EP\_1332\_BRENNAN\_SPIEGEL\_AUDIO

**Brennan:** [00:00:00] You're on a planet that's pulling you down. You can't get up out of bed. You're exhausted. You're [00:00:05] slumped over. Those are the symptoms of depression. Right. Those are also the symptoms of too much [00:00:10] gravity. What we're trying to do is fight gravity.

**Dave:** This is the missing link in biohacking, and it's [00:00:15] maybe the most ignored of all of the signals because it's always [00:00:20] present and we just assume it's there.

**Host:** Brennan Spiegel is a director of health services at Cedars Sinai and a [00:00:25] professor of medicine and public health at UCLA. He has pioneered groundbreaking work on how [00:00:30] virtual reality and emerging technologies can transform patient care. His vision [00:00:35] is reshaping the future of healthcare and the way we experience healing.

**Brennan:** Low blood pressure is a bad [00:00:40] thing. That's a gravity intolerance problem. Passing out, feeling dizzy, [00:00:45] low back pain, ankle swelling, even depression and anxiety are forms of [00:00:50] gravity intolerance. I used

**Dave:** to weigh 300 pounds. Is obesity a gravity disease? [00:00:55] You're listening to The Human Upgrade with Dave Asprey.[00:01:00]

Hey guys, quick [00:01:05] reminder. If you're listening to this on your favorite audio podcast app, and you haven't been over to my [00:01:10] YouTube channel, check it out. Just search for The Human Upgrade or find me under Dave [00:01:15] Asprey BPR. I post full video versions of every episode and a bunch of other cool content every week.

outside the [00:01:20] pod. It's a great way to go deeper into the content and connect with other biohackers like you. [00:01:25] So leave a comment for me. Yeah, I'm actually going to read them and poke around while you're there. There is a lot of [00:01:30] stuff specifically for you. It really helps. And it means a lot to me. [00:01:35] If you think about the definition of biohacking, it's the art and science are changing the environment around [00:01:40] you and inside of you.

So you have control of your biology and control of your state. [00:01:45] Of all the different variables, we have light, we have sound, we have vibration, we have [00:01:50] food and timing, and gravity is one of them. And it's [00:01:55] maybe the most ignored of all of the signals, because it's always [00:02:00] present and we just assume it's there.

And I've been interested in hacking gravity, [00:02:05] levitating too, but that's not what I'm talking about. If we learn how to do that in this episode, I'll be surprised. [00:02:10] But the signal of gravity is something that is a very strong signal to the body. And it's [00:02:15] something that we manipulate with the cheat machine at Upgrade Labs, where instead of [00:02:20] fighting gravity, you're fighting an AI system that does weird things to you.

But I haven't been able to find a [00:02:25] researcher. There's people who look at gravity and planets and things like that, [00:02:30] but what is the direct signal gravity on the body? How does it affect us? Well, it's [00:02:35] I found a guy, and he's legit, Cedars Sinai, very [00:02:40] well published, and, well, he just came out with a book called Pull, [00:02:45] and so I got to have an early copy of it, and we're recording this actually [00:02:50] before it comes out, and I'll release it right when it comes out, but your subtitle is How [00:02:55] Gravity Shapes Your Body and Steadies the Mind and Guides Your Health.

So thank you! This is the missing [00:03:00] link in biohacking that no one's written a book about. So this is a [00:03:05] big deal, I would say, at least in our study of the whole universe of what we can tweak. [00:03:10] Why gravity?

**Brennan:** Well, you just said it. You know, gravity was here long before we [00:03:15] were. It's going to be here long after we're gone.

So it stands to [00:03:20] reason that every part of your body, you know, every sinew, every cell, every organ evolved [00:03:25] to manage this fundamental force of physics. You know, we are, to [00:03:30] gravity, like a fish is to water. A fish is designed to survive and thrive through this [00:03:35] aqueous liquid world. I don't know if it knows that, but that's what it does.

Right. We are the [00:03:40] same way. We don't think about gravity much, but every part of you, right this second, on a [00:03:45] microbial level, on a microtubular level, and on a [00:03:50] macroscopic level, is trying to stand up and stay up as long as you can and as well as you [00:03:55] can. So being alive is basically resisting gravity?

That's almost all [00:04:00] it is. There are only four fundamental forces in the universe as we know it. One of them has to [00:04:05] do with stars. One of them has to do with us not exploding, right? Like, as we're talking. It's always a [00:04:10] problem. So once we got that situated, it's about electromagnetism and [00:04:15] gravity. And that's what we're talking about today is the gravity side.

**Dave:** Okay. What do you study to become [00:04:20] a gravity expert?

**Brennan:** Well, you know, I never set out to be a gravity [00:04:25] expert. I'm a gastroenterologist. I'm a professor of medicine and [00:04:30] public health. I teach a lot of different things. That's why this book is, you're not who I thought would write this [00:04:35] book, but I'm glad you did.

I'm not the person either who I thought would write this book. This all [00:04:40] started a few years ago when my mother in law, Was [00:04:45] in an assisted living facility and she had cognitive decline. And [00:04:50] she found herself lying down a lot. She was flat on her back, like a lot of our patients are in the hospital, too.[00:04:55]

And she started getting stomach issues, bloating, constipation, and depression. [00:05:00] And nothing else had changed, not her diet, not her medications. And of course, my [00:05:05] family asked me, what do you think is going on here? And I thought, you know, we're not designed to lie flat. We're designed, we're [00:05:10] bipedal creatures that stand up and stay up.

And I started thinking a lot about that. And I [00:05:15] ended up writing a whole paper called Gravity in the Gut. And it kind of went viral, [00:05:20] and then I realized this isn't just about the gut, this is about the entire body, and that's Cardiovascular, [00:05:25] glymphatic drainage. You got it, that's just the beginning. Inner ear, and your [00:05:30] brain itself.

**Dave:** I didn't think about the inner ear, but of course. Alright, you make [00:05:35] the case in your book that medicine ignored gravity. That seems like a [00:05:40] big thing. How did medicine end up ignoring it?

**Brennan:** You know, we spend a lot of time learning about the [00:05:45] individual organ systems and how they work, but we don't talk a lot [00:05:50] about what they're aiming to achieve.

What we're trying to [00:05:55] do is fight gravity. Like, we literally emerged from this planet. We are [00:06:00] grounded on this rock. And we are a consequence of it. And so all of our [00:06:05] biology, physics came first, and biology second. And nowhere in medical school did I hear [00:06:10] that. We came out of the earth. You know, it basically came out of the oceans, which is something we [00:06:15] might want to talk about.

And we evolved all these pumps and tubes to keep the [00:06:20] hydraulics so that you can stay awake and talk with me and have your brain getting oxygen. Yeah, low blood pressure is a bad [00:06:25] thing. That's a gravity intolerance problem. Passing out, [00:06:30] feeling dizzy, low back pain, ankle swelling, even depression [00:06:35] and anxiety, I argue in the book, are forms of gravity intolerance.

So,

**Dave:** so highly [00:06:40] resilient people resist gravity better, you're saying? Physically, metaphysically. [00:06:45] Resist gravity better. Yeah. What does metaphysically resisting gravity really mean?

**Brennan:** Well, what I mean by that [00:06:50] is there is a part of us that is hard to identify in [00:06:55] physical space, and we can get into philosophy. I was a former philosophy major, so That explains a lot.

Okay. [00:07:00] But what I mean by that is even consciousness itself, which is hard [00:07:05] to locate in space and time, is, I argue in this book, [00:07:10] Also, very much a consequence of our relationship to gravity itself.

**Dave:** [00:07:15] Fascinating. When you get into some of the more quantum consciousness, cutting [00:07:20] edge philosophy books, they're making the case that, that time and space at [00:07:25] least are hallucinations that our bodies create.

Is gravity [00:07:30] one of those, too?

**Brennan:** Yeah, so consciousness itself is sort of a controlled [00:07:35] hallucination, in essence. And it's a narrative that we [00:07:40] construct in our mind using the signals of the universe. [00:07:45] Right, right. So, right now, we talked about two of those signals, electromagnetism and gravity. [00:07:50] So, we are sense making machines.

Right now, your body is [00:07:55] taking in, you know, billions of data points, the pressure on your bottom, your cerebral [00:08:00] spinal fluid in your brain is dependent on your elevation related to sea [00:08:05] level. We can go through lots and lots of examples, but you're taking in all of this data, and like a [00:08:10] computer, you're compressing the data down more and more at each level.

You compress it. [00:08:15] And compress it again through nervous system and eventually ends up in the brain as a [00:08:20] mental map of your relationship to this planet. And then you're making sense of it [00:08:25] in relation to the physical reality that we're in as we understand it. And that's what [00:08:30] we do. That is how we survive.

Is by creating a mental perceptual [00:08:35] understanding using the data like a compression engine. And then from there, it's [00:08:40] all dependent on the decisions we make, and how will we support this body to stand up and stay up [00:08:45] until eventually we're pulled back down again.

**Dave:** Wow. That's a very different view of living and [00:08:50] dying and being conscious, but it maps.

It makes really good sense. Okay. How would [00:08:55] I know if my antigravity system was breaking down? What's the first sign?

**Brennan:** So, I think of it like there's [00:09:00] different stacks in your body,

**Dave:** okay?

**Brennan:** So, the first is probably the most obvious. [00:09:05] which is the musculoskeletal system. You know, what is lower back pain if not a form of [00:09:10] gravity intolerance?

We originally were four legged creatures.

Yeah.

And only [00:09:15] in relatively last part of our evolution did we stand up and change our relationship and [00:09:20] center of gravity completely. And then all of the viscera started dangling [00:09:25] down. And your spine became this chassis that had to hold up the sack of [00:09:30] potatoes that you've got in your belly.

I'm a gastroenterologist, so that means you have to have a [00:09:35] strong back in a way that four legged creatures don't. [00:09:40] And back pain is a form of gravity intolerance. Pain [00:09:45] itself, chronic pain, is often a form of gravity intolerance. It's a way of your body telling [00:09:50] you, you're literally not Aligned with this downward pull or upward [00:09:55] push, depending on how you look at it, of the planet itself.

So those are just a few [00:10:00] common explanations of gravity intolerance. But then if we dig deeper, there's something called [00:10:05] tensegrity, which is tensile integrity. So,

you

know, Tom Brady [00:10:10] played for so long, not because he was the biggest guy, It's because he was the most [00:10:15] durable, zipped up guy. Because his fascia was working.

His fascia was tight. [00:10:20] And so resilience is about bending and not breaking. And in the body, we [00:10:25] have all these organs that we learn about, but it's actually the in between space that we rarely ever talk about. [00:10:30] It's the connection points within the body where one system connects to [00:10:35] another. It turns out a lot of disease begins at that point.

And if you toughen that part up, [00:10:40] you toughen your gravity resilience too.

**Dave:** Have

**Brennan:** you ever

**Dave:** heard of Ni Gong? No. [00:10:45] Have you heard of Qi Gong? No. Okay, so Qi Gong is, you know, Chinese medicine, you know, people [00:10:50] doing energy work. Yeah, sure, that I know. So, Ni Gong is kind of its red [00:10:55] headed stepsister. And it's, uh, It's, if you look at, say, a [00:11:00] Shaolin monk, they're doing these one finger push ups and they have no muscle mass to [00:11:05] explain it.

So there's a third form of strength in Chinese [00:11:10] medicine. That they call Wong, which is not from bones and tendons, and it's not from muscle. It's [00:11:15] from interstitial strength. And that's your tensegrity system, right? So,

**Brennan:** the [00:11:20] interstitium, just since you mentioned that, I happen to know the guy, David Carlock.

Oh, wow. Who, [00:11:25] who discovered the interstitium. And this is literally the most recent organ [00:11:30] to be identified. Oh, this is so cool. And so the crazy thing about the interstitium is no one [00:11:35] even knew it was an organ. Until about 15 years ago or so, I could have it [00:11:40] off, but about that, it's, I didn't learn about it in medical school.

**Music:** Yeah.

**Brennan:** And now we understand that [00:11:45] that space is so vital to autoimmunity, to cancer [00:11:50] spread, to tensegrity, to gravity tolerance, that [00:11:55] We've totally overlooked it and now we have to really spend much more time thinking about it Just like [00:12:00] these guys have known long before we were thinking about it in Western medicine

**Dave:** They probably have very different [00:12:05] language to explain it But we do know there are some practices that seem to be able to train it [00:12:10] even if they don't have the same Cognitive picture of it we do [00:12:15] are there things that you've learned that we can do to make ourselves stronger in that way.

**Brennan:** Yeah [00:12:20] so Starting again, we're talking about this first stack of the muscles, the [00:12:25] tendons, and the connection points. Right. So, in the book, I talk about, I called it [00:12:30] Operation Gravitate. So, I decided to wear a weighted vest [00:12:35] for eight weeks. So cool. All day long. I've got pictures of it in the book. [00:12:40] Uh, I wore it to meetings.

20 pound ankle weight on each ankle. [00:12:45] Smart. Standing desk, balance board. Mm hmm. All day long. That's what I'm [00:12:50] doing for eight weeks. It's a big amount of work. It's a lot of work. At first it was exhausting. But [00:12:55] as a few weeks went on, I found this strength from within that I'm not accustomed to. I run [00:13:00] marathons, and I'm somewhat athletic.

So you're a masochist kind of. Yeah, but, but I actually [00:13:05] found it was very difficult to just stand there with a weight. It was like simulating life on a bigger planet [00:13:10] with a stronger pull.

**Dave:** Did you wear wrists by any chance? I didn't do wrists, yeah, I didn't do [00:13:15] wrists.

**Brennan:** Although when I box, I sometimes wear weighted gloves, but I didn't do that at work.

[00:13:20] And so, uh, other than looking like you have some tactical vest on and some people looking at you funny, [00:13:25] I got through these eight weeks, and I had this much stronger strength in my [00:13:30] intrascapular space, the fascia, the tendons, and I realized I was standing up and, you know, [00:13:35] much, like, straighter.

Right.

And everything lifts when you do that.

You have great posture, [00:13:40] yeah. Well, thank you. It's hard in these chairs, but I do it my best. Anyway, [00:13:45] so I did that and I lost weight too. That was the crazy thing, without even trying. Just weighing myself down and [00:13:50] pushing myself up. And at the end of the day, when I pulled all the weight off, I felt buoyant.

I felt [00:13:55] almost like I was floating.

**Dave:** About 12 years ago. in the biohacking [00:14:00] movement, I bought something called the Anti Gravity Suit. And this is a [00:14:05] weighted vest that included arm weights around the elbows and wrists [00:14:10] and ankles, knees as well. And the inventor of this Anti Gravity Suit, [00:14:15] it was pretty simple.

Ridiculously expensive, like 1, 200 or something, and it looks so stupid, [00:14:20] like a blue padded superhero outfit. So I went for walks with it for a month or two, [00:14:25] but I'm not wearing this all day long. I can't, I just can't do that. But I, I [00:14:30] did notice some similar things. It felt like it was also affecting my [00:14:35] proprioceptors, like, and, and for listeners, proprioceptors, Approprioception is your [00:14:40] body's sense of where it is in space, just because if you don't know where your hand is and there's an extra weight on it, [00:14:45] you're going to flop around the same with your ankles.

Do you feel like your nervous system changed in addition [00:14:50] to your muscles and your posture?

**Brennan:** So we call this graviception. Ooh. So [00:14:55] proprioception is part of graviception. Graviception is your [00:15:00] perception of gravity, and it comes to you in different ways. So, so you have these Golgi [00:15:05] apparati that are constantly keeping track microscopically of your angulation of your muscles and [00:15:10] tendons.

That informs your proprioception, which I train with a balance board when I'm [00:15:15] standing with a weighted vest. But it's also informing your brain [00:15:20] in an area called the anterior insula, which is actually a graviceptive center in the brain. [00:15:25] Oh,

wow.

That is like a control panel that is literally taking in the signals from your inner ear, [00:15:30] your proprioception, and even internally inside what we call interoception, and [00:15:35] creating this mental map of gravity, which we talked about earlier.

And so by doing what I [00:15:40] did, I was training my graviceptive experience of the world. And really [00:15:45] bringing myself to a different understanding of what it means to live on a 1G planet versus, you [00:15:50] know, a 1. 2G planet, let's say. Wow.[00:15:55]

**Dave:** When you talk about a balance board, I've [00:16:00] worked with a variety of balance boards. There's one kind that's like a flat plank with a [00:16:05] tube in the middle, so you can, you could roll. all the way sideways. And then there's the ones with the hard center [00:16:10] cones, you wobble in three dimensions. And then there's the BOSU ball thing where it's a half a BOSU ball.

[00:16:15] Which kind of balance board did you use?

**Brennan:** I did sort of the half the half ball.

**Dave:** The half ball. Okay. I'm

**Brennan:** at [00:16:20] work. So the one with the roller in the middle is pretty hard. You can fly off that. You can injure [00:16:25] yourself. It's like a circus

**Dave:** acrobat kind of thing. Yeah.

**Brennan:** But I've gotten pretty good at it. I mean, I'm not doing that, [00:16:30] that level of complexity at work.

But I've gotten pretty good at just not thinking about it. And so I'm [00:16:35] constantly getting that proprioceptive feedback. So you're always on a balance board at work? Most of the [00:16:40] time.

**Dave:** Okay.

**Brennan:** Yeah, most of the time. When I'm, you know, when I'm seeing patients, obviously that's different.

**Dave:** That'd be kind of fun though.

Yeah, I [00:16:45] guess. Just like, this doctor's weird. How much of your time do you spend seeing [00:16:50] patients versus doing research?

**Brennan:** So, I see patients about 15 percent of the time. [00:16:55] Okay, got it. Um, always with our, uh, students. Um, we have, I'm part of the UCLA School of [00:17:00] Medicine. So, I have students with me all the time.

And you're probably going for the hard, interesting cases, right? I always like to [00:17:05] do the house MD stuff if I can, yeah. Okay,

**Dave:** that's cool. So, you basically keep a finger on the [00:17:10] healing side, but you're really on the discovery side most of the

**Brennan:** time. Yes. It's taking in from [00:17:15] insight from my patients. That's where the ideas come from.

First and foremost is as clinical [00:17:20] observations and then converting those clinical observations to to research questions. Yeah, that's [00:17:25] so cool. As

**Dave:** an unlicensed biohacker, I don't do that.

**Brennan:** [00:17:30] Fair enough.

**Dave:** My former wife, mother of my kids was [00:17:35] a carolinska trained doctor and she used to always say I'm a trained physician.[00:17:40]

And I look at her and be like, I'm an untrained physician. All physicians are trained. That's why we have [00:17:45] medical school, right? It was just it was a funny family joke. [00:17:50] One of the things that intrigued me about your book is I've been thinking about [00:17:55] space travel a lot since I was a kid and I read a lot of science fiction [00:18:00] and I had a chance to ask The president of, uh, [00:18:05] SpaceX, uh, at an event.

You've hardened all of your [00:18:10] electronics for space travel. What have you done to harden astronauts? Yes. She [00:18:15] looked at me and she said, In 17 years, no one's ever asked me that question. We're not doing anything. [00:18:20] And I'm thinking to myself, Going to Mars is an absurd thing because we haven't [00:18:25] solved the gravity problem.

That's And when people get to Mars, their vision will be gone [00:18:30] because of gravity, their brains will be gone because of gravity, and they'll be unable to reproduce, [00:18:35] probably because of gravity and maybe radiation. Why do all those things go haywire in space?

**Brennan:** [00:18:40] Yeah, I mean they knew this when they made 2001 A Space Odyssey because they had the uh, the [00:18:45] rotating centrifuge to create artificial gravity.

So, [00:18:50] we were born on this planet. We were born with gravity. And there's [00:18:55] sort of this gravity Goldilocks zone. Too much gravity for your body could be bad, too little [00:19:00] can be bad. And this not only is in microgravity orbit, but even in high [00:19:05] altitude or even in an airplane. So, we might even talk about that, but we can learn a lot from what happens from [00:19:10] astronauts.

And apply that back to our Earth, our Earth here, our, our, our, you know, [00:19:15] life here in the atmosphere. Well, airplanes don't lack gravity, do

**Dave:** they?

**Brennan:** Well, [00:19:20] so, the pressurized cabin is about 8, 000 feet, and so That's a [00:19:25] pressure versus gravity. So gravity itself isn't too different as you get that far out. But it speeds on the [00:19:30] atmosphere.

**Dave:** Ah, okay, so atmospheric pressure is an aspect

**Brennan:** of gravity. Absolutely. It's a consequence of gravity. Now I'm with [00:19:35] you. So it all comes down to gravity. That's how fundamental it is. So Yeah, it's very much a [00:19:40] gravitational effect. You know, jet belly, people with inflammatory bowel disease get colitis flares, [00:19:45] uh, when they get up in high altitude, serotonin biology changes, microbiome changes, and [00:19:50] all that happens in astronauts too.

So it turns out the microbiome and its [00:19:55] diversity changes in, in, uh, micro, uh, gravity orbit. [00:20:00] Uh, serotonin biology changes, and what happens also is just the fluidics, those pumps [00:20:05] and tubes, there's a redistribution of fluid that leads to more [00:20:10] congestion in the head, headaches, eye issues. Kidney stones, and [00:20:15] really interesting, infections start to come out in this place that's been scrubbed clean.

Why [00:20:20] would astronauts get viral infections? And all that, all that stuff happens in

**Dave:** space. [00:20:25] Okay, let's make this practical. When people are flying, how do they minimize the [00:20:30] effects of this lack of pressure from gravity?

**Brennan:** Yeah, so if you ever have had like a snack bag or [00:20:35] chips or something up at cruising altitude, you'll notice that they're taut with air.

**Music:** Yeah. Yeah. [00:20:40]

**Brennan:** And you can almost imagine that's what's happening in the organs, too, especially the gut will [00:20:45] start to stretch out a little bit and it can be very uncomfortable for many people

**Dave:** unless [00:20:50] you just don't eat all those beans.

**Brennan:** So what you eat ahead of time, watch some [00:20:55] carbs. have some, you know, loose clothing.

But one thing is there's something called the jet [00:21:00] belly release. That's what I call it anyway, where you take your, your hand and kind of push it just under the belly button. [00:21:05] And then you want to milk it like towards your right hip. And what you're doing is you're taking the [00:21:10] gas in the small bowel and pushing it through the ileocecal valve into the colon.

That's just a [00:21:15] few little things you can do.

**Dave:** I used to do that, you know, when my kids were really young, we just, I love you. And you [00:21:20] do this like inverted U shape ascending, transverse and descending colon. And [00:21:25] man, they've. Sure did fart a lot, but,

**Brennan:** um,

**Dave:** what I've [00:21:30] found, and I'd love for you to poke holes or comment on why it works, is most people have [00:21:35] heard you should wear, you know, tight socks to keep blood from pooling in your legs, right?

And so I [00:21:40] would do that, and then, It was Nick Foles the Super Bowl champion, came on, he [00:21:45] said, you know, Dave, I fly more, even more than you, and I fly a lot. And he said, [00:21:50] just wear compression tights and a shirt. I said, seriously, a [00:21:55] shirt? I said, yeah. So I tried it. And I have super tight [00:22:00] compression tights and a compression shirt on when I fly.

And I have zero symptoms of any of this because I [00:22:05] replaced the pressure that's not there from gravity. And it's totally changed my resilience. My brain works better. I don't get [00:22:10] any of the flight

**Brennan:** stuff. Absolutely. So, you know, you see your brain works better and, and we [00:22:15] might even talk about why we sleep because you're reperfusing your brain at night.

Literally, that's a [00:22:20] gravitational effect too. We need to keep, that's why you gotta drink a lot of, a lot of water. This is why [00:22:25] Alzheimer's disease is in part related to blood flow and how many orthostatic [00:22:30] symptoms you have and how much fluid you drink and your salt levels, they're all part of gravity [00:22:35] management.

And so I'm going off on a little bit of a tangent, but it comes back to what you just said. On an [00:22:40] airplane, if you don't stay well hydrated, if you don't have compression of the pumps and tubes, you're not going to get that [00:22:45] Venus return up to your brain. You start feeling a little bit sluggish, a little lightheaded, some brain fog.[00:22:50]

That's gravity.

**Dave:** Wow. You mentioned a lot of things there. So we could have some sodium based [00:22:55] electrolyte would probably be a good idea. I do that when I fly. Um, I do [00:23:00] carbonated water, which isn't really for pressure. I do that because increasing [00:23:05] CO2 in the body increases your body's affinity for oxygen and I've actually measured the change on an [00:23:10] SpO2 thing after a lot of experiments.

So I think, yay carbonated water, no to [00:23:15] Coca Cola. But, and you might burp, but you're unlikely to get bloated from that, at least from my [00:23:20] experience. And then I'll do creatine, which is also, these are all just increasing the amount [00:23:25] of fluid so they don't have those problems. Right. Uh, and then I do a couple other weird things, you know, I [00:23:30] control the lighting environment, and I wear a shirt that helps to block EMFs, because those are [00:23:35] probably bad for voltage gated calcium channels, but I don't think it makes that big of a difference, but what the hell, I'm on an airplane, [00:23:40] who cares.

I also take a ketone beverage to protect my mitochondria, um, [00:23:45] because we know that the presence of ketones in mitochondria reduces ionizing radiation effects, [00:23:50] which would cause cell swelling, which are part of this whole thing.

**Brennan:** Well, [00:23:55] you've got a lot right there. You know, diet perhaps, I mean, you know, some people will, there are [00:24:00] some NASA's research diets for high altitude.

Oh, interesting. Not necessarily [00:24:05] for airplane flight, which is pretty, you know, quick. Yeah. But, you know, antioxidants, [00:24:10] berries, leafy greens, um, almonds. There's a particular [00:24:15] diet that NASA, and I talk about it in the book, examined for you know, [00:24:20] maintaining really microbiome diversity in high altitude.

**Dave:** Oh, [00:24:25] that's an interesting play.

I met someone years ago who had this [00:24:30] ancient Japanese post biotic blend that, you know, [00:24:35] someone learned how to make over generations. Uh, and they said this is the only way we'll ever go to [00:24:40] space because this is what healthy gut bacteria make. Yes. If the body needs it. Short

**Brennan:** chain fatty acids, typically.

[00:24:45] Yeah,

**Dave:** there's definitely some of that and a bunch of Butyrate, butyrate. A bunch of random stuff in there. There's kind of [00:24:50] a brown powdery thing. We've had enough volume to be all butyrate. Mm hmm. But it was an interesting idea [00:24:55] that maybe to go to space, we're going to have to figure out what healthy microbiome makes here.

Yes. If we [00:25:00] can't actually get a healthy microbiome without gravity, do you think it's possible to have a [00:25:05] good microbiome with zero gravity? Mm hmm. I mean,

**Brennan:** that's an open question, because those critters inside of [00:25:10] us, the trillions of them, also evolved on this planet. Right. Mainly in the [00:25:15] ocean, by the way.

With gravity and motion. So it's worth telling the [00:25:20] story here real quick because it gets us to your question. Yeah. You know, we think life evolved in the [00:25:25] oceans, probably around hydrothermal vents, hot, gassy, sulfuric, [00:25:30] dark worlds.

**Dave:** There's the outside Taco Bell. Okay, that was fun. Something [00:25:35] like

**Brennan:** I can laugh at my own jokes.

I like it. Keep going. [00:25:40] So We eventually emerged from the oceans in these [00:25:45] amphibious forms and we needed to find another dark taco bell, like [00:25:50] sulfuric gassy place. And that was the gut created, of course, a hydrothermal [00:25:55] event in our Wow. That's interesting. To give a refuge to these [00:26:00] microbiome. To the microbiome, which we now call it.

Mm-hmm .

Which we co-evolved with. And what did they give [00:26:05] us? They gave us serotonin, and we gave them the [00:26:10] ability to move around the world, but we needed serotonin to do [00:26:15] that, because serotonin is a gravity management substance.

**Dave:** What? That's what it

**Brennan:** does. Okay. [00:26:20] I've heard of

**Dave:** it as a cell signaling substance throughout the body.

It's not just in the brain. In fact, [00:26:25] it's not in Right. It's like a mitochondrial stress signal. And you think [00:26:30] gravity drives serotonin? Yeah. Okay. I've been using whole body vibration plates for 15 [00:26:35] years and used to, used to manufacture them. Is that affecting my serotonin [00:26:40] levels? Because you're affecting gravity with acceleration.

Meaning? I don't

**Brennan:** know. Wow. That's a really interesting hypothesis.

**Dave:** You're [00:26:45] blowing my mind

**Brennan:** here.

**Dave:** Okay. So tell me more about serotonin and gravity.

**Brennan:** I've written a couple papers on this, [00:26:50] so this isn't.

**Dave:** I don't believe in you.

**Brennan:** I'm

**Dave:** just making

**Brennan:** stuff

**Dave:** up

**Brennan:** here. You're as credible

**Dave:** as it gets in this field, so.

**Brennan:** So, you [00:26:55] know, let's just think about what most people when they think of serotonin mm-hmm

They think about a happy chemical. Right. It's in the [00:27:00] brain and it may, it elevates your mood, by the way. Elevate is up and Yeah. You know, depressed [00:27:05] is down. So that's gravitational in a way, gets to that . Wow. And the ti, the neuropsych, [00:27:10] verticality of our neuropsychology. Mm-hmm . We get to that. But, but 95% of the [00:27:15] serotonin in your body is not made in the brain.

It's made in the gut. And it relies upon your microbiome. [00:27:20] And we can talk about how and how to boost serotonin through diet and all that. [00:27:25] But basically, when you look at what serotonin does, without it, you would be a flaccid sack [00:27:30] right now. I mean, like a baby has very little serotonin in its body. It hasn't, it hasn't [00:27:35] developed its microbiome yet.

It's a flaccid sack. Babies are, they can't move.

**Dave:** Yeah.

**Brennan:** What [00:27:40] serotonin does is, it primes your pumps and tubes, [00:27:45] it helps you contract your, uh, vascular system, it helps your baroreceptor [00:27:50] reflex, which is in your aortic arch and carotid, you have these, [00:27:55] uh, pressure gauges. Gauges that determine if you need to increase or decrease your blood [00:28:00] pressure based upon your rising and falling and your your fluid status.

And that's all [00:28:05] serotonin. Your inner ear, which keeps you from not falling over, serotonergic, which is [00:28:10] why people who withdraw from SSRIs get very dizzy sometimes. Uh, we can go on and on. [00:28:15] Lymphatics rely upon serotonin, even that interstitium, and the fluidics within the [00:28:20] interstitium. Basically, without it, we wouldn't be able to move stuff up.[00:28:25]

Uh, and there are more examples than that. Wow. And so, if you think of it that way what it's really [00:28:30] doing is allowing us to fight gravity.

**Dave:** Does this mean that psychedelics and [00:28:35] MDMA are gravity drugs? Yeah, and you feel high.

**Brennan:** Oh, [00:28:40] okay. You literally feel high. Wow. You are floating. [00:28:45] Psychedelics explode serotonin in the brain.

Yeah.

**Music:** Yeah.

**Brennan:** And the felt [00:28:50] experience we call high. Okay, and so I'm feeling [00:28:55] high. I mean, you think about the words we use in our language. Uh, looking up to the heavens, I look down [00:29:00] to hell, I'm feeling down in the dumps, I'm feeling high, and you look up to, you know, [00:29:05] church steeples, or, or, you know. That's why tall people are better, you're saying.

Ha! I don't know about that. You are [00:29:10] pretty tall, though. I'm just kidding. So, Yeah, no, I mean, it might even [00:29:15] be, to be honest, like there is a verticality and how we think about the world. They

**Dave:** get elected more. We know [00:29:20] that.

**Brennan:** For sure. And actually there's, you know, and all jokes aside, there's all this psychological research that if you [00:29:25] go to a market and something is stationed on a higher shelf, we consider it worth more [00:29:30] money than if that same object is in a lower shelf.

Isn't

**Dave:** that crazy? Yeah. Wow. Okay. I had never thought about this. [00:29:35] You're, you're giving me a new way to see things. Thank you. Yeah. Wow. I'm still processing this [00:29:40] serotonin thing. All right. I have a a selfish reason for having [00:29:45] you on the show. I have had low blood pressure my entire life. It's a congenital [00:29:50] thing, apparently, which is ultimately a gravity management issue, right?

And I have it [00:29:55] very well managed because I know all the stuff works. Why do some people get high blood pressure versus [00:30:00] low blood pressure in the context of gravity? Mm hmm.

**Brennan:** Well, there's a lot of reasons, but [00:30:05] one that's often undiagnosed is called POTS. You've heard of this? This is postural [00:30:10] tachycardia syndrome.

Yeah. And What's going on there is, by the way, [00:30:15] those folks also get a lot of stomach issues. Absolutely. Because if we take a [00:30:20] picture of their abdomen on an x ray, their sack of potatoes in their [00:30:25] belly also collapses by gravity into their pelvis.

**Dave:** Interesting. And they

**Brennan:** also get [00:30:30] lightheaded and dizzy. And what's happening is collagen in the body, which is this structural [00:30:35] scaffolding that helps us fight gravity, keeps us together, sewn together.

Right. is [00:30:40] um, different.

**Dave:** It's

**Brennan:** often weakened.

**Dave:** There's a reason that I made collagen [00:30:45] a billion dollar industry when I was at Bulletproof.

**Music:** Yeah.

**Dave:** Because I backed my way into [00:30:50] some of that. Yeah. Having healthier collagen gives you

**Brennan:** less of those. Right. And you probably have some [00:30:55] genetic predisposition to have less or different [00:31:00] ratios of different collagen in your vascular system, because that's a [00:31:05] musculocontractile process to keep the pressure up against the force of gravity.

**Dave:** I don't have [00:31:10] EDS, which is one of those Ehlers Danlos people listening, which would, would imply that, [00:31:15] but probably some other weird stuff like that. And we know from a bunch of weird genetic stuff, um, [00:31:20] that I tend to have leakier membranes, whether it's GI or

**Brennan:** [00:31:25] vascular. So, you know, it comes down to the seams.

We were talking about this earlier. You know, if you [00:31:30] look at a medical textbook, they always label the parts. But they don't label where they come [00:31:35] together. Right. And a lot of disease starts there. Right there.

**Dave:** Is that because of gravity too? [00:31:40]

**Brennan:** Well, insofar as that structural element is managing the force of gravity, that's what it's [00:31:45] doing.

And if there's wear and tear on it, because you're misaligned with literally the [00:31:50] planet, then yeah, you're going to start to see breakdown, physical breakdown, inflammatory immune [00:31:55] breakdown, and then it spirals out of control when those seams start to give. And so it's so [00:32:00] important to have seam resilience and, you know, leaky gut.

We're talking about [00:32:05] the zonula, which basically tack the system together. If those break [00:32:10] down because of microbiome abnormalities or any number of toxins, [00:32:15] processed foods, you know, You're going to start breaking down the seams, changing your serotonin. Now you're [00:32:20] into something. And the net result comes down over and over again to some form of gravity [00:32:25] intolerance.

Wow.

**Dave:** I've seen people use rebounding, which [00:32:30] provides a brief period of what feels like a lot more gravity at the bottom of a [00:32:35] trampoline. Is this a form of gravity therapy?

**Brennan:** Yeah. So, if we [00:32:40] think about gravity for a second. Through Einstein, right? Good physics. [00:32:45] I'm not a physicist. Or at least not a licensed physicist.

Like you're not a licensed doctor. The

**Dave:** difference between

**Brennan:** a physicist and a [00:32:50] philosopher is

**Dave:** very narrow.

**Brennan:** That's, that's true. There's a lot of debate among physicists [00:32:55] about whether philosophy is worthwhile or not. But that's another story. So, the title of [00:33:00] the book is Pull, but really, gravity is a push up [00:33:05] as much as it's a pull down.

That's what relativity refers to. [00:33:10] It's it's not like the Newtonian form of gravity where we think we're being like, pulled [00:33:15] down by some, you know, silent, you know, hand it's or invisible hand. Uh, it's the [00:33:20] warping of space time around an object and it's all relative. So what I'm getting at [00:33:25] is, for example, when you run and I happen to run in these Vibram five fingers, [00:33:30] I want to feel the ground.

That is a gravity management surface. Your foot. [00:33:35] Is a gravity management surface, 5 percent of your body surface area that takes [00:33:40] your entire body weight. So we need to build that up because what you're really doing [00:33:45] is there's an upward push. Right. And you're trampolining off of [00:33:50] the ground. Like this trampoline exercise you're describing we're actually [00:33:55] using gravity as a buoyant force to push us back up Stronger into the world [00:34:00] not to be sucked into it.

**Dave:** So does this mean that padded shoes? Make [00:34:05] you weaken gravity. Yes Good

**Brennan:** chapter one's all about

**Dave:** that. I have taken [00:34:10] so much flack for wearing five fingered Shoes, okay to the point that I put little chrome [00:34:15] studs on each toe. So they'd be fashionable. It didn't work I love it. But yeah, I I don't wear padding in [00:34:20] my shoes.

I wear vivo or poluvo these days Uh, because [00:34:25] it's the only thing that makes you feel good in gravity I love it that you're getting into this

**Brennan:** [00:34:30] Marathons in those shoes amazing. I I shaved 20 minutes off my marathon time

**Dave:** Well, most people seem [00:34:35] like they try to do it and say oh everything hurts. I can't do it And they get all whiny why

**Brennan:** well it has to do [00:34:40] with It Whether you should use the shoes correctly, now to be clear people can injure themselves in [00:34:45] hundred percent.

Okay, so let's just be clear about it. You

**Dave:** have to relearn how

**Brennan:** to walk, correct? Yes, there's, there's a technique to it. And in fact, [00:34:50] in the book, I talk about my experience in these shoes because gravity management begins with the feet.

**Dave:** [00:34:55] Yeah.

**Brennan:** And so the problem is when you wrap your foot in a shoe, the [00:35:00] temptation is to heel strike.

Mm

hmm.

And the calcaneus, the hard heel bone in the back, is really [00:35:05] not designed to be the point of contact for running. It's there so if you're standing upright, you [00:35:10] don't fall on your butt. It's like a tripod. When you're running, you're supposed to flare [00:35:15] out your toes almost like, almost like a swan coming in for a landing on a [00:35:20] lake.

It's, it's like reaching out to grab the surface. And if you look at elite [00:35:25] runners, their toes are contact points that grab the earth and propel [00:35:30] off. And the force is on the forefoot. And that requires a, a [00:35:35] trampoline like explosion across the fascia. And you can't do that very [00:35:40] easily if your foot is completely, like, filled up with, uh, with padding all around it.

**Dave:** [00:35:45] Yeah.

**Brennan:** So, yeah, that's, that's why I wear the, uh, the Vibrams.

**Dave:** I've spent the past, [00:35:50] really, like, four or five years completely learning how to walk differently. And I've been wearing these shoes for [00:35:55] almost 15 years. Mm hmm. But I just never learned when I was young because of padded shoes and whatever [00:36:00] else.

But it's, it's really changed how I move in

**Brennan:** the world. This is the Alexander [00:36:05] Technique, if you're familiar with that. And, you know, uh, this all started from an [00:36:10] Australian stage actor, and I forget exactly what year, a long time ago, who had lost his voice. [00:36:15] And he was losing his career because he could not speak.

Right. And he finally [00:36:20] figured out, after all his trial and error, that it had to do with the position of his torso, which had to [00:36:25] do with the position of his legs, which had to do with the position of his feet, and his entire [00:36:30] mechanism, as he put it. was misaligned with gravity, and once he reoriented, he got his voice back.[00:36:35]

And so that started the whole Alexander technique, and they talk a lot about grounding with your feet.

**Dave:** It was all [00:36:40] connected, like you're saying, through gravity. And it's a little off topic, but one of the [00:36:45] people I work with showed me that if I stretch my, the top of my right foot and [00:36:50] ankle, That my visual field on the top left improves.

I'm like, what is going on here? But it's a [00:36:55] consistent thing. So there's all sorts of things that I think are running through FASHA or the tensegrity system you talked [00:37:00] about that we aren't aware of in most schools. And then there's probably some weird person [00:37:05] somewhere who figured it out that no one knows.

Right. So I'm, I'm constantly fascinated. I hope AI helps us [00:37:10] here. Change of pace. Let's talk a little bit about sleep.

**Music:** For

**Dave:** the [00:37:15] last I don't know, eight or nine years. I've been recommending, based on a couple [00:37:20] studies I saw, that you elevate the height of the head of your bed by about [00:37:25] six inches. There's some studies on Alzheimer's and brain lymphatic flow.

And so the first [00:37:30] time someone sees my bed, they're like, what is going on with that? Like, it's like a bit of a [00:37:35] ramp. And the theory goes, and I want you to shoot holes in this. Okay. The theory goes, well, animals always [00:37:40] sleep with their head slightly uphill, and if you pitch a tent, you would never sleep with your head down, you'd always have it slightly [00:37:45] up or flat.

So, what are the pros and cons of sleeping on a flat bed [00:37:50] versus a slightly inclined bed?

**Brennan:** Hmm, well, I can answer that first as a [00:37:55] gastroenterologist, because at nighttime, people will get acid reflux. That's a [00:38:00] gravitational effect, especially if you eat too much food. That's probably not what you're thinking about, but I'll get [00:38:05] there.

Too much food before you go to bed, you have this like bolus of [00:38:10] stuff and it leaks up at night to the esophagus and can cause burning. And that's why [00:38:15] we will tilt the head of the bed sometimes up to 10 degrees. To try and just [00:38:20] maintain downward flow through just the upper airways and the esophagus.

Right. [00:38:25]

Now in terms of like the brain and glymphatic flow, and by the way, that's [00:38:30] another example of the seams. We always talk about the neurons, but we don't often talk about the glia [00:38:35] that hold it all together.

**Dave:** Yeah, they never get any love. Like neurons are rock stars,

**Brennan:** they're roadies, right? No. [00:38:40] But there's so much.

Health and disease tied up [00:38:45] in that system.[00:38:50]

I'm thinking aloud right now, and I can't say exactly why [00:38:55] that angulation would make a difference. I'm trying to think about if it has to do with the bend of the neck or something like [00:39:00] that. That's really interesting.

**Dave:** The research, this is a while ago since I read about it, it was out of [00:39:05] Germany. And they were looking at flow of cerebrospinal fluid.

**Music:** Mm hmm. Yeah.

**Dave:** That that [00:39:10] was the primary mechanism. But it wouldn't change the angle of your neck. There are pillows, I use a special pillow [00:39:15] that's designed to create the right arch in the neck so you get better CSF flow into the brain. [00:39:20] Um, but, uh, I think it had to do with gravitational stuff on CSF, not on cardiac, but I [00:39:25] don't know.

**Brennan:** Well, that's really interesting. I'm gonna look into that.

**Dave:** Okay, cool. I was hoping that you could, you could tell me the why. [00:39:30] I that, but I will

**Brennan:** say this much about sleep. We Uh, used to sleep in [00:39:35] trees.

Mm hmm.

Okay? We had to sleep upright. Uh, that meant all day, all [00:39:40] night, we weren't getting, uh, as much flow into our brain as we would have liked.

Eventually, we got [00:39:45] smart enough to protect ourselves down on the ground, so we went from tree to ground. We were able to lie [00:39:50] down, have people keep predators away at night. And that's about when human intelligence [00:39:55] exploded. There's some theories that it was sleep that allowed the brain [00:40:00] to reperfuse gravitationally, to basically give it a break [00:40:05] overnight and, you know, flush out the amyloid and flush out the toxins and [00:40:10] There's some theories that that's actually a gravitational effect.

That's why we sleep [00:40:15] flat, is to just re perfuse at night.

**Dave:** Have you told Matt Walker this?

**Brennan:** Oh, actually, uh, he's [00:40:20] got a great book. Why We Sleep. Yeah. He's been on the show, too. But, uh, he's got a great book, Why [00:40:25] We Sleep, yeah.

**Dave:** Wow.

**Brennan:** In fact, in that book, he talks about the tree to ground. Sleeping. I don't know [00:40:30] that the intelligence connection to the, uh, at least the, uh, [00:40:35] gravitational side.

**Dave:** I've often wondered what would happen if I had a bed that like gently [00:40:40] kind of rocked like, like front to back, like head to toe just to, so if someone, [00:40:45] someone invent that for me, I want to try it.

**Brennan:** Well, there used to be something called the striker frame for [00:40:50] hospitals where we would rotate a little bit and for some reason it fell out of favor.

And I don't [00:40:55] know why, because here we take the most vulnerable. People in the world who are sick, [00:41:00] and then we lay them flat and keep them flat for days. Now, being flat for a little [00:41:05] bit is good. You reperfuse your brain, you get back up again, circadian rhythm. But lying flat, [00:41:10] and then we're surprised when they have bowel paralysis, and they've got blood clots in their legs, and they get [00:41:15] cardiovascular deconditioning, and, and they get infections and pneumonia and can't oxygenate.

All of [00:41:20] that is because if you're lying flat and you're sick, what could be a worse combination? We need to tilt people [00:41:25] around, uh, and certainly stand up and walk if, if they can't,

**Dave:** you know. I think when I was a kid, like, Motel [00:41:30] 6 that. You put, like, a couple quarters in the bed and it would vibrate for a

**Brennan:** while.

Wasn't that called, [00:41:35] like, uh, something fingers? There was a name for that machine, the second finger is, uh, I don't [00:41:40] remember. I don't remember the name either. But they're in the show notes. But yeah, I don't remember. There you go.

**Dave:** It feels like there ought to be [00:41:45] some solution for that. And if you don't have actual gravity, vibration is a proxy for gravity, [00:41:50] right?

Yeah. Okay. Wow. Talk to me more about gravity in the gut and things like [00:41:55] Crohn's or IBS. What do we know?

**Brennan:** Well, I mentioned a little bit before there's not much known [00:42:00] We do know that people with Crohn's disease can get flares at higher altitudes Mm hmm, [00:42:05] whether it's in an airplane that can trigger a flare or just living at higher altitudes.

So where you [00:42:10] are on the planet may have something to do with your gut health. It's interesting, by the way, [00:42:15] that Crohn's varies by latitude. So does MS. There's a number [00:42:20] of conditions that vary by latitude. Is it a vitamin D thing? No, we don't know. We've always thought maybe it's vitamin [00:42:25] D. But no one's really ever talked about whether it could be slight variations in gravity.

[00:42:30] Because as you move across from the equator to the poles, gravity does change. Very slightly. [00:42:35] Very slightly, but that's all we've ever known. And so it may [00:42:40] be that changes in gravity, like on the globe itself, where you [00:42:45] are altitudinally and latitudinally can affect your health.

**Dave:** You ever have one of those days where the [00:42:50] universe just lines things up?

The, the guest who was just here, who you met [00:42:55] on the way out, Roland McCready, has the largest and most detailed data set on [00:43:00] planetary gravity of any human on Earth. It's used all over the place in research. [00:43:05] He's, he's buried sensors all over the planet and correlates them to figure out the [00:43:10] magnetic field and gravitational field of the Earth.

Well, also

**Brennan:** HRV is, is a measure of gravitational [00:43:15] fitness and so is the vagus nerve.

**Dave:** Wow, and Steven Porges has been on and, [00:43:20] oh geez, AJ, what's the guy's name who did the vagal nerve implant thing that was on here a couple weeks [00:43:25] ago? I'm blanking on his name. It was an unusual name. Sweet. Another if it's [00:43:30] going to take a little, it doesn't matter.

But yeah, we, we, we can just say so we had a [00:43:35] lot of vagus nerve, uh, professional people on the show as well. I even work with a [00:43:40] vagal nerve stimulator called Zenbud, where I'm an advisor that does ultrasonic stimulation [00:43:45] of the vagus nerve. In the ear? And the auricular? Yeah. Mm hmm. So. Why do you say the vagus [00:43:50] nerve

**Brennan:** is tied to gravity?

Yeah, yeah. So, we use it, by the way, for [00:43:55] Crohn's disease to finish up that dissipation. The vagal nerve stimulator? Yeah, we're starting to use that because it can boost serotonin [00:44:00] levels in the gut by activating the vagus nerve in the brain and in the gut. [00:44:05]

So

the vagus is involved in serotonin stimulation, and it's sort of like a [00:44:10] spigot in the body for releasing serotonin in a controlled way.

[00:44:15] So in that regard, it has to do with gravity management, because I've already explained how [00:44:20] serotonin is a gravity management substance. But when you breathe [00:44:25] in and breathe out, right, this HRV is about not just the rate, but the beat to beat [00:44:30] variation, the real rhythm of your inner symphony, really. And [00:44:35] what's happening is you've got two pumps that are yoked to each other, the lungs and the [00:44:40] diaphragm and the heart.

And when you breathe in and you're upright, Gravity pulls [00:44:45] the blood to the bottom of your lung. Okay. That's where oxygenation is maximized. [00:44:50] The lung is actually designed in the human to optimize [00:44:55] oxygenation at its base. Because we're usually, and when we need oxygen, we're upright. And [00:45:00] so when we breathe in, the lung pools the blood, the heart [00:45:05] gets less return to it because the lungs are holding on all that blood.

And [00:45:10] so the rhythm of the heart is going to change to kind of keep up for [00:45:15] the changes in flow. And then when you breathe out, you're like, you're extruding [00:45:20] this, this load of oxygenated blood into your left ventricle, and it's going to pick up [00:45:25] and then you're getting it right up in your head. Which is just what you need if you're about to fall [00:45:30] asleep, you want to yawn.

A yawn, in essence, is getting you [00:45:35] bled up into your brain. And the heart rate variability is looking at how well [00:45:40] synchronized these two pumps are, in essence. And so, in an indirect [00:45:45] way, it's really telling you how well you're managing gravity. And your [00:45:50] relationship to, to these two pumps and how they, how they move the fluid around, basically.

[00:45:55] So, that's a long winded way of explaining it.

**Dave:** That is really [00:46:00] fascinating. I wouldn't have, I wouldn't have thought you'd answer it that way. Okay. One of the [00:46:05] other things that's, that's just been fascinating in the field of, of biohacking, and as opposed to [00:46:10] medicine, biohacking is like how do we make it better than it was before, uh, [00:46:15] versus how do we heal someone necessarily, though sometimes there's overlap, right?

And a lot of the [00:46:20] techniques are, are non medical and some of them are. But cell [00:46:25] membranes themselves are

**Music:** piezoelectric. And for listeners,

**Dave:** piezoelectric just means when you [00:46:30] put pressure on it or it moves, it makes a small electrical current. And our bones are particularly [00:46:35] piezoelectric. That's right. In fact, that's probably how bone healing and certainly how bone density happens.

[00:46:40] So, how important is piezoelectricity in the gravity story?

**Brennan:** Man, you [00:46:45] set this up so well. So the piezo channels were first [00:46:50] observed, I think, in 2010. And there are some scientists, I [00:46:55] believe in San Diego maybe the Scripps Clinic, that were kind of poking on cells and noticing that there are [00:47:00] these voltage gates that open and close in relation to physical tension.

Right. [00:47:05]

And the way I actually think of piezo channels, I've actually talked to the Nobel Prize [00:47:10] winner who invented it. I think of it like a [00:47:15] conversion engine or maybe a translation system to [00:47:20] take gravity and convert it into electromagnetism in the body.

**Dave:** What a great [00:47:25] and

**Brennan:** elegant way to explain it. Wow.

So we are, as I said before, [00:47:30] sense making machines. You're getting affected by the pull of the planet or the push, however you want to think [00:47:35] about it, space time curvature that we're all in. Your body has all [00:47:40] of this apparatus. And uh, It takes this physical stretch [00:47:45] and movement and push and pull and at the level of the cell membrane, the piezo [00:47:50] level, it's converting it into bioelectric signals.

That's what it does. And so if that [00:47:55] handoff is broken, you can only imagine how difficult it is to survive and to thrive [00:48:00] on this planet. So there's been research looking at what happens when you lack piezo channels. It's [00:48:05] just, I mean, it's terrible. But if you have well working piezo [00:48:10] function, you now are getting that map of the world sent to your brain and to the insulin, all the stuff [00:48:15] we talked about before.

So that's how I think about piezo.

**Dave:** And that ties in cell membrane [00:48:20] function, which long time listeners, I'm kind of a mitochondrial fetishist. So I'm always talking [00:48:25] about membranes and membrane composition and cardiolipin and how you can manipulate them and [00:48:30] make them stronger. But I've never in my life considered cell [00:48:35] membranes as a piezoelectric gravity conversion system.

I think you [00:48:40] might be the first human to have a gravity centric view of reality.

**Brennan:** There are [00:48:45] some out there, and it was interesting, as I did this research, to find a lot of people who have [00:48:50] written about this, but the story hasn't been woven into a singular narrative. Right. And that's why I wrote this book, [00:48:55] because there's a lot of research, but it's been kind of quietly under the surface.

**Dave:** You've assembled it [00:49:00] into a different worldview, and What I've learned is, is when I've [00:49:05] interviewed almost 1, 400 experts at this point, and I'm an expert in some fields, and I know nothing about [00:49:10] others. But people tend to put on like a lens about how they see the world, right? [00:49:15] And you can teach it to others with a good book or with a good interview, right?

And we're capable of [00:49:20] swapping lenses. Oh, I look at it from a transpersonal psychology lens. It has nothing to do with gravity. Or I look at this from [00:49:25] This is a new way of seeing things for me, so you're, you're kind of blowing my mind here, which is pretty It's

**Brennan:** [00:49:30] literally a fundamental force of physics.

Yeah. So it makes sense that if we [00:49:35] drop all the way down to the bottom, and then work our way back up again, things start to make sense in a different, [00:49:40] maybe more intuitive and more holistic way, like a piezo channel. What's it doing? I always think now, [00:49:45] what is this doing in relation to gravity or electromagnetism?

That's all we're [00:49:50] managing.

**Dave:** Wow. That's it. I've definitely been heavy on light and [00:49:55] electromagnetism and really the only gravity stuff I do is weights or [00:50:00] whole body vibration. But you're adding a whole different way of thinking about this that's, that's, it's going to [00:50:05] shift my biohacking thinking. So thank you.

This is cool. And it's kind of hard to do these days because I'm pretty well researched. [00:50:10] So cool. Let's talk about obesity. I used to weigh 300 pounds. Is [00:50:15] obesity a gravity disease? For sure. Okay. Talk to me about it. For

**Brennan:** sure. So the [00:50:20] mesentery. is this sheet of tissue that is another one of these [00:50:25] seams. We didn't think much of it.

We thought it was just this tissue plane that [00:50:30] holds up everything on the inside. What it is, is your gut is hanging like off of a drape. [00:50:35] And it turns out the mesentery is an organ unto [00:50:40] itself. It's metabolically active. It's very involved in diabetes for example. [00:50:45] And if it gets caked up with adipose tissue.

Which is what happens with obesity. [00:50:50] It starts to throw off not only the function of the gut, the [00:50:55] way the system hangs down, but it also affects the metabolism of the [00:51:00] body, and then the liver gets involved, and then you're into something. Obesity is not just [00:51:05] about the subcutaneous fat, you know, under the buttocks or arms.

It's about what's [00:51:10] happening in the pumps and tubes. And if that system is caked up The visceral fat. Yeah, the visceral [00:51:15] fat. You're going to have trouble fighting gravity. Not only because the muscles and bones are straining under [00:51:20] the excess weight that they're not accustomed to or don't want. It's like you're living on a planet [00:51:25] that's larger.

And so, now you can see why would people get [00:51:30] depressed. Well, if you literally feel like you're on a planet [00:51:35] that's pulling you down, you can't get up out of bed, you're exhausted, [00:51:40] you're slumped over those are the symptoms of depression. Right. Those are also [00:51:45] the symptoms of too much gravity. It's one and the same.

So [00:51:50] depression and obesity are gravity illnesses. Forms of gravity intolerance. [00:51:55] Wow. Okay. Yeah. So there's a guy, Lachlan Kent. He's a friend of mine. We're about to start a [00:52:00] new podcast called The Gravity Doctors. And he's in Australia. And he created this whole [00:52:05] idea of mental gravity. And, uh, the idea of depression [00:52:10] as fallen.

And anxiety is falling. So when you're on a [00:52:15] rollercoaster and you fall, you get gut feelings, your butterfly, your stomach lights up. You do feel it, [00:52:20] okay. Feel it. Why is that? It's like you have a g force accelerometer in your gut telling you you're about to die. [00:52:25] Mmm. That's what's happening on a rollercoaster.

And my patients with irritable bowel syndrome, they often [00:52:30] don't want to ride rollercoasters because they feel that all the time. They don't need to ride a rollercoaster to get gut [00:52:35] feelings. Their g force accelerometer is telling them they're falling. It's a metaphorical fall. [00:52:40] Right. Like we co opted the gut.

to tell us when you're about to get into trouble. [00:52:45] And so, obesity only worsens that process. You see so much [00:52:50] depression, so much, not just the arthritis, not just the cardiovascular problems and the [00:52:55] edema, those are on the back pain. All of those are forms of gravity intolerance. That's how I look at [00:53:00] it.

**Dave:** Are there gravity interventions that are just not [00:53:05] functional?

Things that are being sold out there that, you know, Really just not worth [00:53:10] it.

**Brennan:** I'd have to hear about individual examples Otherwise, I'm not sure.

**Dave:** I don't know. I [00:53:15] mean like there's different types of wobble boards. There's vibration things There's weighted vests versus weighted

**Brennan:** [00:53:20] socks. I think all of these things are all good in the right person if used in the right way [00:53:25] You know, a lot of people are wrecking these days, they're running around in weighted backpacks.

That [00:53:30] is great stuff. I mean, if you can do it, not hurt yourself. Balance boards. [00:53:35] You know, in the book I talk about a whole bunch of different ways you can fight gravity. Whether it's [00:53:40] dead hangs, which is a very helpful way to do it. Big fan. You know, um, some [00:53:45] people, they get, uh, inner ear issues, and I talk about how you can check for that, and, [00:53:50] and in some cases fix that you know, the list goes on and on of ways we can manage [00:53:55] gravity, flotation therapy, um, you know, float tanks, for example, Vick's nerve [00:54:00] stimulation.

**Dave:** I used to have a float tank in, in my barn on Vancouver [00:54:05] Island. Okay. And I, I had a decal made that said human cloning tank. [00:54:10] So when the media would come in to take. Photos, they'd be like, what are you doing? You're cloning humans. But it was [00:54:15] just a, just a flotation type. Yeah. So you, you, it really does feel weightless when, when you're in, in fact you feel

**Brennan:** like [00:54:20] you're falling a lot of the time when you get out.

Yeah. Yeah. And they've done functional MRI studies of people after [00:54:25] and during, well, I dunno how to do it during flotation therapy. That'd be a hard MRI to do, but it [00:54:30] shows, be able to see that it can. Affect the perception of time itself.

Mm-hmm .

When you no [00:54:35] longer have the force of gravity working on your body, it leads to a flow state, and it goes [00:54:40] back to this relationship between mind, body, and gravity and how intertwined they are.

**Dave:** There's that [00:54:45] einsteinian relationship between gravitation and time. Right. Hmm. So, [00:54:50] maybe that 1980s altered states movie where people went into flotation tanks to become, you know, [00:54:55] travel back in time and become Neanderthal, maybe it's real?

**Brennan:** Well, maybe. At the very least, it [00:55:00] does alter your perception, Tom, whether we're gonna see the hominids,

**Dave:** I'm with [00:55:05] you on that one.

What are things like micro movements, fidgeting, when people [00:55:10] stand at a desk, they're actually shifting from one foot to the other they're, we're all [00:55:15] rotating in a small cone that we don't see all the time. What do those have to do with gravity? [00:55:20]

**Brennan:** Well, we have a very unusual center of gravity as humans compared to four [00:55:25] legged creatures.

Which, with a much more stable base. Our base is not stable at all, [00:55:30] which is why people fall a lot. I mean, falling is gravity intolerance, right? We have to be very, very careful about [00:55:35] our relationship to gravity because we're so tall and the middle is so [00:55:40] easily eccentric or can be thrown off. So, eccentric activities within a [00:55:45] cone of safety is going to keep you really, Like, [00:55:50] aware of your relationship to the earth at all times, and you do want to do exercises in [00:55:55] general.

This is more fidgeting, but you want to do exercises that keep you off balance so that you're able to [00:56:00] constantly use contralateral muscle groups to maintain your center of gravity. And if you [00:56:05] can't stand on one leg for more than 10 seconds, that's actually concerning. [00:56:10] There's some evidence, and I'm not saying for your listeners, like, you know, worry if this happens, if you can't do that, but [00:56:15] there's evidence that if you can't do that for more than 10 seconds It is tied to longevity, [00:56:20] and so maintaining proprioception, balance, inner ear strength, this is all [00:56:25] about maintaining gravity management.

**Dave:** It's a pretty good test, actually, [00:56:30] because if you have fascial issues, if you have muscle issues, [00:56:35] if you have neurological issues, vestibular issues, it's going to pick up one [00:56:40] of those, right? So it's a holistic test. Yeah, it's very rolled up of a lot of different data points. [00:56:45] Like a meta test. Got it. Yeah. So, if you're listening to this, you should definitely practice standing on one [00:56:50] leg so you can falsify your data.

Oh, wait.

**Brennan:** Don't fall down. Make sure to hold on to something.

**Dave:** [00:56:55] But in all seriousness, you know, one legged cable pulls across the body, those are really [00:57:00] hard to do. Yeah. They're really good for the nervous system, right? Yes, yes. And those are, I guess, a form of resisting gravity. Right. In time, you're doing [00:57:05] weights.

Yeah, in 10 Right. Band, band training, the stuff that, you know, Brady used [00:57:10] to do. Now, I don't have a lot of time to go to the gym and play with gravity. [00:57:15] And I don't think most of the listeners do either.

**Music:** And

**Dave:** I started a now sizable company, Upgrade Labs, [00:57:20] that's like, let's just do the things that work the most per minute.

**Music:** Mm hmm.

**Dave:** And for a long time, [00:57:25] I've said, just fighting gravity, which 9. 8 meters per second squared. Right. You know, [00:57:30] caveman pick up rock, CrossFit pick up concentrated rock, [00:57:35] kettlebell. There's probably better ways, and so I recommend band training for a lot of [00:57:40] people. What are the pros and cons of using bands versus gravity?

I

**Brennan:** mean, I [00:57:45] think you're still using gravity. Of course, it's elastic and you're [00:57:50] amplifying it. Using a force with a band that doesn't accelerate like gravity. Well, [00:57:55] that's true. That's true. I think it's the sustained tension. The kind of [00:58:00] isometric, it's not, it's a combination between isometric and isotonic, you know, and I [00:58:05] guess I'm not an expert in physical therapy, but you're maintaining a solid, continuous [00:58:10] tension while moving at the same time, which I think is putting that extra tension [00:58:15] on that tensegrity system we were talking about, and that's probably why Brady lasted so long and, and [00:58:20] Gronkowski was always knocked out with an ACL or some kind of shifter issue.

Yeah.

**Dave:** I think you're right about that. And [00:58:25] there's a couple studies on just rate of muscle gain from that. And I believe [00:58:30] it's because we're really optimized to fight gravity. 9. 8 meters per second. Our [00:58:35] proprioceptors know if you pick up a dumbbell, you wobble this much, you turn this off. That's built in.

[00:58:40] But when you pick it up and it doesn't, it's, it's, it's stretchy. It doesn't do gravity. [00:58:45] I think it messes with the system, so it says, I better get stronger so I don't understand the system.

**Brennan:** Almost makes me wonder about the [00:58:50] piezo discussion again.

**Dave:** Ooh. If there's something,

**Brennan:** I don't know. But if there's something, I'm also thinking about [00:58:55] ratios of isotonicity versus isometricity.

That's probably not even a word. But [00:59:00] something about that, and I'm sure probably somebody's written about this, but is there something about the piezoelectric [00:59:05] effects of maintaining a continuous. Uh, almost isotonic pull. [00:59:10] I don't know. That's, that's interesting.

**Dave:** It is interesting, and we replicate that continuous isotonic [00:59:15] pull with the AI machine.

We have a 42, 000 piece of gear run by [00:59:20] AI. Okay. We're providing that kind of continuous force resistance.

**Music:** Uh huh.

**Dave:** But the effects on [00:59:25] the skeleton and on muscles and on bones and tendons are probably fascia. That's not that well [00:59:30] studied. They're different. I

**Brennan:** think

**Dave:** [00:59:35] I wrote a small part of one of the chapters in my book before this most recent one about, [00:59:40] you know, let's do something besides gravity as a signal into the body just to get it to adapt more [00:59:45] quickly.

And you've taken this, this way of thinking into an entire book [00:59:50] and, and got into lots of directions I haven't even thought about, like serotonin, like what are you, so I'm, I'm [00:59:55] really impressed and enjoyed your book greatly. And guys, [01:00:00] if you're listening to this and you like it, the book is called Pole, and the author is [01:00:05] Brennan Spiegel, and thank you, Dr.

Spiegel, for coming on the show, coming to [01:00:10] Austin, and you give me a lot to think about. I really appreciate it.

**Brennan:** Well, you have too, and that's a [01:00:15] sign of a good conversation, so I appreciate the opportunity.

**Dave:** See you next time [01:00:20] on the Human Upgrade podcast.