How to Control Your Blood Sugar & Spike Your Energy – Levels Health with Dave Asprey – #796

Announcer:

Bulletproof Radio, a state of high performance.

Dave Asprey:

You're listening to Bulletproof Radio with Dave Asprey. Today, we're going to talk about something awesome. It's metabolic flexibility, metabolic fitness, and how you can actually look at it in real time, and what you can learn from doing that.

Our guest today is Josh Clemente, who is a founder of Levels Health. He started this company the day he figured out his metabolic dysfunction was screwing up the way he performed during the day. Sounds familiar. I had the same thing happen to me in Silicon Valley. But he found his glucose levels were all over the place in the prediabetic range. And he's a mechanical engineer and a CrossFit Level 2 trainer, but his day job is designing life support systems for astronauts and rescue systems for emergency response teams.

So, it's this weird combination of engineering brain, wanting to go to Mars and stuff like that, as well as, "Why can't I hack this stuff myself?" So, if there was a stereotypical perfect guest to talk about biohacking and controlling your own biology and hacking everything, this is the man. Josh, welcome to the show.

Josh Clemente:

Dave, couldn't be happier to be here.

Dave:

All right. You were a SpaceX guy, figuring out how to keep Bob Behnken and Doug Hurley alive on their May 2020 trip to the ISS. Good work. They are alive, so a mission accomplished, right?

Josh Clemente:

Thank you. Yeah, I think so.

Dave:

I had an opportunity to talk with the president of SpaceX, Gwynne Shotwell, a little while ago. And she's been there for, I think, 17 years now.

Josh Clemente:

Oh, yeah. From the beginning.

Dave:

And I said, "Okay, you've been there for 17 years and I know that you're hardening systems that go to space." And if you're not an engineer, hardening a system means making it so that it's highly resilient, and it'll handle radiation and stress and gravity and all that kind of stuff that we don't have to deal with as much on earth.

And my question for her was like, "How much have you invested? How much work have you done in hardening humans to go into space?" And she looked at me. She goes, "No one's ever asked me that question before. We haven't done that." And I'm like, "How is it that we can like hack spaceships to carry mushy blobs of not very metabolically strong flesh when we couldn't just like hack the flesh a little bit so maybe our spaceships could be a little bit better?" I don't know. I've always thought like it has to be up your alley.

But anyway, that's my SpaceX story. Because I believe for us to do that sort of stuff, we have to know way more about what our body is doing and way more about what our environment, including in the spaceship, is doing to us. And you were on the path of the spaceship way. Tell me what happened with your blood sugar and how you figured it out?

Josh Clemente:

Yeah, so it's funny, the process was almost like discovering that there are options for hardening the body that I wasn't taking into account. And so, that's kind of how things went. I was working on this program. It was by far the most stressful and probably the most serious and important part of my career at that time. I was leading a small team. We were developing the breathing apparatus and a number of other pressurized life support systems for the crew, Dragon Capsule.

And I'm relatively fit, I have to say. I've been working out my whole life. I've played sports. I thought that I should feel really healthy and be performing really well, being in my late 20s, and essentially, as fit as I've ever been. That was not the case. I felt really unhealthy day after day, and it was continually declining. And so, I got to this.

Dave:

Yes. Okay. I get this. This is like my Silicon Valley experience, too. Okay. I feel you, brother. Keep going.

Josh Clemente:

It sounds like it's resonating. Yeah. So, it's just like, day after day, things are heading in worse directions. And I'm getting to the point where every sort of work day is me with an IV drip of coffee, dragging myself from one meeting to another and trying to maintain a facade of positive mood and maintain performance. And really, mood I think is what drove me because I felt like a different person mentally. Like I was losing my sense of humor. I was losing my determination. It was a lot of stuff that really frustrated and confused me.

Dave:

Hypoglybitchy, is that a good word?

Josh Clemente:

That could work. Yeah. That's a great way to frame it. But what was interesting is that I was reading some research from Dom D'Agostino, actually, at University of South Florida. And so, Dom is, as you know, really one of the foremost ketogenic researchers out there.

And this paper that I was reading was actually specific to my work. I was designing oxygen life support systems. And I was reading this paper because it was discussing central nervous system toxicity, and essentially, this is what can happen to an organism if in a high pressure, high oxygen environment for too long, you can actually suffer a seizure.

So, the brain, the oxygen concentration is so high that the reactivity goes up and essentially, tissue start to malfunction. You get a lot of reactive oxygen species, and ultimately, central nervous system goes haywire. And so, this was a situation I was thinking a lot about. And this paper that Dom had written studied rodents in this environment, except that they put them in a ketogenic state. So, they fed them a ketogenic macronutrient ratio.

Dave:

Right.

Josh Clemente:

And this simple switch in diet extended the time to seizure by five times in certain of the rodents. And that paper totally blew my mind. I mean, at this point, I was a person who is a calorie absolutist. Workout really hard, you can eat anything.

Dave:

How long ago was this?

Josh Clemente:

This was 2015 timeframe, 2015 to 2016.

Dave:

Okay. So, Dom was, I think he was guest number 40 out of 800 and something on Bulletproof Radio. So, 2014, this is when really Bulletproof is just coming out for executives called the Bulletproof Executive, because like what you've dealt with, there are millions of other people working high stress, high cognitive capacity jobs with the word façade used. It's endemic, it's epidemic. It's everywhere. And I love the story there. You're like, "Okay, I got this." You read a paper on ketosis. You're like, "Oh, five times more resilience. Maybe I could use that."

Josh Clemente:

Yeah. I was just like, "Wait a minute. So, you're telling me that there's a nutritional protocol that gives you essentially superpowers?" And of course, this is extrapolating from rodents to humans. But I was just like, "What am I doing to ensure that I'm making good decisions every day? I feel like total garbage. It doesn't matter how many hours I put in the gym."

Dave:

Yeah.

Josh Clemente:

I certainly don't feel healthy and I have no objective data to tell me that I am healthy. So, that first paper triggered something in me where I was like, "I got to learn more about metabolism physiology. This is so obvious. Every cell in my body needs energy. I don't feel any energy right now. So, something's malfunctioning in this system."

So, I just started to research and dig into it. And kind of as a byproduct, I decided to start pricking my finger to measure blood sugar. And this was like, "Yes, it's the primary energy molecule in

the body, might as well start there." It's the gas gauge. So, I started pricking my finger. I was getting a ton of random numbers.

Dave:

How'd you like that? It's pricking your finger every day. I did that in 1998 when the doctor told me, "Maybe it's your blood sugar." Like, how many times a day were you pricking?

Josh Clemente:

At one point, I was pricking 60 times a day.

Dave:

Yeah. It sucks, right? You're bringing me back. Okay.

Josh Clemente:

So, you've been there. I mean, not only was it uncomfortable and messy and weird, but also, the data was not useful.

Dave:

Yeah.

Josh Clemente:

Because I was only able to prick my finger when I had spare time. And so, it's like, I'm at home and I'm about to go to work, or I'm about to go to sleep. And that's when I would pick a bunch of times to try and get any amount of data stream. And, ultimately, this didn't lead me anywhere. I just saw a scatterplot. It wasn't giving me any insight.

I read a book, actually, by Robb Wolf called Wired to Eat, and this was now early 2017. And that's the first time that I had read about continuous glucose monitors. And so, he just has a blurb in the book. And it's like, "Yeah, there's the device you use for the management of diabetes, which streams glucose full time." And I was like, "Bingo, that's what I need." Went to my doctor and asked for one. He said, "No, you don't have diabetes. You don't need it."

Dave:

Right.

Josh Clemente:

So, I kind of left confused, continued to try to get one, ultimately did. And within two weeks, I had enough data to know that I was either borderline prediabetic or full-blown prediabetic depending on who you ask. And this is all despite having less than 10% body fat and never having ever heard anything about my glucose from a primary care practitioner or really anyone up until that point.

Dave:

And you were a CrossFit trainer at the time, right?

Josh Clemente:

CrossFit level and trainer, I'm now a Level 2. Definitely pushed hard in the gym, cared a lot about being healthy, and just had this underlying mayhem go.

Dave:

Exercise didn't fix your blood sugar all by itself? Come on, man. Calories are calories. Exercise fixes everything. Get with the program.

Josh Clemente:

I have to say, I think it even could be worse, where the way that I was exercising was highest intensity all the time, no matter what. It's like I'm putting in 120% of my effort, and potentially putting me into a chronically stressed poorly recovered state. And so, it was actually the case that I think my exercise was pushing me more into metabolic dysfunction.

Dave:

Yup.

Josh Clemente:

And coupling with all of the work stress, and the poor sleep, and then of course, the poor nutrition decisions because I didn't have a closed loop feedback system. And so, in combination, the whole environment of my body was just stress and destruction.

Dave:

I love closed loop feedback process menu. You're saying words that are almost romantic to another engineer. So, you need to back off a little bit. No, I'm kidding. But what is the closed loop feedback system for non-engineers listening?

Josh Clemente:

So, basically if you're designing a system that needs to be controlled in some way, let's just say, cruise control on a car, there are two ways to do it. You can do an open loop system, which is essentially you provide an input. You push the accelerator until the car is moving at a certain speed, and then you don't take any other inputs. That's where the accelerator stays and that's how fast the car goes. And that's called open loop because you're not taking in new feedback.

But then, you could have a closed loop feedback system, which is where there are other sensors on the car that are, for example, measuring the distance to the car in front of you, and feeding that back into the computer and saying, "Okay. Slow down" or "Speed up", in order to maintain an appropriate safe gap.

So, the difference is that the system number one does not take into account any new information when it's making inputs. System number two takes into account every decision that's been made prior and new information that's developing in order to improve the decisions being made.

We, as humans, are living in an open loop environment. We're flying blind, essentially, when it comes to our health. Every day, you're making hundreds of decisions, hundreds of lifestyle choices that ultimately directly affect your risk of chronic illness, and who you are, and what you are composed of. And those compound in either a positive or a negative direction. And unfortunately, because we're flying blind, we're in an open loop state. We don't get feedback on whether those are heading in a positive or negative direction, for sometimes decades.

I mean, in my case, if I hadn't stumbled on this, I could have ended up with a serious and potentially much more harmful condition because I didn't get feedback until a diagnosis. So, yeah, I think that the concept of open versus closed loop feedback is critical to bring into the mainstream of health and wellness.

Dave:

The idea of using blood glucose, which is a marker for how much of the most common energy is available in the blood right now and how good is your body at regulating it, as a real-time feedback thing. It's really powerful. And I'd been fantasizing about an implantable when I first started pricking my fingers. But we were still a ways away from that.

When I was at Basis, which was the first company to get heart rate from the wrist reliably. It's the same tech that's now in the Apple Watch and we sold it to Intel a long time ago. I was thinking, "How do I get blood sugar from the rest?" I need blood sugar, blood sugar, blood sugar because it was a big fantasy.

The first experience I had with it, though, when I first started Bulletproof Coffee and just writing about it, a lot of type one diabetics got in. They're like, "Oh my god, this MCT oil is like a backup thing. So, even if my blood sugar crashes, I don't go into a diabetic coma." So, thank you. And one of them mailed me her DeX call monitor. She's like, "This is my old one. I got a new one. I know you'll like this as a BYOC." I'm like, "Yes, I finally got a CGM." And I played with it. But getting new sensors without a prescription, like you said, was a big issue.

And we fast forward to now. I did get a prescription for a CGM a few years ago. And I was on the Dr. Oz show. He's like, "What's that weird white thing on your arm?" And I'm like, "Oh, this is my robot arm. It's got like my sensor and it's got my Oura Ring." And he's like, "Well, it looks weird." But okay, it looks weird on camera. But once I said CGM, he knew right what it was because he's a very brilliant doctor.

And it was still really hard to get. I had to order from Europe and all sorts of hurdles. And then, you guys come along at Levels. You're like, "Oh, here, we can just do it." And I was like, "Okay." But I didn't get that much value from just plain continuous glucose monitoring, because I'm like, "Great. I have a graph, but I can't correlate it to my behavior."

And I turned on the Levels app, like, "Oh, my god, I can take a picture of my food." And the level of control from having your app to just go, "Oh, I need to crank up the amount of protein, the ratio of protein to carbs, even though I'm eating relatively resistant starch in a meal to get my blood sugar to go to 120 after the meal for less than two hours instead of going up to 140." Okay, that's really useful because that blood sugar thing for brains and whatever else, it matters.

But if you want to live a very long time, high blood sugar, I mean, it cooks the inside of your veins. It's correlated with all sorts of bad aging things, even if you have good blood sugar control, just after a meal if it spikes. So, I'm like, "What's spiking it?" And I've just had so much fun looking at my blood sugar. Like, "I wonder why it did that? Oh, yeah, I only slept three hours last night. That's why it went up as high as it did."

And if this is invisible, even to someone who has a good sense of your body, you're very unlikely to know. Unless your blood sugar's like at 65 or something, you're not really in ketosis. You'll just be like, "Ugh. I feel like a zombie." How many people do you think now are walking around with blood sugar regulation issues who just have no freaking clue?

Josh Clemente:

Well, I can guess that it's significant.

Dave:

Yeah.

Josh Clemente:

But I can give some stats from the CDC, which tell us that it is significant. So, right now, the numbers are over 120 million Americans have prediabetes or diabetes.

Dave:

Is there a difference in your opinion?

Josh Clemente:

Well, here's the thing is that we have these sort of mental models about health where you are healthy until you're not. And it's totally not true, right? There is no line in the sand where you suddenly fall into diabetes. We've drawn an arbitrary line on the metabolic health spectrum. And we've said, "This here is diabetes. And this is slightly better, that's prediabetes. And then, everything else is healthy."

And it's giving us this distorted perception of what's really happening, which is that all of us are prediabetic. And if we don't make the right choices, we will all be diabetic because that is the way the human body works. If you feed it the wrong inputs for long enough, you will ultimately end up with an insulin resistant state and glucose dysregulation.

And so, now, we've got a situation where 90 million American adults have prediabetes. Eighty four percent of them don't know they have it. And how are you expecting us to right the ship when people don't know there's something wrong. I mean, there is no feedback loop happening for these people. And so, we're heading in a direction where potentially close to 200 million people could be type 2 diabetic by 2030, 2040.

Dave:

Just in the US?

Josh Clemente:

Just in the United States. And right now, we have half a billion, globally. And of course, most of this is happening in developing countries. And that number is increasing at an increasing rate due to the number of countries that are developing rapidly. And I think what's happening here is that, and again, this is just type 2 diabetes.

The insulin resistance and metabolic dysfunction epidemic touches far more than that. It crosses from type 2 diabetes into obesity, Alzheimer's dementia, cardiovascular disease, high blood pressure, cancer, I mean, the list goes on. But what we're talking about here, if we just talk about that type 2 diabetes situation, how do we get there and why don't we know that we're going off the rails?

And as you mentioned, this stuff is invisible. And the reason I think it's invisible is that for millions of years, humans were evolving in scarcity. We were just constantly in a state of fasting, like just hunting and gathering our way to the next calories.

And so, every calorie was a lifesaving calorie. If you came across something that was edible, you eat it immediately because you needed it to survive. And so, we never developed this sensory feedback

mechanism for the quality of our nutrition. There was no reason for your body to say, "Oh, don't eat that, that's not good for you." Because that actually was good for you because you would otherwise starve to death.

Now, we're in this sedentary situation, where we are able to short circuit our metabolic systems, eating more processed carbs in a single setting than a prehistoric human would come across in a lifetime. And now, without that evolved sensory feedback mechanism, we're in trouble fast. And I think that's why we got from barely 1% of the population having type 2 diabetes in 1960 to now well over 10% in climbing.

Dave:

I'm just trying to remember in my head, I think it's two doctors, at least one who've been on the show, who just flat out said, "Prediabetes is diabetes." And I'm of that opinion, the fact that I have level three diabetes versus level 10 diabetes, it's a slippery slope.

So, what we're talking about there, if you get rid of in the data, younger kids, where they can be a problem, but it's less of an issue. And you're now looking at least a third of people, so one out of three, and they don't have to be fat for this to be a problem. Okay. Now, if someone doesn't use the Levels, continuous glucose monitoring stuff, how would they ever know?

Josh Clemente:

Well, right now, the state of things is pretty grim. It's a situation where we use these metrics, which unfortunately, are single point measurements. You go in once a year, or even fewer times than that, and you get bloodwork. And you get one point in time measurement and that is usually your fasting glucose.

For the most part, people don't get an A1c test, which is an average glucose approximation, unless there's already a concern from a fasting glucose check. And the unfortunate thing is that fasting glucose is the last thing to go wrong. The reason for that is that you're fasting and your body is in a state of stasis, or close to it. What's actually happening is that your body is breaking down after every meal and after every lifestyle decision you're making. It's those moments of dynamic blood sugar response that really define whether or not you are metabolically healthy.

So, when I eat a meal that has carbohydrates in it, can my body process that or am I going to release a ton of insulin and my cells can't respond because they're insulin resistant, and my blood sugar is going to stay high in the presence of that insulin? So, that's the question. It's not whether or not 11 hours after dinner, my blood sugar is down in some arbitrary range.

And so, this is how we are where we are, as we're using screening measures, which check one point, and then they extrapolate that to your entire health. And as an engineer you know, you never define a system by one point. I mean, it's absolutely outrageous to imagine that you can predict how healthy someone is from one-point measurement.

So, we really have to, unfortunately, right the ship by proliferating this technology in a very mainstream way. It has to be the case. Because of that, 84% of the 90 million Americans who have prediabetes because they don't know they have it. It has to be the case that they stumble upon it like me by trying an interesting product that tells them more about themselves. And in doing so, they discover, "Wow, this is not as good as I had expected." And luckily, because I've come across this, I can now make changes.

Otherwise, I just think either we have to implement some sort of social scale mandatory testing or like opt-in testing or something, or you're just never going to uncover it. There's just, you won't find it out.

Dave:

Of the couple trillion dollars that we spent on COVID testing, do you think that that's saving more lives compared to spending a couple of trillion dollars on blood glucose monitoring for the entire country to create healthier metabolisms?

I totally don't expect you to answer that because that would be a PR nightmare, but I will answer it. Here's the deal, if you have blood sugar regulation problems, your risk of dying from all infections is much higher. So, if we were interested in making sure fewer people died, we would make sure that we did what it took as a country to get our blood sugar under control, then it's just that simple.

And if you're in the government, you're listening to this, do the math already. Okay. This is a clear and present danger that's there every year that kills more people every year than probably all viral infections put together, I would imagine. So, it's that big of a deal.

Josh Clemente:

I totally agree. It was interesting. Well my cofounder, Casey, she's a Stanford trained surgeon turned functional medicine doctor and then she joined Levels because she realized how rampant the inflammatory problems of metabolic dysfunction were in her practice and in her surgery.

But she wrote an early review of the data on COVID and the connections to diabetes. And so, that review was profound. I mean, in Mexico, for example, the mortality from COVID was twice as high for people that had diabetes. I mean, 200% likelihood of death. That's not minimal.

What we should describe it as is the collision of two pandemics. You have a viral pandemic, hitting a population that is already diseased. And the situation is that we can vaccinate ourselves from this strain of virus, because luckily, we have the technology to have quickly developed it, but there will be another one and there will be another one after that.

And if our population isn't resilient enough to have an immune system that can fight viral infections because it is frankly undermined or hampered by insulin resistance and all of the byproducts thereof, we won't ever get there. So, it is incumbent on each individual person, and I think also on society in general, to improve our metabolic health and therefore the resilience of our entire population. And not just here in the US, but globally. I mean, this is clearly as we've seen from COVID, it's a clear and present danger, as you said.

Dave:

When I go into the app, and I say what I ate, and you type it in and take a picture, and then I can look, "Okay, how high did my blood sugar go up and how long did it stay elevated?" The goal of eating foods where there's a moderate rise that goes down relatively quickly. You do that, it is the right meal. And if it goes to 170 and stays there for two or three hours, maybe that shouldn't be what you eat regularly. And it can be different for different people, which is really well established.

Are you guys seeing enough data now? I know you've got like 75,000 people on your waitlist. But do you have enough data to be able to say, "Oh, it turns out that everyone who drinks a diet soda or eats some kind of food sees this and these are the clear and present danger foods." Or do you not have that kind of data?

Josh Clemente:

We do have that. So, our data set is we're currently taking in more data per week than we brought in for the entire first half of the company's life.

Dave:

Wow.

Josh Clemente:

And so, the data set is now the largest of its kind in terms of continuous blood sugar information for people without diabetes paired with lifestyle information. So, no data set like this has existed and it's growing exponentially. So, the beauty of that is that we will ultimately have the ability to do what you're asking right now.

We still, at this point, are in the early stages of basically refining our data set and our approach to combing through it and we have some phenomenal data science folks on our team that are bringing out some really brilliant insights. I can't yet state with confidence because we want to make sure that there's statistically significant and such. But let's just say that in the future, these data-driven insights, I think, will ultimately change the misleading marketing that is possible today with food.

So, you will not be able to trick an informed and data driven audience with labeling because they will have feedback. So, you say, this food is good for you or heart healthy and your blood sugar goes to 170, like you said for two to three hours and then crashes. But we know glycemic variability is closely related to cardiovascular disease. So, that'll be an easy one.

Dave:

I am to the point, if a food has heart healthy stamped on it, it just means don't eat it. What it means is it has no fat and especially no saturated fat, which is a precious nutritional substance. And when you eat it, it's basically just like mainlining sugar. You might as well just go have some ice cream.

Josh Clemente:

Much of the time people are, so people come into the Levels app, which by the way the level system exists to answer the question, what should I eat and why with objective data from your body in real time and when.

Dave:

When matters too.

Josh Clemente:

And when. And so, people come into the program and they have preexisting notions built on what we all have, which is, without data, we have internet advice and we have food labeling, and/or maybe something that worked for a friend. And they come in and they're trying to regulate their diet. And oftentimes, people will be eating oatmeal. And if you Google the healthiest breakfast, look at a list of healthy breakfast, top three, oatmeal is going to be on it every time. That's what the internet says.

And so, people are eating oatmeal for breakfast, and a large number, a significant portion. Last time I checked, it was something like 70% of people in our dataset who ate oatmeal had an extremely poor blood sugar response to it, and I mean, one of the worst that they would have through the entire program. And that is highly counterintuitive, because oatmeal, we are told is a heart healthy breakfast.

And of course, this doesn't mean that no one should eat oatmeal. I mean, I think, to each their own, and also, there is that personalized element that we talked about. Some people are just fantastic carb metabolizers. But for those people who are eating it with the intention of being healthier, with the intention of treating their hearts right, I have to say, it's important that we correct the record about

oatmeal. It is not necessarily heart healthy and certainly only for a subset of the population. So, that's the type of thing that becomes almost an urban myth and it gets spread.

Dave:

But oatmeal has fiber.

Josh Clemente:

Right. Yeah. But it actually has a surprisingly small amount of fiber.

Dave:

I know. I'm channeling ideocracy, where they watered the world's crops with Gatorade because it had electrolytes and all the food died. And it's one of the things where just because it has one thing or some small amount of one good thing doesn't mean it's good for you because there's other bad stuff in there.

So, I love it, you're picking on oatmeal, which is not a good choice, at least not for most people. And even for the people who do tolerate it, it's probably not a great choice. It's just tolerable. And it feels to me like a lot of our foods, and a lot of this has to do with my new fasting book. A lot of our foods are, you can eat that and you won't starve to death. But what is a really powerful thing to know?

The problem is, well, we've always eaten that because throughout history, a lot of our people were close to starving a lot of the time, so it just becomes food instead of that's the backup food for when you can't get stuff that works really, really well. And using data to circle around, well, we can tell ourselves that that's good, but the data lies.

And in your case, look, I'm working out, I'm doing everything right, and you got the pedal all the way to the floor, and it's not going any faster. It's very similar to what I went through. I'm like "God damn it, I'm going to exercise an hour and a half a day, six days a week, 18 months, and nothing will stop me because I will lose my weight." When it doesn't work, "Ah, maybe it should be two hours a day." Because the assumptions were flawed. And I've already just in using Levels over the past, oh, I'm guessing about nine months, I've been better able to follow my own advice.

So, a classical example, I have said for years, eat before it gets dark. Earlier dinner is better. But there's always school and whatever else, and it just tends to creep up, especially in winter. I'm in Canada, where in winter, it gets dark at like 5:30. So, I've been saying, "What happens if I eat at 6:00 to 6:30 versus 5:00 to 5:30?" And there's like a 15-point difference in my blood sugar response within an hour of eating.

So, now, I'm really a little bit more militant about eating a little bit earlier because I know it works better versus just saying "All right, maybe I'll just skip dinner and I will just eat lunch tomorrow because I really don't want to eat at a time when my body's really not ready for it." And to see those correlations, I couldn't see that when I stuck my finger because there's only so much that you can do. And I couldn't see that when I would just use the older CGM apps that didn't have the input your food, see what it did, and just the correlation tools. So, I'm truly blown away.

That's why, by the way, I don't know, I think I mentioned this, I am not sure yet. So, I'm an advisor, I'm an investor and stuff like that. And also, guys, partly because of that and also because I try to work out good deals for you, if you go to levels.link/dave, you get to go to the front of the line. So, there's like 75,000 people trying to get this. There's a backlog to get the devices. So, if you want to be one of the first ones and this isn't like a financial thing, I'm not getting paid on that or anything. This is just like, "Hey, let's do a solid for Bulletproof Radio people."

I just have to say, if you want to fast or you want to have more discipline around your diet, there's nothing like saying, "I'm hungry right now." And then you wave your phone over your Levels thing on your arm, you can see mine right here. See, look at that. All right, I'll flex for it. It makes you look all cool. But if you're watching on YouTube, you saw that. Otherwise, you just heard rustling.

But what happens is you wave your phone over it, and it says, "Oh, here's your blood sugar levels." And you're like, "Man, my body just told me I was hungry, but my blood sugar's 105. I got plenty of fuel present. Therefore, that feeling of hunger isn't something that's valid." And then you tell the cells in your body, "Shut up and use what you got and come back to me when you're actually hungry."

And the process of doing that as a real-time feedback loop has been really helpful even for me at 10 point whatever percent body fat, not insulin resistant, and relatively dialed in as a biohacker. It still makes a giant difference. Just because when you're tempted, you check at night, I really don't need that.

And the data is so clear, eating fewer meals per day equals less chronic inflammation and chronic inflammation is the same thing as your mitochondria not being able to turn air and food into electrons. They're turning into some electrons and some inflammation. Another word for that would be insulin resistance because they couldn't turn the energy into electrons.

So, that closed loop has been massively illuminating for me. And yes, I wear my Oura Ring and I monitor all sorts of crazy stuff. But this is, I would say, you might not like this, I'd say it's almost as important as monitoring sleep and I think you need to get your sleep scores first. But you should get your continuous glucose right after your sleep score.

Josh Clemente:

Yeah, so on that note, I mean, I think that the interesting thing for me has been discovering through CGM the importance of those sleep scores. Because when it's like, "Okay, I got a poor sleep score, but I don't really know what that drives," sort of like, well, it's bad sleep, but I mean, what would happen if I just kept getting bad sleep? Well, then you put on a glucose monitor, and I see that a five-hour night of sleep versus an eight-hour night of sleep is a 40% difference in how my body can metabolize my meals, that's when it clicks. Oh okay. Got it.

So, every time I get that poor sleep, I'm kicking myself in the head when it comes to my insulin resistance and my ability to metabolize the meals I'm giving. And rather than compromising myself further with poor nutrition after poor sleep, I need to be even better about my diet because I know I've pulled one of those levers, the sleep lever, and I now need to make up for it by not pulling the nutrition lever too because that's going to do double the damage.

So, that whole sort of context that I think real-time biological information gives, it has been key to my understanding of not only sleep but also just mental fitness, just mindfulness, being able to understand the mechanisms of stress in my life and trying to take control of them.

So, yeah, the real-time feedback loop with a molecule that is significant and contingent on the meals I'm consuming has been a game changer for me in understanding the value of these other metrics.

Dave:

So, you've had the same experience. Do you guys publish how many active users you have versus people trying to get it?

Josh Clemente:

We don't publish it, but I think right now we have something like 1200 active users at any given time. And we're still in that small invitation only beta mode. Dave, you just read out the link. So, if people want to come and join us, this is basically part of the process of developing the product. We're rapidly iterating on features. We're taking in customer feedback and essentially creating the product that we believe is going to be intrinsic to the stain behavior change across long time periods that is necessary for us to write the metabolic health ship here and abroad.

So, if you want to be a part of that, please join us and we'll be slowly increasing that volume. And as you mentioned, we have close to 80,000 people on the waitlist right now and tons of insatiable demand and we're looking forward to being able to launch to the broader public once we finish this development process.

Dave:

Well, it's something I can't wait for. I think a lot of listeners are going to say, "I want to do this," to at least get an understanding. You've got some really cool medical advisors, all but one of them have been guests on Bulletproof Radio, which made me laugh. Dom D'Agostino, David Perlmutter, a very close friend, Dr. Molly Maloof, who's also a friend, Dr. Sara Gottfried. These are cool people who are very knowledgeable.

And looking at, okay, how do we get people who are working with the public and with patients, and then say, how do we make this usable, this is the first usable, just easy to use zero inconvenience CGM that I've come across. So, I want to push you to move your launch date up. And well, I think there should be a lot of people on your waitlist excited to do that.

Now, there are other wearables that are out there, even some kind of blood-based ones. How is this different from other wearables that are out there?

Josh Clemente:

Well, right now, the wearable market kind of consists of what I like to refer to, and this is not judgmental in any way, but there's sort of superficial metrics, which are heart rate, step count, occasionally body temperature, which I think is actually really valuable, heart rate variability, which is, I would say, body temperature and heart rate variability of those two are the most valuable.

Dave:

Okay.

Josh Clemente:

But the reason I call them superficial is because they're outside the body. They're available to be measured, for the most part, with your finger. You can measure your pulse with your finger. You can count your steps.

And so, now with CGM, we're crossing that barrier. And we're going kind of below the skin to an invisible metric that we otherwise wouldn't have access to. And that's why we're calling this biowearables. This is a brand new space. People are traditionally only using kind of the consumer product wearables that are out there, which are admittedly of value. I mean, I have two on right now. I wear my Garmin 245 and my WHOOP strap and I love them.

But I think that the future of this technology is incorporating more real-time molecule measurement in the body and then using that to close these feedback loops to better understand holistically where I land on the health spectrum and where I need to go.

Dave:

Okay, that makes a lot of sense. You know where the 10,000 steps a day actually came from?

Josh Clemente:

I actually don't. I've read about this recently and then I've blanked on it.

Dave:

I figured this out when I was at Basis, the wrist tracking company. I did all this research. And sometime, or is it '52 or '56, in 1952, the first ever wearable pedometer was a mechanical and that clipped to your belt. It was from a Japanese company. They made up 10,000 steps a day and there's no data to back that up. And we've been saying that. Get your 10,000 steps a day, because of the power of marketing. It's exactly the same type of behavior that says oatmeal is a healthy breakfast. So, just saying, so those are superficial metrics.

Josh Clemente:

Yeah. I think if there's something that is encouraging people to get more steps in, maybe they selected that number because it was like 150% of what most people would get in a day, and so, they're like encouraging them to push. I don't know. Maybe it came out of thin air. But as long as it is encouraging people to move in the right direction, I'm glad they did so.

I think that the opportunity that is ahead of us, which is to take something that is totally, I would say, ill defined, which is our nutrition. And frankly, it gives people so much confusion and lack of confidence. Every day, you're sitting down, you're going to eat lunch, what do you eat and why? Again, we're going back to the internet, we're going back to a friend, we're hoping and praying. And then we're not finding out until the bathroom scale increases weeks or months later, or we have some sort of poor diagnosis, and then how do we know what to change.

So, I think the real beauty here is that this is an opportunity to provide immediate confidence to give people that closed loop feedback. You get your meal scores in the Levels app. You get your day scores in the Levels app. You understand your trajectory. And then you get insights that tell you this is a low hanging opportunity. You can very easily add a walk after this meal or by simply substituting this ingredient for another one, you get such better blood sugar control, and therefore, hormonal control.

And that's the opportunity, I think, that we have ahead of us is to give each individual an ideal personalized sort of lifestyle that they can follow and they don't have to worry about what the rest of the world is doing. It's not about applying an average to each person. It's taking each person, optimizing them, do that times many, many people and you get the same social scale change.

Dave:

The personalization is such a big thing here. There are some confounding factors when I think about it. You look at what my friends over at Viome are doing. They're saying we can predict based on your gut bacteria what your blood sugar level will be based from food. And they've got pretty good correlative data there, where they can say, "This probably is going to spike. Oatmeal is going to screw you up or it's not." And that science is always getting tighter. But the thing is, then you get a bad night's sleep, or you eat some industrial meat with antibiotics that shifted your gut bacteria before you send in your next test.

And so, the feedback time of every meal, a few times a day, how am I doing? And then, even when you're checking it, you're not just getting that one point, you're getting stored data. So, at the end

of the day, you have a full curve showing what did your blood sugar do even when you were in a meeting, and you didn't check it.

So, you can tune it, but you can also incorporate advice for instance, maybe intermittent fasting. I don't know, there's a book about that. Maybe that's going to be helpful. But you can see, does a 14-hour window work better for you? Does an 18-hour window work better? Are you overdoing it, because now you're getting insulin resistant? Maybe it's a really bad idea to do that when you're having your period.

All of those things are going to be testable with daily changes. And I found, it really didn't take long for it to become really clear, the things that were causing the little spikes. And there are other spikes that are beneficial, and surprising and useful. Like, you get an infrared sauna, your blood sugar is going to go up. You lift heavy, your blood sugar goes up. And that's because your body is actually using cortisol to make extra blood sugar from your muscles, or maybe from your fat, or I do the BioCharger.

I had an episode about that while ago. This is a pulsed electromagnetic frequency, very cool sort of Tesla-esque thing. You sit there on certain programs, but not all of them, you get a spike in blood sugar as it's doing stuff to your cells. And so, like, wow, I can see that A leads to B. And to me, that sense of knowledge and control, it's kind of liberating because otherwise, it's just this cloud of mystery. Stuff happens to me. I don't know why.

Josh Clemente:

Right. Yeah. Being able to provide dot connections for people is so huge. I like to call them receipts, digital receipts for micro-optimizations. So, you do a little thing, make a tweak, and then you can see whether or not it helped. That's something we've never had. It's been, "Oh, I think I feel better after closing the blinds or putting blackout curtains in my room. I think I feel better and I'm sleeping better." Your recovery score tells you that.

Now, we can do that with nutrition. I think that this new diet is working for me. Well, now I can know. I can connect these molecules, the hormones they drive to long-term outcomes I want to avoid. And so, if I can watch those fluctuations minutes after consuming something, I know with confidence which direction I'm compounding it with my lifestyle choices. And that's something that I think is truly liberating, and will ultimately give I think people not only a better understanding of themselves, but better confidence in the decisions they're making every day.

Dave:

Do you ever use your levels to just sort of do the wrong thing? Like, I really want to eat that giant piece of cheesecake and you're like, but I know my blood sugar is going to go up. So, I'm just going to pound a bunch of chromium and take a couple extra metformins, and do some squats, and I'll manage it.

Josh Clemente:

Well, definitely, I have done all the above.

Dave:

That was a yes, I saw it in your eyes.

Josh Clemente:

Well, I definitely use it as a device to improve indulgences. So, I know, like the biggest one for me is just walking, and that was something that I would never have believed before the power of a quick like just 20, 15-minute walk around the neighborhood, casual. The power that that had-

Dave:

After a meal you're saying?

Josh Clemente:

After an indulgent meal to modify the blood sugar response. So, that's something I've now like almost habitually added to my lifestyle is, if I'm going to eat something with a few extra carbs, or if I'm just going to go all in and eat half the cheesecake, I'm going to finish it, put my plate in the sink, and I'm going to go walking.

I'm just going to enjoy the sights and sounds and talk to a friend or call my mom or whatever it is, but I'm going to go for a walk and I'm going to enjoy it. And I know because I've tested this time after time after time, my posterior chain, the muscles in my legs are sucking that glucose right out of the bloodstream without insulin, and that is improving my body's ability to handle that indulgent kick to the system that I just gave myself. You know what, frankly, I have a sweet tooth and I love dessert. And so, it allows me to go ahead and go off the rails here and there, but do it in a slightly better way than I used to.

Dave:

And also, let's face it, if you eat a dessert that has 25 grams of sugar in it, so relatively sweet, but not like 100-gram Frappuccino extreme explosion, rainbow juice, whatever, but a reasonable dessert that's delicious and sweet and all that, and because you're able to say, "Oh, well, I had a fat and a protein meal before I had dessert, and I'm going to go for a walk and maybe I'll take some supplements or maybe I'm taking the probiotics to lower my blood sugar."

By the way, I see a difference on my levels from those as well. I have permission to do this. And it might do something slightly bad to your microbiome but not very, if you do it on occasion. So, then you're doing it without taking the hit.

And you go for a walk. I live in Canada where it's dark and rainy all winter. So, my kids make fun of me because if I have something sweet, I don't do it that often, but I do sometimes. And you should be able to handle that if you're healthy. But yeah, I'll do 20 or 30 air squats, same thing posterior chain, or I'll stand on a vibration platform. And they're like, "Daddy, you're dumb." And I'm like, "Well, yeah, but my blood sugar is stable. So, it's all good."

But knowing that, I wouldn't do that if I did not have my Levels because I've seen the advice. I've quoted all the studies about 20 minutes of walking a day and doing after meals, but it's raining, I'm just not going to. But now, I'm motivated. So, that motivation for me is awesome. And the idea of monitoring and getting feedback has been a center part of me just disproving.

So, I was doing everything that was supposed to work. So, for 20 plus years, it's been at the core and it feels like every year, it's getting easier and easier and easier. In 2003, I was working on a stick-on heart rate monitor. You had like glue it to your chest, and it was 1000 bucks, and you had to have a prescription. Now, that's in your watch, it just doesn't even matter.

So, what's next though? I mean, you guys have this nailed, are you going to be adding other sensors? Am I going to have to like have a row of these like level sensors going all the way down my arm

like some sort of robot from altered carbon? Tell me the future. You're a space guy. I mean, you have to know the future.

Josh Clemente:

No, you'll just completely replace the arm altogether. It'll just be a bind-

Dave:

With one big sensor.

Josh Clemente:

Sensors are going to be integrated. No, I think the direction we're heading is no doubt about it, we've opened a new market, which is that the non-therapeutic use case for what is ultimately medical technology, this was developed in the medical environment. It was developed for the management of diabetes. But we're showing that the opportunity to ultimately give people the empowerment and their health and wellness before they have something go wrong is here to stay.

So, this technology, CGM, is going to innovate. It's going to get better and better, just like the heart rate monitor did. And ultimately, I think we're going to have sometime in the future noninvasive means. But for the time being, we're just going to get better and better versions of what you're wearing. And we're going to be, and Levels will be, I think intrinsically involved in this innovation, expanding the number of analytes that we're monitoring.

The big ones are hormones. I'm very excited and optimistic to get to the point where we can have real-time insight into not just glucose, but insulin, which is what I really want to measure. I want to know what's happening with my insulin levels. And then cortisol, and eventually, I think we can also add in maybe LDL, or triglycerides, or some other lipid marker that would be interesting. And together, you can have a really good insight.

And also, ketones. And I think you'll then have a really good insight into in real-time, how is my hormonal condition in response to the fuels I'm consuming and what fuel am I burning? Based on your glucose and your real-time ketones, you can have a really fantastic understanding of how your body powers itself, and then you can change those ratios by say, doing more fasting or doing more fasted exercise, which encourages the activation of body fat stores and gets you into a state that allows you to more easily oxidize what you've got on you.

And so, that's the concept of metabolic flexibility. But overall, that's the direction I think we'll head. It won't be a whole row of sensors. I think we're going to see a really nicely consolidated single pop that you'll wear.

Dave:

If you would, just real quickly, add thyroid and melatonin in on that list, I'd love to see those hormones as well. By the way, all of these are circadian hormones, every single one on your list. So then, we're going to get is, what is it you're doing with your food? What is it you're doing with your movement and what is it you're doing with your sleep and your light? And those are the major variables of biohacking. There's also vibration, and EMFs, and whatever, but the big ones are those, and of course, temperature sensing, which is already a solved problem.

And then you've really got all of the things you can manipulate, and then it just comes down to, "Okay, which ones do I have to manipulate for myself given my current state to get the output I want from my brain and my body?" And that's hard. But when you have 100 million people putting their data

into a system, it'll be pretty darn easy to say, "Well, the most likely solution for you is this, because this is what worked for the other 6,000 weirdos like you out of the 100 million."

And this is shortcutting 2000 years of medicine, of what we've been doing with traditional Chinese medicine, with Ayurveda, with all of the historical research, like how do we just better manage the human body? And I feel like we're so close in our lifetime. This is accessible. The AI work is there and it's improving. The sensing is working. The costs are dropping for all this stuff we need to do. So, I don't see a lot of stuff stopping us, but you might have other ideas. What's the most likely thing to slow down that vision?

Josh Clemente:

Well, I think there's a number of things that are currently adapting in real time. I actually believe that we're going to see massive progress very quickly. I'm very optimistic. As you mentioned, the technology that's necessary, the machine learning, the large data sets and the way that we can manipulate and understand them, and then also the hardware.

There are some really fascinating concepts that are currently in place and sensors. But there's also, more DNA-driven sensor technology that's coming available. It's in the research world. It's been demonstrated, and we just need to move that from academia into real consumer products. In order to do that, you got to show that there is a market and that people are willing to use it. But most importantly, you have to show that it works, right? So, that's what we're doing.

And the first step is, show that this is meaningful, show that people should care about their metabolic health and improving it. And that will be everything that's necessary for I think, new innovators to come to the space and bring their new technology. And if anything, we've got some regulatory environment and sort of some, I think, old policies that tend to be very onerous to get a new technology to market. And I understand for medical technology, it's important to make sure that there's efficacy and that their safety. But at the same time, we had a microelectronics revolution.

We had a software revolution, and many of these regulations were written decades before either of those. And it's like, the pace of progress has outpaced our regulatory ability to keep up, and I think there might be a need to revisit some of that.

Dave:

When I worked on that stick-on cardio patch years ago, we looked at the cost of doing this as a medical device, and it's not even invasive. And we said, screw this noise, we're going to go to med city in India, and we're going to go to Singapore. And we're able to do our clinical trials, way, way cheaper than in the US. And I'm a little concerned that for a lot of this stuff, if the regulatory North American, both the US and Canada, if they don't become a little bit more entrepreneurial about this, we're all just going to be buying our sensors from overseas, and sending our data overseas as well.

So, regulatory is an issue. But I'm surprised you didn't mention privacy, because people are questioning where their data goes, and who owns it, and all that. I'm happy for my data to be used to help other people figure out how to manage their blood sugar better. But I'd be kind of pissed if you're like, "This is Dave's blood sugar. Do you guys want to buy that with my name and stuff associated?" What is the privacy situation look like with you guys? I should have actually asked this before I invested in you, but I didn't.

Josh Clemente:

I'm glad you brought this up. And we're currently drafting what I think is the most comprehensive, yet straightforward and accessible privacy policy that I'm aware of. In other words, it is written in plain English, and it tells you exactly what's happening with your data and why, and it gives you full control.

So, one of the core values of Levels is openness and integrity. Well, those are two of the core values. And those both combined into our privacy policy, which is that. The first day that I walked into a doctor's office and asked for a CGM, I was told no, I can't have access to the CGM because I wasn't already sick. And that felt like a violation because not only did it not make sense that I couldn't have it until I was sick, it also felt like this is my body and this is data that is happening inside my body that I think-

Dave:

It's a human rights issue.

Josh Clemente:

Yeah, I tend to agree. And I think I should be the one granting access to other people, including my doctor to see my blood sugar information. I should not be requesting that.

Dave:

Amen, brother.

Josh Clemente:

Yeah. So, that is the underlying foundation that we're bringing to Levels is that you the individual own your data, you can have it removed, you can export it, do whatever you want. We will never sell it to a third party and we will only share it in an anonymized form with others for research purposes, if we have your approval.

And ultimately, that's the intention is that the data set is not a business model for advertising. The data set is a means I think to changing the future of metabolic health by driving large scale research and helping us to understand how people are living, what is improving outcomes, and where the opportunity is to, I think remove the biggest offenders for worse health.

Dave:

That is one of the cleanest and most concise answers I've ever heard to that question. Because it's an issue and if we just to understand, "Look, it's my data. Maybe I'm willing to share it under the right conditions. But the fact that it's mine, I have the right to take it back." It's a very solid view, and it's completely the opposite of the way big pharma has been looking at it and the regulatory environments have been looking at it.

And I think we're going to end up in a situation where there's a group of people who just understand this and if this group, it includes you and me, if we increase our influence and help people think about that, we're just going to end up in a world where you have the right to know anything going on in your body without a permission slip. And that is how it's supposed to be. And if we let it go the other way, only a marketing company or an oppressive government will have rights to it and you won't even get to know, or maybe an insurance company. And that's a dark world. And it's a world we don't want to create.

So, I would encourage all of you guys listening, if you're sharing your data with something or another who gets to see it, ask the questions, and especially for small companies like Levels, if you don't

like it, you can send them an email and say, "What do you think? You're not going to just take this and sell it to some guy who's going to try and push some pharmaceutical stuff on me later?" Unless you're cool with that, and you might be, but you should know.

So, thank you for being super clean and ethical on that. And just for real clear disclosure, I truly did not know what you'd say there even though I'm an investor. When I do diligence, it's the question I always ask, and I don't know why I didn't ask. I think because we're rushing it. And Andreessen Horowitz was about to do it. And anyway, I'm very happy I backed you, and you just made me very calm with your answer. I was going to have to yell at you.

Josh Clemente:

No. Again, in my opinion, there is no other option. The only way my opinion turn around the issues with advertising and misleading marketing is to stop targeting people for information that you know about them that they don't know about themselves. That's what it comes down to is, the reason wherein I think a mess right now is that tech companies have your data, they know what they have, you don't know what they have, and they can use it against you.

And it is really critically important, especially when it comes to health and wellness matters that the individuals aren't, but their data first and foremost, they know what they have and they allow others to get access to specific parts of it if they are willing. And again, like you said, some people are going to be able to post this on the internet. That's totally up to them. I think that is, again, an individual right. But at the organizational level, there's just absolutely no defense for something like that.

Dave:

Have you ever thought about adding a feature so that if the device senses that your blood sugar is going up because you ate the wrong stuff, that it can remotely shock you so that you'll behave yourself better?

Josh Clemente:

That's funny. There is a device out there I think that does something similar. It's a behavior thing like-

Dave:

There is. It's called the TABLOCK. I invested in those guys, a very small amount, because it was too funny not to invest in that because I'm sure [inaudible 00:57:19].

Josh Clemente:

I have to admit that I've thought like, we should at least have that feature because I would take advantage of it. I mean, if I can improve my accountability measures by any means, I'm going to consider it.

Dave:

Crazy enough, it actually works. But you really want to be the guy who controls that button because remote control shocking of humans has really, really dark implications if you've ever had a dog on electric collar. So, we won't be going there. But the other question I have for you, I've talked a lot about electromagnetic frequencies and how chronic exposure to low levels of them actually does affect you metabolically through voltage-gated calcium channels and things like that. What is the level of EMF coming off the device when I'm not scanning it?

Josh Clemente:

So, the Libre device, and the manufacturing company that produces those has all the specifics which are not necessarily released, but we do know that it uses near-field communication. So, it's an essentially a passive product where what you're wearing on your arm emits due to the sensor or as the reader coming into near-field with it.

So, basically, when you move your phone over, it activates a transmission protocol. So, it is not to my knowledge, and this is necessary to preserve the battery life of the sensor, it is not continuously streaming data in the way that Bluetooth does. Now, there are other CGMs that have Bluetooth on them and they're kind of emitting a low energy Bluetooth field all the time. But my understanding of the near-field communication protocol that's implemented in that sensor is that it is not doing so.

Dave:

The way it works, at least the last time I dug really deep on this when I was doing the basis thing, is that you create a field with your phone and the field activates the stuff in the patch on your arm, and actually provides the electrical charge for it. Much like when you have your key card, there's no battery inside your key card. And you wave it over the door, the door creates a field. You wave it through the field, the field creates enough current to cause the microelectronics inside to emit a small signal. So, it has low EMF as you could possibly get because there's no EMF until you put a field on it, and that's pretty cool.

Josh Clemente:

Yeah. So, in the patch that you're wearing, there is actually a small little battery. But what that's doing is, it's waking the sensor to take measurements and record them into you on board storage.

Dave:

It's a continuous recorder. And sure, there would be an EMF from that but it's micro, micro. Okay.

Josh Clemente:

About as minimal as it can get. So, you're not necessarily broadcasting something.

Dave:

And compared to even an Oura Ring, it's orders of magnitude lower, the Oura Ring, you can put it in airplane mode though, and that turns off the transmissions. But it also has a little bit of a microprocessor because it's got to take measurements throughout the day, even if it's not broadcasting them.

And for people listening who are really into 5G is going to neuter mankind and all that stuff, all of these things are small hits, but this kind of devices is so tiny, compared to the fact that we're walking down the street surrounded by Wi-Fi routers, that I don't worry about this. And maybe I'm wrong, and if you guys think I'm wrong, send me some stuff, and I'll read it. But overall, I look at benefit versus risk, and EMF is not an issue for me with this device at all. And I care about it. So, okay.

Josh Clemente:

Yeah. I think on the risk-benefit there, as we mentioned in the statistics, metabolic dysfunction is ravaging us. And I think that those numbers focusing there, and using a technology like this, for however long the individual wants to use it, I think it will be an educational tool, and something that you can use

for a very long time into the future. So, it probably provides a tremendous benefit in the face of the risk that we're all kind of facing.

Dave:

I find that sometimes after the 14-day period when the sensor dies and you have to get a new one, I'll take it off. And sometimes, I replace it right away. Sometimes, I wait a few days, for whatever reason. I haven't figured out why I wait a few days. How many of your users are just, "Okay, I got to put it right back on right away?" And how many of them are like, "Oh, it's okay, if I miss a day or two?"

Josh Clemente:

Well, we have different personality types there. So, I think there is a probably about a 25% of our audience is the hyperfocused. They basically, I am one of these, I'll put my next sensor on before I take my other one off. And so, it'll be warming up before the other sensor comes off the calibration process.

So, I like to have that continuous data stream because it's just the accountability piece for me. I've learned a lot of lessons from CGM, but the best part of it is that I know I'm going to see that data. It's going to keep me on the straight and narrow. So, I think it's about 20% to 25% of our current user base. The rest tend to take a little time in between sensors. Some people even take a month or two off in between months of use. We have a few people that'll just take a break, and they'll implement some lessons learned, and then they'll check back in, and they like to see how have things improved over that time span.

And I think both of those are perfectly righteous ways to approach this. It's up to the individual how you want to use your own data every day. And whether or not you want to just do this in chunks, and I think that ultimately, at Levels, we're developing the product in such a way that you can use this however you see fit, and we're going to meet you where you are.

There's no necessary requirement that you are wearing this continuously. We certainly respect and understand the people that want to. But if you want to check in here and there, and take some time off, we totally get it and want to just build it so it's effective for you as well.

Dave:

Now, when you launch openly, it's $399 for the first month, and that includes all the sensors you need for the first month, hardware, software, everything. And then after that, it's $199 a month, which is for people who are continuously and if you're looking to save a little bit of money like, okay, we're at three weeks out of the month or something you can stretch that. Do you see the price coming down three, four, or five years from now?

Josh Clemente:

Definitely, yeah. We wrote a blogpost on this and it's called the Levels Secret Master Plan, and we rip that off from Tesla. So, when Elon started Tesla, he wanted to make electronic vehicles sexy and cool. But what he really wanted to do was change the world. He wanted to reduce carbon emissions due to internal combustion engines. And so, the first step that he took is the sexy cool route. He initially needed to convince people that it's possible to produce a desirable electric vehicle so that they would pay attention.

And what he built was the Tesla Roadster, which was very expensive premium car and very few people could get their hands on it. It came down to like the core technology was very expensive. But with that first Roadster, he was able to finance then the Model S. With the Model S, he was able to get

into a slightly lower tier of still premium car buyer. And ultimately, the scale of the Model S is what allowed for the Model 3, which is the first mass market electric vehicle ever.

And it has changed the dynamics of the automotive industry completely. There's not a single major manufacturer in the world who is not now building electric vehicles into their roadmap because they have to compete with Tesla.

So, we're taking a similar approach in the sense that right now the technology is expensive. These sensors are not affordable because they are medical devices. There's a heavy regulatory burden, not just developing them, but then continuing to manufacture them. And ultimately, to distribute them. So, all of our devices are fulfilled through a pharmacy partner. There's a prescription requirement. All of that we've implemented into our program. So, right now, we're in this-

Dave:

Because you had to, by rule of regulation, a lot of which isn't even law. Like regulators aren't writing laws, they're just writing rules that they thought were cool, that usually protect some industries including attorneys because the regulators are mostly attorneys. So, there's a lot of price in there that isn't for the tech, it's for the rules.

Josh Clemente:

That's exactly right. So, the beauty of that, it's a situation that we're in today. But the nice thing is that, much of that is going to change. It's going to change quickly. And that will allow us to get to our end state, which our end state is, this is technology that is changing behavior in order to change the world. We want to completely improve the rampant metabolic dysfunction that is attacking every developed nation and we want to turn it around.

Right now, there's a study in 2018 that said that 88% of American adults are metabolically unhealthy in some form. We need to flip that ratio. It needs to be 12% at most are metabolically unhealthy. In order to get that, we've got to have a mainstream change. That means, this can't be a $400 per month program, it's got to be much more affordable. And frankly, it has to be something that employee wellness programs provide and that is more available. And so, we're going to get there, and we're going to have to do it iteratively by sort of building out first the premium product, and then slowly but surely getting down market.

Dave:

Okay. Thank you for saying that. Some people get pissed off at that answer. I actually can buy gluten-free muffins at the first garage in all of North America. It turns out, it's on Vancouver Island. And the guy who built that garage only had a quarter mile of road, and he had to bring his car in by railroad, which was easy because he owned the railroad, which is why he could afford to build a garage and have a car because he was a tycoon.

Cars are a little bit more accessible now. Cell phones, same thing. It was the Hollywood producer paying $25 a minute with his $40,000 cell phone filming the trunk of his Mercedes 300D convertible. Okay, now, it's $1 a month in Africa. So, it'll happen for this stuff, too. And if you're listening to this going, "What the heck," it'll come down over time. And it's okay that early adopters pay stupid amounts of money to get a slight benefit because it always increases demand, which always drops the price. And this is just how economics work.

So, you can be thankful that there are people willing and able to spend 400 bucks to be doing it for their first month because either they're sick enough, they're tired enough, or they're just curious

enough. And to them, it's worth it. And that investment over time, it will drop the price. Everything I've ever talked here on the show will be orders of magnitude cheaper 20 years from now. That's just how it works. It's just irritating when you want it now. So, your master plan holds water according to all of history that I can find. So, I'm going to vote you there. Okay.

Josh Clemente:

Awesome. Yeah, and I think another thing is that the scale of the non-disease market is much larger than the scale of the post diagnosis market. We have way more people still, despite the badness of the situation, there's still way more people who don't yet have diabetes. And so, bringing it to this new space means massive potential demand and even faster rates of I think supply improvement and then price drops. So, I'm very optimistic. I like what you said there.

Dave:

If you had succeeded in the vision already, and we flipped it, so it was 12% of people, not 88% of people, we would not have a pandemic right now because most people who die have two and a half comorbidities and they're always blood sugar related. One of them, I would say, I don't have the exact number, but the vast majority of it because diabetes precedes cancer, and cardiovascular disease, and Alzheimer's disease. So, if we had proper blood sugar control, the entire world would be more resilient to all kinds of stuff. So, that's the order of magnitude we're talking about.

But you did say cool and sexy. Now, I've just got to say, okay, I'm wearing my Levels patch, you guys are watching on YouTube or Instagram. So, I've got on my arm here. Can you make like a Paris Hilton approved like, sparkly bling thing for me maybe here or like smaller sticker, I don't always want to wear a big sticker on my arm, a little smaller.

Josh Clemente:

So, we're going to go in the direction of like Apple Watch. They've got all these cool bands and stuff and even WHOOP, they've got these different bands. I think we're going to have an array of options. We want to make sure that this fits the individual.

And so, that cover you're wearing right now, that was developed for people who are hitting CrossFit workouts and ripping thing off on doing dips and stuff, and they're sweating a lot and swimming a lot. It's really resilient. But what we want is for everyone to be proud and comfortable wearing the Levels device, and that they want to share it with people. So, I'm very open to you, to all types of feedback on how to make that happen.

Dave:

I want a Mad Max style like leather with a few spikes that go in here, so I can feel really like a cyberpunk again. So, that's my vote.

Josh Clemente:

There will probably be an aftermarket for that one.

Dave:

And I'll be the only customer, there's that.

All right, Josh, thanks for walking us through what's going on with Levels with continuous glucose monitoring. Thanks for deciding that this was a bigger thing to hack than even what you were

doing with astronauts. And I think that you're putting your energy into the right place because this is going to help a lot of people. It's going to help them really quickly. And frankly, it'll probably help them become better astronauts too.

Josh Clemente:

Dave, thanks so much for going through with me. I mean, I always love this stuff. I really appreciate the fact that we've had basically the same perspective as it sounds like. So, just awesome to chat with you and I appreciate doing it.

Dave:

If you guys are interested, levels.link/dave, go to the front of the line. It isn't quite shipping for everyone yet. I'm one of the few lucky early beta testers. It helps to be an investor. But this is coming down the pipe. And I will tell you, if you're a biohacker, if you're looking to change your motivation for fasting, for your diet, for anything else, and you just want to know what works, every activity you do has a return on investment that isn't dollars, did it take a small amount of energy and did it give you a big amount of energy back?

When you learn to regulate your blood sugar by changing your behaviors, by definition, it gives you more energy back because you're better at using blood sugar to make energy. So, this is one of those things where it's not difficult to use it and the return is very, very large and it lasts for a very long time. So, this passes my bar, and then some. And then you guys are going to love it. Levels.link/dave and puts you front of the line.

Thanks guys for listening and I will see you on the next episode.