Mind & Life Podcast Transcript
Chuck Raison – Ancient Practices & Conscious Experience

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Opening Quote – Chuck Raison (00:00:02): *I'm so interested in this question of the importance of conscious experience, and what a precious thing it is as a human being to have awareness, and to have this amazing inner world, and the power of that inner world—especially when that inner world manifests transformational stage where people have these qualities of gratitude and a sense of interconnectedness. And I've really been fortunate because it definitely has helped me in my personal life to have this profound sense of wonder at how it is that we are the kind of creatures we are in the universe we live in. Once you catch a glimpse of that, it's eternally mind-blowing, and I think science has done that for me.*

Intro – Wendy Hasenkamp (00:00:45): Welcome to Mind & Life. I'm Wendy Hasenkamp. My guest today is psychiatrist and mental health researcher, Chuck Raison. Chuck is a professor in psychiatry at the University of Wisconsin-Madison, and he's also the director of clinical and translational research for the Usona Institute. As you'll hear, Chuck's work is wide-ranging, but centers on understanding how ancient practices can change our conscious experience. He's one of the leaders in investigating links between inflammation, stress, and depression, and how meditation and other practices might play into that picture.

(00:01:27) I spoke with Chuck last summer and we get into all of that in our conversation, as well as discussing the placebo effect, the role of body temperature in our emotions, and his latest work investigating the effects of psychedelics on conscious experience, and as a possible treatment for depression.

(00:01:46) As we continue to dive into mind-body connections on the show, I'm really happy to be able to include Chuck's perspective. As you'll see, his energy and enthusiasm is infectious, and I so appreciate the lens he brings to this work—thinking about evolutionary biology, human ecology, and balancing the approaches of modern medicine with a deep reverence for ancient traditions and practices. I think you're really going to enjoy this one. It's such a pleasure to share with you Chuck Raison.

Wendy Hasenkamp (00:02:20): Hello, Chuck! It is great to see you. Welcome to the show.

Chuck Raison (00:02:23): Thank you, Wendy. Good to see you, too. It's nice to see you again. It's been a while.

Wendy Hasenkamp (00:02:26): It has been a long time. Well, I've really been looking forward to having you on. I feel like your work is such a holistic and integrated perspective of how the mind works, and how all these systems of our body interact. So not only the nervous system, which we usually think of around the mind and brain, but immune, endocrine, all these other systems that we have, as well as environmental context, and those kinds of things. So, before we get into your work, I'd love to hear just a little bit of background and your story, and how you got interested in doing this work and studying the mind from all these perspectives.

Chuck Raison (00:03:04): Yeah. It's funny, I've thought about that a lot in the last few years. People have asked me that. You know, it's kind of cliche now, unfortunately for me, but I was one of these people that always had an interest in the quality of conscious experience. As a younger person, I had a little tendency towards what we might now call mystical type experiences. And again, this has become... It's amazing how current it is in our culture now. Back in the '70s, not so much. I was an outlier that way.

(00:03:34) So I think I always had that interest in, basically consciousness, to be frank with you. I wandered through some careers. I was a journalist. I was trying to be a novelist—god, I was a terrible novelist *[laughter]*—and I had this "road to Damascus" kind of transformative experience at the end of 1984, and decided to become a psychiatrist. I actually thought I wanted to be a psychoanalyst, found out I didn't really like therapy, but did become a psychiatrist, and was really a full-time clinician for the first few years I was at UCLA.

(00:04:06) And I started the work I do now back in the mid, late '90s when, through a random circumstance, I got to know the Dalai Lama's sister. I hosted a big fundraising dinner for her at UCLA, and I'd gotten interested in Buddhism. You know, I'd had a couple of bad relationships... nothing like suffering in life to make you wonder about the mind. *[laughter]* But it was the Dalai Lama's sister who introduced me to a couple of Tibetan Buddhist monks. At that time, they were both monks, neither are now, both named Lobsang.

(00:04:40) And one of the Lobsangs, Lobsang Rapgay, and I spent the better part of the year together, with him really giving me a deep dive into a lot of aspects of Tibetan Buddhism. And I got extremely interested in some of their Tantric practices. And again, it's interesting how this has become much more... Again, it's been picked up and New-Agified, if I can say it that way. But in that time, it was not very well-known. And I was really interested in the fact that they were using physical processes to try to induce certain types of very powerful mental states. And I was convinced, if we could understand what they were doing, it would give us insight into those mental states. So, again, it was that interest in conscious awareness.

(00:05:20) So I didn't know anything about being a researcher, but I decided this is what I wanted to do with my life. I really got bizarrely obsessed with something in particular called *tummo*, which was unknown at that time, really. Guys like Wim Hof and people have made it... more people know about it now. But tummo is a fascinating thing. In several schools of Tibetan Buddhism, especially Nyigma and Kagyu, it's seen as this foundational practice, but what's weird about it is involves raising your body temperature.

(00:05:51) So tummo is this practice, and it involves both physical procedures—certain types of breathing, breath-holding and things, combined with visualization of a fire at the navel—that explicitly is done to raise body temperature. And so, traditionally in Tibet, the way that prowess at this was assessed was they would take the neophytes that were trying to learn this out in the middle of winter, out at night, strip them down to their skivvies, and then they would dip sheets in ice-cold water and see how

many sheets that people could dry on their body without starting to shiver. And whoever dried the most sheets won. So, this was the most bizarre thing I had ever heard of. And people had been doing this for a thousand years. It grows out of Kundalini practices, so it has a progenitor in Indic practices.

(00:06:41) And at that time, there was a guy named Herb Benson, who was a kind of famous guy for the relaxation response, who had actually had a chance to go film some of this stuff, and Lobsang Rapgay had access to the films. And you could see these guys steaming the sheets and all this business. And so what fascinated me was this question of, why would... And the purpose of this practice was to induce this stable sense of what we might call euphoria, what they might call bliss, but this extremely positive emotional state. And the way Lobsang Rapgay always explained it, which I thought was really compelling, was that the purpose of these sorts of tantric practices is to try to achieve enlightenment within a lifetime, very rapidly. And doing that is not without its risks, and it's rather difficult. The view of actually insubstantial emptiness—this Buddhist idea that things that seem solid are not—you know, it's all fun and games until you actually see it. And so the argument was that, to be able to metabolize that and work with it, you needed to have this extremely positive emotional state. And so, hence, tummo.

(00:07:45) And so, of course, now, I was a guy who was seeing people with manic episodes and depressions, and I said, wow, these guys are doing something to their physical state that's putting their mind into some kind of fixed state. We see that with people who go manic, where they get these unrealistically euphoric states. So there's a whole literature there around that, but that was really what it was. Because it's such a bizarre practice. What does body temperature, and what does thermoregulation have to do with your emotional state?

(00:08:14) Well it turns out: a lot. And we've done now many studies over the years that are just in that domain, but that's what it was. So because of that, I said, well, okay, if I'm going to study this, I need to find a place that has strengths in Tibetan Buddhism, and I need to find a place that has strengths in what I then thought were the systems that must regulate body temperature. And that turned out to be Emory, and that's how you and I met each other.

Wendy Hasenkamp (00:08:35): Yeah.

Chuck Raison (00:08:36): So I came to Emory. And I tried very, very hard to study this one kind of meditation called tummo, and it turned out, despite the best efforts of myself and Geshe Lobsang Tenzin Negi at Emory, it couldn't be done at that time. The folks that were really good at it did not want to be studied. It all came to an end when the abbot of probably the best tummo monastery in exile (outside of Tibet) had come to Atlanta. He was friends with Geshe Lobsang. And this abbot of the monastery enjoyed Brazilian steakhouses; he had a center down in Brazil. (Because Tibetan Buddhists will eat meat, you know.)

(00:09:15) So I took these two guys in monk's robes to Fogo de Chão in Atlanta, and that was a wonderful moment when I walked into the Brazilian steakhouse with these two guys in monk's robes... Just dead silence. Just jaw-dropped staring. *[laughter]* So, anyway, this was the big pitch, and we really tried to pitch to this abbot studying this stuff. He was a pleasant fellow. He was nodding and nodding, and then he said... It seemed like a total non-sequitur, he said, "You know, one of our great tummo masters decided to come down into the plains of India to see the holy sites."

(00:09:45) So he started telling me the story about this tummo master who came down and he was visiting the sites, and the big problem was that he was so popular that he could never find any time to be by himself to practice his tummo. And so he said, "And you know what happened?" I said, "What?"

And he said, "Well, one day, he was able to sneak off by himself and he started doing tummo under a tree. And you know what happened next?" And I said, "No." And he said, "Well, a goat got curious. And the goat came over and started watching the guy doing tummo." And I said, "Uh-huh." And he said, "You know what happened to the goat?" And I said, "No." And he said, "The goat went blind."

(00:10:23): And I realized I was the goat. That was the point of that parable. *[laughter]* And that was the end of my tummo career.

(00:10:32): But meanwhile, I had sort of fallen in with a guy named Andy Miller, who is probably, I think, the world's greatest researcher in the psychiatric space, at the immune brain interface. He had taken me on, but he thought I was pretty crazy. And at one point, he said, "Look, you can keep doing this stupid stuff if you want, but while you're sitting around, why don't you do some real science?" And if I had said no, he wouldn't be talking to me. *[laughter]* But I had the foresight to go, "Eh, why not?" And so that was how then I developed this career with Andy looking at inflammation and depression.

(00:11:05) And I figured, well, that's it for thermoregulation. I gave up on the body temperature thing. And I did for about 10 years, and then it came rocketing back, and we've done a lot of work since. Science is cool that way, things keep circling around. But anyway, that's the story of how I came to... Largely because of Andy's expertise and because I kind of tagged along, we got a reputation for doing that. And then in the last 10 years or so, my work has morphed to studying novel treatments for depression. And so, yeah, that's sort of how it all came to be.

Wendy Hasenkamp (00:11:39): Oh, I love that story. Well, maybe we could start with a little bit of that foundational work that you were doing in the area of depression and inflammation, and what you learned, and how that story got a little more complex over the years.

Chuck Raison (00:11:51): It did get more complex. So, right. And you had said this, that we think about things like depression and happiness as being completely brain-related. And it was quite a shock, actually, in the late '70s when people began to realize that the brain could influence the immune system. That was the first thing, because we're so brainocentric, right? So the beginning of what's been called psychoneuroimmunology was this realization that mental states could affect immune functioning. And early on, people thought that things like stress and anxiety basically impaired the immune system. But you know, I went to med school in the late '80s and immunology had nothing to do with the brain. They were completely separate courses and nobody had any idea. But this was sort of bubbling up.

(00:12:36) There were a couple of real turning points, one was they began to... science advanced and they discovered these immune chemicals that are inflammatory called cytokines. So they began to notice the chemicals, "Oh, whoa, if I inject this chemical into an animal, it gives them a fever and makes them sick." And so` without those chemicals, this never would have happened, right?

(00:12:55) But there was a guy named Robert Dantzer, who I think really was the father of this second wave of immunology in the brain, who is a veterinarian, a French gentleman, who realized that, if you took a laboratory animal and injected it with one of these immune molecules that are called cytokines, one of these inflammatory molecules, the rodent did a certain thing. Its body temperature went up, it lays around, it loses interest in sugar. And he realized, "Oh, if I stress the animal psychologically, its body temperature goes up, it loses interest in things." That inflammation and stress seemed to do the same thing. And he realized that these immune molecules—nobody likes being sick, but that, in fact, it wasn't just an accident—that it was something the body was aggressively doing in the context of infection. And

this gave rise to something called sickness behavior, which they realized was this evolved motivational state. We want to be sick when we're infected.

(00:13:53) This is a really interesting thing, right? And you could test this yourself. If you think about the last time you really... If God forbid, if you have COVID, or if you get the flu and it's coming on, and you start shivering, and you curl up in bed, you put a bunch of blankets on. If, in that state, I told you that you had to go out and lay in the snow... Torture, right?

(00:14:15) And so nobody likes being sick, and yet there you are, you are giving yourself a fever. And the reason you're giving yourself a fever is because fever evolved as an antibiotic strategy. Raising body temperature tends to kill viruses and bacteria. It's not perfect, but in animal models, you can kill a rodent with an infection it will survive, if you block its ability to have a fever. So, there was this realization, "Oh, inflammation seems to produce a state in animals that looks like depression." And then as these cytokines, as these inflammatory molecules were discovered, they realized, "Oh, maybe these things would be helpful for something," and so they began looking at them as drugs. And the one that really ended up ruling the day was a drug called interferon, interferon alpha.

(00:15:01) So interferons are produced by your body in response to viral infections. They're key for fighting viruses. But they purified the chemical and they noted that, when they injected it at very high levels into humans that had melanoma, a type of skin cancer, some of them seemed to get a benefit, some of them seemed to survive. And then later, they realized if you inject this into people who have the hepatitis C virus, especially if you combine it with another chemical called ribavirin, I don't know, for 40%, 50%, 60%, depending on the type of hepatitis C virus, it will actually get rid of the virus. It really worked for people, right?

Wendy Hasenkamp (00:15:37): And does it induce a fever?

Chuck Raison (00:15:39): Oh, yeah. It makes you sick, right? Because it induces inflammation.

Wendy Hasenkamp (00:15:39): Okay, yeah. Can you unpack a little bit the correlations between sickness behavior and depression, or the symptomatology of depression? I just think that's a really interesting link.

Chuck Raison (00:15:51): It's really interesting, sure. So, when you get sick, you don't think about it this way because you generally recognize you're sick, but you get a lot of the same symptoms people get when they're depressed. You slow down, you feel cognitively impaired, you're tired, your sleep is altered, your appetite is altered, you often lose interest in things. Generally, when you're acutely sick, you don't have time to get depressed. With the interferon, for instance, it takes people a couple of weeks of that. But one of the strongest predictors of getting depressed is having a chronic medical illness. So, all around the world, the World Health Organization showed that years ago. This was part of the clue that there was something going on was that sickness makes people depressed.

(00:16:33) But the cool thing that folks at Emory and other places they were working with realized is that, if you line up the symptoms of sickness with the symptoms of depression, they overlap strikingly, including body temperature. So, when you're sick, you got a fever, no big surprise. But really, it was the work of my colleague Ashley Mason at UCSF, but we recently published a paper in 20,000 people, basically all around the world, that were monitoring their body temperature constantly as a test for COVID. We had them fill out depression questionnaires and really showed that, yes, people that are not sick, that are depressed tend to have elevated body temperature. So even elevated body temperature is

something that sickness and depression share. And the short answer is that inflammation is one of the ways that humans can get depressed, right? So that's it.

(00:17:19) So, basically, that's the overlap. And so what Andy Miller realized and Robert Dantzer and other folks realized was that, all of a sudden there were these human beings who were willing to inject interferon alfa on a regular basis. You could take them before they did that and they're not depressed. You can measure whatever you want to measure, and then you can watch them crash and get depressed as they constantly expose themselves to inflammation. And it's a natural experiment, right? And so this was this very powerful line of evidence.

(00:17:49) And then Andy with Dominique Musselman showed that, if you pre-treated people that were going to get interferon alfa with something—it was Paxil, paroxetine, just an SSRI antidepressant—you could reduce the risk of depression. We replicated that later in hepatitis C. So it induces something that symptomatically looks like depression, that can be blocked, at least to some degree, by an antidepressant. So it looks like depression walks like depression, smells like depression. And this was pretty powerful because this is in humans, and it lined up with this increasing amount of animal data showing that, yes, if you inflame an animal, it acts like it's depressed.

(00:18:27) Now, that explains why you get depressed when you're sick, but the vast bulk of depression, especially in young people, is a result of psychological stress. It's only when you get to be my age that you start having all these problems, right? So how does that work? So then there was this hypothesis that maybe psychological stress induces inflammation. And there were animal data to suggest that. So you could take a little rat or a mouse, and if you put it in a cage with a bigger rat or mouse that beat it up, and you stressed it out, you could show that its body temperature went up and it started cranking out these inflammatory molecules. Which is really weird, but there it was.

(00:19:05) So, really, the first time this was ever shown, again, was at Emory. They did a study where they took men who were healthy—some of them were not depressed, some of them were depressed—and they put them in a laboratory stress test called the Trier Social Stress Test, which basically just involves the subject having to give a stressful speech in front of a panel that is just frowning at them, and then doing mental arithmetic. That had been shown to reliably increase heart rate, blood pressure, cortisol (the primary stress hormone). So they had the foresight to do that to this group of depressed men and this group of age-matched non-depressed men. They put them in that stress test and they measured their inflammation before and for an hour and a half afterwards, looking at a molecule called interleukin-6, which is an interesting molecule, but is an inflammatory molecule mostly. And they showed that that simple stress test raised the inflammation, raised that inflammatory IL-6, in everybody, but it raised way, way more in the depressed people. Way more, right?

(00:20:07) And interestingly, all these men had a history of early life adversity. And so it's been replicated now a number of times that stress like that does increase inflammation, and it does so more in people that are either depressed or have early adversity. So this has been replicated. It seems to be a pretty solid finding. So, all of a sudden, now, you have this other key, that, oh, when my girlfriend dumps me and I'm at the Disneyland Hotel in the bathroom crying my eyes out (not that ever really happened)...

Wendy Hasenkamp (00:20:35): *[laughter]* I was going to say, this sounds personal.

Chuck Raison (00:20:38): *[laughter]* That stress, my heart is pounding, you know. Well, up goes your inflammation. So then this led to this question of, what the heck is that about? Right? I mean, why

would a psychological stress need to activate inflammation? If you have an evolutionary perspective on things, especially a guy like me, I'm an adaptationist thinking that these things are expensive, they're complex, they evolved to serve a purpose.

(00:21:00) It was really a researcher named Firdaus Dhabhar, who was at Stanford in those years, who I think said it best, to begin to articulate this idea that, if you think about what is stress across the animal kingdom, most of the time, it comes down to running for your life so you're not eaten, running so that you can eat something, or trying to make a baby, sexual stuff, right? And what all of those pursuits share in common is a greatly increased risk of wounding. Most animals, if they're not directly eaten, die of wounding. And most humans in wars died of infection, not being shot or killed, until World War I. Wounding is very, very common. When your skin breaks (across evolutionary time), that's your main risk of death. Especially in hunter-gatherer societies where people weren't all packed together—you didn't have such a stage for these horrible viral infections.

(00:21:53) So what Dhabhar suggested, and others suggested, was the reason that psychological stress activates inflammation is that it's a prepotent... It's turning on something that you're going to need the minute you get bitten. So the immune system tries to get a jump on being ready to fight the bacterial assault that's going to happen in your body when the lion takes a swipe at you, right? And it's a smoke alarm principle. It's better to have that go off a thousand times and not need it than to miss it the one time that you need it. Which is all fine and good until the modern world, where you get psychological stress without the wounding. And then over time, and we can talk about this, every time you do that, there's a cost to the tissues of your body.

(00:22:32) So, anyway. So then, all of a sudden, we knew that, "Oh, wow. Inflammation comes from sickness. It comes from stress." And then there began to be these studies showing that, if you take groups of depressed people and measure their inflammatory molecules versus the same sort of people who are not depressed, the group of depressed people have this elevation. It's not huge. It's not like if you have cancer or rheumatoid arthritis, but it's... And it began to be shown over and over again. So, all of a sudden, this was the early 2000s, it really looked like we may have found the key to depression—and probably other things, like post-traumatic stress disorder and anxiety.

(00:23:09) And so, again, Andy Miller, there was some back and forth. I will take credit for convincing him to do this, and he gets credit for actually making sure it got done. But the obvious thing to do was to say, "Okay, now, if depression is an inflammatory condition—just in regular people, not just sick people, but in all these depressed people—then if we can find a very powerful specific anti-inflammatory drug, that should work as an antidepressant."

(00:23:33) It took a long time, but we finally were able to get our hands on a drug called infliximab, which used to be marketed as Remicade. It was used for Crohn's disease, and it's a fascinating drug. It's like all these things, like Humira, it's an antibody. It only does one thing. It just turns off one of these inflammatory cytokines or chemicals, a funny one called TNF, tumor necrosis factor. That's all it does. So it's a beautiful test. If inflammation makes people depressed, we're going to turn off the inflammation, and that should make the depressed people undepressed.

(00:24:09) So we did a study where half of them got saltwater as an infusion, because infliximab is an infusion. Half of them got the infliximab. We gave them three doses of whatever they were randomized to, and then followed them for three months. And you know, we thought we were going to be famous and rich, but it turned out that the saltwater actually worked a little better than the infliximab. Not statistically, but saltwater was a very powerful antidepressant.

Wendy Hasenkamp (00:24:32): As a placebo?

Chuck Raison (00:24:33): Yes, yes. If I was a young person, I'd study placebo. But what we did find was that there was a bit of a wrinkle. So if you looked at the people in this study, if you looked at how inflamed they were before they started getting the drug, we saw a perfect straight line. If you were inflamed, the infliximab blocking inflammation made you less depressed than the saltwater. If you were just as depressed, but had low inflammation before you got the drug treatment, it was the opposite—you did better with the saltwater.

(00:25:08) So it looked like there was a group of depressed people who had increased inflammation. And it makes sense, if your inflammation is up, if that's causing depression, you block it, you might feel better, right? If your inflammation is not up, why would blocking it... Why would that help you?

(00:25:25) So, it was at this point that I left Emory and went to Arizona and thought I was stepping away from the world of psychoneuroimmunology. But Andy Miller, who really is a genius, then took that and has done an amazing line of research over the last 10–12 years, 13 years, showing that indeed, it is not true that depression is an inflammatory condition. There are plenty of desperately depressed people that have very low levels of inflammation. There is a subgroup of depressed people, depending on the population, 20%, 30%, 35%, that have elevated inflammation in their body. And Andy has now shown with his group that those people have different patterns of brain... Their brains are connected differently. Their brains respond to things differently. They have a little bit of a different symptom presentation. It seems like it's really a subtype of depression.

(00:26:19) So the way to think about it is there's a number of ways you can get depressed, and inflammation is one of them. So first, nobody back in the '80s would have ever thought that the immune system had anything to do with the brain or how you feel. And then there was a time when we were so overly excited about this. We thought it was completely... that it [inflammation] was the explanation for everything. Now, we know that it's one way you can get depressed. And that is the long story of inflammation and depression.

(00:26:45) – *musical interlude* –

Wendy Hasenkamp (00:27:13): Maybe we could take a minute and just talk about the placebo response, because I don't think I've talked about it too much on this show, and it's something I've always been totally fascinated by. It seems like you are as well. So, how do you think about that these days, mechanistically, if it's understood? It seems to me to do a lot with predictive systems in the mind, but...

Chuck Raison (00:27:33): Yeah, I think that's true. Well, I am an admirer, but not an expert of placebo response. I have a colleague, a guy named Gerard Sanacora, who is kind of a famous psychiatrist at Yale, who has some independent means. He's very famous, he did a lot of ketamine work. But he's basically dedicated his life to placebo. It's fascinating. He's right, because placebo is so powerful, and not just in things like depression and anxiety. You can show a very strong placebo effect with pain. You can show a placebo effect with Parkinson's disease. And one of the interesting things of the neurobiology of placebo, and these are studies from a few years ago now, but it really looks like, when placebo works, it sort of targets whatever in the brain needs to change for the symptoms to go away. So what I mean by that is that the placebo works a little bit like the drugs that work for the same condition.

(00:28:27) So, if you have a placebo response to depression, you can see these things in the anterior cingulate, a part of the brain that is often implicated in depression. Parkinson's disease, you actually can see changes down in the dopamine areas of the brain that we know are what caused you to have Parkinson's. Pain, you see blockage in areas like the insula. So it's weird, it is like that... you're right, that predictive thing somehow knows how to target the area of the brain that you would have to target to relieve the symptoms that the placebo is helping with, if I can say it that way.

(00:29:03) So it really is a biological effect, right? It's very powerful. And so, Gerard Sanacora, now, what does he call it? Non-specific factors. Placebo is only part of that. There's a range of contexts—it has to do with relationship, it has to do with hope, it has to do with expectation, beliefs. There's a number of factors that go into what we more colloquially call "placebo effect." This goes back to an interest in consciousness that, how the brain sees the world—in an immediate, embodied sense—has these very clear ability to influence how the biological body works. How that happens is very much tied up with the question of, how does consciousness do anything? Right?

(00:29:52) And can you get a placebo effect if you're unconscious? That's an interesting question. Maybe. Maybe. There is a recent study done by a guy named Boris Heifets, a very clever guy at Stanford, looking at ketamine versus placebo, where they knocked people out and they gave people either ketamine or placebo while they're being operated on. These are a bunch of depressed people. And that's an interesting paper, it's widely cited as showing that ketamine doesn't work. Because, if you gave placebo or ketamine when administered in unconscious state, there was no difference between placebo and ketamine. Now, ketamine we know is a powerful antidepressant. But if you look at the data, what happened, the ketamine worked just fine. It's just that, when they got the placebo when they were unconscious, they had a huge effect.

Wendy Hasenkamp (00:30:36): Wow, that is amazing.

Chuck Raison (00:30:38): Yes. And it's probably because they didn't know what they got.

Wendy Hasenkamp (00:30:42): They knew they were getting something. One or the other, yeah.

Chuck Raison (00:30:43): Right. And when they woke up, what predicted being undepressed was not whether they got ketamine or placebo. It was what they thought they got.

Wendy Hasenkamp (00:30:53): Right, right. This is so fascinating. One thing occurred to me just while you were talking about that, it's amazing how placebo treatment can cause those biological changes in the brain and body, like you were saying, in the very specific ways that need to be changed to produce the amelioration of symptoms. Do you think it could work in the reverse? Like, if there's a strong belief that these symptoms will be improved, you start acting that way, and that, in a backward fashion, changes the biology accordingly?

Chuck Raison (00:31:24): So, do you mean do you think it's possible that if you change bodily functioning, that signals the brain to induce a placebo response? Is that what you're asking?

Wendy Hasenkamp (00:31:35): Maybe. I'm not sure how the mechanism would work. I don't know, it just struck me.

Chuck Raison (00:31:39): Well, but that's relevant because it's interesting, there's a huge issue right now that psychedelics are driving around unblinding in psychiatric studies. And one of the ways that people

get functionally unblinded is that they get physical signals that suggest to them what they're getting, right? With psychedelics it's obvious, you're having a psychedelic experience. But with SSRIs, you're yawning, you're not sexually performing. Or you feel better and you go, "Oh my god, what happened to me? I feel so much better," that it produces this functional unblinding.

(00:32:14) But this is what's interesting is, if there was some way you could briefly induce that physiologic experience in the body and see, would that enhance placebo response? Yes. So, in fact, there are studies showing that you get more of a placebo response if whatever you're using as a placebo has physiologic effects that fool you, right? So there's old studies with antidepressants showing that, if you use something like Benadryl as your "placebo", the difference between the antidepressant and the placebo shrinks. Because you're kind of doing that, right? There also is very nice evidence showing that the more invasive your placebo is, the more of a placebo effect you get, and the harder it is-

Wendy Hasenkamp (00:32:56): Like an injection versus a pill?

Chuck Raison (00:32:57): Right. Like our infusion, right? So yeah, with the infliximab, we have the people on the crash cart and all this stuff (because, every once in a while, infliximab can screw you up). Yeah, so there's a whole literature on that, right?

Wendy Hasenkamp (00:33:08): Right, which is more about ritual and...

Chuck Raison (00:33:11): Right, and that's more about ritual and social context. So this is why there's always this active discussion when things are hard to blind, can you find something that would blind them without producing the same therapeutic benefit that you're trying to achieve?

Wendy Hasenkamp (00:33:26): Yeah. Well so, you've been alluding to research with psychedelics, which I know is another big part of what you've been interested in. So, however you want to approach that—how you got interested in that and what you're up to now.

Chuck Raison (00:33:40): Sure. So how did I get interested in psychedelics? Well, there's a story there. There's always a story. It's so interesting, the combination of opportunity, seeing an opportunity, and then just blind luck. In the mid-2000s, I got asked to be on an advisory panel for a remarkable, just a crazy study called The Shamatha Project, which you might remember. Cliff Saron was-

Wendy Hasenkamp (00:34:02): We've talked about it with Cliff, yeah.

Chuck Raison (00:34:05): Yes. One of the most complex studies ever done of meditation that produced very interesting (and confusing) results. But anyway, so I flew out. Richard Davidson was there. We flew out to [UC] Davis and we were on this advisory committee. And that night at dinner, I sat next to this very charming woman, who was unbelievably articulate. She was working on a PhD. She reached over and she said, "You know, meditation, it's okay, but that's not the deal. The deal are psychedelics! And I'm going to go study psychedelics." And I said, "What are you talking about? That's hippy dippy, illegal, Timothy Leary..." She said, "Oh, no. No, no, no. There's this guy, Roland Griffiths, at Johns Hopkins, and he started studying this stuff, and I'm going to go study it with him." And that was Katherine MacLean, and she did in fact go and study with him.

(00:34:46) Three, four years pass. I'd left Emory. I had moved to Arizona. And just as I was leaving, this lovely lady, who was the director of the museum on campus, the Carlos Museum, called me up, she said, "Chuck, Chuck, Chuck, listen. One of our scholars has written a book on pre-Columbian, Western

Hemisphere art, and the argument is that all this art is shamanic and psychedelic-based. We want to do a thing on psychedelics. Can you come and be the expert?" And I was like, "I absolutely cannot. I don't know anything about psychedelics. But I know a 'guy'," right? So I called up Katherine MacLean, I said, "Listen, would you be willing to come down to Emory and give a talk? I'll emcee it." She said yes.

(00:35:27) And you know, I've given thousands of lectures in my life, and I had already given probably more than a thousand by that point, and I had never seen what happened. So, they opened the doors at 6:30. By 6:45, every seat was taken. By 7:00, people were sitting on the ground. By 7:15, there were 150, 200 people out in the hallway. By 7:20, the police were there getting rid of people. And then we started at 7:30.

Wendy Hasenkamp (00:35:52): Whoa!

Chuck Raison (00:35:53): And I was like, "You know what? Hmmm. Something is going on here. This doesn't happen when I give a lecture. What the heck is going on here?" *[laughter]* And she gave this lecture where they'd started doing the brain scans and stuff. And I was utterly fascinated. Because, again, it's that subtext of this interest in conscious experiences—because this is what she was talking about, psychedelics induce these potentially transformational states.

(00:36:13) But I stayed on at Arizona. I had nothing to do with psychedelics. We got back into heat and cold, interestingly enough, but I was just minding my own business pretty much. And one of the deans who had brought me to Arizona, she just packed up and left and went to Wisconsin. And then she started wanting me to get to Wisconsin, and I almost went, but I didn't do it. And so, again, four or five years pass.

(00:36:38) And this dean, this woman calls me up one morning when I'm sitting at my desk and says, "Listen, there's this guy and all he wants to do is study psychedelics, and I want him to donate money to our school. Are you willing to come to Wisconsin?" And I said, "Nah." And she said, "Okay. Well, never mind, you just got to help me figure out how to get the funding." *[laughter]* So she told me about this and I said, "Listen, I'm going to change what I just said. If you can get me in front of this gentleman, and if there's an opportunity for me to begin to work in the psychedelic space, I will come to Wisconsin. I will move."

(00:37:09) Because I had begun to realize that, without realizing it, a lot of the research I was doing was around what I now sometimes call ancient practices. That I was like a retrofitter. I was a guy going around like a junkyard, a guy working in a junkyard of things that we no longer think of as being useful turn out to... many things that had been understood for thousands of years, they seemed to have antidepressant potential. So I had started with meditation, and then we'd gone into heat, hyperthermia, and it was clear by then that psychedelics were maybe the queen of these ancient practices. That it was building, right?

(00:37:44) So, that was it. The gentleman who she was trying to get philanthropic support from, that she did in fact get philanthropic support, was a gentleman named Bill Linton who had started something called Usona Institute. And one thing led to another, and I ended up moving to Wisconsin and taking on a role of what was called the Director of Clinical and Translational Research for Usona Institute, which is this nonprofit medical research organization that is committed to trying to do studies that, if they were positive, would support what's called a new drug approval, or FDA approval, for psychedelics. In particular, psilocybin.

(00:38:19) So, that was how I came into it. I was not a psychonaut. I was not... you know, a lot of people in the field had had very powerful psychedelic experiences. Not me, no, no, that wasn't how it was. I'm kind of a stick in the mud, things like that scare me. So it wasn't for having had... but it was because of this research direction that I said, "This is the next thing." You can't just walk into psychedelics. You kind of can now. But in 2015, there were very few places in the world doing this.

(00:38:48) So that's how that came to be. So, Usona Institute now has done... We published a reasonably sized, what's called a phase 2 study of depression with psilocybin just last fall in JAMA, and we are now in the midst of a phase 3 study. So doing these larger studies that the FDA wants to see. And a lot of data has accumulated that, if you take people that are very depressed, or very anxious, or have a substance abuse problem, if you give them a high dose of a psychedelic, and you do it in a clinically supportive, safe way, many people get a profound benefit.

(00:39:26) And it's fascinating because the drug is in your body for about six to eight hours (with psilocybin), but the effects can last weeks to months, sometimes to years. So how is it possible that something that has an acute biological effect can produce such a long-term benefit without still being around? It's very different than SSRIs or standard antidepressants. You take those every day. When you stop taking them, if you've got a chronic depression within a couple of weeks or a month, you've crashed back into a depression. So this is a very different idea. What are psychedelics doing that could produce such a long-term benefit?

(00:40:03) So that work that we're doing is very much related to just doing these very straightforward but very rigorous FDA-style studies. Now, of course, there's all sorts of entities in this space. There's a lot of money in this space. There have been a lot of adventures in this space recently. But I also have a position at UW-Madison. The university was not supportive of psychedelic work when I first came here and I had all sorts of challenging adventures, but times change. And now, every major university, as you know, is doing psychedelics. Everybody is doing psychedelics. So they're kind of "the answer to everything."

(00:40:37) So it has allowed us to develop a more basic translational science program at UW, where—these are studies that I run—the interest really is this question of, how does a psychedelic do that? How can you do something for eight hours that can produce eight months of benefit? And our interest really is in the conscious experience, and it goes back to what we started talking about. There are a number of studies that say, if you take the drug and it produces a psychedelic experience that has, say, mystical qualities, or cathartic qualities where you face your demons and deal with them, when that happens, people get a larger benefit. The more that happens, the more undepressed you are after taking a psychedelic—suggesting that there's something about consciousness that can produce longer-term changes in consciousness. And most people in the field just assume that's the case. Like, "Duh."

(00:41:30) But science is tricky, and something we were talking about, Andy Miller, my long-term mentor back at Emory, said, "You know, if you're scared of the truth, get out of science." If by truth, we mean empirically replicable findings that, every time I do it, we tend to see this, that there's a mechanism, right? Association is not causality. Just because something like a mystical experience fairly regularly associates with a therapeutic benefit, it doesn't mean it's causing it. It's very possible that some other factor is causing both the mystical experience and the therapeutic benefit. In which case, you might be able to get rid of the mystical experience and just get the benefit. If this sounds crazy, there are millions and millions of dollars in this space now trying to do just that, to find drugs that...

Wendy Hasenkamp (00:42:13): To not have any mystical experience, but still have...

Chuck Raison (00:42:16): Bye-bye consciousness. Yeah, of course. So they've been called psychoplastogens. There's fascinating work going on in this area. They're basically taking psychedelics, tweaking the molecule, and trying to find something that, you know—you, Wendy Hasenkamp, you're depressed, you could take it on Saturday morning, nothing happens, you have no experience. You take it at home, because it's just a pill. You wake up Sunday morning, you go, "Oh my god, why was I so depressed? I'm so happy. I'm going to start meditating. I'm going to exercise. Oh, it's Sunday, I'm going to go to church. Oh, thank you, God, life is beautiful." Why do you feel that way? "I have no idea, I just do." Right?

(00:42:54) You know, just like Prozac... People that have experienced—as I have over the years—if you've ever responded to a regular antidepressant, you just take the pill, and about two weeks later, you wake up one morning, you go, "Why was I so upset about everything? God, I feel so much better. Oh." But I don't know why, I just do, right? It's not conscious. The consciousness follows from the non-conscious effects of the drug, right?

(00:43:14) Whereas psychedelics seem to be the opposite. It seems like they induce this conscious experience. So, inquiring minds want to know. And I tend to do crazy studies, right? That seems to become my stock-in-trade, and so we're doing some really interesting studies at UW. The most outlandish one is that we've developed an intravenous form (that you can get through your vein) of psilocybin, and we are trying to give it to people while they're in deep sleep, without waking them up.

Wendy Hasenkamp (00:43:43): Wow. I wonder how their dreams are.

Chuck Raison (00:43:46): Well, it's interesting. The idea, of course, being that... You know, we all dream, and we've all had the experience, you wake up after a dream. If it's a bad dream, your heart is pounding...

Wendy Hasenkamp (00:43:54): They're kind of psychedelic anyway, dreams.

Chuck Raison (00:43:57): Yeah, but within 15, 20 minutes, most of the time, no big deal, right? Where psychedelic experiences, people say, "Oh my god, I still feel it years later." So, we're trying to separate the biology from the experience. It's been something with adventure. It turns out that psychedelics wake people up pretty reliably. So we've now had to add a second drug called clonidine to suppress this powerful... Your heart rate doubles basically within 30 seconds if you get an IV of psilocybin. And now, it may be working. We actually have somebody asleep.

(00:44:25) We have another study where we give people just a psilocybin pill, a regular old pill, but we co-administer a drug called midazolam, which works like alcohol. And if you've ever had a blackout, it basically produces a blackout. So you can induce something called conscious amnesia where, I'm talking to you, I'm making sense, but tomorrow, I don't remember any of it, right? Because we got interested in, well, what do you mean by consciousness? So if I have a powerful psychedelic experience, is it the experience itself while it's happening, or is it the memory of the experience that you need for that later change? So I got this idea, "Well, why don't we give them psilocybin and give the midazolam, this drug that'll make them forget the experience at the same time, and see if it does anything?" Right?

(00:45:09) So this we've done, and we've got a paper that, knock on wood, is hopefully fairly close to being accepted for publication. Small study, eight people. Turns out it's very hard to forget your psychedelic experience. So we used a certain dose in a couple of people, it didn't work. We raised the

dose, it still wasn't working. We raised the dose, raised the dose. So we set up this little dose-response study, by accident almost. And what we found was that, when we got to a high dose of midazolam, people began to forget the experience. But the really striking thing was that, at the time, we asked them repeatedly while they were in the psychedelic trip, "Are you having an experience?" "Oh, yeah. Man, this is profound! Whoa, I'm seeing weird stuff. And oh my god." So, at the time, they said, "Oh my god, this is really powerful." But the next day, they were like, "Nah, it didn't mean anything."

Wendy Hasenkamp (00:45:52): Nothing happened. Yeah.

Chuck Raison (00:45:54): Nothing happened. They kind of remembered it, but it didn't matter. And the lower dose, when we were not blocking the memory, or not interfering with this, afterwards, a week later, they'd say, "Whoa, that was profound. I have much more well-being." That effect completely went away.

Wendy Hasenkamp (00:46:08): So it doesn't linger, if you block the memory.

Chuck Raison (00:46:08): It doesn't linger. Yep, yep. So, as I tell people, you know, I grew up out in the country and my buddies would go out drinking in the fields, and they'd get drunk and go, "I love you brother!" But the next day, they'd be like, "Oh, man," you know. So it's sort of like we converted to a psilocybin, this transcendent experience, into more of an intoxicated experience.

(00:46:29) So what is it in the brain? These are GABAergic systems, basically. There's a neurotransmitter called GABA that is really pumped up by this drug, midazolam. What is the difference between a psychedelic experience that is powerful at the time and stays with you—that there's a salience that stays with you—versus a psychedelic experience that you think at the time, "Oh, yeah, that's powerful," but then biologically, we've done something where it doesn't matter afterwards? So, now, we've gotten some funding. We're going to really blow it out and begin to chase this, and see if we can understand, what is that midazolam doing in the brain to unstring the power of that initial conscious experience?

Wendy Hasenkamp (00:47:08): That is so fascinating. As you were speaking, it was making me think that psychedelics, that kind of transformation, feels like what may also be achieved through much slower means through long-term therapy or meditation—these other practices that are ostensibly slowly rewiring our patterning, of the way our mind is set up maybe by default or something. And it's like this rapid shift into that. But that's such an interesting additional question about... And I guess it would make sense—if you go through a whole lot of therapy or meditation, or whatever, but you don't remember this new state, then, of course, it won't make any difference.

Chuck Raison (00:47:51): We think. Right, exactly.

Wendy Hasenkamp (00:47:53): Yeah. It's so interesting.

Chuck Raison (00:47:54): Although if I asked you, do you believe that early childhood, things that happened in early childhood, affect who you are as an adult? You'd probably say yes.

Wendy Hasenkamp (00:48:04): Right. And we may not remember them either.

Chuck Raison (00:48:06): Mm-hmm. So you see it's complex, right?

Wendy Hasenkamp (00:48:09): It's very interesting, yeah.

(00:48:10) – *musical interlude* –

Wendy Hasenkamp (00:48:37): Well, I want to circle back... So, you still have continued your interest and inquiry into this body temperature angle. So I know you've done work with heat and sauna, and things. Can you share a little bit about that?

Chuck Raison (00:48:50): I can indeed, yes. So, we talked about that I got into it because of this tummo meditation practice, and then gave it up because I couldn't get anybody to let me study them. And there it lay. I was done with it. You know, this is the weird thing about science. I've been done with everything and nothing ever goes away. It's really cool. The world is more creative than my imagination. *[laughter]* So I was teaching, doing a one-off class in Austria back about 2010 maybe, something like that, and I was talking about all this stuff, and tummo, and I was talking about body temperature, because I never lost that interest. I was convinced that there was something about thermoregulatory systems that were involved in our emotional state. And there were these two youngish students who... They were both engineer types. They were fascinated with body temperature, and one of them worked in sort of a New Age psychiatric hospital where they hospitalized people that were very depressed and anxious and had psychiatric troubles, but they tended to use non-traditional interventions.

(00:49:45) He found an old hyper-heat, hyperthermia machine in the basement. In Europe, these sorts of machines are often used for cancer, as an ancillary cancer treatment, or for rheumatoid arthritis. The guy rebuilt the machine and wanted to do a study, so I said, "Okay, I'll do this paperwork, and here's how we're going to do it." And so it was a small study, but they took 16 very depressed people and stuck them in this basically cooking machine, this hyperthermia machine, and heated them up pretty hot—on average to 101.3 Fahrenheit, 38.5 Celsius—and they measured their depression before they did that and they measured their 24-hour body temperature before they did that, and then they repeated those measurements five days later. And what they found was that single treatment produced a major drop, on average, in people's depression score. On average, it dropped by about half. So not a miracle cure, all in, but that's not so different than what you see with an antidepressant.

(00:50:44) So it's heat, we're heating people up. But five days later, their core body temperature was way lower. So what we had actually done was induce long-term hypothermia, and there's a whole literature we could talk about, about reduced body temperature and psychological resilience. And we found that the more their body temperature dropped, the more undepressed they got.

(00:51:05) And so, at the same time, my friend and colleague, Chris Lowry at UC Boulder, the other person at the time that was obsessed with mood and body temperature (he's a basic neuroscience guy), was showing that, in animals, in rodents, he acted like, it looked like Prozac. And he had some evidence that it had very specific effects on certain parts of the raphe nuclei, which is the serotonin part of the brain. So there was this coming together of these animal data and this study we just did.

(00:51:32) And so, one of the young guys from Austria, a German guy, came over and was my PhD student. And we did a larger study with a very nice placebo control in Arizona and showed that, once again, if you take very depressed people, put them in this hyperthermia machine, cook them up to 101.3, that you get this... In this case, actually, their scores were still down six weeks later.

Wendy Hasenkamp (00:51:55): Does this have any relation to the subset of people who have inflammation as part of that, or is this totally different?

Chuck Raison (00:52:02): No. What's interesting is—that would be a very nice simple story—we haven't seen that. We did see though, that if your body temperature was elevated before you got heated, you actually did better. It's sort of paradoxical, right? If nature was simple, you'd think, "Well, if you're cold, I'll heat you up. If you're hot, I'll cool you down." Because the reason people are too hot is because they cannot shed heat. People with depression, on average, have an elevated body temperature, and we've known for 40 years that people with depression don't tend to sweat. And if you think about what antidepressants do, one of the things they do is they make you sweat, right? So we think what we're doing with the heat, one of the things we think we're doing is that we're basically pushing the system, and then you push it into heat, and then it responds by overcompensating, and then it kind of blows open your ability to better thermoregulatorily cool, so your body temperature drops, you sweat more... And so that's the best theory for what we're doing.

(00:52:57) So not so much for the inflammation, although we do have an immune measure that seems to predict responses. But that's what we did. But now, the problem was... So I left Arizona. And when I came to UW, we were going to do the next phase of these studies. And this machine we were using is a medical device from Europe, and that means you have to get FDA approval to use it... And I was just like, "That's it. I'm done with hyperthermia. Once again, I'm quitting."

Wendy Hasenkamp (00:53:22): *[laughter]* It's not done with you.

Chuck Raison (00:53:23): Yeah, you know. And so there was a group at Harvard that was doing hot yoga work, I said, "You can have the whole thing. Just go, take all my work. Goodbye." They were very lovely and they kept bugging me. And so, eventually, we ended up getting all tangled up. And I have a brilliant younger colleague named Ashley Mason, who I had known in Arizona, who... body temperature and hyperthermia is her academic life. She's amazingly dedicated to it. She had a simple and amazing realization, which is, "Wait a minute, Raison is doing it with this fancy machine. It costs $50,000. It's never going to work. How can we do it in a way where it could get out into the public, and be scalable?" And she said, "Well, you know what? There are devices that are... they're in your local gym." I mean, a sauna could do this, right? So she identified a commercially available, non-FDA regulated device that does the same kind of thing as this fancy machine. She showed that it worked, you can get people up to the necessary body temperature, and she began doing studies. And she and I have now published studies—really her studies—showing that, yeah, it seems to produce an antidepressant effect.

(00:54:35) So, one of the things I'm most excited about is, amongst the various jobs that I do, in the last year I've become the director of something called the Vail Health Behavioral Health Innovation Center out in Vail, Colorado. Just an amazing guy named Mike Shannon gave us a very nice initial gift to set up in the Vail area, a research center that would look at novel treatments. And since they asked me to direct it, I said, "Okay. Well, novel treatments—let's look at hyperthermia and psychedelics. I mean, what do I know?"

(00:55:05) So we've started this really cool study out in Vail. We have one of Ashley Mason's machines, and we are heating people up, and then we're trying to address a couple of key questions, and one of them is, would you get more benefit if you then had people jump into cold water? Because most of the time, in most cultures, a sweat lodge or Finnish saunas—hot, hot, hot, jump in the river, hot, hot, hot, jump in the river. Nobody has ever studied that, nobody knows.

Wendy Hasenkamp (00:55:32): Wow. And it's so popular now, too. I feel like it's very-

Chuck Raison (00:55:35): Absolutely. A cold plunge is the [latest]... again, all these things, they become cliches. But there's very little real data about cold. There's much more data about heat. But the combination, nobody has ever looked at. So we're randomizing people to get either heat alone, or heat plus cold. And then in that very first little study we did in Austria and Switzerland, there were a couple of few people that were on chronic antidepressants, and they got no benefit from the heat. And Chris Lowry, my neuroscientist friend, had done some studies early on suggesting that, in rodents, chronic antidepressant use blocked what he could see as the brain effect of the heat. So the other great question we don't know is, can you just be on a Prozac, Paxil, Zoloft, Effexor, or Cymbalta and still get as much benefit—from either heat, or heat and cold? So that's the other thing we're looking at, out in Vail. Big study, 100 people with depression. So, yeah, you see, I've been sucked into it again. *[laughter]* So, yes.

Wendy Hasenkamp (00:56:29): Fascinating. I'm also thinking about tummo. We think of it as a heating practice, but with the ice blankets, that's actually also a cold-heat alternation.

Chuck Raison (00:56:40): I know. It's kind of weird, isn't it? And somebody did eventually study tummo. And they were very clever, they went into Tibet, and it turns out that there are nunneries, there are nuns who are tummo experts, and the women were willing to be studied. So, they did a study where they used... they didn't use a rectal probe and all that like we do in our hyperthermia studies, but they used axillary. So this is kind of core temperature. And it was a fascinating study. There are only three or four subjects, three or four tummo practitioners, and they had various capacities, but the couple of best ones, it was amazing.

(00:57:17) So, first, they just had these women do the breathing practices of tummo, not the visualization. Up goes their body temperature, right? And then they say, "Okay, now, add the visualization," and the body temperature skyrockets. So it looks like both the breathing exercises and the visualization are powerful. And they hooked them up to EEGs while they were doing this to measure their brain waves. And when the nuns were doing just the tummo breathing exercises, there was no association between their brain wave patterns and their body temperature. But once they started doing the visualization, there was almost a perfect association.

Wendy Hasenkamp (00:57:51): Yeah, that makes sense.

Chuck Raison (00:57:52): The more they did the brain waves, and up goes their temperature, right? Interestingly, if you look at the temperature curve and the time period that it took them to get there, it almost exactly overlaps with what we see in the hyperthermia machine.

Wendy Hasenkamp (00:58:05): Wow.

Chuck Raison (00:58:06): Right. So we think that there's a commonality there, probably. Tummo has the advantage probably of having much more powerful psychological effects, but it's probably also more dangerous. You know, in the Tibetan tradition, tummo is not something you teach people—that's why I could never study it. No, it's top secret. It's like atomic energy. And I have known people that practice tummo, Westerners that got really messed up. But anyway, there's a real commonality there, yes. And you're right, one of the reasons that people did tummo, on a pragmatic level back a thousand years ago, was that you could be up in Himalayan mountains and not freeze to death.

Wendy Hasenkamp (00:58:46): Yeah. Well, Chuck, this has been so fascinating. I love hearing all about your various interests, and I've lost track of the number of positions that you're holding at various

places, *[laughter]* which just speaks to how fascinating and important your work is. I'm just wondering, wrapping up and stepping back from all the things you've studied, do you have any big picture or take home thoughts, or has this changed the way you think about the mind?

Chuck Raison (00:59:14): Yeah, definitely. Definitely, it has. I think if you look at it, the scientific work I've been involved with, it had two polarities. One is this interest in how bodily processes could effect a conscious state, and the other, I've gotten so interested in this question of the importance of conscious experience and what a precious thing it is as a human being to have awareness.

(00:59:38) And this is becoming extremely urgent in the age of AI, right? Because we are about to enter a world where there are going to be entities that are infinitely smarter than we are, and that will seem to be completely conscious. And whether they are or not is going to be one of the most pressing questions in the next 20 years, right?

(00:59:59) But what have I taken away, is this wonderment that, as physical entities, we're able to be aware and to have this amazing inner world, and the power of that inner world. And especially when that inner world manifests states that... I'm very interested in these transformational states where people will enter a space, that has these qualities of gratitude and a sense of interconnectedness.

(01:00:25) And again, this has now become much more cliche, and there's always a danger when things become cliche, because they get overextended and then they get bowdlerized, and then they get, you know, stupid. But there's something in there that's really powerful. So I think that, yes, that's what I've taken away from this is, I've really been fortunate because it definitely has helped me in my personal life also, to have this profound sense of wonder at how it is that we are the kind of creatures we are in the universe we live in. Once you catch a glimpse of that, it's eternally mind-blowing, and I think science has done that for me.

Wendy Hasenkamp (01:01:00): Well, Chuck, thank you so much. This has been really, really fun to chat, and I look forward to seeing what's coming next.

Chuck Raison (01:01:07): Thanks for having me.

Outro – Wendy Hasenkamp (01:01:13): *This episode was edited and produced by me and Phil Walker, and music on the show is from Blue Dot Sessions and Universal. Show notes and resources for this and other episodes can be found at podcast.mindandlife.org. If you enjoyed this episode, please rate and review us on Apple Podcasts, and share it with a friend. And if something in this conversation sparked insight for you, let us know. You can send an email or voice memo to podcast@mindandlife.org.*

(01:01:43) *Mind & Life is a production of the Mind & Life Institute. Visit us at mindandlife.org where you can learn more about how we bridge science and contemplative wisdom to foster insight and inspire action towards flourishing. If you value these conversations, please consider supporting the show. You can make a donation at mindandlife.org, under Support. Any amount is so appreciated, and it really helps us create this show. Thank you for listening.*