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Dave Asprey: You're listening to Bulletproof Radio with Dave Asprey. This is a special live edition of Bulletproof Radio in that we're recording in person in Scottsdale, Arizona. But, before I get into the show for you today let's do today's cool fact of the day. It turns out that we're closer to understanding the mysterious atmospheric light show called STEVE. It stands for Strong Thermal Emission Velocity Enhancement, which is something that really only an astronomer, or someone like that, could really name. But, STEVE is an unusual type of sky glow that appears on the equator instead of like the auras or auroras that you would see in other parts of the world, where I live in Canada.

Dave Asprey: So, unlike those shimmering green ribbons that make up the Northern Lights, STEVE is a mauve band of light that stretches east to west and has vertical green stripes that they call a picket fence. So, massive displays in the sky that no one has yet been able to explain, until now. They looked at celestial and satellite data and they discovered that heated atmospheric particles produce the ribbon when electron showers from space are creating the picket fence. So, that purple smear is from a westward-flowing stream plasma. Charge particles in the plasma which are moving about 5 kilometers a second heat other atmospheric particles through friction and cause that amazing purple light. What the scientists say ... I love this quote, "Something special is happening." The latitudes where STEVE appears it allows those electrons to tumble into the atmosphere and create the picket fence.

Dave Asprey: Now, you're thinking to yourself, "Dave is a master of foreshadowing, so clearly he's going to be talking about picket fences or the color purple," and you'd be wrong in both of those. Because, it turns out biology responds to what's going on in the atmosphere, what's going on in the magnetic fields that surround the Earth, that come from the sun. It's amazing that you can even predict some aspects of human behavior based on what's going on with sunspots. This isn't the mystical astrology stuff of years ago. This is real-time measurement of heart rate variability and things like that where there is actual data that shows that some of this is real. To date I don't know data that says unequivocally that when Saturn is dominant over Europa ... You can tell I'm really into this stuff, I just made that up. But, that that's going to be something that's specifically measurable with what we can measure today. I'm not saying that stuff isn't real, I'm just saying we don't have good data on it.

Dave Asprey: But, we know a full moon affects you. We know gravitational ties affect you. We know electromagnetic fields affect us, and that is what we're going to talk about in today's episode. Today's guest is a friend named Peter Sullivan. We first met in 2007, and we're sitting here in Scottsdale, Arizona. He's the CEO and Founder of Clear Light Ventures and major environmental health funder who focuses on two things that I care a lot about. Number one is toxins, and the other one is wireless safety. I actually really like my wireless devices. I think they're really useful, but I also know that they are not without a dark side. Peter is a fantastic guy to learn from today, because he spent the last 15 years successfully

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recovering his two sons from autism and sensory issues. In that same period he recovered from mercury poisoning and the effects of high levels of wireless and EMF exposure, because he is a former tech guy who, like me, I used to work in the data center business. I got my fair share of exposure.

Dave Asprey: So now, Peter is working on raising awareness about what we know about wireless and electromagnetic fields. It's not all bad. Some of it is actually good but just saying, "Here's the actual science without the dogmatic sort of it's an all-or-nothing mindset." It turns out that EMFs and wireless radiation are listed as group 2B carcinogens by the WHL. Before I ask Peter to start talking some other stuff I didn't know until I was preparing for this interview, even though I've known him for a while, he funded roughly half of the National Resources Defense Council's mercury program. In 2008, they successfully sued the EPA to close the cement industry's exemption of the Clean Air Act, which resulted in annual healthcare savings of about 6.7 billion dollars. Peter, thanks for that little thing.

Peter Sullivan: Sure. Actually that 6.7 I think to 14 billion or something. It's actually even higher. I don't know if the estimates have changed. But that was my best investment so far, social investment. It was not a lot of money. It was pretty major. That was just a surprising impact.

Dave Asprey: You basically funded the lawyers who were saying, "Uh, isn't it important that cement plants adhere to environmental regulations?"

Peter Sullivan: You know, I was working with NRDC and they said they came up with a really strategy. It's not about me, it's NRDC had a really targeted strategy. They said, "Hey, you know, in California we noticed that most of the mercury is coming from these cement plants that haven't been regulated. Some of it's coming from China, but, what we can control here is these cement plants which have been exempted," and they're really good at suing people. I really had no hope in policy, in a policy win, but like you have a diverse portfolio, and I was really thinking it was going to be all about consumer awareness and measuring consumers, just everything went backwards on me. So, just got to be prepared for anything, especially really good stuff.

Dave Asprey: I really like the way you talk about it, and think about it. You're talking about portfolio management when enacting important environmental changes. Like, "Oh, I'm going to make you five or 10 bets," just like a venture capital thinks, a venture capitalist thinks ...

Peter Sullivan: Right.

Dave Asprey: ... in order to say, "Well, one or two of these bets is going to pay off and create the results I want."

Peter Sullivan: Yeah, so I'm basically trained, so after I dropped out of software in about 2005 or so, I was working at Netflix, I ended up becoming a philanthropist and focusing on this area. I thought I could just jump in and just start funding stuff, and my financial advisor said, "You need training." I was like, "What do mean? You're just writing checks," whatever. I realized that was just idiotic, and I wasn't trying to know what I was doing. So, I went with a group called The Philanthropy Workshop, and they trained me as a Strategic Philanthropist. I realized how ... Now, you're looking at the hardest problems in the world and you can't get too attached. You got to have a good strategy and you got to be ready to fail, and pivot, and all that stuff. That's what we did. I pivoted now from mercury now to wireless, because we've got an international mercury treaty, and I'm not a big enough player to be playing in that realm so much.

Dave Asprey: You did fund a few nonprofits who supported the international mercury treaty?

Peter Sullivan: Yeah, exactly. Yes, I helped a little bit. I still help with Pure Earth on the East Coast. They work on pollution. They work with the Lancet Report. So, pollution is killing more than nine million people a year.

Dave Asprey: Nine million?

Peter Sullivan: Nine million.

Dave Asprey: That can't be a global number, that's just the U.S.?

Peter Sullivan: No, no, no that's global.

Dave Asprey: It has to be more than that.

Peter Sullivan: In the U.S.?

Dave Asprey: No, just globally nine million out of the percentage of the population.

Peter Sullivan: Oh 9.6. Well 9.6, if you look at, I think, it's the highest preventable cause of death in the world from the Lancet Report. War and murder is about a quarter million people. So, if you made just a little dent in pollution it would be the same so ending all war and murder. So, that would be kind of good.

Dave Asprey: Yeah. I'm actually less concerned about deaths from pollution than I am about crappy lives from pollution.

Peter Sullivan: Exactly.

Dave Asprey: That's where it's awful. I had high mercury and lead in my late 20s that were tied with all sorts of other stuff. People who have toxic mold exposure typically have higher metal levels. They travel together for interesting biological reasons. I did do the work to get chelated and remove the stuff, and I, on a regular basis,

detox those things. It matters greatly because if you have more metals EMFs affect you more because they're little micro antennas, right?

Peter Sullivan: Yeah, exactly. I went through the same experience you did. I had less mold exposure. I had a little mold exposure but not as much, and I had pretty bad mercury exposure, and so did my kids a little bit. So, that was a passion of mine for a while. The problem was, even after we detoxed and I was pretty clean on metals, I was still becoming pretty sensitive. That's actually when I really discovered, I became even more sensitive to EMFs. So, that started the journey. Again, you and I both love our tech, and I was studying with B. J. Fogg at Stanford, writing papers about personal technology. Meeting with Tony Fadell who did the iPhone in the mid 90s when he had left General Magic. So, there's nobody who loves this tech more than I do. But, my body started having reactions to it. I was an early adopter in Silicon Valley, and I just got hammered by exposures. I also had an exposure next to a military base. So there's a-

Dave Asprey: A big radar will mess with you.

Peter Sullivan: The Blue Cube in Silicon Valley near Moffett Field, it was an Air Force Base, was under the Cube there was a space radar before they closed it. I was in the closest office outside that.

Dave Asprey: You were kind of living in a microwave oven.

Peter Sullivan: I was getting fried. I was working out. I was doing everything right. I was on the triathlon team at Interwoven, the company I was there at with. I was doing everything right and I was slowing down and trying to make it work, and nothing. It wasn't working. It wasn't happening for me. I had money. I had resources to, my family's all medical, and I had resources to the best people. It just wasn't coming together.

Dave Asprey: It makes sense. Given what we know about being very close to microwave radiation, specifically what comes out of radar, that's really not good for you biologically. People who work on ridge tops, and doing fire spotting and things like that where they're in the beam of radar they typically have really weird health problems. Even the Russians back in the 80s were beaming radar into the U.S. Embassy in order to make it so that people would just get sick and be defocused, right?

Peter Sullivan: Exactly. That's still actually going on in Cuba.

Dave Asprey: Is it really?

Peter Sullivan: So, the Cuba sonic attack. I'll talk about the radar first. The military has known about the radar problems for ages.

Dave Asprey: Oh yeah.

Peter Sullivan: So, the Navy had about 2,000 studies back in 1972 with over 100 health effects. That's what makes it confusing, because the health effects aren't always the same. You get inflammation and then you know-

Dave Asprey: Inflammation can go anywhere.

Peter Sullivan: You can go anywhere with that. Yeah, so what's going on with the sonic attacks now. This is in Cuba. We just had, my congressman just pitched a 60 Minutes episode and it aired a couple of months ago, about a month ago, talking about the people who have gone through the sonic attacks. Basically they're saying that we think it's not a sound, that's it's some sort of EMF weapon that they're hitting the building with.

Dave Asprey: This is relatively easy to detect right? You and I both have detectors that could pick this stuff up.

Peter Sullivan: Yeah, exactly. So, I'm kind of wondering what's going on there a little bit.

Dave Asprey: I think it's neurotoxins.

Peter Sullivan: You think they're doing neuro ... It's probably maybe a mix.

Dave Asprey: Even just environmental toxic mold, I'm not saying that it's mold, although I bet you they have it there because it's Cuba, but it will create those exact symptoms like the vertigo, the nausea, and also the weird sounds in the ears. If you did metals and ... Metals themselves can have that thing. You put it all together, I think we're just dealing with a high neurotoxic load in that facility.

Peter Sullivan: You know what I think we need to talk about in this area in general, and this goes for autism and chronic disease, that it's total load, that it's never one thing. This is a mistake I made. This is a mistake everybody makes. You start out thinking it's genetic. Then you do diet and you start stuff. Then you try-

Dave Asprey: It's everything.

Peter Sullivan: You try to find the one thing. Now, what is interesting... I was a troubleshooter early on in Silicon Valley. In Silicon Valley something breaks and then you immediately see it fail and then you fix the one thing. The human body, unfortunately, is so much redundancy that by the time you see a symptom you've had a cascade of failures. You've had like a gang tackle of multiple things usually that's weakened your immune system. So for me, if you talk about my total load, I had a little Post Traumatic Stress from the military. I was a Navy pilot. I had an accident. I had the mercury poisoning, I had mercury exposure. I had EMF exposure. I had a root canal, infected root canal.

Dave Asprey: Yeah, that will also create all sorts of weird bacterial toxins that increase inflammation.

Peter Sullivan: Exactly. I had cavitations from wisdom teeth removed. I had a silver filling touching a gold filling.

Dave Asprey: A little bit of a battery effect.

Peter Sullivan: I had a conductive corrosive battery-

Dave Asprey: Because the electricity in your skull doesn't do anything ... Oh wait.

Peter Sullivan: So, the dentist that measured my conductive battery effect told me that the amperage flowing between the two fillings was 10 times what my brain's amperage was. I can't remember exactly what that level was. The day after it was removed I was in a yoga class and I was like, "Oh, my god, I'm so chill." It was fantastic.

Dave Asprey: It's this background buzzing stressors that become invisible, like the humming of a refrigerator.

Peter Sullivan: Exactly. So, I'm going to start talking about the thing that you're kind of nerdy about, because you and I are both tech, signal-to-noise ratio.

Dave Asprey: There you go.

Peter Sullivan: So, everything we know about computers, and audio, and all the stuff that audio toys are playing with now, if you want clarity high signal, low noise. Well, okay, so it turns out the EMF creates a lot of noise in your body, obviously. So obviously that signal, that tooth, created a lot of noise in my electrical system. So, I've done a ton of things that have actually lowered the noise floor in my body, that have created just more clarity.

Dave Asprey: It makes resilience when you do that.

Peter Sullivan: Exactly. What Martha Herbert, who I work with at Harvard, kind of explained to me, she says, "Think of inflammation as creating noise, or like a speed bump, in your brain." If you have a hangover, concussion your brain feels slower, because it is actually physically slower. We're pretty awesome beings but we're not above the laws of physics. The laws of physics apply to us. That's why I love talking to people who do biophysics, like Martin Pall. Yeah, so I try to give people a felt sense. Now, I'm not a scientist but I'm really good at ... I'm better than most people at feeling things and having the experiences. My training as a software designer was to make technical things really easy for people. So, I try to take a lot of the deep science in this area and simplify it and do it in a way that's grounded so people can feel it in their own world.

Dave Asprey: That's one of the most challenging things. A big gift for me, in addition to all of the weird biological stuff that I had, is I ended up running the program at University of California Santa Cruz for Web and Internet Engineering, so I taught

classes several nights a week, three-hour classes, to working engineers. They were all of the mindset you said, "Well, if there's a problem then we turn it on or off." But, what we're talking here was highly distributed systems where you don't know who owns the other end. In fact, I used to give lectures on Interwoven and other App servers and things like that, because you mentioned you were with that company. But the mindset there was very different. You're saying, "You know what, there's a phenomenon happening on the internet and it's more like a weather pattern than a specific something needs to be turned on or off."

Dave Asprey: The most interesting things I went, "Oh, there's a problem in a browser and a problem in a router and a problem on a web server over there, and the symphony of those three creates an unpredictable behavior." That mindset of, "How do you troubleshoot a system that is by definition a black box with blurry edges?" That's what led to biohacking. The idea that said, "You know what, I want a result. I'm going to make enough configuration changes in my environment and my body to get the results and then I'll maybe undo some of them and see if it sticks." But, your idea of signal-to-noise ratio, your idea of reducing the total burden there, that's what leads to human resilience, because if your total burden on useless crap is there your ability to carry something meaningful goes up.

Peter Sullivan: Exactly. It's not my concept. It's called like allostatic load. Formally we call it total load for parents. I think Patty Lemer who works on autism coined the term, and Martha Herbert helped introduce me to it. I accidentally said instead of allostatic load, I misspoke when she was saying it back, I said allopathic load. She fell over in laughter [inaudible 00:16:27]. I said, ...

Dave Asprey: That's a problem, too.

Peter Sullivan: ... "Why are you laughing so much?" She goes, "That means like Western medicine load." I said, "Yeah, okay, I get it." I take a lot of ... A lot of things that we're taken in tech it's not just from troubleshooting software, but there's a couple other principles that I think are important, like the ability to roll back. You and I have both written code that we thought was going to fix something and we broke something else. I've been in the newspaper for that. Stuff I did at Excite, I brought the whole server down. I'm in the newspaper, right.

Dave Asprey: Like Oops.

Peter Sullivan: It's not super fun. So, what we do is you roll back to known good until you can do a comparison and figure out what's going on. That's kind of what's going on with a little bit of Paleo movement, and so forth. With biohackers you're tracking what's going on, you're doing a little bit of revision control, and when something doesn't work you go, "Ah, I'm going to go back to that," and you're going to measure ... You're going to test for it first. You're going to try to measure your success.

Peter Sullivan: The other concept that comes from Silicon Valley is just general quality control. I would say ... I do a lot of autism work, and I would say, "Let's say imagine if the iPhone if the percentages of iPhones that kept breaking, that didn't come off the line correctly and communicate correctly kept going up every year, or every month,-

Dave Asprey: You might want to correct that problem.

Peter Sullivan: Yeah, you might want to jump ... As a matter of fact, in Silicon Valley that would get fixed in a month. If it took a month people would lose their jobs. So, this kind of drifting along here, and we're all just kind of sitting there acting like ... No one knows what's going on. It's like, "Well, if we roll back to what we had, if we start looking carefully at some key suspects that have changed, let's roll things back." So, how do we focus that? But, there's a ton of things to roll back. How do you not impair all this commerce? So, what we want to focus on is this is a risk factor for both autism and for electrosensitivity.

Dave Asprey: You're saying metals are?

Peter Sullivan: No, I'm going to talk about a genetic risk factor, calcium channel variation.

Dave Asprey: Yeah, let's talk ... Oh, this is good.

Peter Sullivan: I'm going to make it simple. I had heard about calcium channels for a while in autism, but I didn't understand the purpose of them. So, [inaudible 00:18:29] to understand the purpose, he explained the purpose. So, the calcium channels are in, like if you have a cell, or like a neuron, there's mostly dense in neurons and heart activity, in the heart. The calcium channels open up and they open up based on voltage, and they let calcium into the cell. The inside of the cell is very void of calcium. It's like a dark room. If you imagine calcium coming in it's like a little spark. The purpose of that spark, that calcium channel signaling, is to excite the cell. The more calcium gets inside the more excited the cell is and the more easily it fires.

Peter Sullivan: So, we all the concept of we talk about people as being high strung and low strung. We've all had the experience of like being a little geeked out, or playing tennis and you swing and you miss and you're like, "Oh, I need my coffee," or whatever right? Speaking of coffee, coffee releases calcium from inside, so you can get calcium from the outside, but when you drink coffee it's signaling to wake up, somethings important going on, comes from the inside stores.

Dave Asprey: Inside the cells, already inside the cells?

Peter Sullivan: There are organelles inside the cells. When the calcium goes in they are little organelles inside the cell that absorb it so then it's like a dark room again, and then you're calm. Okay, so that's the purpose of the calcium channels. So, in

autism there are about 1,000 genes, and the largest cluster of those genes that are risk factors are calcium channel signaling variations.

Peter Sullivan: Now, it turns out I have one of those variations and it's also a risk factor for adult electrosensitivity, which is when you ... You could call it electrosensitivity, or electrosensitive, or microwave sickness. People have different names for it.

Dave Asprey: So, is there a test that people listening could do for this?

Peter Sullivan: There has been some debate. Martha, who I work with, has looked at a lot of the biomarkers. They're not super specific biomarkers, that's the problem. They are biomarkers that are common to a lot of other multiple diseases, inflammation- [crosstalk 00:20:18]

Dave Asprey: [crosstalk 00:20:18] kind of variance?

Peter Sullivan: Oh, well first of all. You can definitely do the genetic testing and see the genetic side of it, but clearly there is environmental and physiological load going on, too. So, there are genetic variants to either being ... And there is a window of opportunity. So, if I had had this exposure when I was a kid I might have been a little bit more on the autism spectrum. My kids had some issues going on. Like they're old now and they're off-

Dave Asprey: They're fine?

Peter Sullivan: They're fine and they don't want me talking about it. like, "I don't want my friends to know this." They are totally fine.

Dave Asprey: You realize it's your right as a father to embarrass your children for your entire life, right?

Peter Sullivan: Yeah, and I do that a lot with my kids.

Dave Asprey: I hope my kids are listening to this episode.

Peter Sullivan: I don't even have to try, that's my default. You know that. The kids are going to be mortified even if you don't open your mouth. But, I'm really proud of them. They're both at Berkeley now and they're doing great. So, I want parents to know that, number one, these aren't lifetime conditions, autism or if you have electrosensitivity, or environmental illness, or whatever. It's not a lifetime thing you're going to have the rest of your life. You can recover from these things, and through usually not just doing one thing but multiple things, and lightening the load. What I tell parents at autism conferences and other things is that, "Okay, you got this genetic load potentially, and you can't change that, but we can change how our bodies react. We can change the environment around it." One of the things that we talked about at the conference today was magnesium.

There was one of the folks here has a magnesium supplement. It turns out that if you're low in magnesium your calcium channels can be hyperactive.

Dave Asprey: Yeah, Jim Ricola and I did talk about that on the episode, as well. So, taking more magnesium if you have a cell phone around or you live in a WiFi oven is a good idea.

Peter Sullivan: I would say the first thing to do is lower the exposures as much as you can at night. I tell people ... People are like, "What can I do? Do I need to buy something? Do I-"

Dave Asprey: It's cheap.

Peter Sullivan: I know, it's usually the other way around. It is fairly cheap, especially when-
([crosstalk 00:22:19]

Dave Asprey: A lamp switch, right?

Peter Sullivan: Yeah. I would just say, "Usually the problem is you've bought things that are harming you," and now the weird thing is how do you get people to realize it. Everyone likes what they've bought. We love our toys. They look beautiful and they really serve us in great ways, but how do we limit like with the Oura Ring, I can turn it to airplane mode.

Dave Asprey: Yeah, me too.

Peter Sullivan: What we told parents, and this is a doctor in California, Dr. [Tori Elder 00:22:45], came up with this protocol, and it's really brilliant. I was thinking, "Oh my god, we're going to have to scale all these meters to all these people and get building biologists to do all this stuff to really help lower autism stuff and child development issues." She's like, "Okay, here's how this works. Turn off your baby monitor, No. 1."

Dave Asprey: Baby monitors should be illegal unless they're ethernet.

Peter Sullivan: Exactly.

Dave Asprey: Ethernet means wired in if you're not a tech geek.

Peter Sullivan: We think that the big transition might have been ... Autism started picking up in the mid 80s, and that's around when we went from analog signaling in baby monitors and cordless phones to DEC digital signaling, and the digital signals are much different on your biology, and much harsher.

Dave Asprey: For a long time no one could explain, how is it that those eight cells in an embryo know, "Oh, I'm going to turn into a liver cell. I'm going to turn into a heart cell, a brain cell." There are electromagnetic fields that control that. It's

not that hard to understand that if you manipulate those fields in a way that's really unnatural you might see subtle, or not so subtle, changes. We can see it in plants. We can see it in insects. It's true even in mice.

Peter Sullivan: Exactly. There was a book in the mid 80s, and I'm spacing on the name now. But, there's a guy at Tufts University who was doing this research, with Steve Allen, the Microsoft guy?

Dave Asprey: Paul Allen.

Peter Sullivan: Paul Allen, sorry. Paul Allen funded his work. This guy is basically regenerating limbs and all these things using electrical protocols.

Dave Asprey: Robert-

Peter Sullivan: You know him? The book is Becker's book. What is it again?

Dave Asprey: Electromagnetism in Life is it?

Peter Sullivan: No, I can't remember. We'll put a link in the podcast.

Dave Asprey: Yeah, it's one of the-

Peter Sullivan: It's classic.

Dave Asprey: I've had a Schumann Resonance Generator which is a good EMF in my house for 20 years because of that book. It's like a little alarm clock thing.

Peter Sullivan: Exactly. I have actually been playing with ... So, there's a debate about is the Schumann Resonators are they in phase with the Earth or not, or could they cancel and that.

Dave Asprey: There's great debate, but who the heck knows.

Peter Sullivan: I know. So, there's one that's kind of interesting that I found recently. There's a Schumann antenna which just amplifies the natural Earth's [one 00:24:54].

Dave Asprey: Ooh, I want one of those. Talk about the Schumann resonance. We're talking super geeky ... Sorry, guys, let's define some- [crosstalk 00:25:02]

Peter Sullivan: Not nerd out too much. So, the Earth has a natural magnetic field, and we've all been inside that. These magnetic fields permeate our bodies. They go right through us. The lightning strikes in the ionosphere are constantly going on around the globe. On average the primary frequency fluctuates at about 7.83 Hertz, which is kind of in our Alpha brainwave segment. You can see people talking about, "Is that Earth's frequency helping entrain our brainwaves kind of like a drumbeat for us?"

Dave Asprey: Yeah, it's right at the border between theta, which is a dream state, intuition, subconscious, and the consciousness.

Peter Sullivan: Exactly, and then there are harmonics of that frequency, so there are things that are above and below, just like in musical harmonics. So, we have this Earth's frequency kind of supports us. Unless you've been an astronaut, even Apollo astronaut, you haven't lived outside of this. The Earth's magnetic field now ... Now we have these magnetic fields in our houses that surround us but come from different angles and different frequencies and create kind of an interference pattern and can really disrupt ... I find that it really disrupts my deep sleep. Have you found that, as well?

Dave Asprey: Yeah. I get about an hour and a half of deep sleep every night now, but I definitely know that if I'm in a hotel it's not as good, although still pretty darn good. But, if you're getting like really close to one of the wireless phones in hotels I notice that dampens my sleep score, so I always move them out of the room or unplug them.

Peter Sullivan: Yeah, I was surprised I had ... Years ago I had a jawbone app, which is one of the first biohacker- [crosstalk 00:26:42]

Dave Asprey: Yeah, I had one of those things.

Peter Sullivan: I loved that because it did no EMF, or whatever. At some point the ... Before I was really clued into this I think we had a smart meter installed, or moved, or something, just for one night and I noticed a dramatic shift. It really surprised me. It's really subtle, it's like heart rate variability.

Dave Asprey: It's not going to kill you right now.

Peter Sullivan: No.

Dave Asprey: That's why people get really upset and skeptical. "Well, I don't feel anything." Look, there's something called a tetrachromat. Do you know what that is?

Peter Sullivan: No, I don't.

Dave Asprey: These are people who can see more than the 16.7 million colors that you and I can see.

Peter Sullivan: Oh, yeah, yeah.

Dave Asprey: They actually have extra rods and cones, so they can say, "That color of pink is different than that color of pink." I would say, "You're a liar, and you're a bad person and clearly a con artist." But, the bottom line is they actually did see it, and the fact that we perceive things differently doesn't mean that it didn't happen. That flaw in the scientific method says everyone has to observe

everything the same way. There are people with more mercury, or with genetic things, or just who've gotten plugged in who can feel the difference.

Peter Sullivan: There are people that feel different things than I do. My friend, Jolie Jones, is also very public about electrosensitivity. She's Quincy Jones' daughter, and she's just amazing. She feels ... She came into my house. She's like, "Peter, I feel something going on over here." I didn't feel it. I was numb to it, so I became ... Just like you've become nose blind to mold, you can become very blind to the frequencies, and you need to kind of step out of them for a while to feel them. Other people will feel different things. So, I don't get judgy about, "This is good/bad." I've had situations where I plugged something in, it feels good for me and it makes somebody else worse.

Peter Sullivan: But, what I have learned about the felt experience really grounds this. So, there's 22,000 studies in this field. Hundreds of them show pretty serious problems, blood/brain barrier breeches, DNA damage, inflammation, all kinds of issues with like miscarriages. Actually, the sperm damage thing should just freak everybody out. There's dozens of studies showing sperm damage and DNA damage. Unfortunately, we don't get a lot of people ... You tell people that and they're just not ready to believe that and even read it. It's out there on PubMed or research on Google Scholar. The one research that's good is EMF Portal has all of those resources kind of categorized.

Peter Sullivan: Some of these things, again, are not just bad but they're used for medical devices. They're having an impact. They're having a positive impact. So, I realize that studying ... I studied with B. J. at Stanford and really felt that it's all about the influence in the first [inaudible 00:29:11] of mechanisms. A guy, Chip Heath, I'm forgetting the name of the book, wrote about that people think about things but then they really make decisions based on how they feel. I've got a house that has low EMF, and I can get most people to feel something. So, I decided that that was really the route to try to influence people. So, we did ... About 2016, we did a wireless-free tent, and we put shielded material and we grounded it, and we told people when they wanted to go in they needed to turn off their phone and any fitness trackers or Apple watches, or whatever. Most people were willing to do that.

Peter Sullivan: When they went inside we have a meter and we measured outside and said, "This is 5000 microwatt measurement outside, and you go inside and it's zero. People would walk out and then they'd walk in, and they'd have an immediate discerning experience. I was surprised to find ... Because, we think only about 1-3, maybe 3%, of the population is pretty severely electrosensitive, maybe 30% feel it a little bit but not so much. Well, I was surprised to find that 85-95% of people at these conferences had a felt experience.

Dave Asprey: Wow.

Peter Sullivan: I was shocked that it was that high. We've had some pretty profound experiences. So, we've had autistic kids who were stimming and really

overloaded walk in and just lay down, sit down, and then go to sleep. We've had a woman with Tourette's who had her Tourette's symptoms kind of go down. We've had people with ear ringing immediately go in and it stops. But the symptom that people report most commonly is they sit down and they just go, "Oh, I feel calm." You may even almost feel bored. Well, now that constant stream of calcium that's been leaking into your cells and overexciting you finally stopped.

Dave Asprey: I used to have an office that I built in a garage in Silicon Valley, and I made it a Faraday cage. If you're listening and you're not an engineer, a Faraday cage is basically a metal box that's electrically grounded that blocks EMF. I knew about this stuff. The books have been out even before the modern cell phone [inaudible 00:31:24] the way they are. So, I said, "I'm just going to try it because it doesn't cost anymore to do it that way than another way." I just took aluminum-backed foam because it's inside a garage anyway, and just built out the walls and connected everything electrically. Cell phones didn't work in there and things like that, but it was amazing to meditate in there. You meditate in a Faraday cage, you feel a difference.

Peter Sullivan: You know, we had some people when they go into the tent they said, a woman once said, "I feel like I'm meditating but I'm not meditating." I said, "Yeah, the signal-to-noise ratio in your body just changed." That's reason you ... You know, when you meditate you stop moving. I've worked with some pain researchers at Stanford and they said one of their biggest problems is getting a pain sensor as there is a lot of electrical noise in the muscles.

Dave Asprey: Oh yeah, huge.

Peter Sullivan: Yeah, okay, so you stop moving your muscles what happens? The noise floor drops. So, what I'll frequently do is I'll go into a low EMF room. I'll get a zero gravity chair. You kick back, so now your brain is unloaded from even the load of trying to deal with gravity. You lighten that load, you get rid of the noise, and you just get to go deeper. Great for power naps.

Dave Asprey: Guess what happens when you're in a float tank? You're in magnesium-enriched water. Magnesium helps with the calcium channels, but it's also very conductive, so you're fully electrically grounded, and you have no physical vibration, no noise, no temperature, no clothes, et cetera, et cetera, no light. But, part of it is that you are truly electrically grounded when you do that.

Peter Sullivan: I think the other part, too, is that when you shut your ... When we get overloaded, frequently you'll see people blink and shut their eyes, or whatever. We turn off that sensory input because we've got overload going on. You'll see autistic kids cover their ears. So, it's nice for people to have a break. So many people are being overloaded. The calcium channels we talked about are risk factors for neuropsychiatric issues, as well. So, autism, ADHD, depression, anxiety, bipolar, and even schizophrenia. So, if you have some sort of calcium thing going on, or if you've got ... If you're not sleeping well, you've got high

inflammation, or any sort of mental health thing at all, this is really a key area to step into, to just give yourself more space.

Dave Asprey: There are a collection of I'm just going to call it alarmists, or fear mongers, online saying, "We live in a blue lit microwave world, and we're all going to die, and you should be hopeless, and send me your money," or whatever their message is. It's kind of the conspiracy theory side of things, but the reality is blue light is bad for you. EMFs are not good for you either. So, that said, I kind of like light bulbs. They're useful. I love my cell phone because it allows me to communicate and do things far more effectively, like Uber kind of requires cell phones, and it's really useful to get around and to reduce environmental load from gasoline and leaded gasoline and thallium in gasoline. All the good things that happen, you can't take that away from the equation, but you can also say, "Maybe holding your cell phone right up against your sex organs is a bad idea."

Peter Sullivan: Yeah, you know the guy, Frank Clay, who spoke at the Commonwealth Golf Club back in 2010, or so. He was Microsoft Canada's President. He really coined the term safe technology. So, we don't want to get into this thing where this is good, this is bad. It's like let's meet the design requirements that don't interfere with biology. In the future safe technology is going to be a requirement just like seat belts were with automobiles. So, the industry will get, just like the automobile industry ... We love our cars but we want to be as safe as possible, and we're going to continue to make them safer. So, the only long-term solution here is safe technology. In the interim until we have that, until our companies believe it and we demand it, and all that, we need to just use it a little bit smarter, especially at night.

Dave Asprey: The good news is that there are some companies paying attention to this stuff. No one wants to believe that their life's work, or that their career is causing harm. So, there's a lot of just denial of evidence. In part there's legal things that companies know if they admit it then they might be sued into oblivion and things like that. In fact, it's a big concern for all companies, and they teach you about that in business school and all. It's one of the things I think led the asbestos industry, and big tobacco, and big oil, and even big pharma to just ... They have a long track record of doing bad things and trying to sweep it under the rug. It's that psychological behavior that does it.

Dave Asprey: But, when I look at the EMF and the light thing, I had a chance with Peter Diamandis to ask CTOs, three or four of the largest tech companies, including like the VR, the virtual reality, augmented reality, headset manufacturers. We're talking CTOs from publicly traded companies. "So, guys, what about the fact that the eyes and what we see is about 25% of brain function ..." The question was really simple. "Whose job is it to make sure that this awesome new technology isn't causing unintended harm to our brains?" All these CTOs looked at each other and the consensus was, "Not ours." There is no one watching.

Peter Sullivan: Exactly. When I was at Silicon Graphics in the mid 90s I worked in a design and human factors group. It was actually my job-

Dave Asprey: Were you at Google's Headquarter Building?

Peter Sullivan: Yes, so I sat in ... Exactly.

Dave Asprey: I used to sneak in there to make espresso at lunchtime every day. So, everyone thinks Google has cool architecture. No, that was Silicon Graphics architecture.

Peter Sullivan: Yeah, exactly. Silicon Graphics was amazing and-

Dave Asprey: The first company in Silicon Valley to put espresso machines for employees to use. Changed the world.

Peter Sullivan: I sat next to the espresso machine, and then I had to give up coffee about mid 90s because I was just overdoing it, just definitely ... That's another thing, if you've ever had too much coffee, which most of us have-

Dave Asprey: That's that feeling, especially bad coffee with mold toxins in it.

Peter Sullivan: Exactly. I'm not sure for me whether it's the mold toxins, a little bit of that creepy feeling, that creepy feeling of being too wired. That's where you're going if you get too much EMF exposure. I ended up ... To me I wanted to keep a certain level of performance so I had to start dropping things. So, it was like you drop soda, you drop so-and-so, and all that.

Dave Asprey: Yeah, we both went through that path with like trying to hold on.

Peter Sullivan: So, back to where I was. I was working in the Human Factors and Design Group, and I was in charge of actually taking the devices to the FCC to have them approved. One time I took one of the machines to an FCC thing. I was in charge of mouse testing. We just aren't in a position, and there's so much pressure to get the thing out there. We're just not in a great position to start demanding this until the consumers ... It's very much like the government, like a democracy, when the market requires it then the managers pay attention and so forth.

Dave Asprey: It works with grass-fed beef. The number of grass-fed yogurt companies, grass-fed butter, grass-fed beef, I've been hammering that drum, along with some other people, for a long time. But, it actually happened and that shift is just in the last five years. So, the same thing will happen.

Peter Sullivan: I think the right things are going to happen.

Dave Asprey: What inspired me the most is that a friend of mine at Microsoft, who is tied in heavily with their augmented reality stuff, HoloLens. I got to go in there and do like an executive briefing. I brought my kids. We were all wearing these things, which probably were wireless.

Peter Sullivan: Some are wired.

Dave Asprey: Yeah, I have the wired one at home, the Oculus Rift that's wired, on purpose. But even then I wore my TrueDark glasses under it. I managed to fit them under it to keep the blue light out. But I got a chance to sit down with the engineers and, "Guys." They're like, "Oh, wow, it would be so easy for us to change the color of light coming out of these. So, they said, "Of course we could add that," so they actually took us back into their design process. So, the people who are doing the work they actually want to make products that are awesome and good for you, because they have kids and they're alive.

Peter Sullivan: We're not assholes. We're not totally ... We want to do the right thing. Yeah, no one wants to feel bad about themselves.

Dave Asprey: They were open-minded. They were curious. I shared what I knew. They took it back and did what they did with it. But, it's that kind of a mindset. I find the same thing in big, bad food companies that people talk about. No, the execs there are desperate to make food that's good for people that they'll buy. They want to do it.

Peter Sullivan: You said, like a lot of the activists will demonize the tech companies and so forth. There's definitely been some bad stuff that's gone in the Federal Government and in the Telecom world, I would say, definitely some merchant [inaudible 00:39:58]. But a lot of the tech people, really we just didn't know, straight up. We didn't have time to look, and people will correct it as fast as they can. One thing I will say about light, there's a little bit of EMF overlap with light. If you don't like fluorescent lights it may not just be the light. There is the noise. There is an electric field frequently, but there is also a flicker rate.

Dave Asprey: Yes.

Peter Sullivan: The flicker rate is also really key.

Dave Asprey: Drives me insane.

Peter Sullivan: You can also get what's called dirty electricity, so if you're electrical noise is not pure pristine 60 Hertz, which most people don't have, if it has all this noise and garbage in it that comes out in the lights and it makes your audio quality worse, screws up the signal-to-noise ratio. Your light will have weird flickers, and it just it's harsh.

Dave Asprey: Yeah, it sounds weird. That's an area where who knows if it's genetic, or toxin related, or whatever but I am, according to Helen Irlen, one of the more sensitive people she's seen. I've also seen her find the right color of filters for people who are disabled, like full-on institutionalized and they put weird sunglasses on tuned for their brain and they're fine. This is the power of light on some brains. Fortunately, we now know the circadian biology of it, and that's why I started a company to do that. I didn't mean to start a company to do that.

No one made the right stuff so there's two patented sets of glasses now for different things that actually work.

Peter Sullivan: Well, you would like Jacob Liberman's work, the Light is the Future of Medicine. Have you seen that?

Dave Asprey: Yeah. Let's talk a little bit more ... Because you did something that's pretty interesting. You said, "All right, I'm going to do a documentary about this." I did the same thing on toxic mold. And toxic mold, toxic metals, EMFs they travel ... They're so related, and Lyme disease, too. If you get one the odds of the other ones getting worse are very high. It's a huge amount of work to do a documentary. So, with Moldy, and if you're listening to this, just go [inaudible 00:41:58] moldymovie.com. It's a free thing just put your email in and you can watch it. But, it's a couple hundred grand to make a decent documentary. It's a philanthropic act, unless you're going to have like some big marketing funnel campaign thing, which I didn't do. Yours is called Generation Zapped.

Peter Sullivan: Generation Zapped and I did some grant funding for that. We did some crowd funding. We've been at festivals. It's now on iTunes and Amazon. We spent a lot of time talking about the tone of it. We wanted to have a tone that was really approachable for people. We didn't want to be too harsh. We didn't want to scare people away. We also don't want to be too soft. I think Sabine did a fantastic job, and I was really happy with how it turned out.

Dave Asprey: Now, that's a movie essentially saying, "Here's what this excessive EMF is doing to people." Give me the gist of it. So, we talked about inflammation in general. People who listen probably know that inflammation underlies every major disease, but what are the big ones that pop out for you?

Peter Sullivan: Exactly. Well, my goal is to make sure everyone knows the health effects of wireless and also EMF, as well. But, let's start with wireless. Martin Pall has a great paper and does a field survey of all the symptoms. This is not his work. He's just surveying the field, and he says the most common symptom is sleep disruption or insomnia. So, a lot of people going to bed, waking up in the middle of the night, having restless sleep. The number two symptom is ear ringing.

Peter Sullivan: So, again, inflammation goes up, it kind of screws up a lot of these things, but people don't think of inflammation. That's like the trunk of the tree. They think of all the leaves. So, people will see sleep disruption, ear ringing. A lot of people say, "Oh my god I have ear ringing." I say, "Yeah, I know." I'm trying to remember the exact order but it's anxiety, depression. If you go to my website, clearlightventures.com, there's a little link at the bottom for the wireless safety card. That card has on it, it has the most common symptoms, a couple key studies that you could show that there's science and credibility around this. Some of the key things in your environment that you may want to address and what to do quickly.

Dave Asprey: Isn't blood sugar dysregulation one of them?

Peter Sullivan: It is, especially if ... There's a book called Dirty Electricity and they've discussed that topic. So, if you have blood sugar issues work on not just your wireless but the dirty electrical noise as well.

Dave Asprey: It's profound, but if you clean up junk light, especially at night, which is also shown to screw up your blood sugar. Clean up your dirty electricity. There's filters you can buy. I used to sell them on the Bulletproof website in the very early days when it was called Upgraded Self, and you can do things like turn off your WiFi at night. Magically it's possible those environmental changes, even if you're still not eating very well, may be enough to move the needle on your blood sugar. Maybe take out your breakfast, do some intermittent fasting, have some Bulletproof coffee, whatever. Any sort of dietary manipulation to your blood sugar, you might actually go from prediabetic back to normal just through environmental changes. The thing is, which one of those mattered? No one can tell you yet.

Peter Sullivan: It's hard to know. I think you systemically do a list of suspects and you just do your best and see what happens.

Dave Asprey: It's sort of funny. We have this reductionist Western thing. If you were to ask Picasso, "What color mattered in that painting?" It's like, "What a dumb question. I had to put all of the colors in the right order for it to look the way it looks." Yet, we want to go down to that one thing. I just don't ... I think we're more like paintings than we are like rigid computer science.

Peter Sullivan: It's like an automobile. There's a lot of different things that have to be put together to work. You've got to do it all. I would also add ... I forgot to add fertility or sperm damage.

Dave Asprey: Oh huge one.

Peter Sullivan: If we want to try to lower the autism epidemic some part of the autism epidemic is de novo mutations, non-inherited mutations. So, your DNA didn't make it to your kid. Something got switched. You've gone through millions of years of evolution, you don't want to be the guy that started playing Russian Roulette with the DNA. So, definitely keep the cell phone out of the pocket. Whether it's fertility or whatever. You can have it in the pocket but turn it to airplane mode. Turn off Bluetooth and WiFi.

Dave Asprey: My first book before the Bulletproof Diet, a lot of people don't know about it, it was called The Better Baby Book. It was five years of research on fertility and way more than 1,000 studies. My wife and I put this thing together, published it through Wiley, and I learned how to not publish a book that way. But, the data even back then on wireless devices and fertility was very clear. Even if the data

was wrong there is no benefit to keeping your cell phone right next to your junk. I just don't see it.

Dave Asprey: So, what I did is I said, "I'm going to wear mostly cargo pants," and there's actually cool ones now that don't look too awful. They have a pocket on the middle of my right thigh, so if I'm going to have my phone there it's great. It's out of the way. Problem solved, right? Then I go and I do a high resolution bone density scan. Right where my phone sits there's 10% lower bone density in my right femur, which should be higher density than my left, because I'm right-leg dominant. Well, that sucks. So, now my pants have RF blocking fabric stitched in behind where I keep my phone. And I put it in airplane mode when I can.

Peter Sullivan: It's brilliant that you found that. There is a study showing that the hip that you keep your ... If you keep your cell phone on the right-hand pocket and you keep it on that there's lower bone density on the hip. So, let's avoid the hip replacements as well.

Dave Asprey: That said, I'd rather give up my femur than some of those other more recreational organs, right?

Peter Sullivan: Exactly. Exactly. Oh, and there's erectile dysfunction is one of the other issues. There's a lot going on, not positive.

Dave Asprey: That said, these increase your risk. They make it a little bit worse but it's not going to kill you right now. You turn your phone on, you hold it up to your head, it's a bad idea. I don't generally do that. But, if it was an emergency would I do it and not worry even a little bit, I would. Because, you can take the hit. You just don't want to take hits all the time.

Peter Sullivan: Exactly. It's the cumulative damage. Some people get so nervous and say it's permanent damage. You don't want to get into that mentality, that fear mentality. Your body can repair itself, even DNA damage. So, it's just a matter of keeping up with it, keeping up with the repair and not overloading. That's what I mean by overload. When you're overloaded you have more damage than you can repair.

Dave Asprey: Let's talk long term. I've been really open in the last year or so. I plan to live to at least 180. I run an anti-aging nonprofit group for 20 years. I've been working on this, and I didn't start out when I created biohacking, the word and the field and all that stuff, talking as much about that, because it was just too crazy pants for people to even think about. I would have just lost credibility. I've been working on it for a while, and still working on it. Some of the things when you're saying, what's going to be in another 140 years? How are we going to have enough topsoil? What's happening with the carbon load? But also what's happening with EMFs, environmental pollution, and then how can I counteract those as a person of means who lives on an island, on a 32-acre farm, where

there isn't a WiFi signal unless I turn it on? Then, the other one is, "How is everyone else going to do it?" Because, I would like to have friends.

Peter Sullivan: Exactly. Like you have friends that still live that long.

Dave Asprey: Right.

Peter Sullivan: I'll try to be there with you.

Dave Asprey: Right, like I'm working on actively solving the global issues like this. But, given all the bad stuff that could happen, where does EMF sit for you? Is it worse than mercury? Is it less of a threat?

Peter Sullivan: I think for me ... For me right now I think that in the long term ... In the long term my vision is we have a clear world and we have clean air, clean water, clean soil, and clear fields, clear and natural fields. As you were saying, in the beginning you talked about STEVE. NASA says that our natural magnetic field has now been polluted with man-made frequencies, which might involve the STEVE situation. So, I want things to be clear and natural, and have none of these environmental factors impacting our cellular biology and our children.

Peter Sullivan: So, that's the long-term goal. I think where we have to go in the short-term is I think the short-term most urgent issue for me is EMF. The reason is it really tips your body into fight-or-flight mode. We talked about that. To me it's not that we have too many people on the planet, we have too many people in fight-or-flight mode who are irresponsible, black-and-white thinking, don't have access to their full brains. So, we need to lower that exposure, get people sleeping, get people back into their full potential, and then we can solve these other more long-term problems. So, in the short-term I really want to focus on EMF, and then I want to see people's autonomic nervous systems balanced and heart rate variability improve. Then, we want ... The vision is that everyone knows what's in their body. So, you have the right to know all the toxins that are in your body. Right now neither of us know. There are 80,000, more than 80,000, toxins. We don't know exactly what's in your body. We don't even have tests for everything. But we're getting there.

Peter Sullivan: I have little long-term plans. We've got things going on. So, ideally we'll have in the future the ability to measure for lead, mercury, and arsenic with spectroscopy like a pulse oximeter. We'll start managing these things. We'll start measuring and managing these things, just like we do a clean room in a chip lab, and we'll start measuring all the environmental factors and the end results, and we'll start managing our environment so that we can create things that live longer. Just like farming, we're going to start ... The information's out there now. Your neurons ... We should grow them like a farmer, give it all the right soil, all the right conditions to maximize neuronal growth and development. We could do so much better. We're just doing stupid stuff right now. We could do so much better.

Dave Asprey: All right.

Peter Sullivan: And feel so much better.

Dave Asprey: How long are you going to live.

Peter Sullivan: I don't know. I'm going to just every day get up and do the best I can. I'm going to try to keep lightening these loads and lightening these loads.

Dave Asprey: It's almost like you went through corporate PR training. That was the most canned answer that I've ever heard.

Peter Sullivan: Good or bad. Didn't that sound authentic?

Dave Asprey: It sounded-pretty canned. Seriously, give it to me straight.

Peter Sullivan: You want a little more authentic. Sorry, Dave. Okay, I'm usually pretty good.

Dave Asprey: I saw the corporate shill just slide right in there.

Peter Sullivan: All right, all right. You know, it's tricky. I honestly ... I definitely, definitely more than 100. I'd love to do 120. I was at the Palo Alto Longevity Challenge when they were trying to do a 50% bump. I'd be cool with that. Again, I heard you talk at the last talk. I mean, some people are afraid of death. I know some people in Silicon Valley are just terrified of death. I'm not so terrified of death. When I'm done ... What I'm terrified is like B. J. Fogg, I'm terrified of leaving before my mission's done.

Dave Asprey: Yeah, that's what you don't want to do, and you might have more missions than you think.

Peter Sullivan: Right.

Dave Asprey: Yeah, when I'm done, I'm done, but until then I'd really like to be at full performance mode.

Peter Sullivan: Exactly. Exactly. I want to have my body. I want to have my mind. I want to be able to serve. I think the more you serve the more ... If you serve life, life serves you. I'll be here as long as I'm needed.

Dave Asprey: Beautiful. Well, Peter, your website is clearlightventures.com. You're doing fantastic philanthropic work in the world, talking about mercury, when you started doing it made people think you were nuts, even though mercury is a well-known toxin, and the word's finally getting out about it. Now, talking about EMFs, you're ahead of the curve in talking about things that matter and have real science behind them but aren't yet commonly accepted. So, thanks for your

work. Your movie is linked there. Your work on all these different things at clearlightventures.com.

Peter Sullivan: Thank you, Dave.

Dave Asprey: If you liked today's episode you know what to do, just break a thermometer and drink it down and you can be a test to see if what Peter talked about is true or not with mercury poisoning, or you can say, "I'm going to take the precautionary side of things," and you're going to maybe lower the toxin load in your body. Maybe you can turn off your WiFi and put your phone in airplane mode at night. It's not that hard. If we are wrong what you did is you wasted a little time hitting the off switch. If we're right maybe you saved your balls. Seems like the bet is a good one. Have an awesome day.