

How to Hack Your Metabolism and Power Your Energy – Michal Mor, Ph.D. – #962

Dave Asprey:

You're listening to The Human Upgrade with Dave Asprey. Today, we are going to talk about metabolism and what you can do about it, and even how you can measure it. I promised this year that I was going to tell you what you get out of an episode so that you know that it's worth your time to listen to it because you have an hour or so we can spend together. So why don't we make it the most valuable hour? There's only almost a thousand other episodes full of all the knowledge of what you might want to know to be a better human being. Turns out, having more energy, because your metabolism works is fundamental to everything you do, which is why I focused on metabolism for a long time as one of the big building blocks for just being the kind of person you want to be. And our guest today is Michal Mor.

She's a co-founder of Lumen, which is a company that measures metabolism in a different way. If you read my books or listened to the show for a while, you know that many years ago in my early 20s, when something wasn't right, my doctor couldn't tell, he said, maybe you have high blood sugar. So I'd stick little pins in my fingers and gather blood like I was diabetic, even though I wasn't just to see what was up. And I've talked about ketone meters over the years of making cyclical ketosis, kind of a thing. But there's other interesting ways of just knowing how your body's doing that fundamental job of turning food and about 30 pounds of air into electricity, then that powers everything you do. And I wanted to interview someone with a different take on that. So bachelor of science in medical laboratory sciences, master of science in physiology, and a PhD in physiology with an emphasis on cardiac arrhythmia, someone who's maybe kind of qualified. What do you think? Michal, you have an interesting background?

Michal Mor:

Yes. And the truth is that I started working on Lumen that at the time it was almost 10 years ago. I didn't thought about Lumen as a company, but the things that brought me is actually not all those stuff that you just said. The things that brought me is the fact that I compete in Ironman competition. And I don't know if you know, you're familiar with this type of competition?

Dave:

Tell me more though. I don't think all of our listeners are.

Michal:

So it's a long triathlon, right? So you need to compete between 12 to 16 hours. You needed to swim, bike and then run a marathon. And one of the challenges of that type of competition is usually most of the competitors are doing amazing, the swimming part, the cycling and half of the marathon. But after 20 kilometers, their body is starting not to have enough fuel and they crash and not able to finish.

Dave:

Yep. Happens a lot.

Michal:

So it happens a lot. So for me, and also for my twin sister, both of us founded Lumen. It was very clear that in order to be able to finish such a competition, we need our body to work efficiently. We need our body to be able to rely on fat as much as we can in order to preserve our carb stores, which are pretty

limited to the time when we need them. For example, when you are climbing a hill. So all what we did during our training sessions is to improve our metabolism, which means to become more metabolically flexible, being able to use fat more efficiently and carbs. Now you know, yes, we are talking on 2011, the term metabolic flexibility and what you can do in order to improve it. It was not a common term.

Dave:

No, the ability to either burn fat or burn carbs, people thought you had to do both. But the speed of switching is the thing. That's why I went from Atkins in the 90s where I could lose half the weight I had to lose to being able to cycle in and out of ketosis to keep the metabolism able to do that. So you don't get maybe insulin resistance, which is a common thing that happens when people go all keto all the time. So how do we know how good you are at burning fat? Even though sometimes you are also good at burning glucose, which your body does that really naturally. And I don't think you want to say, I never am going to eat a carb again, because everyone I know who does that with the exception of maybe 20 people who have epilepsy eventually are realizing that maybe that wasn't good for them.

But I want to go back to your cardiac arrhythmia research. So you're doing this kind of masochistic exercise and competition regimen, but you studied cardiac arrhythmia. I would've wondered, aren't you causing arrhythmia? There's lots of studies around heart damage from marathons, not to mention alter marathons. So were you like, what kind of bad things can I do to my heart just so I can fix it? What's going on here?

Michal:

It was good to my soul. Yeah. You want maybe not the best thing I can do to my heart, but it was good to my soul.

Dave:

Now, cardiac arrhythmia. You've done all this endurance exercise. You believe as I do, when I've talked with marathoners and Ironman people, it's like, you should be running on fat as long as you can. And then have some sugar in your water bottle and some L-glutamine and probably some MCT oil and maybe even some ketones to get the endurance you want. And maybe some ribose for ATP creation. That's my recipe in electrolytes. That's what I would do if someone was going to torture me and make me go do some long cardio thing. What am I missing? Or what's wrong with that thinking, if anything?

Michal:

I think it's not about what is wrong or not. I think it's about what is the root cause? What enable us to perform at our best? The solution to perform at our best is within us, is basically how healthy our metabolism is, how metabolically flexible. So someone that has a healthy metabolism, that knows how to switch between using fat and using carbs will perform much better. So during long cycling, he will be able to shift and rely his fat stores, which you and I know are almost unlimited. Sometimes it's very sad that this is the case, but they are unlimited and will be able to pull carbs from glycogen stores, for example, or from energy drinks when we are consuming them. So this ability to shift between them, it's not only good for athletic performance it's also improving our quality of life.

It enable us to enjoy life to our fullest potential. It's about longevity. It's about being able to achieve our goals, not having those mood swings. This is so much more than for improving athletic performance. And I wish that this awareness of how important it is, our metabolism to our quality of life, I wish it would. It wanted to be just a conversation between you and I, it will be something that

everyone will know. And not only your listeners that probably are, the term metabolic health is not new for them.

Dave:

I believe we all need to understand our metabolisms way better than we do. Because if you wake up and you feel like trash in the morning, is it your metabolism isn't working right? Is it toxins? There's, five or six things that could be a cause. But if you have low energy, which is a major thing, it's one of the five things that Upgrade Labs we're working on solving. You don't know why you have low energy. You just know that you don't have enough. So how do you define metabolism? Because you've studied it both as an endurance athlete and just academically, right? I say it's air plus food equals electricity, but it's probably a little bit more academic than that. So what's your take on it? How would you tell my mother her metabolism works?

Michal:

So metabolism. When we are seeing the word metabolism, there are two parameters. One is the amount of energy our body needs in order to sustain itself. Those are, how much calories I'm burning. This is the kilo cal coin, but there is another terms which is what type of fuel our body is using. Meaning what type of fuel, carbs, fat or some ratio in between. I'm using in order to produce that energy. Now a healthy body. A flexible that is metabolically flexible will wake up on fat burn and will shift to use carb burn after he's eating a high carb meal, for example, after eating a pasta.

So, and today we know that, I mean until today, even not until today, I think until six years ago, the term energy expenditure and all the focus was on how much energy my body is burn, how much calories. This was all the language. And this lead us also to talk about how much calories I consume versus talk about quality food, calorie it's not a calorie. So today the focus is much more on what type of fuel my body's using because we know this has a high correlation to metabolic health and quality of life. You are laughing.

Dave:

I'm laughing. I love the way you're saying it. You're very well qualified. And I'm just thinking of all the Twitter wars and all these 27 year old people, who've never been obese who are telling you calorie deficit, calorie deficit. And I'm just laughing and saying it's a type of fuel. Well, it turns out candle wax and coal are high calories and you could eat those or uranium is actually one of the highest calorie things on the planet. So you could put all that stuff in your mouth and calories in calories out. And it's such obvious nonsense to think about calories the way that so many of us have, the way I did when I was obese. And you're sitting here going well, just in the last 10 years, we've shifted to what kind of fuel, because anyone who has a fireplace knows if you burn garbage in your fireplace, it does bad things.

And if you burn wood, it works better. And different wood does different things. It's so basic, but I just love it that we have this PhD on the show and you're telling us, no really we've shifted. So everyone there who's ever said, you can out exercise a potato chip. We have a PhD in physiology telling you that the type of fuel matters. So I'm just laughing because it's funny. And we're just going to just play it on loop every time something goes, but Newton's law, thermodynamics. What do you say to people like that?

Michal:

So you made me laugh. You are not the first person that says to me, come on Michal, don't speak like a scientist.

Dave:

No, I'm not saying that at all.

Michal:

You're [inaudible 00:12:15].

Dave:

You are a scientist. That's awesome. So speak like a scientist. Look, tell those little calorie people out there telling you to eat diet soda and whatever pizza and lose weight. Okay. How do you speak to them?

Michal:

I spent hours on hours with a girl named Kyla. She's helping me to bring the messages out there because sometimes it's very hard to understand me because every I'm speaking like a scientist, so-

Dave:

No, don't stop.

Michal:

She's failing to communicate.

Dave:

Don't stop speaking like a scientist. You're smart, own that. And you can translate the science.

Michal:

[inaudible 00:12:58] translate me.

Dave:

So this isn't a criticism at all of that. I love that you're a PhD because when the people who are not PhDs or they're saying, oh, I studied physiology in sports training, yes, and you've never once had an obese client who got healthy because you keep telling them to torture themselves by eating low amounts of sugar and no fat and getting on a treadmill. So what's wrong with that advice? Science me out of that kind of thinking.

Michal:

I just, I want to share with you that my PhD was in cardiac arrhythmia. I focus on where we should implement a pacemaker in order to avoid the desynchronization between the electrical pools and the mechanical pools in the heart. And it was amazing study. And the things that, what was hard for me is that at the end of this study, which made a lot of noise in the cardiology community, this study was still stuck in the research. It didn't was able to move forward into our day to day, meaning it wasn't move into creating a real impact on people. So even today, I finished my PhD, I don't know, almost 13 years ago. Even today doctors are still implemented the pacemaker in the wrong pace. And over time people have cardiac arrhythmia. So they solved the problem of the cardiac arrhythmia, but over time they are suffer from heart failure. So when I started Lumen, it was about closing this gap between the science

world, the technology, the insight that have there and into the day to day. So this is how everything started.

Dave:

So Lumen is a fascinating device for figuring out how your metabolism works, but I didn't realize that your motivation for starting it. Because, you're smart enough, you could have done all sorts of things. But you zoned in on it, partly because of the endurance athletics, but that frustration, I have a lot of it too, where we have all this knowledge and this huge gap between knowledge and what we do. And it actually hurts when you see stupid happening around you because, but we know better. We already learned this and in your case you actually wrote the paper and then you'd see people walking around there. It's like driving into posts. But the post is clearly labeled. Like, yeah, I just never bothered to read the sign. So I just drove into it again.

So you were frustrated and you knew some stuff. So why did you pick metabolism? Tell me what Lumen does and why you chose that. I didn't realize that your cardiac experience was a motivator, but I see it now, it's the gap between what we know. So what do we know about metabolism, or what do you know about metabolism that you want other people to know because of Lumen?

So what do we know about metabolism, or what do you know about metabolism that you want other people to know because of Lumen?

Michal:

So first of all, metabolic measurement, it's something that's been used in hospitals and top clinics, since the sixties. It just been stuck in hospitals because every measurement is taking 45 minutes. You need to lie down covered with something like an astronaut. You need a physician to read the data in order to provide you insight. So you understand that this type of measurement is not accessible to any one of us, at least not on a daily basis.

Dave:

And what you're gathering there is, you're looking at what people are breathing out in terms of exhaust gas, because the amount of carbon dioxide and oxygen and that tells you about your metabolism. And you're looking at the heat put off by the person. Maybe the amount of water, what else do you look at it in a medical setting like that?

Michal:

So we are measuring the type of fuel. So cells that use fat release less carbon dioxide versus cells that use carbs for energy. So by measuring the oxygen consumption and the carbon dioxide release by analyze this ratio, we know what type of fuel your body is using. And as I said before, a healthy body is a body that on fasting condition will rely mostly on its fat stores. So Merav and I, Merav she's my twin sister. So we thought, wow, if we would be able to measure our metabolism on a daily basis, we will be able to understand how metabolically healthy, how metabolically flexible are we. Also, this measurement is extremely sensitive to lifestyle, meaning to nutrition, to sleep, to movement and to our mind.

Dave:

You mean to biohacking? You might be able to biohack your metabolism? Who would've thought? That's why I'm really interested in Lumen because it's a quick change, for what you did last night is going to affect how you would score on Lumen today.

Michal:

Exactly. So imagine that by understanding what you did yesterday, today you're being able to see the real impact on your body. So now instead of waiting, I don't know, I think that how today we are measuring different things that we are doing. If today I want to test fasting, or I want to test low carb or core manipulation, whatever. So the way I was able to measure it is probably by subjective questions or by standing on a scale, if my intent is to lose weight. So, the time that you would be able to see that impact to have this self-validation is very far away. And until you're going to have this self-validation, you are all the time going to feel like you are in the dark. Am I doing the right things? Is that working for me?

Maybe I should do more. Maybe I should do less. It's very hard to keep motivated like that. And it's very hard to understand what is working for you in order to make small decision. So by measuring your metabolism by a daily basis, you actually being able to see what is the impact of your sleep. Whether you are having enough sleep, maybe you are having your last meal too late at night. And this is what holding your body from shift into fat burn. Or maybe you're just in stress, you're doing everything amazing. But you know, our day to day is busy and sometimes we need a bit to relax because we have too much cortisol in our body. This is by the way, one of our main problem today.

Dave:

That's true. Stress is a major thing. I've been so fascinated with mitochondrial function, which is what drives metabolism. But it's like for maybe since the late nineties, when we first really started learning about them, because I had a problem with energy. I was just tired all the time, brain fog, fibromyalgia, chronic fatigue. And I did fix my metabolism and I mentioned showing up at my doctor with a hand drawn graph of my blood sugar from back then, from pricking my fingers, which sucked. And then I got into it a few years ago, doing it again for ketone levels. So then I could say, all right, what's my blood sugar look like, how many ketones am I making? How much ketones are present? What can I do with MCT oil versus other kinds of ketones versus fasting, versus caffeine, which doubles ketone production, all that kind of stuff.

And I'm just going to say I'm tired of sticking stuff in my fingers all the time. In fact, I quit doing it and I switched to more heart rate variability. Okay, what's my readiness score, or my heart rate variability. Like my readiness score this morning was 94. It was the highest it's actually been ever that I can think of, which is cool. And I think that was as a result of light therapy and nitric oxide. I don't really know. Tell me why Lumen is useful compared to heart rate variability. And I know why it's better than sticking stuff in my fingers, because that hurts. But why does Lumen beat heart rate variability of something that I should do every day for my metabolism?

Michal:

So I don't know, you might not going to like my answer, but-

Dave:

Well, you only studied cardiac-

Michal:

I don't think it's about who is better than who.

Dave:

I'm fine with that.

Michal:

And I don't think it's... Okay, so metabolic measurement, this is the only thing that we should do. I think that eventually, and this is where Lumen is going, it's all about integration. And by having this holistic picture of our body, if it's HRV and resting heart rate and even continuous blood glucose and metabolic measurement, all of these together would enable us to better understand how our body's working and guiding us towards better nutrition and lifestyle choices. So it's not about one or the other. It's about all of us, all those trackers in the world will combine together. We do joint forces, creating a hub of data and enable us, the consumer at the end enjoy the values of everything integrate. So I think we should go on integration, everyone.

Dave:

You are such a good scientist. I agree. I want all the data from all of us put into an AI engine so we can actually figure out what works. And in fact, one of my companies is working on that, to get as much data as we can to understand, if this is your goal and this is you, what's the fastest path to that goal. That's what Upgrade Labs is doing in a facility. But here's the question. Someone's listening to the show. They're saying, I am thinking about getting a sleep tracker that may include heart rate variability. And I'm thinking about tracking my metabolism with Lumen. How do I know which one to buy first? Tell me the... I agree, they're both useful. And I think most people will want both, but what does Lumen do that heart rate variability doesn't do?

Michal:

So metabolic measurement is, think about it like the end of the funnel, right? It's being affected by your HRV, your resting heart rate, your nutrition, your movement by everything. It's an aggregation. It's like everything, all your lifestyle is being aggregate into one result, which is your metabolic measurement. So if I were that person that can decide what to buy, I would choose to measure the top of the funnel. So having a measurement that is an aggregation of everything and starting to understand, making sure that this measurement is going on the right trend and doing my self-analysis to understand what is working for me better. So having that metabolic measurement on the right track for better metabolic health. So I would go buy Lumen, otherwise it was weird for me to be here.

Dave:

Well, of course you believe in Lumen, which is why you started the company.

Michal:

I believe in metabolic health.

Dave:

You believe in metabolic health. So compare and contrast it. So, you've got an audience here. There's a bunch of people who are saying, I just wanted to lose weight and upgrade myself. So I'm just learning. And you also have a set of people who are in my mentorship group who go to the Biohacking

Conference, by the way guys, biohackingconference.com September 15th through 17th, Beverly Hills. It's going to be amazing. Oh, is Lumen going to have a booth there? I think you guys are, aren't you? No?

Michal:

Wow. I don't know.

Dave:

I would bet that someone from your team is going to be there, but we'll find out.

Michal:

I'm going to ask Kayla.

Dave:

Okay, good deal. So that group though, they're going to say, look, I can prick my fingers and maybe I'm even willing to do it and I can get my tracking of this. So, okay. Someone who's willing to prick their finger and get ketones in the morning. What is Lumen telling me that I don't get from those other measures?

Michal:

So for the biohackers, and we have many of them. So they use Lumen in order to optimize different things. For example, they want to optimizing their fasting duration. And one of the problem with fasting is that fasting is a great tool, but you need to manage it. So if you are pushing your body too much into the fast, your body will respond with a stress response, will actually do exactly the opposite. So during the fast, your body started to shift into fat burn. And then if there is a moment when you are pushing your body for too much, so your body will start to shift back into carb burn. So biohackers that using Lumen are measuring the metabolic fuel during the fast and they want to optimize it. They want to find this sweet point when their body is now starting to shift back into carbs.

And then they know, okay, this is the right time to end my fast. So this is one scenario. Also we have biohackers that use Lumen in order to optimizing their workout. So they taking a measurement before and after the workout. They want to see their body shift from using carbs to using fat. And some of them is also use Lumen in order to know whether they have enough fuel for intense workout or strength workout. In those workouts they want to have enough carbs, so they take a measurement before they work out. And if they see that their body is using mainly fat. So I don't know, they take a banana or something in order to fuel themselves. So those are different scenario in which biohackers use Lumen. By the way, the fasting, we have an amazing insight. We saw Lumen is like, we have more than 6 million metabolic measurement within context.

And I think this, you will find it very interesting. We see that women that are obese their body starting to shift back from using fat to using carbs after 12 hours of fasting. So for them it's better not to over the 12 hours. And for women that are overweight, they need 14. And for women that are normal weight, it's not an issue I can shift into fat burn after 10 hours and after 12 hours. And I can also fast 16 hours. So it's super personal.

Dave:

So this is why the title of my book on fasting was called Fast This Way, because I got tired of people saying, what's the right length of fast. You can't say everyone should fast 18 hours. And there's a study

out of Australia that showed in, funny enough overweight middle-aged women in particular that 12 hour fast, three days a week shifted their metabolism towards ketosis. And that was the minimum effective fasting. And the problem is over fasting is more of a problem in women because it hits women before it hits men. And so there's a bunch of stuff in the book about that, but I wish I would've known a little bit more about Lumen to include this ratio in it. Because if you wanted to be precise to know, am I over fasting, as a woman, you over fast, because it actually harms weight loss.

And as a guy, it also harms weight loss. And in both of them it breaks your hormones right after it starts to mess with your weight loss. So you're like, yeah, fasting is great, I'll do more. And then you hit a wall and you wonder why. So it's like a powerful scalpel. It's a tool you get to use. So, okay. Now, let's say that someone buys a Lumen and now they want to know how to use it with fasting. Is the app going to guide them through that? How would you even know to do this?

Michal:

So there is a... Lumen, after you're taking the usability with Lumen. That every day you wake up and you take a morning, a morning measurement and based on your metabolic measurement, Lumen provide you with what is your nutrition for that day. And we also have the ability to pull different strategy, for example, to pull fasting as a strategy and then they can log their fasting and they can take a measurement and log the amount of hours that they fast. And it's going to save in the Lumen data in the meet up whatever. And they can actually track after their metabolic fuel during and overnight, during the fast.

Dave:

Okay. So then you're fasting, you do it before you go to bed and but you wake up and it's going to give you a Lumen score. And then what do you do with that in terms of your fast? Does that tell you fast for two more hours, fast for four more hours? How do I actually use this for fasting?

Michal:

So currently Lumen not recommend to you to continue your fast. This one is, it's like a tool for biohackers so they can track it on their own. So at the moment we are not guiding you to do more fast or less fast. In overall the recommendation with Lumen, we needed to do a better guidance. Because currently we are very focused on nutrition, but as I just said, and you know eventually it's not only our nutrition that impact our metabolism. It's also about our sleep and our movement and our mind. And currently Lumen is guiding you only towards nutrition plan and providing another different tools that you can manage your workout and your fasting on your own. But this is something that we are now going to change and we are looking everything it's a balance. So based on your nutrition, for example, if you ate too much, I can suggest to you to prolong your fast or to increase the amount of steps.

Dave:

So we're getting there is the basic answer. But the short algorithms are things that you talk about even in the literature with Lumen. And it's kind of cool because you have 20 million metabolism measurements from Lumen so far, which is an enormous data set to be able to figure out what's going on. And the validation that you have. Earlier, you mentioned this ratio of how much oxygen are you using and how much CO2 is it producing? You use a lot of oxygen, don't produce a lot of CO2. You're burning fat. You use a lot of oxygen use and produce a lot of CO2 you're burning carbs. And it's kind of like that. And in metabolism research, that's called RER, did I define respiratory, what's the E stand for and the R?

Michal:

Respire Exchange Ratio.

Dave:

Thank you. Respiratory Exchange Ratio. Did I define that well enough or am I missing a piece there?

Michal:

No, you did. You did good. I mean the way that Lumen is able to take a technology that take 45 minutes and in the size of a table and shrink it into a portable device and into single measurement is basically by very simple principle. As I said, when our body use carbs for fuel, they release more carbon dioxide. And when they use fat, they release less. But if I will measure the carbon dioxide in a normal breath, I will not see any changes in the carbon dioxide because when my body release more carbon dioxide, the way to get rid of that carbon dioxide is by increase my ventilation.

So the Lumen maneuver, it's not a normal breath. You need to inhale a specific amount of air. You need to hold your breath for ten second, which is exactly the time in which the carbon dioxide in the blood will reach to equilibrium with the air in your lungs. And then we asked the users to exhale and then the CO2 in your exhale breath is actually in correlation to what is happening in your blood. And by having that maneuver, we was able to hack the measurement and being able to measure it in a single measurement, in a single breath versus 45 minutes off. Yeah, it's very cool.

Dave:

Have you completely pissed off all the people who make those expensive hospital 45 minutes pieces of equipment? Are they hating... Because you have the study from San Francisco State University that says that your device, the Lumen device has similar results to the hospital grade stuff. It seems like you've just completely disrupted a big market because here's a very affordable handheld Lumen, just do that and it's going to give us the same data.

Michal:

So the truth is that many of academic institute are using Lumen for their own studies. So Merav and I are extremely passion about research. So we created a science mode for those academy and researchers that interested in better understand metabolism. So they use Lumen as a measurement tool and they provide many studies. If it's about women that work out on fasting versus after a big meal and they see the impact or about fast and slow carbohydrate on metabolic health. So they're using it for their own study and Merav and I enjoy from increase or increase the understanding of metabolism in the world. So this is how we want to give back to the research community. So for us, it's extremely exciting for them using Lumen.

Dave:

This really is something that's new in the world of biohacking. It's different than measuring ketones or glucose or HRV. So it's a fundamental signal that it's really important and it changes on a regular basis. Like you said, and most people don't know this, but yes, you should wake up in very mild ketosis and you can increase that ketosis dramatically. There's this weird thing called caffeine that'll do it. And another thing called MCT oil and I used to measure with a finger stick that I could go from eating carbs at dinner, like sushi with rice. So definite carbs, and then waking up and my ketones are at 0.1. And then I drink, magically coffee with butter and MCT oil. And my ketones are at 0.6, which is the entrance to ketosis.

Now, if I woke up and I breathe in Lumen, it would've said because I had carbs the night before that I was still burning mostly carbs and it would've shown that I had a higher amount of carbon dioxide.

And then after I chugged the coffee and the MCT and waited till my ketones went up with all the blood, then the Lumen would've shown at that point when my ketones were up, that suddenly I was burning less carbon dioxide to make energy. Am I saying this right?

Michal:

Yes. I have to share with you a funny story about the MCT. Okay. When Merav and I started and we build the first prototype of Lumen, we need to validate it. It was important for us to say that what we are measuring is equal, the same as you would take the same measurement under the gold standard. This Indirect Calorimetry, this is the name of the gold standard that is used in order to measure metabolism. So how we can do that. We needed volunteer to take a measurement to the prototype of Lumen and to take then a measurement into the gold standard. And we want them to compare between them, but a single measurement in one metabolic state was not enough for us. We needed in fasting condition and we need after consuming carbs and we needed everyone to use fat as much as possible. So we asked them to drink MCT in order to see their body shift into fat, but I got wrong with the doses.

Dave:

Oh no, you got disaster pants didn't you.

Michal:

So instead [inaudible 00:39:27] I gave them 10 tablespoon and they had, everyone has need to go to the bathroom.

Dave:

Ten tablespoons. That's like feet up on the stall screaming kind of zone. Oh my God.

Michal:

And until today they remember it. You've told me to drink MCT because you needed to validate Lumen. It was funny.

Dave:

Wow. So you probably also didn't have the research. There actually wasn't research when I created the C MCT. And I said, guys, you need to use this because it works better. Because you could feel it work better. And then a while later Kunain down at UC San Diego came out with the study, showing C8 was far more ketogenic. But what I knew was that C8 was far less, I'm going to run to the bathroom than normal MCT oil. So I switched to that because at the very first Biohacking Conference, it was a hundred people at a bar in San Francisco. And we didn't have, I didn't make MCT oil. So we were using street grade stuff that had a lot of impurities that would make it even worse. So there was only two bathrooms at the bar and there's a hundred people there drinking a ton of bulletproof coffee. And we had a very similar problem to what's happening there. So warning to everyone, number one, MCT oil really will put you in ketosis, put you in fat mode. Yes. Lumen proved this.

Michal:

I think it's well validated.

Dave:

Yeah, there's an upper limit. So it was validated through pain. We'll just put... I did not know that until this interview, but I love it. Well, let me ask you this then. As an expert in metabolism, when you have some MCT oil during a fast, does your metabolism still look like you're fasting?

Michal:

Yes.

Dave:

But-

Michal:

It shifted-

Dave:

... to make one of those fasting apps keep doing videos with this young guy who doesn't know what he is talking about saying that if you have fat during a fast, it has calories therefore it breaks a fast. I guess, metabolically, the type of fat and the amount of fat might change things.

Michal:

But Lumen measure your metabolic fuel. So when you are consuming the MCT, so your body will use those free fatty acid in order to produce energy. So we want to know if you are now using body fat in order to produce energy or the fat from the MCT. So it's very important to mentioned it.

Dave:

I totally love it. You won't know. Metabolically, I'm not sure that it matters. If you're looking for fasting metabolism where mTOR is suppressed and insulin is either suppressed or at least didn't rise, which are the hallmarks of fasting. So I've gone through so many people saying, but there was a calorie and like-

Michal:

So what? What is calorie?

Dave:

Well, like I said, you could take some uranium during a fast, you'd still be fasting. It wouldn't be good for you, but there were calories in there. So it's like, what did the calorie do to your metabolism? And what does fasting look like metabolically? And it looks like burning fat.

Michal:

Yeah. I mean, it's all about improving your mitochondrial functionality. So now, okay your mitochondria is now practicing in using fat for fuel. This is a good thing.

Dave:

Yes. So I'm all over that. And I wish that we could remove suffering from fasting because when people are first starting to fast, it can be really hard to get into fat burning mode. So you feel like crap for a

while, or you could have a little MCT oil and then be in fat burning mode right away as your body adapts. And then what do you know, fasting without suffering? And the fact is, if you wake up and you're like, oh, I feel like garbage this morning. And you just don't know why. Maybe you've just stopped having carbs or the first time ever the night before, when you use your Lumen, what's it going to show? Because you're not yet switched into fat brain mode. You haven't had coffee, you haven't had MCTs. So are you just going to be having less oxygen and less CO2?

Michal:

So someone that is not yet practice on using fat for fuel. So it's someone that is metabolically less flexible. It's like, you will be stuck in the middle. So it's not, you are going to see that you are using 50% of carbs and 50% of fat. So gradually when we are getting better, meaning when our metabolism has become flexible and we are gradually pushing our body to be able to use more fat for fuel. So you will be able to wake up on fat burn. So it's like, because metabolic flexibility or metabolic health, it's a range. It's not whether you have it or whether you don't. So in the left side, it's going to be someone that is extremely not flexible. Those type of people even might have diabetic, have high risk to stroke and heart attack.

This is all the kind of metabolic syndrome. And in the right, you have people that enjoy life for the fullest potential that are able to lose weight and to maintain it, which is the main problem with losing weight, you will not be able to maintain it. You have high energy, you don't have those mood swings. So metabolic flexibility is a range. So the more you are metabolically flexible, you are able to wake up on fat burn and the less you are more waking up on carbon and there is a range in the middle.

Dave:

I absolutely love that. So you can tune yourself in, that way. And I should mention too, listeners know that whenever someone comes on with a product they're making, number one, you have to be exceptionally well qualified to talk about stuff, and number two, you have to give something to the audience besides knowledge and information, which is interesting anyway. So lumen.me, L-U-M-E-N.me, use code Asprey 50 and you're giving them as a gift, a \$50 discount. So there you go, guys, that's something that's worth checking out. So you probably, if you're overweight would like to know how to control your metabolism. And if you're not overweight, you may be really tired at certain times during the day, especially in the afternoon or maybe in the morning. It depends. People have these crater rings. So what's going on with your metabolism then? And since we're taking essentially a one minute window, you're getting a ten second breath hold. It takes quite about a minute to do a Lumen reading.

Michal:

Even less, 30 second.

Dave:

I figure it's a minute by the time I get the Lumen, turn on the app and then do the 30 second breath hold thing. So quick check is what I'm saying.

Michal:

Yeah. I think I'm so enjoy of taking my Lumen measurement that the time, just pass. So maybe it's one minute and I feel like it's 30 seconds.

Dave:

There you go. Right. Right.

You're supposed to have a stopwatch. You're a scientist. Come on. What we can do though, is we can wake up and say, how'd I do when I was sleeping? And you could say, I'm going to do something in the morning. I might take some supplements. I might have coffee or march or whatever, and see what the difference was. Maybe a half hour after, after it's had a chance to take action. The studies I've seen show that the amount of caffeine in two small cups of coffee will double ketone production. So after your coffee, without sugar in it, you should see a slight improvement in your fat metabolism. And then if you're still intermittent fasting, maybe you're going to have lunch at one o'clock the way I'm going to today.

Michal:

Wow. This is super cool. I didn't know it. I will try it.

Dave:

Oh, absolutely. The black coffee and also prebiotic fiber that turns to butyric acid also will be, be pro ketogenic. So you can put those in your coffee. And then all of a sudden you're like coffee, MCT, prebiotic fiber, all of those increase fat metabolism during a fast, but suppress hunger. So you're like, oh, that's better. But you can test anything I'm saying here with a Lumen. And so maybe you just have water because you think you're a mouse in a lab study. Like those guys who run one of those dumb [inaudible 00:47:52] apps. And what you would do in that case is you would test and see what worked better. And if you're more in fat burning mode and you feel better, that's great. And then maybe the next morning, you're saying, you know what, maybe I can just burn my own fat. I don't want to do the MCTs. And then you don't. And then you can test it with Lumen.

And then right at say noon, if you're following my advice, you should exercise fasted. So you'll actually blow out the glycogen in your muscles and you turn on your metabolism. So then you get your Lumen score and then you can exercise. Like, what am I burning right now? And you're going to be burning more fat, and then you can eat lunch and you can have the ribeye steak and be like, I'm so carnivore right now, except that you had coffee, which is good for you, even though it's a seed. But anyway, so you did that and then say, what worked? Did it work for me? And I promise you that if you are one of these middle aged obese women who benefit from only 12 hours fasting a day, you might see that you've over fasted on your Lumen.

And then maybe you wanted to have some sweet potatoes with your steak. This is why it's interesting to me. And then a half hour after you eat lunch, you get your Lumen again and say, am I burning carbs? What percentage of carbs and fat? So now you guessing is gone and you can say, is what I'm doing, working? And it's that real time score. If you were to do heart rate variability with an Oura ring or a whoop or any other sleep scoring system, like SleepSpace, you're going to wait till the next morning to know whether your stress went down, but that's not a real time signal. And with biohacking, the quicker you can get a signal based on a behavior, the faster you can change.

And that's why at the very high end neurofeedback, that's why 40 Years of Zen exists because, oh, a thousand measurements a second, as I'm trying to change, I can do that quickly. With Lumen many times throughout the day, whenever you have a question, you can check. What's my body doing now? But now here's my question for you after all of that rambling. Can you, when you... Because you're the inventor of Lumen. Can you, without the Lumen, approximate accurately what your metabolism is? Like, Could you today, right now say, I'm probably burning 47% fat. Do you have an onboard sense? Can I learn to feel my metabolism using the Lumen? Have you done it?

Michal:

Well, it's a good question. Yes, I can.

Dave:

That's awesome.

Michal:

I think I can, I can do both. First of all, I know when I'm more metabolically flexible, I can feel it. I'm really able to be super productive, super focused on jumping from one meeting to another meeting all day. I'm like a battery that never ends.

Dave:

So you feel it in productivity?

Michal:

Yeah.

Dave:

So is that different than just fat burning? Because anytime someone... The reason bulletproof coffee took off was that people were like, oh my God, I love how I feel. Because I'm burning some fat for the first time in 20 years. Is there a difference for you between the feeling of being in fat burning versus being flexible? Describe what it like... Do you feel it in your gut, in your heart, in your brain? Where is it? What does it feel like?

Michal:

So, metabolic measurement, being able to use fat for fuel. So the power of it is being able to see it in real time. It's like a snapshot of what is happening now in your body. But metabolic flexibility is taking into consideration many snapshots of your metabolism. It's not like one day I'm metabolically flexible and tomorrow I will be metabolically, not flexible. So today I'm really able to know what is my snapshot? And I'm also able to know where exactly I am in that range in very high resolutions.

Dave:

Wow. So you can feel it and you know when it's not happening, but the high resolution, since you don't really have?

Michal:

I have also the high resolution. Today, I'm reading to Lumen eight years.

Dave:

Okay. So you actually have the high resolution. So you could predict your Lumen score within a couple points?

Michal:

Today I am, today.

Dave:

That's cool.

Michal:

I'm taking measurement eight years morning, before bed at the end of my fast, before and after work out. I'm a master. I love to control my body like no one else can.

Dave:

Okay. I love it that you just said that. And it's funny. My wife is an ER doctor by training. And to this day, even though she's not practicing, she can put her fingers on someone's wrist and just know their heart rate, because she's done it so many times. You don't need a stethoscope and a stopwatch. You just know. And I've certainly figured that out with heart rate variability after a while you do the training and you track it, you just know what's going on with your nervous system. So you can feel vagal tone and know what it's going to do. And you can just know what it's like when you actually go into ketosis because there's a quality of your consciousness that's different.

And it's so hard to even say it or to put words behind it. Because what we're doing is we're using a device to measure something and then our brains automatically will correlate that measurement with, oh, that's the word for how I feel. You partnered with the Adidas running team for five weeks, you being Lumen, right? And so you took athletes. Now these are not in the lab. These are working athletes, doing their thing. To our point about lab work. But they just added Lumen breathing and got a daily metabolic score. What results did you get with the team?

Michal:

So for them, they want to improve their athletic performance. So they took a measurement before the running, in order to make sure that they have enough energy and based on that they fuel themselves properly. So their goal was to lose weight and to improve athletic performance. And we know that there is... One of the problems with carbs is that it's very important for us, but you don't want to over consume carbs. Now, when we are talking about carbs and athletic performance, we have a conflict here because from one side carbs are important for athletic performance. But if you want to over consume carbs, you will gain weight.

So we needed to optimize the amount of carbs. So you will have enough carbs to support the workout, but not over consume the carbs. So you will not convert them into fat. So for those Adidas running, who actually help them is to support their workout while helping them to lose weight. So this was the challenge. How you can manage the amount of carbs by still support your workout, but not over consume carbs so you will not gain weight.

Dave:

So wait a minute here. Are you saying that the Adidas runners, runners had a hard time losing weight? Everyone listening to the show, that should tell you something about doing cardio to lose weight. Just wanted to say, because they're running more than you and me. That's for sure. Anyway, that's a side thing, but what happened when they tuned their carb intake using Lumen? Because the numbers for professional runners, they're unbelievably good. I had a hard time when I read them, I had to read it twice. Do you remember the numbers? I have them in front of me.

Michal:

No I don't. But, so tell me what is-

Dave:

Okay, good. So sometimes people have studies memorized and that. So in five weeks of optimizing their carb intake using Lumen, this is the Adidas running team okay, they lost an average of 2.5% of their body weight. They lost 9.5% of their body fat and they decreased their running time by 17%. And this is why when people say you can exercise away a potato chip, it is garbage. These are professional exercisers. And when they got the right amount of carbs by measuring it using Lumen, they had incredibly... 17% faster running, 9.5% body fat loss in five weeks.

So if anything on earth talks to the importance of knowing how many carbs to eat and it's not no carbs, it's not low carbs. It's not even medium carbs. It's the right amount for your exercise output. And also for your cognitive output, I would say, which is a different discussion. But holy crap, those results are unimaginable at high level athletes. And it's because of getting the metabolic score from Lumen. You can't do that with CGM. You can't do that with blood glucose sticking or with ketone measurement. So that's just impressive.

Michal:

You know what else we discovered? I started to get, from a customer service, I started to get complaint from users, from women that said, it's very weird, suddenly I wake up on heartburn and it doesn't make sense. And by starting to collect data and starting to look on the monthly cycle, we realize that pre ovulation, our body tend to use more carbs. Now, if you think about it, it completely makes sense because our body is prepare itself to pregnancy, potential pregnancy. And when we are in that state, so our body going to shift to carbs and in order to preserve fat stores for the pregnancy. So we saw amazing how our metabolic measurement and metabolic fuel is changing during the menstrual cycle. Super cool.

Dave:

Is there a blog post or a paper on this? Because there's a whole chapter in Fast This Way on fasting for women and it feels like that knowledge is really important and there's, I don't know, I found maybe seven or eight studies of fasting in women. Most of them at least talked about where they were in their cycle, but a good number of them were perimenopausal or menopausal women. Because it's actually easier to study menopausal women because you don't have the cycles, right. So this on the Lumen blog-

Michal:

[inaudible 00:58:55] article about it. So a scientific article. So it's going to be published soon.

Dave:

All right. Well once it comes out, you definitely need to put it on the Lumen website and send it to me and I'll share it on whatever, all my social stuff. Because understanding differences in metabolism that are based on your cycle as a woman is entirely different. So it's biohacking, but it's entirely different than what us guys deal with. And there is a monthly hormone cycle for men with testosterone and full moons, but it's so subtle. It basically doesn't matter. Just take your testosterone cream, if you're over 40, you'll be fine. So we need to crack this code so that women understand, oh, this is why I should feel this way right now. And here's how to change my fasting regimen and my carb intake. And right now the carb intake number is so random. But with Lumen, I think you could dial it in and you'd probably see a reduction in PMS symptoms based on appropriate, but not excessive carb intake, right.

Michal:

Wow. Yes.

Dave:

Have you tried that on yourself? Does it work?

Michal:

I completely reduce my craving also and when I see that I'm more using carbs for fuel, but I know it's because of ovulation. So the recommendation, how I would manage my nutrition going to be completely different. So if I'm not around my ovulation, when I see that I'm using mostly carbs, I'm going to go probably on more on a low carb. But because now it's all about the context, right? So if now I'm using more carbs because of that ovulation, my body is really need those carbs. So I will eat a moderate amount of carbs, small meal, every three hours, complex carbs in order to keep my blood sugar stable and not having that drop of energy in craving.

Dave:

And you do that during which part of the cycle? Does that... Okay. So, how many days pre ovulation or is that just during ovulation?

Michal:

... there is a spike. Yeah. In that period-

Dave:

Just two or three days before?

Michal:

... spike, in burning, mainly carbs. So in that moment, I'm having small meals, every two, three hours of complex carbs in order to keep my energy levels stable, avoid craving, but I don't want to over consume carbs because as I said, pre ovulation, my body is more about storage. So if I will eat more carbs, I will gain fat. So, it's having that balance.

Dave:

So, it sounds like eating a quarter of a dark chocolate bar, every three or four hours would solve the problem for most people so, there you go. That's what I heard. I heard women should eat chocolate three days before ovulation as much as they want, as long as it's not high sugar chocolate. I'm just trying to share the news that people want to hear. I'm not sure that I would agree with you about complex carbs versus saturated fat, with some carbs and some fiber might be better than a complex carb versus longer chained carbs. But that, we'd have to test that out, but it comes down to the gut stress that comes from most sources of complex carbs versus just making the carbs complex by having fat and fiber with them, without them actually being complex. Because we know that fat modulates the intake rate of carbs.

So you can lower the glycemic index of carbs by having fat with them. And as long as we're not using a fat that slows metabolism like omega six, I think dark chocolate really is one of the best things you could possibly do. It just needs to be 80% dark chocolate. So you're getting four grams of sugar or

something, but you got enough fat. You're like, oh, that's good. Plus the theobromine and all the other [inaudible 01:03:07] benefits of chocolate.

Michal:

[inaudible 01:03:08] adding fats to carbs are absolutely super important in order to moderate insulin spike.

Dave:

Okay, awesome. So rather than pasta, if you could have dark chocolate and they metabolically did the same thing, would you eat carbs or dark chocolate?

Michal:

I learned [inaudible 01:03:27]

Dave:

I'd pick dark chocolate too. Screw the spaghetti, I'm having the chocolate. I could do that. I don't have a monthly cycle, but I could do that anyway. So I'm going to have some chocolate as soon as we get off the interview. Well, it has been a pleasure to pick your brain about hearts and metabolism and arrhythmia and Lumen. And thank you for taking all that academic knowledge and doing what very few academic researchers ever do, which is say there's a better way. I can't buy a better way, I'll just make it, and then I'll make it available to the world. And I honestly think your database of 20 million and growing people's metabolisms or measurements of people's metabolism, that's going to end up being something that illuminates an incredible amount about the way our bodies work, because you have a timestamp on each one of those things.

You have a big data source that is incredibly amazing and untapped that tells us so much about how our bodies actually work. And it dwarfs every academic study ever done using the RER equipment that we have these 45 minute things just because you have so much. So tell us more about how our metabolism works. Can I invite you back on in a year or two to give us an update on what you learned from everyone getting these measurements?

Michal:

Yes, even now it's amazing the focus that we did, because now we have so much data. So at the moment that we have a new user, we immediately know how to cluster it. And we even before he's taking any measurement, we already know so much about him based on people like him. And from that moment, it just become more and more personal. So it's amazing having that much of data.

Dave:

Ah, so cool. Well, you're going to do good things with it because you've got all the knowledge and ability to do that. And for listeners, it's lumen.me, L-U-M-E-N.me, use code Asprey 50 and you'll save 50 bucks as a gift from Lumen. And, I got to say, there's real science here. And anytime I bring an entrepreneur on the show, they've got to really be able to bring it otherwise it's not worth your time. And there's a ton that I learned in this interview and I prepped for it. So this is a new tool in the world of biohacking that's going to tell you, maybe I don't want to be on a low carb diet, but I don't know what a moderate carb diet is. So maybe you can find out what your moderate carb diet is so you don't overdo it. You don't, under do it. And you get the best performance and you also feel totally safe to, when you choose to go

out and eat all the bagels, that's okay. At least you know, all right, I'm going to take the hit. Whereas before when I was young, I would eat all the bagels because I believed it was going to make me ride my bike faster and it doesn't do that.

And we just got all that info from Michal. So again, lumen.me code Asprey 50, save some money as a gift. And if you don't get a Lumen, you still learned a lot today, which is awesome. Thanks again for being a guest.

Michal:

Thank you. It was so much fun. Thank you.