

Speaker 1: Bulletproof Radio, a state of high performance.

Dave Asprey: You're going to love today's episode, and it's worth listening through all the way to the end, because you'll hear about all sorts of things, signals coming from your body that you can use to know what's going on. It's actually a way to use your biology to drive self-awareness, so throughout the whole interview, there's just tidbits wrinkled in about what can happen. We talk about some new tech, but behind that there's all, there's a wealth of knowledge here. I had a great time in this interview with one of the companies I respect most in the field of monitoring the human body, so enjoy the show.

You're listening to Bulletproof Radio with Dave Asprey.

Today's cool facts of the day has to do with timing. There's a recent study where scientists found out that, especially for women timing is everything for intense workouts. Women, not men, who performed the high frequency leg resistance training five times a week during the first two weeks of their cycle, shows significant results. They had increased jump height, higher peaked torque values in their hamstrings, increased lean body mass of the legs - and who doesn't want good legs - and an overall positive experiences post training. In other words, they didn't hate their life after they trained.

When they did the training during the last two weeks of their cycle, none of those results happened. One thing you could say is, "Well hey, maybe you should just workout half as much during the right time and get the same results." I'm just saying. As a strategically lazy person, who wants to get the most return on the investment of time and energy in everything I do, in that, if I can do it less and get more return as measured in physical results, or just in terms of joy. I don't actually get joy from heavy leg lifts and you probably neither. Think about that, maybe when you're doing the training really matters you might even run your own little personal experiment there, and realize you want to take it easy or do a different kind of training. A more detox, more stretching, things like that, during different times of the month.

I have not seen any formal recommendations from any exercise people out there about this, but I bet there's really, really interesting experiments to be done. If you do this, and you notice a difference, I would love it if you just share the thing on Facebook, because this is sort of an idea that's come to mind that, "Hey, maybe we should talk about this."

Before we get into the show today, you probably don't know about Bulletproof Cacao Butter, and yes if you're watching on YouTube, I'm holding up a bag of this in a shameless way of promotion here. There's a Bulletproof Cacao Butter, comes from chocolate, but it doesn't have the dark stuff in chocolate. It's just pure chocolate fat, which melts almost at exactly your body temperature.

What I do with the Cacao Butter is I put just a teaspoon or two in my Bulletproof coffee, along with the normal grass-fed butter and the Brain Octane Oil, and the special beans. What happens is, instead of a strong coffee finish, you taste the coffee and at the very end you get this amazing chocolate flavor, that's very different than you would have if you're drinking a mocha - which is kind of an overpowering chocolate flavor, even though I like a mocha as well.

All chocolate is produced by fermentation, and about 80% of South American chocolate sampled recently had mold contamination. It's a jungle product that's dried in a moist environment. These are not studies that I funded or made up, this is a known problem in agriculture, which is why they have different standards in different countries. 64% of the microbes that create chocolate, create toxins that are called micro toxins or mold toxins, and even at levels that are approved safe - they can make you tired, they can make you jittery, they can give you headaches.

What's going on here is, they're saying, "Well we're going to assume that you're having X amount of toxins per day, so this is safe because you won't eat very much chocolate," but bottom line is, we're lab testing our chocolate to make sure that you're getting some clean chocolate. There's a difference in the Cacao Butter, so you'll like how you feel after you use this. You can also make truffles and other dessert-like things with it. It's one of those things that I don't talk about very much, but I absolutely adore it, as a chef and as a culinary guy. You can do just cool stuff with it, so that's called upgraded Cacao Butter at Bulletproof.com, and it's a fun hack for desserts and your Bulletproof Coffee.

All right, let's get going.

Today's guest is a huge challenge for me, because I'm going to attempt to say a name in Finnish. Are you guys ready? His name is, here we go, let me just say this right. Petteri Lahtela. Petteri, how did I do?

Petteri Lahtela: Yes, very well.

Dave Asprey: Awesome. All right, then now I can claim that I speak Finnish right? Okay, maybe not.

Petteri Lahtela: Finnish names are hard.

Dave Asprey: Petteri is the CEO and co-founder of Oura Health, and he's a serial entrepreneur with 25 years of experience. If you don't know about Oura, you might have seen me in a few different venues wearing a kind of cool-looking ring. If you are watching on YouTube, you can go to [Bulletproof.com/YouTube](https://www.youtube.com/channel/UC...) and just get a link to the channel if you want to see this. Most people are driving.

I'm wearing this kind of cool, I didn't know what kind of metal it looks like, like a shiny black metal ring thing. My first episode on "The Dr. Oz Show," I was

wearing this and a 24-hour blood glucose sensor, so it's kind of my bionic arm, because embedded in this ring is a bunch of trackers. Like they track movement and respiration and temperature and things like that.

I'm really interested in having Petteri to talk about monitoring yourself. The reason I think that you'll care about this is that, when you can get a little bit more data particularly around sleep quality, it totally tells you whether what you're doing works. I've tracked my sleep for almost 10 years now on a nightly basis. I can tell you for the past five years now, I've had six hours and five minutes of sleep per night on average. How do I know that? I do it. I can tell you when I put on my TrueDark glasses and wear them for a while before bed, I double my deep sleep, on not every night, but on many nights if I do the other stuff right.

When I stack it with Sleep Mode, it works even better. Sleep Mode is the Bulletproof supplement. I can also tell you like I have caffeine later in the day, I can see it - I still sleep, but my sleep quality changes. I want you guys to understand that, and a lot of people also don't know this. I was CTO of Basis, the wristband company that Intel bought for \$100 million, which is the first company to get heart rate off the wrist, even before the Apple watch did that. I have like a deep knowledge here, and I wanted to share with you an interview with Petteri, who really knows a lot about what's going on here, and to suggest that if you're going to do monitoring and tracking, we're going to tell you about what's useful. What's not useful, that is tracked commonly in the industry, and how you could potentially incorporate either this kind of technology, or as something similar into your lifestyle, and how it can with very little work on your part, give you something meaningful.

Welcome to the show Petteri.

Petteri Lahtela: Thank you very much, very nice introduction.

Dave Asprey: All right.

Petteri Lahtela: It's an honor to be here with you today.

Dave Asprey: Oh, thank you, and I appreciate that you're dialing in on this call from Finland, and so for me it's morning, but for you it's evening.

Petteri Lahtela: Yeah, that's right. If we would follow our chronotypes, I think it should be opposite. You're having-

Dave Asprey: I think it's ...

Petteri Lahtela: ... In the evening and I in the morning.

Dave Asprey: Are you one of those disgusting morning people?

Petteri Lahtela: I'm a lion, yes.

Dave Asprey: Naughty question.

Petteri Lahtela: I'm a lion, yes.

Dave Asprey: I'm just kidding there. What we're talking about, if you heard the interview with Dr. Michael Breus, who wrote "The Power of When," there's four chronotypes and that 15% of us are morning people, like Petteri - and those are called lions. 15% of people like me are night people called wolves, and about roughly half of people are bears during the normal time, is 15% of people never sleep very well. Those are the people, by that you're one of those you always wake up every night, there's hacks for that, and I've written a lot of them. In fact, a lot of the book of hacks have been like replicated on hundreds of health sites now.

If you want to know what's going on, having a tracker is the number one way to know what's going on, which is why it's cool that you mentioned that. I just have to say, we've all heard that the early bird catches the worm, that common euphemism. The second part of that never gets repeated, and it's that the early bird works for the late bird...I'm just saying. I'm just kidding!

There is no moral superiority for waking up early or waking up late, it's just about your chronotype.

Petteri Lahtela: Exactly.

Dave Asprey: Right, and that's a cool thing.

Petteri Lahtela: Yeah.

Dave Asprey: All right, so let's get back to this cool tracking stuff. You're 25 year experienced health entrepreneur, you've done tracking stuff before. Now, one of the reasons I joined Basis is that, it was the first technology, this was back when at the time when Fitbit was a tiny company, and we were competing with them. I joined them because it was the first and only tech, this is going back to, it's almost 10 years, that could get heart rate variability from the wrist, while you're moving around. It was really cool stuff.

Now, like the world has changed, sensors are better. I don't like bracelets that much, although I'm actually wearing a bracelet today, but it's not heavy and doesn't require charging. The thing I've gotten in my hand right now, the Oura Ring, could track a bunch of stuff. What are all the things that you can track from one finger now?

Petteri Lahtela: Yeah, so first of all, we access the arteries from every finger. We have two arteries on the palm side of the finger. With the ring, we access directly the arteries, so we get really accurate reading, not only of your heart rate, but the

pulse wave form and the inter beat interval, time between the heartbeats - as well as the pulse amplitude variation.

All the characteristics of the pulse wave form, and there's lots of information about your physiology, even about your biology inside there. It tells about your auto nervous system, balance, and also how it's working together with your central nervous system. How your brain and heart are talking to each other. There are plenty of very interesting information in different timelines of collecting the data.

Dave Asprey: It's interesting that you can tell how someone's breathing, how often they're breathing, just from looking at their heartbeat. A lot of people just don't know that, so there's this wealth of knowledge that comes from just like, what's going on here. You might know this - who or what's the first tradition that notice this?

Petteri Lahtela: Yeah. It has been known for quite some time that, of course from the timing, the time between the heartbeats, you can calculate your respiration rate. But also from the variation of the pulse wave itself, you can actually see the breathing frequency as well, and the variation of the frequency.

Especially when you do, you have the visualization of the pulse wave form and you do, for example, a deep breathing exercise - you can see very well that how the pulse amplitude is varying along with your breathing rate. There are two different ways to derive the breathing, and breathing frequency and respiration rate.

Dave Asprey: It's kind of funny, cardiologists figure this out probably going back over the last 60, 70 years when they started looking at this stuff, when we could first get reliable pulse stuff, and they started looking at correlative analysis. But if you go back thousands of years, traditional Chinese medicine, traditional Tibetan medicine, which is a different form of medicine that's a little bit more linked to Ayurveda.

Ayurvedic physicians, they would all touch your wrist in different places and an experienced practitioner would have all these algorithms in their nervous system. So they could touch your finger or sorry, touch your wrist for about eight seconds, and not just get beats per minute - any doctor who regularly takes a pulse can do that, like they just know, like an ER doctor can...it's like the magic power. But these guys, I did this in Tibet. He like touches four points on the wrist and it's like okay, and he tells you all sorts of stuff. What's going on here with the Oura Ring is something roughly similar to that - probably not as nuanced as two nervous systems interacting - but you're getting this wealth of data that is not intuitively obvious to almost anyone. Even if you're a medical professional, you wouldn't think it's there, but when you do the crunching.

How do you fit all this stuff in a ring, though? I mean I've got to say, that having worked in this space, I was kind of impressed. It's still a bit bulky, I would like it

to be half as big, and I get a tan line I don't like from my ring. I've never worn rings, but it's less annoying than wearing like, a heavy bracelet. How did you get all that stuff in there? How, give me the story.

Petteri Lahtela: Yeah, so when we started it was impossible to fit everything in. So in 2012, 2013 at that time, even the processor, all the necessary functions was too big to fit in. Fortunately, the technology and everything started to develop along with our designs. The first prototypes we're huge, so count boxes and so on.

Dave Asprey: Oh I know.

Petteri Lahtela: Eventually, playing with the varying comfort and different kind of the aspects of anatomy, and combining all those to the beautiful Scandinavian design, eventually we could fit in. Of course, the battery takes the biggest part here, and the electronics can be fit quite nicely to a smaller form factor already. But the battery taking a lot, it hasn't been developing so well during the recent years. I hope that there will be some quantum leaps there as well, in future.

Dave Asprey: Well, I'm looking forward to the day when it's as thin as a normal, like decorative ring, but you've got a battery and the sensors in there.

Petteri Lahtela: Yes.

Dave Asprey: It really matters. I'm also looking forward to the day when the charging system is the same size as the ring.

Petteri Lahtela: Yes.

Dave Asprey: Right now when I travel, when I travel...the charger is like six times bigger than the ring. Like, I don't want to put that in my luggage! But these are minor things that will change over time. Right now, just kind of from memory, I know that the sleep tracking is something that I've got a lot of value from. I use the microphone on my iPhone when my phone's in airplane mode, to get a rough sense of my sleep quality, but this is much more accurate. You're getting heart rate, heart rate variability, which is something since the beginning of Bulletproof, I've talked about training your heart rate variability as a form of feedback.

Usually using a heart math stuff has been really powerful, so this isn't you training. But it tells you, essentially, how much you're in a stressed or unstressed mode. Activity, like number of steps, and I want to ask you a lot about that. Your body temperature, which is super cool, and then how much you're breathing, and things like that.

Now, I want to kind of go through each of those. Why would someone listening care about getting this stuff? You're getting heart rate variability reports from

just wearing a ring and they show up on your phone. What does that tell you? What can you get from heart rate variability this way?

Petteri Lahtela: Yeah, so first of all, something about heart rate variability, of course you know a lot about it. But for listeners that someone who doesn't, is not so familiar with that. Heart rate variation is something that, it's so sensitive a parameter that basically everything in your life affects that. It's really important to know the context when you can measure it, and so that you are not affecting subjectively or with some stimulants the actual reading.

Our perspective is that, the most rallied time to measure your heart rate variation is during the night...so when you sleep. The ring calculates it's RV for each five minute period, so it measures every beat, and the time between the heartbeats, and it calculates over the five minutes periods. It calculates the heartbeat variability, and then it shows that average value there in the app, in the Cloud. In the Cloud UI, you see actually the whole curve over the night. True that, and especially as a trend of how your heart rate variation is varying over the time, that's really important information. Like along, in relation to your sleeping patterns, how they change over the time.

It tells you the direction that how your automatic nervous system is tackling stress, different stresses in your life, mental and physical stressors, whatever – it's always a combination of those. You can get a good indication where you're heading to.

Dave Asprey: That's something that so many people have never been taught, in school or in the gym, it's that...stress is not good or bad, but stress is stress. There's psychological and emotional and environmental stress, and then exercise is stress. If you're under a ton of stress because you are just in a hurricane and your house was flooded, which is happening to a lot of people right now, or maybe you're displaced for a little while, and this actually has happened to me. It's terribly stressful. Or you just broke up with someone, maybe that's not the time to go hit the gym really hard, and do a full day of intermittent fasting, followed by a fasted heavy workout.

You may not know that, especially because you're stressed already, so you're not thinking as clearly. But if your data says, "Today is not a heavy workout day," the heart variability is going to tell you that. If today you're like, you should hit it really hard because you're in a good place, you can apply the stress to become hermetic. Hormesis is this idea, what doesn't kill me makes me stronger, and not everything is hormetic. Cyanide in small doses it doesn't make you stronger, it just ruins your mitochondria.

Petteri Lahtela: Yes.

Dave Asprey: You can use the Oura Ring to tell you when you should apply stress that makes you stronger, because you have less of the stress that makes you weak. Is that a good way of explaining it?

Petteri Lahtela: Yeah, definitely. This is really important in relation to stress, because many people have kind of negative annotation to stress, and definitely it's not negative. We always need some stress to perform at our best. Usain Bolt, when he's on the starting line of 100 meters, if you would measure, he's in a high stress situation, but the effect is that you get the best out of yourself that way. That's why basically we don't talk about stress, because many people have negative association to stress.

We have turned the coin upside down and talk about readiness, and so through the aids are we as one of the parameters, you can see what is a good day to stretch your limits and really push forward, and what are the days to take it easy.

Dave Asprey: That's why you would care about heart rate variability, because it's going to tell you how much unconscious stress is my body under, and then you might decide, "All right, I'm going to figure out what this is." Maybe you have a chronic low grade infection, which is a common source of stress. And if your body's always stressed and you're not exercising, like, "All right, I have work to do here." What that means is that, I'm doing something or even better yet, something is happening that I'm not doing that's making me weak. It could be something in your environment.

If you're sleeping on top your Wi-Fi router and it's turned on, that's actually going to change your heart rate variability. It's going to show that your body was stressed, like, "Oh wow, I've got to figure out what it is." You may not know what it is, but okay, knowing there's a problem, now you can start the hacking process. And when you stop doing the things that make you weak, it's much easier to do that than just, "I'm going to get stronger."

If you're the strongest man in the world, but you're carrying a huge burden of useless crap with you, you're still weak, because the amount of free energy left after you do all the weak stuff isn't very high. Whereas, if you're the strongest person in the world and you do nothing that makes you weak, you have this infinite, enormous, like, untapped capacity. A lot of biohacking is around that algorithm. In fact, it's the core thing behind the Bulletproof diet.

It's like, let's stop the stuff that makes you weak. Heart rate variability tells you if something's making weak, that's why I'm such a fan of getting that signal. Until now it was always, sleep with a chest strap on, like one of those cardio monitoring chest straps - which is just terrible, like no one's ever going to do that unless they're seriously into this stuff.

All right, nightly temperature is another thing that I've been fascinated with forever. Talk with me about why tracking your temperature changes at night would be important.

Petteri Lahtela: Yeah. Temperature, as you said, is a really interesting parameter especially during the night. Like basically all the kind of by signals we make, we get during the night, they reflect what's happening in our life during the day. Our body is giving its response, but in relation to temperature, it is inside our biology that actually human body reaches the lowest body temperature during the night.

All of us humans, we are around a few hours of window around 4:30 AM, when we reach the lowest body temperature. With the ring, we actually get about zero point zero seven degrees centigrade resolution of your body temperature reading and the variation during the night. We can really accurately detect what's the lowest body temperature for each night. Then we, as a trend, we show you how it's varying between the nights.

Dave Asprey: Now, I'm putting on my hat from when I was at Basis - we were also looking at tracking body temperature. There's just one problem and I get this, because I'm wearing the ring on my middle finger. I get to show off my middle finger, which I haven't really done on Bulletproof Radio! When you're looking at a finger or a wrist, this is not near the core - and you're supposed to like, suck on something, get a rectal temperature, or maybe an armpit temperature for full accuracy. And some people get cold hands, especially when they sleep. How are you able to track temperature from a finger?

Petteri Lahtela: Yeah, actually as you know, when you go to sleep the core temperature is pushed to the [inaudible], so that's what happens. It's biological thing that needs to happen when we go to sleep, and then your ...

Dave Asprey: In fact, you can't go to sleep with cold feet and cold hands.

Petteri Lahtela: Exactly.

Dave Asprey: Your body won't let you.

Petteri Lahtela: Exactly.

Dave Asprey: Right, most people don't know that - so if your hands are really cold and warm, you have to warm them up, that's why blankets are helpful, or a warm bath, so there you go. Thanks for saying that.

Petteri Lahtela: Yes, exactly, so that's one of the things that has to happen so that you can get to sleep. There's quite a high rise of temperature, when you just lay down and you're prepared for sleep, if there's enough melatonin, the hormonal balance is for sleep. Then, the skin temperature starts to reflect the body temperature, and then they start to get closer to each other. Then when you reach the lowest

body temperature, then the skin temperature is the same as the body temperature. That happens during the night.

That's one thing and that's actually one of the basic things for detecting your chronotype. The Oura Ring is basically, it's the only product in the market that can detect your real chronotype, and then reflect back to you.

Dave Asprey: That's not in the report is it?

Petteri Lahtela: No, it's not there yet, because it took quite a while for us to get enough data, we have now customers in more than 50 countries, and for the last couple of years we've been learning a lot through that data. That how unique we all are. We have dug deeper into the data, and now we validate it, we can see, we can detect those chronotypes that Dr. Breus is talking about. We can dig deeper into your personality, your biology.

For those who don't, who are not so familiar with chronotype, it's as deep in our biology as fingerprint or skin color. It's very, very, deep there.

Dave Asprey: It is possible to force yourself to wake up early. For two years I woke up at five AM every morning. My chronotypes is usually waking up at 8:45 or 9, and I wrote "Headstrong" basically between 11 PM and 5 AM under red lighting, using TrueDark glasses, stuff like that, so I didn't break my biorhythms. But that's when all the good stuff happens in my brain, and it's been that way since I was a kid. That's just how I am - and I would sort of beat myself up and say, "Oh, I should just wake up early," and it's like we're different, right?

Petteri Lahtela: Exactly.

Dave Asprey: Neither is good or bad - but what has me most excited about Oura, and just this whole era that we're coming across, when you think about it, you now have more data about this stuff than probably - I don't want to say any other company, because there's some other fitness trackers, but they don't have the resolution of data that you have. You can apply machine learning to this, and get stuff about chronotype that no one's ever known, so that's always been happening. Stuff that a few doctors, like Dr. Breus or others out there for a whole bunch of things, they've been saying this forever. But not enough data to just be like, "All right, we didn't have to do a double blind clinical trial," we just have data from a million people, and you have machine learning that'll tease this out.

Going way back in the early days of big data, I was actually an angel investor in what's arguably the first big data company. It was a company called Ata Mark, it was like semi-structured data and all these, and we didn't have machine learning back then. Now though, it's almost painless, and you look at other companies doing stuff like this - Viome, Naveen Jain, has been on Bulletproof Radio, a good friend. I'm an advisor for Viome now, and these guys are doing

something similar, where they're gathering data about all of the weird stuff growing in your body - like fungus and virus and bacteria in your gut - and correlating that stuff with a dataset that's unparalleled, because no one's ever gotten all the data at all, much less mixed it along with knowledge about behaviors and things.

There's this huge wave of knowledge, and you're doing this for sleep and for stress and recovery, and it's that that has me just like - this is world-changing stuff. Even 40 Years of Zen, which is one of my other portfolio companies, the stuff that does high end, high performance, executive neurofeedback, we're getting these brain states from like world leading meditators and gurus and CEOs people, and looking with machine learning at patterns in the brains, so that we ... Like, what are the things that high performers actually do, and no one's ever done that.

Petteri Lahtela: Exactly.

Dave Asprey: It's happening across every field, but you guys I think are the leader right now, because of your form factor.

Petteri Lahtela: Yes.

Dave Asprey: What else are you going to tell us from all these big data? Like what else is on your horizon for cool stuff?

Petteri Lahtela: Yes, so our target is to really get to personalized guidance, so that we really get deep into your biology and physiology, so that we can reflect with the product. We can reflect back to you how you are doing, and how you can help yourself. That's our passion, really, to have a product or have a solution that you can self-reflect and become more self-aware, what's happening in your body, in relation to your lifestyle. Whatever you do in your life, how your body is responding with that, and be a best validation tool for you to allow, explore different kind of things, and then see what's the response from your body. Because we are all unique, and we really respect this uniqueness and we want to bring it back to people, so kind of people can start respecting their uniqueness. Chronotype is one thing, but as in your company you are respecting the uniqueness of all your employees having their characteristics. I don't remember what kind of name you use for that, but anyhow you have your chronotypes and so on. Yeah.

Dave Asprey: Oh yeah, we get a, the Colby score...

Petteri Lahtela: Yeah, exactly.

Dave Asprey: Which shows your instincts for how much data you need to make a decision. We shared this, everyone knows everyone else's chronotypes, and our love language. It's kind of ridiculous, but it really helps you interact, because these are deep wiring things.

Petteri Lahtela: Exactly, and also the people have different responses to stress. And of course, life situations change all the time and the risk, stress response in our body, let's say, our dynamics and capacity vary over the time depending on the life situations. We want our users to be aware of those things, and then look forward, okay - I'm aware of what's happening in my body right now, so I know what kind of small things I can do to improve.

Dave Asprey: I would make the argument that it is a moral imperative to hack yourself. Which just means driving awareness, and then making the changes that are painless to improve how you feel, how much energy you have. I'd also argue, and this is a bit controversial, that as an entrepreneur or as an employer, ethical and moral to hack your employees. Anything I can do in the environment that, like we're opening a new headquarters in Seattle soon. I just spent a bunch of time with our lighting engineer, to have the most biologically-compatible lighting possible, and it's directly affecting the biology of the people who support the Bulletproof mission. I feel obligated to do the very best I can - and there's no diet soda. I don't care if someone wants to drink it, I'm not paying for it.

Stuff like that, like how could we not all be doing this, because we care about each other. All right, flip side of that. Now let's say that I'm a big, bad company spraying toxin on our soil and our crops [inaudible]. Now, if I got all my employees to wear the Oura Ring, and I require that they sent their data to me so I could track - is there like a downside to having all this data? Are you worried about privacy issues, or because you're in Scandinavia where they actually value privacy [crosstalk]?

Petteri Lahtela: Yes. Actually, yeah we value your privacy a lot, and we want always that the user is owning the data, and also consenting the access the data to those that say, those people - or those coaches or doctors - that they want to themselves. We never want to, we don't want to go to that kind of arena, that your data would be mishandled by someone to read something - I don't know even, yeah.

Dave Asprey: Well, the idea is it's your data, and this is something, when you're listening right now, it's really worth thinking about another paradigm shift or as, is on top of this. All of your data by your biology, including your medical lab tests, it's your data, it's not your doctor's data. The traditional patriarchal, just kind of evil perspective is when you have to go to your doctor, you get a permission slip to know about what's going in your body; the doctor gets the data and decides if you get to see it, and they get a copy and they can do whatever they want with it. Not okay.

I keep mentioning Viome because they did the same thing you're doing, where they're getting data about what's growing in your body, and they give it to you on the web page. They will not give it to your doctor, you actually have to choose to share it with your doctor what they share about you. Which is completely like a middle finger to the entire paradigm that we had before. I love it that you're honoring the fact that our data is ours - and this is something, for everyone listening here, anytime you're gathering this data, if you're going to

get a life insurance policy, if you're going to get a health insurance policy or any other thing like that, you should be allowed to disclose or not disclose this stuff as you choose.

It is not supposed to be part of your permanent record, and the whole electronic medical records thing is BS. And thankfully, what you're collecting is not officially medical data. Now we're talking about temperature, and you didn't mention because it's medical, two things, but I can mention them because I don't work for them and I don't have business relationship with them, which is awesome.

By the way, this is something else you should know as a listener of Bulletproof Radio - depending on what country you're in, there are laws and they are different that prevent you from having free speech. It's literally called in the US, controlled speech. You can't make this stuff up - so I'm not allowed to tell you what my products do, if they affect a medical condition. In fact, it's illegal to say that any saturated fat - including ones that have a thousand studies that say they're good for you - it's illegal to say that they're healthy, because the definition of healthy means less fat. What that means is that, if you can diagnose medical conditions with the data coming off the ring, the second you say you're diagnosing a medical condition, you become a medical device and you have to charge 10 times more for it, and have all these studies.

By making the data owned by a person, and allowing the person to apply algorithms, you're kind of cutting out the middle man here, and kudos to you for doing that. Here's the two things that I'm going to say that you may or may not be able to say. If you wink with your left eye [inaudible]...I'm kidding. One of the things that is profoundly important that was in my own life is, thyroid problems, especially Hashimoto's thyroiditis.

I was diagnosed with Hashimoto's when I was 26, going back on like 18 years or something. You will see a sub-clinical thyroid condition, where they're, "Oh your lab tests are normal, it doesn't matter if you're fat and tired all the time, and your eyebrows are falling out." My eyebrows, I don't have the outer part of them, so I've had thyroid for a long time, thyroid problems. All that stuff, you can see it from nighttime temperature variations, so if your lab tests are within normal, but low, but you have symptoms and your temperature is off, it's time to start looking at removing the things that are causing a thyroid problem, that would be whole grains and mold toxins in your environment, and some other things too. Those are big triggers.

Or, to look at what else is going to be, maybe going on thyroid meds. If your temperature's chronically low, the ring's going to tell you and then you can go out and solve the problem, but that is massively important. I think you're going to find a lot of people with sub-clinical hypothyroidism, it's a rampant issue now. It's also tied to light exposure by the way. If you're looking at bright screens at night, your thyroid can get jacked from that because of your hypothalamus.

Second thing, was the topic in my first book called "The Better Baby Book," and it's fertility. Can you talk about what happens with your nightly temperature if you're a woman? What does it do during the time you're ovulating?

Petteri Lahtela: Yeah, actually, yeah, we have validated that we can see and we can show the menstrual cycles, and even to take the ovulation times. At least it's very useful for females to see the menstrual cycles accurately there in the app, and then they can do what you mentioned in the beginning. The female athletes especially, they can really concentrate on those exercises that are good in that phase of their menstrual cycle.

I'm not that deep in the biology itself, what's happening in different phases, but it's anyhow a reflection of the hormonal balance that is changing, changing during the period. Females are so...they're beautiful creatures. We males are kind of a dull in that sense, all variation in our hormonal functions, it's not that interesting or it's not that big, like females. They are beautiful creatures in that sense that it is needed for fertility and for many other things. What it can reflect in relation to your sleep and readiness, how your menstrual cycles are affecting them. There are plenty of different kind of insights that you can derive from that.

Dave Asprey: For a long time I've believed just from observation, women are much better biohackers than men.

Petteri Lahtela: Oh yes.

Dave Asprey: Because the self-awareness that's a part of understanding, wait, something just shifted, because women experience more shifts than men, they tend to be more aware of them. Every woman out there can learn, "Oh, I'm about to ovulate," and a lot of them know it. But a lot of them don't know it, because they've never learned, "Oh here's the changes in my body that happen five days before, four days, three days. Okay, I'm probably in my ovulation window now, in the next day or two, and then I'll be fertile for a couple days after."

You go back 50 or 100 years, pretty much most women learn this, because it was the only reliable method of birth control, was well, when I'm fertile, don't have sex. There was an interesting podcast recently, where we talked about post birth control pill syndrome. It turns out, if you're on the birth control pill, you'll see changes in the fluctuation of your temperature. But if you choose to go off the pill, and I will tell you if you want lower your risks of cancer, the pill is not a longevity strategy that's very effective for women. It comes at a greater health cost later in life, that isn't well-disclosed.

If you decided you wanted to allow your body's hormonal rhythms to work, but you wanted to know the time when you would be most fertile, so you can have a child if you're looking to. Or the time you were fertile to not have a child when you don't want to - your temperature fluctuations from a ring can actually show

you when that's happening. Then you can be, "Oh, this is what it feels like when I'm about to ovulate." Once you have that, if you're a woman who's clued in to how her body is feeling, you'll probably know without the ring.

It's that really cool signal like, "I think I've got this, now I've got the data to show me I've got this. Now I can put this feeling together with this biological state that's what it is, and then you've got it. That's precious stuff.

Petteri Lahtela: Yes.

Dave Asprey: All right, let's shift gears and talk about sleep, which funny enough also controls, well not controls, but influences your thyroid function and your fertility. Now, you have a sleep score and going back to the days of Zeo, which was the first sleep monitor. I guess there's this headband you'd wear that got EEG. Ben Rubin is a friend, who's a founder of that.

I was always annoyed because the sleep score was based on eight hours of sleep, but we know people who live the longest sleep six, five hours a night. And different people need different amounts of sleep, depending on their stress level. I talked to Ben, and this is going back years, and I actually changed the algorithm - at least how to calculate it. If I only wanted five hours of sleep, what was my sleep score? Four to five hours I wanted - versus eight hours or 10 hours. How do you calculate a sleep score? When I wake up in the morning, it says, "You've got," whatever your sleep score was. What does that actually mean? Like what, give me a little bit of [crosstalk].

Petteri Lahtela: Yeah, actually the sleep score is, there are seven, at least seven different contributors that affect or formulate the sleep score, so the total sleep is only one of them. Efficiency, disturbances, amount of REM sleep, deep sleep and sleep latency, when you go to sleep, how quickly you fall asleep. Then sleep timing, which is a reflection to your chronotype, so how much variance there is when you go to bed and when you wake up.

So total sleep is only one factor there, and it has, it doesn't have that big of an influence to the score itself. We try to reflect more about the restorativeness of your sleep.

Dave Asprey: Beautiful

Petteri Lahtela: Yes, so how efficient sleep you get in the time that you are in the bed.

Dave Asprey: Good sleep is better than more sleep that's not good?

Petteri Lahtela: Yeah.

Dave Asprey: You're tracking that in this ring?

Petteri Lahtela: Yes.

Dave Asprey: Good.

Petteri Lahtela: Yes. It's a combination of many things, and we know that one of the biggest questions for people is the amount of deep sleep. Amount of different sleep stages, and I would say that, that the challenge in the existing research, sleep research that has been done so far is that it's based on one night in sleep lab, having all the wires. Who sleeps well in that environment? All the specialists know that problem, but still they kind of derive generalized kind of recommendations, like how much deep sleep you should get. How much REM sleep you should get.

But actually, there is a big variation on those amounts depending on what's your life situation, what's your autonomic nervous system capacity dynamics? What kind of things is happening in your life? How much mental stress there is? What's the timing? Especially this rhythms, daily doings, your meal times, the amounts of meals, the quality of the food you eat and so on, your activities and light exposures. All the things they are affecting those different sleep stages, and the amount of them.

There is no such thing that, for everyone we could say that you have to get 20% of deep sleep every night, that's not true. In the normal ...

Dave Asprey: Thanks for saying that.

Petteri Lahtela: In the normal daily life context, there is a big, big variance on those things, and we need to respect again our uniqueness in that sense that, we need to correlate the feeling and also other body responses. Not only looking at the sleep just by itself, but also the other body responses, to see how restorative the sleep you got is. There are many factors there.

Dave Asprey: The other data point that I would love to see, and this is something that you don't need any technology to do. But if you literally have a piece of paper next to your bed, with a row of dates on it. You can do this on your phone if you want to be tech about it, but it's like - how do I feel when I wake up?

Petteri Lahtela: Exactly, yes.

Dave Asprey: Just that second when you wake up, like, Wow! I wake up like, was I having a really nice dream and then I just drifted away. Could I have jolted awake, or do I wake up feeling like stressed and anxious like physically, not like I'm worrying, but just like my body doesn't feel ... All those things hugely impact...what did I eat last night? Like did I stay up late watching a movie? Did I have a glass of wine? Those are huge things that affect that, and you'll get all the data, but if you have no data, just how I'm I doing right now the second I wake up? It's so valuable. But if you had a little, on a scale of one to 10 how I feel to tie that end

of the data, I think you'd probably come up with this amazing thing that says, "Wow, and people have this, this, this and this happen," 90% of them get a 10 out of 10 when they wake up. I'm all over that kind of stuff.

Petteri Lahtela: We are going to have texts and notes in the next versions of the app, so that you can do exactly that thing. We collect that data to the Cloud as well, so that you can do your insights, you can derive your insights through that. We can start showing you this kind of cause and effect, kind of the insights that have even let's say, longer than just 24 hours effect on your body responses. All that is about becoming more self-aware, so we want to enable you to learn about those things, and take those things that you feel kind of meaningful in that context.

Dave Asprey: I'm very excited about where the world is going with applying machine learning algorithms to all this biological data from hundreds of thousands of people. Then finding something new, and then sharing it with the world and saying, we have very high correlation here, where we know that these are correlated. Then we can theorize what the cause is. But whether or not we know what the cause is, we could theorize that it's actually caused by invisible leprechaun aliens. Okay, it's a theory - and all medicine including the causal stuff is still based on theories that will probably be evolved and disproven. Just like Newtonian motion, like, oh it turns out there's a quantum stuff going on, but it's a good model. It doesn't really matter if we know what the cause is, if we don't do A and B will happen almost all the time - what happens between A and B, that's science and it's awesome.

In the meantime as a biohacker, I'm just going to keep doing A, because I know I'll get B, and we'll figure out why in the middle. And maybe we'll find out that there's some reason that we should change it. In the meantime you're getting data, just, this is like a sea change for humanity kind of stuff. I'm really excited, so I've been in quantified self for a long time. Kudos for this, and I want you guys to publish regular reports. "Hey, we don't know why, but we just noticed this and it probably matters.

Then a whole wave of academic researchers can go out and do this, like, "This is what's happening in the world right now, it's never happened in all history." It's a great time to be alive.

Petteri Lahtela: Yes, and we're happy to see that lots of academic, different universities are so interested about these things, and we have lots of those universities as our collaboration partners these days. We really wish to be able to help sleep research, and this kind of chronobiological research, and enabling us individuals to be empowered of all those findings, that we can find through that kind of work.

In normal daily life context, we get this kind of huge amount of valuable insights of so many things. Then you can think about kind of finding your kind of people, those who are the same chronotype as you are, and their demographics is close

to you, then you can start sharing with them. That, "Okay, I'm doing these kind of hacks. I can improve my deep sleep or model, whatever you want to improve, this marks." That's the sharing that we would like to enable.

Dave Asprey:

It is kind of funny, when the hack there, the time you drink your coffee is based on your chronotype, and there is a daily acid alkaline rhythm where, if you wake up, you're one of those people like you who wakes up early in the morning, bright and ready to go, you have an acid spike earlier than I do. That actually gives you energy, so an acid spike is not that, it's normal and if you don't have it, you'll feel like crap.

Then after the acid get metabolized, you get alkalinity, which gives you endurance throughout the day. For you, you probably should wait an hour after you wake up to drink your cup of coffee, because you'll get an extra little bit of an acid spike that then will become alkaline, you get more endurance throughout the day. Whereas, someone who wakes up earlier than they really should, can drink their coffee right away to move the acid spike earlier, and to get a little bit more cortisol when you want to it right?

Then to cause the alkaline, as the fruit acids get metabolized, they become alkaline. Stuff like that, okay, if you can identify your type of people and go, "Oh hey, I shifted my coffee so I have it after breakfast instead of before breakfast...who would have thought."

Of course you're in Scandinavia, it's dark all the time there, so you should just drink coffee 24/7. I believe you're in the highest coffee-drinking country on earth, but I diverged there.

Petteri Lahtela:

That's true!

Dave Asprey:

Okay. Anyway, I somehow brought sleep and coffee together, because they go together. But just getting the data, to know what you are, to know how you should change the habits of your day, I just find that to be some of the coolest stuff you could ever do. For everyone listening to the show right now, there are, it's like if you're playing Super Mario Brothers and you're playing a video game, there's this little power ups, there's this little gold coins as you walk through the day, they're invisible. We don't know what they are, and they're different for different kinds of biology. But if you know what they are, it's like just free energy sitting around for you to harvest. But only if you know - and so we're reaching the stage of knowing this invisible map, so we can navigate ourselves better.

There is a dark side to this, and something I wanted to ask about. I have been, even in 2011, I was writing about the dangers of electromagnetic frequencies. The industry has always said, look it's about a heating effect and there's not enough heat going on, but we've all known it's a mitochondrial effect. Recently the research has come out there's something called a voltage gated calcium

channel. I interviewed Dr. Mercola about this recently, and this part of our cell membrane is seven million times more sensitive to electromagnetic frequencies.

So without any heating effect, even something as simple as Bluetooth, or a Wi-Fi, or your cell phone, can cause a calcium channel to open up. Some calcium rushes into the cell, which causes inflammation and mitochondrial dysfunction, because you're getting too much calcium.

Now, one reason I'm willing to wear the Oura Ring is that, you can put it in airplane mode most of the time, so it doesn't have any meaningful effects. Then when you are going to get the data off of it, you're getting a brief burst of Bluetooth and then you're done. What's your take on, I mean a lot of times - in fact, Dr. Mercola was like, "Look, sometimes my ring goes out of airplane mode and just into active mode when I don't want it to." What's your take on EMF and bio monitoring? We don't want to break our bodies because we're monitoring so much. Like, walk me through your thoughts.

Petteri Lahtela: Yes. Definitely that's very important thing that we've taken into account from the very beginning of designing the product, that's one of the reasons why we wanted to make it a completely stand-alone device, so that it doesn't need to your mobile or anything else to be able to do all those things that it does. All the algorithms are running inside the ring itself, and it can store the data for three to four weeks without having connection to the mobile. Still you have all the data, so that was the first thing. Then second ...

Dave Asprey: Wait, it can't track the data for three to four weeks without being powered right?

Petteri Lahtela: Yes.

Dave Asprey: It just stores the data for a few minutes.

Petteri Lahtela: Yeah, you just need to charge it, but it continues to store the data and calculate everything, so you can ...

Dave Asprey: You charge it basically every two days when you need to, like an hour of charging.

Petteri Lahtela: Yes. Or if you charge every day, it's 15 minutes or so. If you just keep it charged, you don't need to connect it to your mobile. It continuously storing the data for 3-4 weeks at least, and then you get all the data. That was the first thing. The second is that we wanted to minimize the time that the ring is communicating with the mobile. Bluetooth was the only kind of acceptable way for us to do that, and we minimized the time that there is the communication between the ring and the mobile. That the longest time of that communication is in the

morning when the ring transfers the sleep data to the app and for the visualization.

It takes about 45 seconds, or something like that. That's the longest time, and then the rest of the day, if you don't switch it to the airplane mode, then every now and then it uses the advertising mode to check that whether the mobile is there or not, but still ...

Dave Asprey: About how frequently is that?

Petteri Lahtela: If you think about 24 hours, it's less than one percent of the time, so it's very, very rarely.

Dave Asprey: Compared to wearing a set of Bluetooth headphones around your neck, that are turned on that you're not talking on, it's far less than that. Or if you use Bluetooth headphones for a 10 minute phone call, especially in your brain, is not a great idea.

Petteri Lahtela: Yes.

Dave Asprey: It's very small compared to that?

Petteri Lahtela: Yes, and also in the power levels, we wanted to minimize that and we use, it's less than one milli watt. Normally like, your cell phone, normally, the output power is typically between 1,000 to 2,000 milli watts as big, and approximately 120 to 240 during the call, so it's huge difference there.

Dave Asprey: If you're listening to this, and you keep your cell phone in your front pocket by your junk - even if you're not on the phone, you're getting tens of thousands of times more EMFs than you would get from an Oura Ring. Which is one of the reasons I'm willing to wear it, because I don't want to have a constant Bluetooth transmitter when I'm sleeping and all day long. This is one of the situations where I believe that the value of the data you're getting, especially with the ring in airplane mode, it far exceeds the very low EMF tax. Because if you have Wi-Fi in your house, you're getting more than this anyway. Like it's trivially small, but it's not nonexistent.

Petteri Lahtela: Yeah, and then to your question that sometimes the ring exits from the airplane mode - and that may happen if the ring is too loose. If you're wearing the ring and it's very loose in your finger, then in some occasions, for zero point something percent of our users, it may think that it's not in the finger anymore. Then it turns on the Bluetooth - but still it just turns on this advertising mode, it doesn't kind of start sending anything or something. It's just the advertising that checking whether there's more power available for data transfer.

We would recommend anyone that if the ring is too loose, to wear it in another especially during the night, just wear it on another finger, so that it's a little bit

let's say tight, but comfortable there. Then you don't have that problem, so it's zero point something percent of the users. But anyhow, we have already addressed this. Dr. Mercola has given this message to us, and already a few months back we addressed this already in our development, and there will be different technical solutions to this. We may end up developing that kind of settings, that you can define the time when the ring wakes up for data transfer. Then it's exact, then it's kind of sleeping. It doesn't activate the connection. But because of the user experience recently, we didn't want to have that there yet, but we will have different alternatives there.

Dave Asprey: You're going to run into this problem, and every tech company does this, the early adopter biohacker crowd, like we wanted control. And then for an average consumer, who is just not going to care about this stuff, the control actually just adds complexity. It's the difference between running Linux on your laptop, and having a Mac.

Petteri Lahtela: Yes, exactly.

Dave Asprey: Sometimes it works, sometimes it doesn't. There's always a trade-off there, and I would encourage you, and I would encourage every company making these bio monitoring devices. Look, make a simple interface, but have - even though it costs more for development - have the interface that allows the power users to do what they want with the device. Because - I promise you that power users like Dr. Mercola, like me, and like the many of our listeners - they will provide more value to you than the cost of the development. If you just let us be at the cutting edge, so I appreciate that you're putting that in there, thank you.

Petteri Lahtela: Yes.

Dave Asprey: All right, so we've talked about electrical pollution and how you've addressed it from the design. Something else we didn't talk about and all you listening, we don't have a business relationship here. You might have sent me my ring for free, I don't actually know...I might have bought it too, I don't remember. The bottom line is, I'm not selling this at all, I'm just telling you like, okay, this is kind of cool.

The other thing is, it's waterproof. At Basis, especially our prototypes, they weren't waterproof. And even our own engineers would forget, and take a shower, or they'd sweat on it, like, "Ugh, like there were 10 of these things, and we just lost five of them thanks to showers." I've ruined so many...I have a drawer full of ruined wearable devices, like half of the companies aren't even in existence anymore. This is waterproof, and that actually matters to me, because I'd probably, especially when you first wake up and take a shower, like, "Oh, I didn't take my ring off, damn it, there goes a few hundred bucks."

By the way I don't even know how much the rings cost right now, but they're reasonably affordable. What's the cost?

Petteri Lahtela: \$299.

Dave Asprey: \$299 - so in terms of bio monitoring, it's more expensive than a Fitbit or a wristband kind of solution. But it gives you a lot more data, and it's less weight. I think it's a superior thing. And I'll be really straightforward. I've never worn any tracker for more than about six weeks. They just get irritating, and the value of the data isn't high enough to justify continuously charging it, downloading and syncing and all this stuff. But this is the first device I've been able to wear for more than six weeks, and like, oh, I'm still getting good data. It's not that much work. I look forward to charging it less and all that, but the amount of thought and management required is very, very low.

Which is why I thought I'd have you on the show just because, hey, I think you guys kind of cracked the code, because you get more valuable data in less working with less inconvenience. Like the equation is there, that I would tell my mom to wear this ring, and I wouldn't tell my mom to wear any of the stuff that I've worked with previously, so I think you guys move the needle from a just from a consumer usability perspective. That's actually hard to use.

Petteri Lahtela: Yeah.

Dave Asprey: Kudos.

Petteri Lahtela: Yes, that's right, yes. Retention rates also show that we have really committed to user base, and we highly respect that because that's the way for us to get to know everyone as users and that uniqueness of every person. The longer term data that we get, the more we can learn, the more we can customize the algorithms to bring in more value.

Dave Asprey: I think you guys are doing something pretty special here and I appreciate it. Now we're coming up on the end of the show and now more than 400 episodes, I've asked a whole bunch of inventors and scientists and authors and researchers all that, the same question because I am also gathering data. The question is, if someone came to you tomorrow and they said, "Petteri, I want to perform better with everything I do as a human being, not just my work, not just sports, but just being a human. What are the three most important pieces of advice you'd have for me?" What would you tell them?

Petteri Lahtela: I would say the first one is have your sleep patterns or sleep efficiency fixed, so that you know how you get the best quality sleep and what's good for you and what's not in relation to sleep.

Dave Asprey: Sleep better?

Petteri Lahtela: Yeah so sleep and recovery are our passion, so we want to provide meaningful value information for people about that.

Dave Asprey: This is your personal answer you can include your life's work and all that which it usually does, but you've got two of them, what are the other two things that are most important?

Petteri Lahtela: I think yeah, follow follow your inspiration in your life. I think that's really good to try for doing whatever you want to do, and what you want to realize in your life, whatever you do, follow your inspiration. Kind of find your way to serve others as well, but also ...

Dave Asprey: Service...

Petteri Lahtela: Yes, kind of...I would also say value your close people, because they are the most important people in your life. Like, we have two daughters, and my precious wife, we've been together for more than 30 years now. The older you get, the more you value those close people around you. Your own family, your parents and everything you can learn from them, they are best reflectors of yourself to understand, become more aware of yourself.

Dave Asprey: Beautiful. Well, Petteri, thank you for being on Bulletproof Radio - and where can people find out more about the Oura Ring? By the way it's O-U-R-A that's how you spell Oura.

Petteri Lahtela: Yes.

Dave Asprey: What's the URL people should go to, just to check it out?

Petteri Lahtela: Yeah, OuraRing.com, there you can find some more information.

Dave Asprey: That's O-U-R-Aring.com?

Petteri Lahtela: Yes.

Dave Asprey: Awesome. All right, If you enjoyed today's episode, you know what to do. Do something to make yourself more self-aware, and you may decide you want to incorporate some tracking tech. I've been doing it, jeez, for 20 years now, and it's made a huge difference, just to me understanding when is my balance doing, what I wanted to do, when is it not and whether or not you choose this piece of technology or something else or just to wake up and say, "How I'm I doing right now?"

Things like that are so profoundly important to just doing what you're here to do, and just not wasting the precious gift that is your life here. I've had so much change in my life by just knowing what's going on in there that I couldn't see, and making it visible and this is one of those many, many pieces of technology. In addition to the practices of meditation and awareness and all the other things you can do.

If this is valuable for you, great and I'd encourage you to share it with someone and you could also go to the iTunes thing, go to Bulletproof.com/iTunes, I'll give you a link to the thing. Just leave a quick review on the show that says, "Hey, this is a show that's worth listening to," and that helps other people find Bulletproof Radio, which is really useful. I would personally be profoundly grateful if you've read "Headstrong" or "The Bulletproof Diet." If you took another few seconds to head to Amazon and leave review, and just say anything about the book, it really makes a difference and I actually see all the reviews on Amazon and things like.

That's one way, I put thousands and thousands of hours into writing these things, or into producing Bulletproof Radio, and if it's a good use of my time to consolidate all that knowledge for you, and to find people who are changing the world. To have these conversations, it's a simple thing to just say thanks, and it's something that I really notice, so I appreciate if you do that. Have an awesome day and I'll see on the next episode.