

Scott Britton (00:01.081)

Dr. Dave, what's going on, man?

Dr. Dave Rabin (00:05.035)

a lot. Thanks for having me.

Scott Britton (00:08.483)

Well, it's great to have you and yeah, as an Apollo Neuro, early Apollo Neuro user, who's been kind of passively tracking the company for the past couple of years, I'm really excited to be having this conversation. And I guess where I'd like to kick things off is, is, know, when we think about healing, usually people don't really think about vibration, right? It's like, I think about, I'm going to go to the doctor and I'm going to get a pill or maybe I'm going to eat a certain herb or food or maybe do some exercise. And so when this whole world as vibration as a mechanism for healing start to get on your radar.

Dr. Dave Rabin (00:50.766)

that's an interesting question. I mean, I think that in, the Western model of medicine, which most of us probably here listening to this are, are coming from, vibration, sound and touch and those kinds of things have not really been a major part of, of healing therapies for a long time. Although they're starting to, they've been starting to come back since the 1960s.

with the development of biofeedback, which is the science of breath, breath work. And interestingly, if you look back further into the history of medicine, going back into ancient cultures, Eastern and tribal cultures, for instance, that have been treating chronic illness much more effectively and doing preventative care much more effectively than Western medicine. Western medicine is great at saving our lives or...

limbs if we are in an emergency situation, but Western medicine has been notoriously not particularly successful treating chronic illness or preventing illness. And so, you know, I'm really, I was really fascinated about as I was, you know, training in psychiatry and starting to treat hard to treat mental illnesses and seeing the things we do well, the things we don't do well, kind of like where are the areas for improvement.

And the chronic illness and illness prevention side of things was really interesting to me. And, and I started to do research about 10, 15 years ago. I started to research, aged more older medicine techniques, like, Eastern and tribal techniques. And then even getting into like the origins of Western medicine, which I think stemmed back to about 2000 BC with Hippocrates and Maimonides who are considered the forefathers of Western medicine. And what's really interesting.

is that if you look at all of those ancient disciplines, including where Western medicine originally came from, they all talk about vibration as healing. And in these techniques, they use music, they use drumming, rhythms, touch, laying on of hands, therapeutic touch, and other sensory experiences to like aromatic oils, sense.

Dr. Dave Rabin (03:11.502)

and things of that nature to induce healing states in the body. And these are all vibrational based experiences. Everything that we experience in a sensory perspective, every sense that we have, whether it's sight, sound, smell, touch, they're all frequency. And frequency is vibration. Vibration from Apollo is vibration you can feel like sound wave, like bass vibrations from a subwoofer, but.

They're all just different frequencies of vibration light is vibration. You can see sound is vibration. You can hear Touch is vibration. You can feel so these are all ancient healing techniques that we know work that have now tons of neuroscience evidence behind them and interestingly if you look at some of the greatest minds in the modern world that we look to now like Nikolai Tesla and Albert Einstein and these folks, you know, they talked about frequency is healing and it still took

almost 100 years to integrate their wisdom and discoveries into the way that we think about modern medicine. But it's always been there. It's just something that Western medicine is now kind of catching up to.

Scott Britton (04:20.613)

It's so perplexing, like why? Why have we not said, hey, maybe this can help us too and we should do some science on it and we should really embrace it.

Dr. Dave Rabin (04:32.203)

Well, I people have done science on it. I think the challenge is that what most people don't realize if you haven't had science training and you're just kind of looking at science from the outside as an observer is that science is not the end all be all approach. It's limited by how well we can measure stuff empirically, right? So the way that the scientific method is,

not taught well to the average person, but it's basically the core of all scientific discovery and research. And it involves coming up with hypothesis, right? If X and Y happen, then at the same, if X and Y happen together, then my hypothesis is that Z will result, right? So that's where it starts. That's called a hypothesis. Then we design an experiment where we can measure X and Y together becoming Z or something else.

And then we either run the experiment and we either prove or disprove our hypothesis. And then we repeat it over and over again until we prove enough to achieve what we call statistical significance, which means that the chance that we have observed what we hypothesized or showed in the experiment is not due to chance. It's due to an actual relationship. And the key...

there that a lot of people don't realize is that our ability to prove or disprove that anything will work like a medicine or a therapy or a sound wave based treatment or a breathing technique or whatever it is, right? Whatever it is we're trying to prove, the limitations of proving it are based on what we are capable of observing reliably. And so for instance, when we were looking at

When we were looking at things like antibiotics, for instance, and antibiotics were discovered to treat infections in the 1920s, originally by Alexander Fleming, we didn't have double-blind randomized placebo-controlled trials back then. So doctors would start to use antibiotics just individually with their patients. They weren't running clinical studies. And they would have a very concrete measurable outcome, which is a person is diagnosed with an infection like syphilis, very, very common back then.

Dr. Dave Rabin (06:54.44)

and syphilis would kill you. All of a sudden you administer penicillin and now the person doesn't die. Right? So you have an obvious empirical measurable outcome where you can say, normally this person would die. We just gave them a full course of new antivirus, of the new treatment called penicillin. All of a sudden they're still alive. Right? So we have a very concrete, easy way to measure that. However, let's, you know, extrapolate that to more, you know, a technique like more natural technique, like a sound therapy.

Right? And sound therapy isn't necessarily going to have as dramatic an impact on your health with, with, you know, a week of use as taking a week of penicillin when you're diagnosed with syphilis. And so it has other impacts on the body. It affects your heart rate and rhythm. affects your breath rate. It affects your inflammatory milieu in the body, how much inflammation you have. It affects your thinking process and the interactions of your, of your brain waves together and all of the ability to measure that kind of stuff in.

these kinds of experiments was not really available to us, particularly with inflammatory biomarkers that are reliable and affordable to measure until the last 20 years. So if we set the burden of proof as, well, we think sound therapy decreases inflammation, and that's what we need to show, then we need the technology to assess inflammation to be good enough and cheap enough for people to be able to run experiments in thousands of people to be able to actually assess that.

Scott Britton (08:05.709)

Mm.

Dr. Dave Rabin (08:23.682)

That really didn't happen until recently. So, you know, there's a lot of factors in science where our ability to measure an outcome is directly related to how likely we are to prove that something is working or not working. And just because we have a tool and we can't show that it works in a scientific way, like meditation for a long time, we didn't know it worked, breath work, we didn't know it worked. As soon as the science came around in the 1960s,

we figured out how to show that these things are working, right? Doesn't mean they weren't working before. It just means we weren't good enough at measuring the change. And so that's kind of like where we're at in science now. And with the new measurement technology we have and assessment technology, we're able to prove therapeutic effect from things that we never

could before. And that's why a lot of these old Eastern and tribal and psychedelic based natural techniques

Scott Britton (08:58.51)

Right.

Dr. Dave Rabin (09:22.016)

are finally coming forward as having great efficacy when we did not know that in science in the past.

Scott Britton (09:29.677)

I really appreciate that. It never really occurred to me that a lot of these quote unquote preventative care measures were things that we just couldn't measure the efficacy of.

Dr. Dave Rabin (09:41.592)

Well, think about how expensive it is to do that, right? Like for preventative care, it's even harder. You have to measure some, take somebody who's healthy and then measure whether or not they develop a disease at some point in their lives. Right? That could, that study, have to follow people for decades to figure that out. That could cost like millions and millions of dollars. And then that requires a funder to recognize the benefit of that and be like, okay, here's your millions and millions of dollars to run that experiment. And then you have to go run it. And then, you know, you have to have this technology you need in the beginning and the technology you need in the end.

And the beginning part is the tough part and convincing folks to put that money forward in the beginning and invest in a 30 year long study for preventative care is tricky. Funders are not, like our funding system is not particularly interested in that experimental style, as it were.

Scott Britton (10:30.415)

So maybe now is an interesting time to introduce Apollo Neuro for the people that are not familiar with it.

Dr. Dave Rabin (10:38.936)

Sure. So, and I can start out by kind of explaining to you how we discovered it as well, but basically Apollo is a sound wave based software technology. It works on your iPhone. You can try it on your iPhone right now as you're listening. If you download the Apollo Neuro app, it's free. Or we have a wearable like what I'm wearing on my chest. Both deliver these soothing, gentle sound wave vibrations that are

Scott Britton (10:45.167)

Perfect.

Dr. Dave Rabin (11:06.958)

effectively bass rhythms that are like what would come out of a subwoofer at a music event you were at, but specifically composed for the vagus nerve and what the vagus nerve and our touch receptors receive and interpret as safety. And the reason why we were able to figure that out in my lab at the University of Pittsburgh and starting in 2014 was because we were studying chronic stress.

and trauma in veterans and traumatized women and people who were basically diagnosed with PTSD or traumatic brain injury and not responsive to our best treatments like medication and therapy and these kinds of things. They were just never getting better. They were sick for life. And so I started to look outside the box and understanding that the core of trauma or stress, chronic stress, that's been known for many, many years in both human and animal models decades.

is that it's a learned fear response. And so when you think about learned fear, and we're learning to be afraid, our bodies and minds have been taught to be afraid, then how do you fix that? Well, you fix learned fear by relearning safety. And that's been known for a really long time. And you can train animals to even do what's called extinguish a fear response, literally eliminate a fear response from their reactions.

by reconditioning them in a safe environment. Meaning you can teach them to be afraid of their food and then you can extinguish the fear of their food by associating their food with safety again. So it's very powerful evidence base for this that goes back to Pavlov and Skinner and some of these famous behavioral scientists from back in the early 20th century. And so we started to looking at this pathway. I started to become interested in psychedelic research in about 2012.

because even in 2012, we were seeing some of the first major peer-reviewed studies coming out showing that psychedelic medicine combined with therapy was having more powerful treatment responses than any other single treatment that we had ever seen in the history of psychiatry. Like one to three doses of a psychedelic was taking people who had severe depression or PTSD, and over 50 % of them were no longer having symptoms of those conditions at one year out.

Dr. Dave Rabin (13:30.47)

And with just one to three doses, mean, this was like really incredible data. and we, again, we've never seen anything like that before in mental health antibiotics. We've seen stuff like that, but not in mental health. And so, I went to Rick Doblin and I said, you know, in 2016, I was like, Rick is a founder of maps running most of the MDMA trials. if not all of them in the United States and around the world. And I said, Rick, like these results you guys are getting are just absolutely outstanding. We need to figure out how this is working.

And, you know, Rick is a blunt guy and he is very, was very focused on just showing that MDMA works. And he wasn't really convinced that we needed to understand how it worked at first. And,

and I, you know, said to him, you know, if we can figure out how MDMA is actually targeting certain neural pathways in the body to help extinguish fear responses in these extremely sick folks, then we can potentially replicate some of the benefits of MDMA without drugs.

and just following me.

Scott Britton (14:31.628)
yeah.

Dr. Dave Rabin (14:32.782)

So basically we, know, Rick was very thought about this and started to pique his interest. he allowed me and three of my psychiatry colleagues to get trained in MDMA assisted therapy in 2016. Then we went back to the lab and we, and from that therapy, it became the therapy training. became very clear that safety was the core theme and that MDMA from the animal trials and from the human work was showing that MDMA therapy works by

amplifying safety cascades in the emotional brain that helped to reduce the fear response and help people feel safe enough to effectively remake meaning around past traumatic events and remake meaning about yourself and remake meaning about the world. And so that was really interesting to me. And this word safety just kept coming up. And so I mapped out, went back to the lab, mapped out the entire neural pathway of safety in the body, how safety is induced by soothing touch, soothing music.

yoga, mindfulness, meditation, deep breathing, all the natural techniques, and then compared it to MDMA and lo and behold, they're basically targeting the same systems. And so I thought, well, what if we could use technology to send the right signal to the body that just reminded us that we're safe and present and comfortable in our bodies? Would that do it? Would that get us to the point of just feeling some of that

safety that MDMA gives us that's potently healing and therapeutic for people. And so we went down that path and started pulling on those threads and ran some, you know, some early clinical studies and at the University of Pittsburgh. And we found that yes, in fact, that the specific vibration patterns that we had developed that we compared in double-blind randomized placebo controlled studies to all the other kinds of cell phone vibrations and other vibrations you're exposed to, that only these layered

soothing ocean wave like vibrations are actually capable of inducing safety states in the body and you can measure it with brainwave analysis, with heart rate rhythm analysis, respiratory analysis, vagal nerve analysis, and people are feeling less stressed out within minutes, their cognitive performance and physical performance get better, their HRV goes up, and they, now we've seen in subsequent publications of this technology, on this technology that they're recovering.

Dr. Dave Rabin (16:54.766)

more quickly from very severe illnesses, from physical inflammatory autoimmune illnesses to mental health disorders. And that was really exciting. And so as of 2020, we commercialized Apollo as a wearable and released it to the world. And now we have hundreds of thousands of users and we've gathered lots of data confirming what we saw in those early days. And then in February, released it on iPhone as a free experience for everyone to get access to these therapeutic.

waveform sound waves through their iPhone without having to buy a wearable. And, you know, if you want all the advanced AI and sleep benefits, like 30 to 60 minutes more sleep a night and get the wearable. But if you just want to feel good in the moment, you can use your phone. And that was a really exciting opportunity for us. And also we've seen it, you know, do great, provide great good in the world. And so it's been very gratifying and rewarding to work on.

Scott Britton (17:55.429)

It's amazing, man. I love it. And yeah, as an early customer, I can attest that the wearable is pretty sweet. This whole idea that anybody with a phone can try this out is pretty cool. From a practical standpoint, how does that work? Are you putting the phone on the same surface that you are on? Are you putting it on somewhere on your body?

Dr. Dave Rabin (18:14.828)

Yeah, either. As long as you can feel the vibrations, that's all that matters. Your body does not, what's interesting about touch is that, think about your life, right? Like if you are around somebody you like, like someone you have a crush on, and that person puts their hand on your shoulder, or they put their hand in your hand, or they give you a hug, it feels pretty darn good in either position, right?

Scott Britton (18:38.7)

yeah.

Dr. Dave Rabin (18:40.184)

So the body is exquisitely sensitive to touch when we, from somebody we like, as long as it's the right kind of touch. And so unlike other traditional electrical stimulate nerve stimulators to the body where you actually have to like stimulate the nerve itself in specific parts of the body, which is a big adoption issue because a lot of people don't want to take.

30 minutes out of their day to go and sit down and apply their vape nerve stimulator with the gel and do all the things. And, and so that prevents people from using those healing tools, even though they work. And so what we wanted to do is say, all right, well, how do we make this easier for people effortless, something you can take with you in an existing technology or

or wear on your body in a way that you don't even notice it's there and it doesn't require any extra time out of your day and you can do all the other things you were doing just better. And so it was a really audacious goal, but the idea being that sound waves are uniquely situated to do

this and have this benefit because they can run in the background passively and our bodies know these rhythms and they like them because these rhythms are resonant or

what's called harmonic with our natural breathing and heart rate rhythms that our bodies want to be at. And they just naturally slow our body down. It's the same thing that would happen if you were deep breathing at, you know, five to seven breaths per minute for five minutes, you would induce the same effect that Apollo does. But you have to put in the work to do it and train your body how to do it. Apollo works from the bottom up body first. So it gives you the feeling of what it feels like to be in that meditative, mindful, present state.

Feeling safe and calm in your body and then to give that gives you a bull's-eye of This is the feeling that I'm aiming for when I do my breathing or meditation exercise Like this is what I'm trying to get to and then once you understand what you're trying to get to In terms of a feeling state it makes it's like it's like going to play darts with a blindfold on at first, right? And then you take the blindfold off. You're like, the bull's-eye is over there That's where I should be throwing my darts, right? And so that's the that's kind of like the

Scott Britton (20:49.304)
Hmm

Dr. Dave Rabin (20:54.988)
the understanding that people get when they experience this. And it's especially unique in that it works in the background and anywhere on the body. with the wearable, you can wear it on your chest, wrist, arm, ankle, wherever you can attach it. With the phone, you're not really attaching it. It's a point of use experience. So it's like, I'm stressed, I want to feel calm, or I'm distracted, I want to feel focused, or I'm tired, I want energy. And then you press a button, you turn it on.

and you can hold your phone to your chest, you can hold it on your leg, you can put it in your pocket, you can put it in a bag, you can put it on your table, on your mattress, on your yoga mat. It doesn't really matter as long as you feel the vibrations, your body will resonate with it. Does that make sense?

Scott Britton (21:33.453)
It makes complete sense. A question I have is, you know, I know a lot of people have been on YouTube and they see 528 Hertz, listen to this and be healed and like all these kinds of biannual beat type entrainment stuff and, and that's kind of one use of sound. And then this is actually kind of like physically putting sound waves against the body. What have you seen in terms of the difference in efficacy of those different types of technologies and how we can use sound to improve our wellbeing.

Dr. Dave Rabin (22:07.982)
Well, so a lot of it works. It's just how easy is it to use, right? So the like, have you ever been having a hard day or a bad day and then you walk into a room or your car and all of a sudden, like one of your favorite songs comes on and you instantly feel better? So that, right? So that's

like a, that's like a near universal human experience. And those songs that you're, you when your favorite song is probably not like, you know,

Scott Britton (22:25.927)

yeah, of course.

Dr. Dave Rabin (22:37.838)

548 Hertz or whatever, or the resonance of DNA or the earth. It's like just one of your favorite songs, but it still has this powerful, relaxing, healing, mind clearing effect. And the reason why is because it's familiar and creating a state of harmony in the body. Harmony means if you imagine like all of our organ systems, like just thinking about brain, heart, and lungs, they're all functioning in time together.

They're all doing their thing every moment they're doing their thing. If they're doing their thing out of sync, then it's like an orchestra playing out of tune, out of time. It's like a warming up orchestra. sounds terrible and there's not nothing organized. There's no song that you can pull out of it. It's just a whole bunch of instruments playing out of sync. And that does not sound or feel very good. And we call that dissonance. And that's the state that

most of our bodies are in most of the time because we're stressed out. And we're breathing at like 12 to 24 breaths per minute on average, which is stress breathing. Harmonic breathing is, and resonant breathing is five to seven breaths per minute, which is what we should all be breathing at at rest. Think about that. That's like 50 % of our most humans breathing rate in their day to day. So when you start to breathe at five to seven breaths per minute, which is what Apollo, the state of Apollo induces,

then or certain kinds of music that induce that state, your heart and your lungs and your brain all of a sudden become an orchestra playing in time and in tune together. How does that sound? Well, it sounds like a masterpiece, right? It sounds like a beautiful, gorgeous song that is so much bigger than the sum of each of those individual parts. And that is how music works and our bodies are like an orchestra.

and we need to think about them that way. We don't need like, they are literally functioning that way and we want them to be harmonic and we want to be resonant and we want all the different parts of our bodies to be working together in harmony. so sound delivered to the body in the right way, at the right rhythm, at the right time, at the right volume gives us access to those and induces those harmonious states. Sound that is not that like jackhammers or construction sounds or

Dr. Dave Rabin (25:03.136)

noisy city street sounds or babies screaming or any of those kinds of things or news sounds or things like that. Those induce dissonance. Those are not inducing resonance and harmony. They're inducing the opposite, which is why we feel terrible when we're surrounded by those kinds of experiences for too long. So the right kind of sound can induce these harmonious

states very powerfully. And you're usually, you're off, we're often just hearing it, but a part of our bodies is also feeling it, especially if it's

if there's a bass component. And what we discovered was that, interestingly enough, you don't need to hear the sound. If it's the right sound, you don't need to hear it to get to that harmonious state. You just need to feel it. And that was never known before the work that we did. that was really the important discovery is you can induce these harmonious states in the body nearly instantaneously, just like when you hear your favorite song on a bad day, but without your ears being necessary.

Dr. Dave Rabin (26:02.24)

And that allows you, because we need our ears for so many different things in life, that allows us to access those states on the go and be in flow sustainably.

Scott Britton (26:11.759)

So basically like the Neuro Apollo Neuro device is using a sound that's like outside of the normal hearing range, but it's still effectively sound.

Dr. Dave Rabin (26:20.43)

It's at the very bottom of our hearing range. So it's like 20 to 200 hertz. So it's like what comes out of a subwoofer, literally. It's like a subwoofer range. what that's called is the tactile range of sound. So it's the range of frequency of sound that you can feel, where your touch receptors are actually more sensitive to those frequencies than our ears. Does that make sense?

Scott Britton (26:44.325)

does one thing I've always been really curious about and I've done a lot of weird shit. I have a rifle machine. I have an opus sound bed. I've done sound healing court, like all this frequency based healing stuff. I've done a lot of different things and like how does one attune the sound to the particular thing that it's trying to help with like and maybe, you know, Maybe you don't want to give away your special sauce or maybe this is some crazy technical explanation. But like to me, that's always been like a big question mark.

Dr. Dave Rabin (27:20.654)

Yeah, no, it is. I mean, and I can tell you the way that we typically do it as humans and then the way that we did it in the lab. So the way that we normally do it as humans, which is with music, is you just go by how you feel, right? So if a song comes on and it might be a song you normally like, but you're not really, it doesn't make you feel that great right now, well, what do you do? You adjust the volume first, right? You're like, oh, maybe it's little too loud. Maybe it's a little too soft.

then you adjust the volume and you listen to it for a few more seconds, you're like, nah, this isn't really doing it for me today. And then what do you do? Well, you change the song, right? And then you see how you feel with that song. And then if that doesn't work, then maybe you change the genre, right? You go into different mood states of music. Maybe you turn up the energy,

maybe you turn down the energy, right? But you're adjusting the sound for your goal state and how you want to feel. And we are doing that with music very much based on

how it makes us feel in our bodies. So that's how we typically go about this. With Apollo, didn't have people doing the, we didn't want people to be able to adjust it on their own. We wanted to figure out how do we mathematically identify what states we're trying to get to in the body and then try to predict what states we can get people to and see if we actually get there.

And so the way we did it is we ran a double-blind randomized placebo controlled crossover study where every subject experiences like 20 different vibration patterns and no vibration conditions. they don't know what they're getting or what the vibrations are supposed to do. And then they have to do cognitive performance, physical performance, stressor tasks and rate how they feel before and after. And we're measuring their heart rate, brain waves, respiratory rate, pupils and their performance on these tasks.

And then interestingly, we had them do a rating scale that's very specific called an affective and valence rating scale, which is basically how much energy are you having in the moment and how much positive or negative emotions are you feeling in the moment? It's a two axis scale. It's very easy, very simple. And it's just on a scale from like zero to 10. Do you feel like zero? just, have like closer to zero energy, which would be like sleep or closer to 10 energy, which would be like

Dr. Dave Rabin (29:49.016)

totally wide awake espresso shot level energy, or are you feeling like, and then on the X axis, are you feeling sad or happy or anywhere in between? And we had people rate all of these experiences. And what's interesting is within 30 seconds, which is all we gave people to feel the vibration in 30 seconds, if you force people to answer, 80 % of people reliably rate them the same. And so we had a bunch of vibration patterns that people found that made them

angry or sad and low energy or high energy that were like in the angry, sad, frustrated category. And we just took all of those and we just eliminated them, just threw them out. And then everything that people rated as high energy through low energy that were in the happy, joyful, positive emotional category became what we were most interested in. And

Scott Britton (30:19.877)

Mmm

Dr. Dave Rabin (30:47.266)

We basically then took those vibrations and then did the cognitive and physical performance stressor tasks and measured the body. And lo and behold, we found that those vibration patterns reliably improve vagus nerve activity, heart rate variability, and cognitive and physical performance. And so that became, you when you think about like how much effort it takes to design a scientific study like this and making sure you're measuring the right stuff, it's a lot of effort. I mean, this was no joke, a huge amount of work.

It took us years to do this work, but we were able to, through rigorous testing, understand that people respond to these vibrations differently than to any other vibrations that they're exposed to on a regular day to day with reliability and repeatability. And that's really how we were able to figure it out for these kinds of touch-based vibrations.

Scott Britton (31:37.731)

And I would presume that that understanding can be applied outside of a polyneuro. Like all types of things can use those vibrations now.

Dr. Dave Rabin (31:48.056)

For sure. Yeah, mean, these particular ones are patented. if you, because we didn't want people to take them and start using them to make people feel badly, because that is also a possibility. So we patented the whole range of vibrations that you can use to augment the body's functioning. then allowed us, that allows us to control, at least for a little while, how people use these to change the body.

either therapeutic ways or non-therapeutic ways. And we really want to keep this in the therapeutic category to help people feel good. So if people want to use these kinds of vibrations, we're happy to share. And as you can see, we just made them free on the iPhone. So we're not all about putting these behind some expensive fancy paywall. But point being that these are unique vibrations that exist that are referenced in nature.

Scott Britton (32:33.22)

Totally.

Dr. Dave Rabin (32:43.884)

Right? Like there are reference to ocean waves and chanting ohm and getting a hug or holding a purring cat. Like people who feel Apollo vibrations most often relate the feeling to one of those feelings. And it's not foreign feeling. It reminds them of one of those feelings. But the way we generate these patterns is very specific and, and is not generated in nature, except in some of those instances I just described. And so.

We protected that so that people could use these for ill, malevolent purposes. But now we're able to show that through rigorous clinical trials, have like 17 clinical studies done to date of different varieties across over 2000 subjects. And people are reliably showing that their bodies are responding the same way, whether interestingly enough, whether you're under the influence of psychedelic drugs or medicine, or whether you're or whether you're performing.

performing a very intense task or not, or you're a veteran recovering from war, or you're an entrepreneur living a very stressful life, like our bodies respond very, very similarly to these kinds of vibrations within like a 5 % variability rate, which is pretty incredible. And so now we're just working on, well, how do we get these out into more applications that make it easier for people to...

get a little bit of dose of calm and flow state focus, whatever they need, because it's way safer than drugs, and it gives you almost the same benefit.

Scott Britton (34:16.919)

Yeah, that's awesome. I'm coming off of a recent big psychedelic experience that was a little, I would say, difficult. So I appreciate the accessibility of some of this healing stuff without the variability of some of these more potent medicines.

Dr. Dave Rabin (34:36.206)

Yeah, I mean, that's the idea, right? Like if you knew that you could do like 50 % plus of your healing using a technology that has no side effects for like, you know, \$349 or spend \$10,000 to do an MDMA assisted therapy that while it does work really, really well, does carry with it some risk like all drug therapies do. Most people...

And most doctors would opt to do the risk free treatment first, which is what we're taught to do. First do no harm, right? It's first to the Hippocratic oath. Try the thing that has no risk, no side effects first. If that doesn't work for you, that doesn't get you over the hump you're looking to get over, then we can go to the other more risky stuff. And SSRIs like Zoloft and Prozac, perfect example, most doctors when they see that you come into the office with depression,

or anxiety, they check off the boxes, or they have a staff member, a team member check off their boxes, depression, anxiety, okay, here's your prescription, right? And what patients are not told is, by the way, it takes four to 12 weeks for that to work, and you're potentially and likely to experience all of these different side effects from emotional blunting and numbness, your potential increase in suicidal thoughts, to decrease in sexual arousal and sexual functioning.

And by the way, you may have a hard time getting off of this after you get on it. And I don't think most patients really understand the risk that they take when they just go from never being treated to starting to take a pharmaceutical. They don't understand the potential downsides. And it's not to say those medicines are bad. They're great for certain people, but they need to be, and stabilization of certain people, but they need to be used very carefully. And we are in mental health desperate for

as a field and our patients are desperate for tools that we can use before we go straight to drugs. There's so much more we can do.

Scott Britton (36:37.829)

100%. And I want to, I want to talk more about that, but there was one question that was coming up for me as you were talking about these kinds of archetypal frequencies that seem to help, you know, majority of the people, one of the concepts that I've come across in different sound healing stuff that I've explored is this idea of resonant frequency where an individual has like a specific tone or frequency that's like extra nourishing and supportive for them.

Have you seen any evidence of like personalization with sound having an enhanced effect that you can point to?

Dr. Dave Rabin (37:17.358)

Oh, for sure. Yeah. So, so that's, uh, that actually is what drove us to develop the Apollo AI, which detects the state in your body specifically from sleep through to or ring biometrics, Apple health biometrics, and then customizes vibrations to you that improve your health specifically. Um, and that's a feature that came out in November of 23, because we saw that certain people responded differently. And what if we could

you know, personalized experience to you. Well, then we've like taken a huge leap closer to personalized medicine, um, using digital therapeutics. So that was a major focus that has actually done very, very well in it. You know, just upgrading to the AI, which is like a hundred bucks a year. If you have the wearable doubles the health benefits you get from Apollo. it's it, the AI, this is like, it's, it's a human centered AI that's really focused on doing the work for us and minimizing the effort you have to use to engage with the technology.

which is really exciting. You set your bedtime and your wake up time and it customizes it for you throughout the day and night. So that's absolutely the case. What's interesting is that it is more, resonance is what I was talking about earlier with when we were talking about harmony in the body, right? So resonance and harmony are really like synonymous terms in large part. They mean all the systems working together.

peacefully in time and tune. And that's why when we chant om or we hum at certain tones, we instantly feel better. And this is these kinds of hums and chants have existed again for thousands of years. Like as long as humans have existed on the earth, we have been humming and chanting. And the reason why is because that humming and chanting

in is inducing a resonance state in the body between the heart lungs and brain and Really the whole body that results in the body getting into a state of idea what we what you might call like ideal physiology it's like optimum frequency based self induced frequency based optimization of our bodies functioning because every single cell and every single protein and every single functional object in our bodies is responsive to frequency

Dr. Dave Rabin (39:39.438)

it's not just one part or another part. It's all the parts are responsive to frequency. And so when we do those kinds of chanting, humming, resonance based techniques, you get there and if you practice it, you'll notice it pretty quick. but most people don't practice it or take the time to do it or learn it. And so that's what that was part of the reason why we developed this because we're like, let's just make it easier for people. Right. You could get, if you knew you could self-generate the nice feelings you get from using Apollo.

Scott Britton (40:02.383)

Hmm.

Dr. Dave Rabin (40:08.91)

That's really empowering for people. know, it helps people understand that they have a lot more control over their health and how they feel and their energy than they might've been taught.

Scott Britton (40:19.725)

Yeah, I've actually been at a year long Siddha yoga practice, which is chanting different Sanskrit things to the different chakras or purifying them. it is wild what is possible with our own, how we can use our own voice for vibrational energy, energetic practices. It's, it just feels so untapped. But at the same time, when I think about

how many people are realistically gonna sit in their house and chant, like, you know, even just the practicalities of that where I'm like, I have a 20 month old, my wife's still sleeping, like, where am I gonna do this, right? It's just very impractical. And so I appreciate what you guys are doing, you know, how you can make this similar technology accessible without having to look like a crazy person like me.

Dr. Dave Rabin (41:16.152)

Well, I'll give you one other example that I think is practical for everyone, because I'm all into the how do we help people understand all the free things you can do for your health. So humming, as one example, and chanting, but humming, just regular old humming, makes it virtually impossible to ruminate. So think about that for a moment, right? Rumination is like the bane of most of our existence.

like thinking about negative intrusive thoughts, including mistakes we've made in the past, regrets, you name it, right? Worries about the future. Basically, that's one of the main thought patterns of just cycling on stuff that is not serving us in the moment that takes us out of the present and makes us miserable. Now enter ancient technique all humans have access to called humming, right? Which is just,

Scott Britton (41:46.669)

Yeah, there's intrusive thoughts.

Dr. Dave Rabin (42:15.596)

And when you do that, you can't really ruminate. What could be more helpful to people? And yet we don't teach it. And you can do that anywhere. Like you don't have to just do that sitting. You can do that when you're walking somewhere, right? You can hum a tune that you like, right? You can do it when you're in the shower, right? You can do it at lots of different times. It's just that people don't realize that how powerful these natural techniques are. And so,

think a lot of my work is really focused on helping people remember these ancient traditions of people have been doing this for thousands of years because it really fucking works. know, like this is not, this isn't a joke. This isn't like a copper bracelet. This is like the real deal, like where spirit meets science. And people figured this out thousands of years ago, not because they had

double-blind randomized placebo-controlled trials testing it and proving it. They figured it out because they had intuitive knowledge.

Scott Britton (42:54.394)

Yeah.

Dr. Dave Rabin (43:14.412)

Right, they listen to their bodies and what happened when they did X, Y, Z and they saw, wait, when I do X, Y, Z together, I feel completely different. well maybe I should do that more. it's still working. okay, maybe I'll teach some other people and see what they think. it's working for them too. All right, now we have a thing. Right, and that's where science starts and I think if we remember to tap back into the natural.

for science and ourselves for scientific experiment. Like we are the greatest scientific experiment that we'll ever have access to in our lives. You know, that's why the field of biohacking is so cool because it's like reframing your life as like an opportunity for self discovery, which I think is really like the meaning of life. And if we embrace that invites a whole lot more pleasure and excitement into this lifetime.

Scott Britton (44:04.549)

100%. Well, I'm I'm gonna start walking around humming. I love it. Yeah, yeah, why not? There was something else that I was interested to get your perspective on, which is related to everything we're talking about, which is kind of this like new paradigm of how we think about medicine and medical intervention. And I know you've been

Dr. Dave Rabin (44:09.134)

Let me know what you think.

Scott Britton (44:28.643)

lecturing around this around the countries. Can you talk about the shift that you see happening right now, or at least the one that you hope happens?

Dr. Dave Rabin (44:35.392)

Yeah, I mean, I think, you know, this is easily the most exciting time in the history of mental health. And a lot of people don't fully understand because when you look at the mental health, mental illness statistics in the world, especially since 2019 or 2020, when COVID happened, we see mental illness on the rise quite exponentially. Like more people are diagnosed with mental illness now than ever before. And every year that number is increasing. So that

which does not tell a great story. But what's happening at the same time is that we have new techniques being developed that rather than you going to your doctor and your doctor just saying, hey, you looked like you have a mental illness because you check off all these boxes, here's your prescription, right? Now take this for life because you're diagnosed and you have a diagnosis and there's no cure. You know, we're taught not to use the cure word.

when we talk about mental illness and we're treating patients, we talk about treatment. Treatment is an ongoing thing. It's like getting treated for cancer or getting treated for an autoimmune, chronic autoimmune disorder. It's a treatment. It's treatment you have to keep doing and you never really stop. Or maybe you pause, but you will likely have to resume. It's not something where it's like an infection that you treat the right way and then it doesn't come back. And what we're shifting towards in mental health is this really

interesting and exciting opportunity where we're starting to develop cures for mental illness. And to give you an example where we're no longer treating it for life, we're like getting people into sustained remission, meaning their symptoms don't come back. And that's pretty darn incredible. And most people, many people don't think it's possible. But I would argue that if you go back to

I'm a big history medicine buff and I think we learned a lot from history and we learn a lot more from the history we've forgotten. And if you go back to, you know, the 1920s when we didn't have antibiotics, like I mentioned earlier, and then all of a sudden Alexander Fleming, you know, discovers penicillin from bread mold. And we, within 20 to 30 years, without double-blind randomized placebo control trials, within 20 to 30 years, we are now curing what infections like syphilis and other infections that used to result in loss of life or limb.

Dr. Dave Rabin (46:59.438)

Right? And we're not just treating them indefinitely, we're curing them and we're extending human life by 10 to 30 years with one invention, antibiotics. Started with penicillin. Right? So that was arguably next to hand washing, which is another insanely simple discovery. Arguably one of the most...

essentially important discoveries in the history of medicine that impacted health span, the quality of our healthy lives, and longevity, how long we live. That one discovery of antibiotics. So most important thing though is before that discovery, infections were considered terminal illnesses that resulted in loss of life and limb. People did not believe, most people did not believe in the scientific community that we could develop cures for these things. Now move forward to where we are with mental health.

Right? We're kind of in the same boat that we were in 1920. We have chronic lifelong disorders people are getting diagnosed with depression, anxiety, PTSD, you name it. And when you get a diagnosis, there's you're not told there's a cure. You're told you have this for life. You need treatment for life and that you need to that you're going to figure out how to deal with this, but it's going to be a lifelong thing. And if you stop taking your medicine, then you're going to have like an 80 % chance of being sick again. And.

That's kind of like what infections, people were told about infections in 1920, right? And so now we, and then if you look at the results with MDMA assisted therapy, for instance, in the FDA trials, with three doses of MDMA, 42 hours psychotherapy over 12 weeks with two therapists,

we see people with 17.6 years on average of completely treatment resistant, non-responsive PTSD.

55 % of those people are no longer meeting diagnostic criteria for PTSD after that 12 week, three dose MDMA treatment is over. But what's even, and that's miraculous in and of itself, but what's even more interesting is that at one year out, with no additional treatment, that number goes up from 55 % to 67%. So more people get better after the treatment is stopped than...

Dr. Dave Rabin (49:17.038)

when a year later than when the treatment was concluded. And we don't see that kind of result in anything other in medicine basically than antibiotic treatments of infections, where you have a one to 12 week treatment course and people can bodies continue to heal after the fact, after the treatment is stopped. That is pretty darn cool. That's really like the paradigm shifting that real evidence for the paradigm shift that we're discovering now, because people are not just better in the short term.

they continue to be better long-term. And of course we need more longer-term studies, but this theme tends to play out. And I think it really begs us to ask the question of, you know, if psychedelic medicines used properly with psychotherapy in these very careful, intentional, thoughtful ways are capable of inducing this kind of effect at scale, then we are effectively on the cusp of

discovering antibiotics for or what are considered to be antibiotics for mental illness and Cures therefore for mental illness and if we can put all of our energy and resources and effort into that goal Collectively as a medical community as a society rather than arguing about all the bullshit about the propaganda from the 70s and Reagan times and Nixon times and all the racist anti-drug policy and all that stuff we can just focus on the science be like, okay what

kind of level up in terms of health and medicine and paradigm shift. Do these types of therapies really, are they trying to convey to us from the data? It's very clear that this is an antibiotic level effect for mental illness. So if we can rally around that, we can change the world forever and have an equal contribution to medicine and healing and human quality of life as antibiotics by starting to cure mental illness.

And so that's what I'm really trying to help excite people around because, know, and there's not a single person I know that doesn't have, know somebody who has mental illness. And so if we can, if we can address that, we will change humanity forever.

Scott Britton (51:24.353)

I love it, man. And, you know, I can't help but ask like, well, the powers that be let that happen. Right? I mean, you saw it with the MDMA trials. Despite the evidence, there's just this entrenched system that's incentivized to the certain players and it are incentivized to not want people to heal themselves, cure themselves. And I'm, I'm also interested, like, have you guys gotten

Like my friend, one of my best friends who's been a podcast guest is the founder of mind bloom, the largest psychedelic medicine therapy, whatever he's gotten death threat. He's gotten death threats. You know, he had this, had like the FBI had to like step in because people don't want him to succeed. And, you know, it's real, it's definitely real. And, I'm just curious, like, have you guys gotten lots of push, push back and trying to bring this technology to

Dr. Dave Rabin (51:59.266)
Yeah, Dylan.

Scott Britton (52:22.415)
to the masses and all that kind of stuff, because it is potentially displacing a lot of people, a lot of things that are quite profitable.

Dr. Dave Rabin (52:31.726)
For sure. Yeah, I mean, it's certainly disruptive, both psychedelics and the kind of psychedelic-inspired technology that is Apollo that we work on. I think that the, we need to think about this together as a collaboration of humans for the good of humanity rather than who's putting the dollar in their pocket.

A lot of people are thinking about this from the perspective of, where, if there's only so many dollars in the world, I want them. And there aren't only so many dollars in the world. There's a lot of resources and a lot of money and, there's plenty enough for everyone to go around. Pharmaceutical companies, for instance, are, they are going to be just fine despite what people may be talking about.

in terms of the threat of psychedelic medicine and technology, because guess what? They're so entrenched into our medical system that in every way, in insurance, in the hospital system, in medical education, pharmaceutical companies have been there for 100 years. They're not going anywhere. We're still gonna use medicine. It's silly to think that drugs like SSRIs and all of these other medicines are gonna get instantly displaced. It's not how it's gonna work. It's not how it's ever worked.

What what will happen is that we'll start to have alternatives for other people who are not responsive to drugs Right or to the drugs we currently have or the therapies we currently have there are 70 % of people Who get diagnosed with PTSD as one example? never get better with the drugs all the best drugs that are prescribed and These people are amongst the most expensive people to treat in

Scott Britton (54:21.477)
Hmm

Dr. Dave Rabin (54:26.08)

in the Western medical system. They are literally not their fault, but because of the way the system's structured, they're literally bankrupting our entire society, right? So this is a public societal level issue. We don't have enough money to fund education. Big reason why the FDA made such a silly decision around MDMA, because they're not educated about it. They don't understand how MDMA works. They're a risk averse bureaucratic government organization. Their job is to reduce and minimize any risk that they see.

And so if they see any potential risk they don't understand and they don't understand that the entire way that MDMA works is by inducing safety states in the brain, they don't understand that safety is at the core of how MDMA works, then they're going to say it's not approved, but they're going to say we need more evidence. We need more evidence that it's safe because they don't understand that it is safe by nature of how the drug is delivered therapeutically. The entire therapeutic process is based on safety.

Scott Britton (55:16.709)
you

Dr. Dave Rabin (55:25.998)
Can people screw that up? Of course they can. People screw up surgery, surgeons screw up surgery, doctors over-prescribe opiates and benzodiazepines and all other drugs, and people use drugs that would not, according to best recommendations. People have more overdoses on Tylenol over the counter than many other drugs, and it induces more deaths than many other drugs every year. That's Tylenol, right? So now we're talking about MDMA that has never killed someone. But you know what does kill people is PTSD.

untreated PTSD. And many of the people suffering from it are veterans who made the ultimate sacrifice to defend the freedom of Americans. And now they're being told they can't get access to treatment when they have the highest suicide rate of any single American population segment. And that is just, I don't know what a nice way to say it is, it's just a bad look. How are you gonna engender loyalty of your population?

when people know and how are you gonna have an army or a military if the people coming in know that they're not gonna be taken care of when they come home? That is bad news. This is bad news bears. Our military system is going to have a real problem. And that's exactly why the VA is stepping up and they're like, you know what, FDA did this, but we're still gonna study it. We're still gonna study MDMA and ketamine for PTSD. Yeah, that's happening. One of my colleagues actually got, that was a big...

Scott Britton (56:31.109)
Hmm.

Scott Britton (56:46.275)
Hmm. Didn't know that was happening.

Dr. Dave Rabin (56:52.598)

and getting that study through. that kind of stuff is, and the DOD just put like \$9 million into psychedelic research. And so there's still a lot happening that is moving this forward. But a lot of the government organizations and the pharmaceutical companies that are sitting in critical places that need to support it and should be supporting it are not putting their best foot forward here. it's...

And it's selfish, it's greedy, and it's not a good look. So I think ultimately we just need to all recognize that we're human first and we need to be in this together. And the goal is to decrease human suffering, right? It's not to make more money. And believe it or not, if you think about making money, and that's your goal, think about ways you can make money by decreasing human suffering rather than perpetuating it, right? Like there are, if we can make money by making humans suffer,

We can certainly make just as much money by making humans feel good. People love to feel good. They love to feel good way more than they love to suffer, right? It's just a mindset switch.

Scott Britton (57:56.549)

100 % man. It's a lot, a lot of ways to make a buck and, yeah, it reminds me of a recent conversation I had on the show with the author Martha.

shift in consciousness where like, I think we're just saying how and she's a Harvard sociologist and studies like population change and stuff. And she's talking about how, you know, she thinks that a lot of these movements are going to be like, the government wants to go to war does something crazy. And there will just be a critical mass of people that are like, I'm not going to do that. You know, like, we're not doing that anymore. And so even if there are

these like entrenched power players who maybe are looking out for themselves. Like, yeah, we'll just, you know, eventually it just, there will not be the support to actually fulfill that even if when the mandate is, yeah, just not in the highest interest of all. So.

Dr. Dave Rabin (58:56.866)

Yeah, yeah, definitely. And that's the way it happened in the past, right? There was like a public outcry of people saying, hey, we don't want this or we want this. And then eventually it happens. I think the biggest challenge we're facing right now, two of the biggest challenges, one is that people feel divided. People are afraid of each other. They're more separate from each other than before and ever before. And a lot of that is the political agenda of making us feel afraid of each other because if we're

Scott Britton (59:14.991)

Totally.

Dr. Dave Rabin (59:24.214)

afraid of each other for any reason, including having different political beliefs, then we're not going to work together. And our superpower as humans is collaborative adaptation. Like we have an entire segment of our brains that evolved over millions of years to just focus on empathy and collaborative adaptation, working together to solve hard problems. So if we become afraid of each other or apathetic, meaning we don't care about the outcome because it's too much work to do anything about it, or we're afraid of

being punished for speaking out, right? Then, which is a very fascist situation that we're starting to enter into, to be afraid to speak your voice in a country that has a constitutional right to free speech, because you're afraid of the repercussions of speaking freely, then that effectively is the, like seals the demise of democracy, right? And constitutional democracy can only sustain itself where

human rights are protected from the government abuses and from media abuses and manipulation and propaganda and from fear-based tactics. that is what is like, whether or not we decide to care enough to speak our voice together and to stand up together and say, no, this is not okay. Or yes, we are in favor of this, we need this. If we like speaking no voice saying nothing is

Effectively saying I consent for you to do what you will right? speaking your voice is saying or making your opinion known as a community as an individual is actually having a say and exerting your will on the world that you want to live in and making the world you want to live in and your you want your children to live in more like The world that you actually that we care about, know and sustaining it if we don't say anything we're just giving up our right to

to make a difference in that outcome. So I think it's like you said, it's real, like the change can happen from people literally just saying no or yes together. But if we don't, because we're afraid or apathetic, then we no longer have a say in the outcome.

Scott Britton (01:01:41.445)

Well, I agree with everything you just said and I think more people are starting to recognize their sovereignty and have the awareness for these things. And I'm optimistic and also optimistic with technologies like the ones that you're developing and what that can mean for putting people in a regulated state.

everything flows from that, right? And so Dave, I want to just give you the opportunity to just share, people are excited about what you talked about with Apollo and maybe testing some of these things out. You know, where's the best place for them to do that?

Dr. Dave Rabin (01:02:20.978)

For sure. you know, first off, thanks so much for having me, Scott. It was real pleasure to be with you and share the space. if people want to find me, you can always find me on socials at Dr. David Rabin. I love to hear from folks. Instagram is probably the best place to find me. Twitter,

second best on socials. And if you want to try Apollo and get a nice free neuroscience based upgrade for your iPhone,

You can, and you have an iPhone, you could just go to Apollo neuro in the app store. It's two words, A P O L L O space and N E U R O. and if you don't have an iPhone or you just want to learn more, you can go to Apolloneuro.com or wearable hugs.com, which is what the kids call it. And, if you want to learn more about my work in psychedelics and, psychedelic medicine and how the brain works, I run, the psychedelic news show called the psychedelic report.

Scott Britton (01:03:08.451)

Nice.

Dr. Dave Rabin (01:03:19.95)

which really covers the latest and greatest and most controversial stuff going on in the psychedelic space every couple weeks on iTunes, Apple podcasts and Spotify. And I also have a consciousness show on neuroscience broken down for everyone to understand how the brain works better called Your Brain Explained. And that's on also Apple podcasts and Spotify. So please come and check it out. And I'd love to hear your thoughts.

Scott Britton (01:03:50.261)

Epic. You're a busy man, Dr. Dave. That's a lot of stuff, but it's all awesome and exciting. Yeah, thank you for coming on the show, man. This was a real pleasure.

Dr. Dave Rabin (01:04:01.334)

Yeah, likewise. Thanks for having me.