft palate or spina bifida.

And what we're getting at here is really, this is a very clear clinical sign that, that this, this enzyme doesn't work that well in the process of reducing Cobiella mean the cobalt on B 12, after it becomes oxidized, it becomes oxidized after about 20 after about 1000 to 2000 reactions, bringing homocysteine back to matthias. And some people have a version of that, that it doesn't, it doesn't bring the Cobalt back into the proper surveillance.

And uh that's a person that really probably can benefit from I dose method Kabbalah mean to support their, their metabolism, but you won't find it without the genetics and you can find it for $99. I mean, it's just astounding.

– Yeah. What are your thoughts on the ketogenic revolution in mental health? You know, some are saying that it can reverse some mental health conditions. Chris Palmer has a new book out on this.

– Yes, absolutely. I mean, there's, there's, I think there's two really easy things, easy aspects of leverage to point to as to why it could be so helpful.

One is simply that, you know, if you think about, I don't know if you've ever driven a diesel car, but, you know, when you, once you drive a diesel car, you don't go back to gasoline, they're so they're so stable, you know, they're just, they just go forever and they get a lot of mileage out of a gallon of a gallon of diesel compared to, compared to gas gas is like, it's just on, off, on off. Yes, it helps you jump off the line, but you're just having to go to the gas station all

the time.

Right. It's just fast fuel, fast fuel. So, I kind of think of it similarly in that way. And that, that so many of us are, get used to with the three meal a day kind of model.

You know, we get used to that fast fuel that it's off fast fuel. Then it's often that just creates, it runs the insulin system ragged, but the brain doesn't like that either. It doesn't like the ups and the downs.

And so, you know, training the body to live on ketones and using fatty acids. And even, you know, I actually believe I'm less, I'm less specific about having patients do keto than I am that they do intermittent fasting because I believe that if you intermittent fast properly, what you end up doing is really turning up the architecture that produces uh this type of fuel for the brain anyway, it can take a couple of weeks for the brain to kinda and bring the body to kind of get used to it. And then you find people will say, yeah, it was really hard in the beginning and now I don't even notice it.

I don't feel that feeling of like I'm hungry and their, and their energy is a lot more stable that said some people that's not the proper path and, and actually more of a ketogenic diet and the, and the, you know, the C A C 10 fats and things like that M C T oils and stuff like that can be nicely supportive. But you know, a perfect example of what I was just getting at Polycystic Ovarian syndrome, one in eight women, really looks at some core level like it has a lot to do with insulin resistance.

And you will see a lot of carbohydrate craving in, in these individuals and if you can get them to change their diet and move over and get on to a, a longer slow burn fuel, they just do so much better.

Sometimes again though, to remind, again, you know, check your chromium levels because a lot of them are low in chromium and they don't, that's glucose tolerance factor. That's the metal in the middle of glucose tolerance factor. If you don't have your chromium traveling chromium, you know, you're gonna have insulin issues and chromium is going down in our diets by about 30% over since 1950. So anyway, I'm again saying, don't ever forget the labs and all that. But um the you know, I think it can be very helpful that way. And of course, for aging, you know, it's not good for us to blow our insulin system out.

And if we're not careful, you know, it happens, sugar is pretty toxic, – Right. So you mentioned intermittent fasting. What is the, um, schedule that you recommend the most?

– It depends on the person. Some people, some people never like breakfast. It's just not natural for them. I'm one of those folks. If I eat breakfast, I'm tired by noon and I am and I eat more and I don't feel as well. It's weird.

I don't know why. I don't, I thought that I could figure out what's going on, what kind of patterning or something. And I just kind of gave up a long time ago and just said whatever, since natural patterning is just so let's work with it.

Some people really, they breakfast is very important. In which case, you know, you, you try to bring, eat all of your food within an eight hour period essentially is, is what it means. What I don't care what eight hours, it's not ideal to go to bed on a full stomach, of course.

So, you know, there's other principles to kind of include in that, but I don't feel, you know, ideological about it has to be breakfast or it has to be uh you know, the other way around. There is some, there has been some data that says that it's not good to not eat in the morning.

And then there's some data that says that it's okay and sometimes it says you can, you shouldn't have coffee and you should, I just say, do what do what feels right at a certain level, but give your bell some rest from feeding all that bacteria in your small bell. You know, it's the best way to get rid of this idea.

You know, I think it's kind of, it may be the only way honestly. Small intestinal bacterial overgrowth. Excuse me, – Psychedelics have been referred to as neuro plastic.

Could you, can you elaborate on that?

Ketogenic Diet, Fasting, and Brain Health

– So what they mean by neural plastic is that there's, you know, there's this kind of window of potential for learning and for kind of learn, you know, new, new connectivity increases in dendritic densities and and uh and it's not a surprise that if you know how they work and I was talking about ketamine before that ketamine inhibits the inhibitor. It inhibits the chandelier sell primarily at the kind of low doses that we use partly because those cells are slightly excited.

And that means the magnesium isn't an N M D A receptor and the academy can get on them, preferentially, turn them off and then all the cells are allowed to talk to each other.

The pyramidal cells psychedelics work differently. They they attached to the cell body and the proximal dendrite coming in. And when that five ht two A serotonin receptor is activated, what it does is it increases the chances that any given cell is going to fire based on a given amount of stimulus. So it's kind of like, it's kind of like a global stimulant in a sense for pyramidal cells but not in the way that we normally think of stimulants being norepinephrine driven and maybe some dopamine, neither of those catacombs means it's just, it just, it just increases the the ability of that neuron to fire.

Remember that inhibitory neuron, the chandelier. So I was talking about it's still trying to stop that firing maybe, but it gets overwhelmed. And now there's new connectivity, right? Cells have been able to overwhelm the inhibitory tone, right? And you're the dose, the dose matters. Obviously, you take a lot and you get a lot of increased cattle is catalyst effect in terms of firing and a little bit and maybe a little bit. I think this is where the micro dosing model comes in and has been quite interesting to watch that grow.

The idea of using a very small amount every two or three days just to kind of help keep an expansive state. And also why a whole lot in some people where control over control over thought and and all that may be actually pretty important and kind of breaking that down isn't always a good thing for some people.

I mean, you can have post psychedelic psychosis of course, and some individuals. So these are all, you know, solid considerations about whether somebody is a proper candidate and dozing and what drug and all of that and support, you know, before and after.

– You know, based on the mechanisms that you're discussing, it seems to me that what you're suggesting is these are substances that not only can be beneficial to people with mental illness problems, depression anxiety, but also for the average person they could increase their brain health.

– Yes, I would say that, you know, we always have to be careful as doctors when we start applying something to somebody that doesn't have a disease or a disorder.

Exactly. But, you know, aging and dying and memory loss is all, you know, these are, you know, is that a disease FDA doesn't feel that aging is a disease. But I mean, in some ways, I mean, it's a, it's a process of the question of whether it needs to occur at, at least at the rate that it does. I think it's a very legitimate one and in that kind of use it or lose it model. You know, increasing connectivity and increasing creativity and, you know, maybe, you know, dusting off sources of meaning and kind of integrated sense of self. These are all, these are all aspects of consciousness that I think are, it's not hard to understand why that might improve, improve both health span and lifespan even. I think we tend to make better choices when we feel better and we tend to take better care of ourselves.

And there's an orientation towards the world is often more healthy. The food that we choose to put in our body tends, tends to improve and, you know, it all kind of adds up. – Yeah, this is a, such a fascinating subject in a mushrooming subject as well.

No pun intended there. Can you briefly describe the differences between the most common uh psychedelics and

use right now? – Yeah, absolutely. I mean, that's a lot of fun.

There's so, I mean, I think that the most common thing for any given person, I mean, if you just query 200 people in a room, you know, I think mushrooms are probably the most commonly experienced and, you know, they've been around a long, long time, of course, you know, Gordon Wasson discovered the, uh you know, discovered that those were not, those were not balik, you know, stones, you know, down in Mexico, but mushroom God stones and, and all of that. And we discovered this, the psilocybin class and um that psilocybin is a pro drug and it turns into Cillessen, it's got a phosphate on it, that's cleaved off by a phosphate.

And that's Ellison is basically called four hydroxy D M T. That D M T part is kind of important for hydroxy means that D M T has got a little substitution on there lasts about, you know, anywhere from 4.5, 5 hours to maybe eight depending on the dose. And it tends to have a quality that's very generally, it can be, it's very spiritual, it's less intellectual, it's less kind of people in the field will say it's got, it's less clear head space. But also I think a lot of people feel it can be the deepest of the spiritual experience. Depending on the person, it can be quite punishing as well. Sometimes it can be, you know, the union concept of the tree that has its, its, its leaves in heaven, has its roots in hell.

Psychedelics, Neuroplasticity, and Major Compounds

I think it's very pertinent in this when one moves into the psychedelic arena, you know, this is a very, very, very real considerations. I mean, you do it enough and it's very, you will, you will have a dark experience at some point. So being prepared for that and understanding it, I think it's important. LSD, of course, you know, discovered from the fungus uh by Albert Hoffman, the 25th compound that they had isolated from that class purpurea.

And uh there are LSD analog for close, close molecules and morning glory and rosewood and things like that, but LSD very, very potent uh and kind of a cleaner, cleaner kind of experience a little bit more, more intellectual. I think that that is often where people turn when they're looking at micro dosing and they want to be able to kind of work and, and kind of grind out, you know, more may be tedious stuff, you know, whereas mushrooms, you might micro dose mushrooms and be like, wow, I'd really rather be out like, you know, walking through those oak trees than, you know, getting the slide deck done kind of thing.

So, last a long time, a lot longer than, uh, than I've often enjoyed. But it's, you know, is what it is. These things have their own, own pharmacogenetics on that five HT two A receptor, they all attach to that receptor at least partially.

And then they have these other flavors by probably how they bind to the receptor we're finding out and then also probably other receptor binding profiles that kind of create flavor. And then there's, there's Mescaline, of course, from the peyote cactus and that's actually a phenyl ethyl amine and life.

The LSD is a life surgeon mean it's a different, it's a different scaffold and then we have fennel ethyl amine looks not that far off from norepinephrine and dopamine really, whereas the psilocybin and it looks more like serotonin.

But mescal in very non potent, uh you know, it's more like 300 mg, but that was the original a lot in, in many ways, one of the most important molecules in our history with Aldous Huxley having uh you know, his two really major and important experiences with Mescaline leading to doors of perception and heaven and hell as this kind of short, very, very powerful and very, very deeply felt and meaningful uh kind of extended essays about what the experience is like that if anybody has not read those, those are very pertinent still today. And then finally, you know, we have the rise of Ayahuasca, which is really kind of amazing.

And D M T, of course, which D M T dimethyl trip to mean it's so simple that our body breaks it down quickly if you take it orally. So, Ayahuasca uses D M T from one plant and an M A O inhibitor from another in order to decrease the ability to break down the D M T.

So the D M T gets into the body, it's broken down by an enzyme called mono amine oxidase. If you take a mono amine oxidase inhibitor, then that means that the D M T can get into our bloodstream and kind of come on slowly and powerfully and kind of Stay up for a while and then slowly it gets broken down. And so there's kind of a, there's

a rise and a fall that's much over a much longer arc, you know, eight hours, even 10 hours depending. Whereas DMT that's inhaled is like a rocket ship straight into the space because it goes right into the brain and very, very rapid onset and can be very, quite scary for people but but also can be quite profound. – Yeah. Yeah, this is a fascinating subject with a lot of implications, Jeffrey. I'm so pleased that we have the opportunity to have this conversation. If people wanted to reach you or learn more about what you are doing? How can they do that?

And would you have something that weak people, Like an E book pamphlet on some of this that people can reach out to you for? – Yes. You know, we talked about this before and I definitely have a few things that I think I'll pull together and offer here at the end of this uh for me, I, you know, I do have my own personal website that's, associated with my practice as a doctor. I'm also the science director of an early startup pharma company that is developing ketamine, subcutaneous subcutaneous form of ketamine with a patch pump, a wearable simple to use patch pump, take off a sticker, put it on for pain management actually in postoperative pain as our flagship. But that will be, you know, that that's our starting point and then we will branch into mental health.

We're looking at other indications as well.

Closing Remarks and Contact Information

We need a, an effective, an effective, you know, convenient way of delivering ketamine and parental fashion to get this back into the psychiatrist's office.

I have lots and lots of anesthesiologist, friends who have anesthesia clinics on the board of Escapee American Society Academy providers who very much believe in their good work. But I do also feel that it's a shame and it's really not acceptable that the psychiatrists have not had access to this powerful medication in a way that works. We have, we have to deliver this in a parental in a, in this subcutaneous fashion so that we can get people in the space properly and does a tune. So that's been my mission for the last five years and that's, that's in biomedical B E X S O and you can follow us there.

– Well, again, Jeff, thank you so much. We really appreciate it and good luck in what you're doing with that company. – Thank you both. Yeah. Thank you, Stephen. And I really appreciate what you're both doing.

Its privileged to be invited. – Thank you.