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Dave, I got bad news. You're at high risk for stroke and heart attack. If you're going to a hospital with a heart attack, they're going to ding you for somewhere between 50, 000 It's kind of like a pimple growing in the artery. If that pimple gets red hot and inflamed, then that pimple could rupture. So you're saying we should eat more butter to make our arteries more lubricated and slippery.

That's what you're saying. Vascular disease is still the number one thing that's going to take people out. You haven't mentioned exercise much. You're listening to The Human Upgrade with Dave Asprey.

In today's episode, we're going to talk about cardiovascular stuff. And if you read my book, superhuman about longevity, the first step to living longer than you're supposed to is not dying. And there are the four killers I talk about. And one of the biggest ones that takes out most people before their time is cardiovascular disease, heart attacks.

And I'm going to teach you, or more to the point, the guest today is going to teach you. What you can do to have a healthy cardiovascular system so that you can live longer and have more energy and probably a better sex life along the way. This is particularly interesting to me because if you look at my genetics, the highest risk of the four killers for me is cardiovascular.

So I pay extra attention to how do I maintain my system so that it works really, really well. You're gonna learn a ton. Our guest is Dr. Michael Twyman. He's a board certified cardiologist and the founder of Apollo Cardiology. The reason I like Michael is that he uses functional medicine and conventional medicine.

There's nothing wrong with using the tools of hospitals or even pharmaceutical tools to get exactly the results you want. They're all just tools. And there's nothing that says one is morally better or worse than the other. You just want to look at all of the risks, including risks that may not be cardiovascular, whether you're doing something functional or conventional.

So I find a very, very balanced approach. And part of the reason that Michael knows all this stuff is that he's the cardiovascular director for the Institute of Muscle Centric Medicine and a faculty member of the Quantum Biology Collective. That means he doesn't think like a normal conventional statin swilling cardiologist.

Or do you, Michael? Welcome to the show. Well, thank you for the opportunity, Dave. And, uh, there's a quick sidebar. You got me into circadian biology back in 2017 and been wearing the blue bocker since that time. So nice. The effects of the true dark glasses or even just blocking certain wavelengths of light on mitochondria and therefore cardiovascular, they're so profound.

And they've been a part of my work since the first blog post. And I started. Uh, TrueDark, my company that makes the circadian glasses, I'm back, I think, in 2011, if memory serves. So I've been into this for a long time because I couldn't buy the stuff I wanted. The fact that you're using it in your practice, I'm honored, because I'm an unlicensed biohacker here just talking about some stuff.

Yeah. I mean, I know you had a goal of at least 180 and I had a grandmother make it to 106. So I just want to at least beat her record. Nice. That's a, that's a healthy goal. And with all the tools at our disposal today versus what your grandmother had, she had cleaner food. Um, but she also had tobacco and you know, all this stuff over the last 106 years, like you know, scarlet fever and polio and all kinds of stuff.

So it's amazing if you can get to 106, you and I, we can do better. You were actually a Navy medical corps guy by training, and then you got into cardiovascular stuff. Any connection? So I went to St. Louis University School of Medicine for all my training and they paid for the medical school of the military.

So I owed them four years of active duty service. I was in Beaufort, South Carolina during that time. I was mostly taking care of the Parris Island that would get banged up during their basic training. But after the four years of my active duty, Service. I really want to go back and do my cardiovascular training.

So I came back to ST Louis and did the three years of traditional cardiovascular training. Yeah, was an invasive cardiologist at that time, treating the very sick people in the hospital on the cath lab, but always thought that there's probably a different way that we can kind of look at this. I mean, yeah, we're very good at.

You know, acute care medicine, we're not so great at chronic care medicine. And so then kind of came upon that the functional medicine guys started learning a lot of that information and then came upon the biohackers at some point and then kind of merge all that into my current practice. You know, a biohacking cardiologist is definitely going to be remarkably cutting edge, which is so cool because, I mean, I see cardiovascular benefits all the time in people who go to upgrade labs and it's because your mitochondria work better.

As a side effect, your cardiovascular system gets better. It's almost like mitochondria control way more than we give them credit for. What got you specifically into mitochondrial biology? Well, I was initially figuring out that, uh, I didn't want to die from jet lag going over to Asia. And so I found one of your articles that talked about the glasses.

So at the crazy, you know, yeah, uh, super dark red ones, which, you know, you look like the Unabomber on the plane when you wear those ones. The twilight model. I wore those two on the way from Texas to, uh, Switzerland. And I slept seven hours that night with no wake ups and 90 minutes of deep end REM sleep.

Because. Circadian biology trumps almost everything else. We think that matters. What else do you do? Just cause I'm curious. We're going to get into heart attacks in a minute. So you don't want to get jet lag. What else do you do besides the TrueDarks? Oh, I mean, I have, if I see the red lights in my office and I have multiple different photo by modulation panels, you know, cold exposure therapy, sauna, you know, uh, there's a facility in St.

Louis that has the AirX device. So did my AirX work out yesterday? So yeah, I'm pretty well versed in all about the mitochondrial medicine, biohacks. You're definitely a biohacker. All right. Let's get into this the words heart attack are almost like perfect pitch marketing to scare people and scared people don't always make rational decisions.

What actually is a heart attack in most cases it's when a plaque ruptures so you have nearly 60, 000 miles of blood vessels and you have a lining of the article the glycocalyx that's trying to protect the arteries from getting damaged but if plaque starts to form in the arteries. It's kind of like a pimple growing in the artery.

If that pimple gets red hot and inflamed, then that pimple could rupture and then all the damaged cholesterol and cellular debris spills out into the bloodstream and then that forms a blood clot. And with that blood clot, you don't get oxygen nutrients downstream and then whatever tissues downstream will start to die.

So if it's in your heart, That's going to be a heart attack, and if it's going up to your brain, that's a stroke. That's how the majority of those type of events happen. Now, the plaque itself, how much of it is made out of cholesterol? Probably less than 20%. You know, there's a lot of other cellular debris, different clotting factors, different white blood cells, um, you know, your body.

Basically thinks of it as kind of a, um, you know, a splinter in the wall of the artery and it just starts forming all this different scar tissue, smooth muscle. And then eventually a lot of this plaque often will calcify or ossify. Your body basically turns it into a bone to try to seal it off. It's the calcification of arteries that's really bad.

And I've seen studies showing that soft plaque, when you look at radioisotopes, It's almost all made, at least the fats in it are almost all made by gut bacteria, right? So it's not that we ate some kind of canola oil or butter or something that turned into plaque. It's that a process in our body manufactured the plaque that has some lipids in it.

But like you said, it has fibrinogen and thrombin and all these other. Uh, immune factors or tissue growth factors that are trying to heal something. What's causing the original quote, injury that needed healing in the first place. So I always tell patients, you know, cholesterol is needed, you know, without cholesterol, you're not alive, but there's always going to be some amount of cholesterol in a plaque.

But cholesterol was coming there to try to repair the damage. And it kind of got stuck in the process is how I generally think about it. But I really think it comes down to the health of the glycocalyx and the underlying endothelium. If your glycocalyx, which is a protective gel surface. So think of taking a fish out of water and it's slimy.

That's kind of what your arteries is coating with. If that coating is healthy, then the lipoproteins kind of just slide on by. The white blood cells slide on by. But if you have high oxidative stress, inflammation, stress, toxins, heavy metals, there's hundreds of things that damage that protective coating.

And then that kicks off the cascade where lipoproteins start getting retained in the arteries. And the most starts to swell as more and more white blood cells come in there to gobble up the cholesterol particles. So you're saying we should eat more butter to make our arteries more lubricated and slippery.

That's what I heard. Right. Or at least don't be so worried about the saturated fat in that instance. That's not what you said. I had to be super clear, but the slipperiness. Of that very, very thin layer called the glycocalyx is critically important. It's something that almost no one talks about. If that's intact, you're not going to get the soft plaques.

And we'll talk later about things you can do to reduce clotting factors and things like that. Um, but I had not heard of this till about maybe seven, eight years ago, um, at a conference called A4M or the American Academy of Antigen Medicine. And, uh, I've presented there to 3, 000 doctors a couple times.

Now they only let doctors present, uh, which is, which is interesting. So I will be on stage this year interviewing a doctor, which is kind of cool. So I'm, I'm a huge fan of this conference. I actually met my, uh, my former wife there in 2004. This is like where a lot of longevity people come together to share medical stuff.

You've been there. You've probably, have you spoken a day for him yet? Yeah, I mean, A4M is one of the places where I learned a lot of integrative cardiology from Dr. Mark Huston and Joel Kahn. So, I was there and I came across, um, a company called Calroy, uh, that makes a product called Arterosil. And they're probably the only company out there, I know you work with them, um, who have, um, been glycocalyx and they had a whole bunch of clinical studies.

I was saying, Oh, look, we have a supplement that supports this lining of the arteries. And I've been on that stuff for ever since that time, whether I don't know if it was seven or 10 years, but for a long time, um, because I know that's a weak spot for me. And I don't have any of the signs that you would want to see if I was getting cardiovascular disease, which is a good sign.

And I think that protecting that lining is a major part of what I do. We have a slippery lining and we have the plaque itself. And you said there could be some cholesterol, which is a necessary part of, of your body. Um, we have some other lipids that probably come from gut bacteria. Uh, and then the other proteins though, thrombin and fibrinogen are the things that make blood sticky.

Right? What, where did those come from? What do we do about those? So the glycocalyx also houses different antioxidants. It does house different clotting factors. So think of like the glycocalyx is like ready to go if there's an emergency. So if you get cut, injured, you want the blood to clot so you don't bleed to death.

And so the glycocalyx holds onto a lot of those things. In normal dimes, those things are just kind of buried in like this gel coat. But if the gel coat gets stripped off, then these clotting factors have access to the blood and then you kick off these clotting cascades. Got it. Is there something we can do directly about clotting factors to reduce risk?

Probably the best way is cell mites. Cell mites are a natural blood thinner. Grounding helps thin the blood and then if people are going to take, you know, more kind of standard approaches, Aspirin potentially helps, natokinase potentially helps. Seropeptase as well, probably. So natokinase and seropeptase are enzymes that dissolve those clotting factors.

When I was about 28, Uh, my functional medicine doctor said, uh, Dave, I got bad news. You're at high risk for stroke and heart attack. Like, what are you talking about? Like, I'm not even 30 and I've already lost a bunch of weight. And so we'll look at how fast your blood clots. And it was like full clotting in something like six seconds.

And it was pretty bad. And. They measure those factors that they're out of control. So I said, I gotta do something about it. One of the things I did do was start taking seropeptidase or natokinase. And I still do to this day because I don't want extra clotting factors floating around in my blood. Is that a good strategy?

For most people, it's generally safe. I mean, the only reason you would be careful is if you had to be on some type of blood thinner for some other deep vein thrombosis, or you had AFib and you're on Xarelto or something like that, you gotta be careful with that. But for most people, it's generally safe.

Got it. And since they also break up other scar tissue in the body, I look at those as just baseline longevity practices. The protection of the glycocalyx, uh, the supplement that I was talking about earlier is called Arterosil, and that's a bunch of different plant compounds that have a whole bunch of research that, that they make that slippery lining so you lower your risk.

If someone's already at high risk and they start, say, taking some enzymes or doing arteriocel, does it reverse things or just stop them from getting worse? It can actually do both. I mean, I often talk about, you know, products like arteriocel is, you know, building blocks to repair the damage. And if you repair the damage, it can actually reverse the damage.

The body's pretty wise. It will start repairing what's underneath and the intima and under layers of the artery. So think of like arterial cells as something that can help put up a force field. So you try to hold back the damage. Arterial cell has some polyphenols in it to prevent some of the oxidative stress, but it's big thing is that it has Raman on sulfate in it.

And. The glycosaminoglycans, the GAGs, they're all heavily sulfated, they hold onto a lot of water, so that's what gives that glycocalyx that kind of that gel coat consistency. But the ramanin sulfate acts as like a building block to kind of regenerate or grow that glycocalyx back. And so, if that coating is healthy, they have done studies where they're using a device called the MRI plaque view, and they're looking at plaque in the carotid arteries.

In the lipid rich cores, the softer plaques. They were tending to regress in a few months being on this particular product. Well, that's impressive. So we've got, uh, we've got a pretty solid way to say, even if you're somewhat progressed in cardiovascular disease, there's something you can do. And if you don't want to get it, do you take a lower dose of these things?

You take them every other day, like what's the strategy look like? That's a good point. Yeah. Yeah. I, from my standpoint, you know, vascular disease is still the number one thing that's going to take people out. So it's never too early to start thinking about your risk. And some of these strategies potentially could be preventative.

They haven't necessarily been studied that way, but at least teleologically makes sense. The dose generally is one tablet twice a day. If patients do certain testing, they can kind of assess like, well, My arteries are pretty elastic. I have normal blood pressure. You know, they can use the nitric oxide test strips.

Okay, are they making good nitric oxide? Then maybe they only need it once a day or once every other day. But if you start seeing other markers kind of going against you, then you probably want to go to the standard dose of one tap twice a day. Tell me about some of the lifestyle things you can do that aren't supplements or pharmaceuticals that would reduce your risk of cardiovascular disease.

It always starts with circadian biology, so I see every single sunrise to set my super cosmic nucleus and tell the rest of my body clocks what time of day it is. You know, if you don't see the sunrise, it's going to be very hard to stay optimal. You have been following my work for a while. It's totally true.

Yes. Sunrise and sunset are important signaling things, right? Very much so, you know, the light is the Zeitgeiber, the food, the temperature, all those things have an effect. But I always start with circadian biology because it's the one that ultimately makes the most sense, but it's free. You just have to go out and do those things and then block artificial light at night.

You can do it naturally or you can get the biohacker glasses and just, you know, do what you need to do at nighttime. So I always start there and then we talked a little bit about, you know, grounding. Get some free electrons from the earth. It's going to help keep your blood thinner. It's going to help lower inflammation.

It's all good stuff. It's fantastic that you're talking about grounding. The guy who discovered that, Clint Ober, was sitting here in the studio an hour before we're recording this, where we talked about how did we discover earthing? What is the evidence? And Dave, I got 30 studies over 25 years. I'm just a retired electrical engineer from the cable industry, but I've been working on this for a long time because it works.

And then Steven Sinatra, who was a renowned cardiologist, who was actually scheduled to speak at the biohacking conference and passed away before he could do it, for many years said, you know, if you would just go outside with bare feet or use an earthing pad That will reduce your cardiovascular risk and you've seen all these changes, but very few cardiologists talk about this today.

Uh, you're, I think one of a small number. Do you have hope that the field is going to say, huh, maybe before I put them on a statin, I should tell them to take their shoes off. I don't know if the conventional guys are going to ever get that message that they're going to do that first. I think it's going to be people like you, me, going on the podcast circuit and reaching the patients directly and like, Oh, I heard something interesting.

I could do this for myself without having to ask my doctor's permission for this. Okay. I always tell people that stans are tools, but they're not all magical. You have to get all these other things right. I mean. Okay. That's why there's the big mitochondria on my wall. I talk about this with the patients like you have to get your mitochondria to work well.

Otherwise, your cardiovascular system is not going to be working optimally and grounding is just one of those fundamental tenets that's going to help mitochondria function. So you've mentioned earthing, you've mentioned, uh, circadian biology, getting sunrise and sunset, dimming the lights at night, or wearing the true darks, uh, which is, Exactly what I've done for 10 years now.

What about temperature? Talk to me about temperature exposure in cardiovascular disease. And to recommend people, you know, sleep in a dark, cool cave. I know you've said similar things in the past. I personally like, you know, the air temperature would be at least 68 degrees Fahrenheit or lower. Now I've had one of the chili pads since I originally came out and I could keep it down to about 60.

I generally can't get down to 55 sleeping. I just keep waking up if I do that. Um, and then if people don't have access to those things, then. Teaching them how to do, you know, cold showers appropriately, cold plunges, or just cold baths at night so that their body temperature is dropping. You know, if they're into sleep tracking, you know, with Oura rings or Wu bands or whatever, they generally are going to see their sleep scores improving.

So using cold is that other Zeitgeiber to get them into that, uh, circadian rhythms being optimized. After, oh, at least 15 years of really working on, like, what are the things that are controlling the SCN, which is the central circadian timing circuit in the brain? It's clear to me that light is number one.

I think food timing is number two and temperature is number three. And then social contact would be number four. Does that actually maybe exercise is the same as number five. If you exercise before bed, it's going to screw you up. Does that seem like a good ordered list of what's going to control your body's perception of when it's dark and it should recover?

Yeah, that's a pretty good order. And as you said, you know, it's light is the biggest one. And that's the one that most people just really don't really Think about, I mean, you've said it before, like junk light, that it is, that it's ubiquitous and people just don't understand how their biology is really being driven by the light that they decide to live under.

If you had to make a choice between constant exposure to junk light and eating a bunch of stuff fried in soybean oil every day, which one would you choose? Can I eat the soybean oil outside in the sun? Uh, sure. Yeah. And then have the blue light the rest of the day? I'd probably go that route then. Wow. I would not want to do either one for my health, but if I had to wreck my circadian biology, it doesn't matter how well you eat, if you're sleeping like crap and, and it's kind of personal for me.

I mentioned, you know, genetically higher risk on the cardiovascular side, but I used to go to sleep reliably at 2 0 2 a. m. and I've tracked my sleep for 17 years. I used to wear a headband before we had, you know, Victoria's Secret approved aura rings, but it was a problem and, and I knew it, I'd have to wake up, especially if I had a normal job.

And it was just brutal, but I didn't want to go to sleep before that. And it was only after I got this really deep understanding of light. It's not just blue light. It's blue, amber, violet, and green, and it's the intensity of the light and the angle of the light. And I put all those in a lens, filed a patent on it, even with TrueDark.

When I started wearing those reliably at night and had all the dimmer switches and actually used them, I got about a 1030, like a normal person, and I could not do that until I was in my 40s. And in fact, I probably would have been diagnosed with delayed sleep phase onset disorder. I met all the criteria for it when I looked into that.

But you can just fix it with light and then you add in this eat dinner earlier, which also helps you to know what time it is. That seems to help as well. When you're working with patients for their meals, talk to me about what you recommend they eat to reduce their cardiovascular risk and when. Great question.

And in my intake questionnaire, I usually tell patients I'm only going to ask them three questions to start with. Then everything else is going to be based off of what their goals are. And then what the biomarkers on one of the advanced cardiovascular panel shows. I always want to know, primarily, what time of day you're eating, because food is energy and information.

And I tell patients, if you want to do fasting, fine, but I prefer you fast in the evening time and have a longer period before bedtime when no food's going in. Your optimal feeding window, from my standpoint, is sun up to sun down. If you want a shorter window than that, that's fine. Second, I want to make sure the person's getting enough fish in their diet optimally.

They need DHA for the retina, which is approximately 60 percent DHA in the brain is approximately 30 percent DHA. So getting high quality seafood into them or lamb or macadamia nuts if they're not going to eat enough seafood. And the third big question with my friend, Dr. Lyon, you know, is getting enough protein in to maintain the muscle mass that they want to hold onto their frame.

And most people under eat their protein requirements. They need at least 90 grams of protein a day just to maintain their muscle mass. So those are the three questions I start with. And then everything else is going to be based on, do they want to be gaining mass, losing mass, maintaining? And then most patients who come see me, they generally have some type of lipid abnormality.

And then I do a conventional lipid panel, but then I do all the advanced cardiovascular testing as well. And I'm looking at how well they absorb their different fats that they're eating. Like at how insulin resistant they are, if they are, and then we start fighting to being the other macros. But I always start with like, it's the light that's driving those macronutrients, how it's being metabolized.

So you've got to have that circadian piece dialed in first. I love that. And you're totally right. Uh, my research, the peak of your calories should be at 2 PM and because 2 billion years ago, actually it's somewhere between 1. billion. There's different camps about how long mitochondria have been floating around.

Around noon is when there's the most algae in the ocean and the most sunlight directly overhead, which is when our mitochondria be at their peak. And then you'd be consuming the most energy over the next two hours. And then it starts to get cooler. The light gets warmer as it starts to set and then you have less algae to eat.

So you go through this beautiful daily cycle. And with the Bulletproof Diet, which was the first big intermittent fasting book, it's much easier to skip breakfast. Bulletproof Diet But also have an earlier dinner. And the reason that I teach skipping breakfast is that very few people can skip dinner because of the social aspects.

So then what you do is you schedule dinner earlier, as early as you can. So I'm doing a business and I'm like, guys, can we meet at 5 30? Like, I think we can all make it there, maybe six, but I don't want to do a 730 or eight dinner. It, it's too late. In fact, I'll pre eat and then I'll just have like some sort of food to push it on my plate to look cool.

And so I like it that you're saying a skipping dinner is functionally best. And if I was at no high risk of a heart attack right now, I'd be pretty militant about no dinner after five or six. You haven't mentioned exercise much. I mean, it's a lever, but I don't think it's the primary lever. Once people, you know, get through the circadian biology, because they usually talk about like, there's four pillars to optimal health.

There's probably more, but most people are, they at least have some concept of what nutrition they should be consuming. They have an idea that they should be doing some exercise, but they usually don't have a great idea of how to mitigate their stress. They don't know what heart rate variability is, and then fourth, very few people really sleep optimally, unless they really bow into doing the things that you've been doing as well as I have.

As you know, sleep is the superpower. Like if you sleep well. You can do almost anything the next day. So I'm often working on that first with people's like, let's get your sleep dial then, and then we're going to work on the exercise component where then you're going to stress the system because you've got to sleep well enough to recover from that exercise.

What do you think about these guys who fly across 10 time zones, land, do a CrossFit workout and a cold plunge to recover? I mean, I don't know if I would do a CrossFit right after, you know, a long flight. The cold plunge maybe makes sense. Um, uh, yeah. You know, as you know, like air travel is extremely, you know, toxic to the system.

Like you want to try to do everything possible to eliminate oxidative stress and inflammation when you're flying and then going to do a big crushing, you know, aerobic workout right when you're off a plane. It's probably not going to go well, long term for you. It feels like that just makes the most sense.

Your body's weak and going and hitting it hard when you're weak. It doesn't make sense. Hit it hard when you're strong and hit it hard enough to trigger the changes you want and then recover as fast as you can. So you get the most benefits. And we see that in the data at upgrade labs all the time. We have clients who come in and they work out far less using AI and things to get the right signal in, but they transform and they're doing it with Therapeutic grid, red light.

Uh, frequency specific treatments, PMF, all the things that are mitochondrial enhancers and recovery enhancers. And they make shocking changes in 30 days, but if they were just hitting it hard every day, they wouldn't see those changes at all, even though it would take more time. So my advice, and it sounds like yours would be if your system's tweaked by a long flight, recovery versus more exercise stress would be your first task.

And then the next day go exercise, right? That would be a good plan. Yes. Okay. What kind of exercise is better? Load of question. I mean, any that the patient will do is usually the first way. But, um, it's going to be a combination of, you know, some type of strength resistance work, hopefully at least twice a week.

Um, and then some amount of cardio depending on their, you know, fitness goals. I mean, I'm usually starting with getting people to do some zone two type of training to try to get some mitochondrial base work done. And then. Then layering in the Zone 5, the interval type training, once they're a little bit more conditioned.

And if you're hearing this going, Zone what? Uh, smarter not harder. In my most recent book, I talk about all the different types of cardio and the effectiveness per minute. And definitely a very short, high intensity Zone 5 works. And there's great evidence for zone two, which is when you're, you can, you can talk, you're almost out of breath, but not quite, but it's a relatively narrow zone.

And it takes something like three hours a week to do that for maximum benefit. I don't really have three hours a week to be in zone two. So I'm like, screw that noise. I'll, I'll do my hit, uh, and get my VO2 max up way more effectively than hit. And I'm okay with that, but some people really want to do more.

And it's whatever, you know, whatever the goals are for that patient. You know, how much time they have available. Yeah. I think that's much like, you know, you know, work will always fill in all the gaps, so people have to schedule their kind of recovery, schedule their exercise. Be like, How many hours a week are you going to give me?

Yeah. Six. Okay. How about half strength, half cardio? You know what I'm saying? Yeah. How many of your patients really spend six hours a week in the gym? I have kind of a, you know, uh, a biased population and I got a lot of, you know, people who are trying to optimize for health. So there are some people that I do take care of some professional athletes inside.

So they're the outside, you know, kind of, uh, um, you know, bell shaped curve type of people, but, um, Most people probably are only exercising, you know, between two and four hours a week. I think you can get it done in that time. And I'm not sure that eight hours a week is even appropriate unless you're recovering like a professional athlete.

That's a lot of training. So I made that mistake when I was younger, when I was 300 pounds. I'm going to do 90 minutes a day, six days a week because more is better. And man, I never lost a pound after 18 months of that. We haven't talked about, A couple of hormones that I am a huge fan of in the biohacking world, thyroid and testosterone.

What are their connections to cardiovascular disease? So I check thyroid hormones in every single patient. Well, not only because, you know, it affects your metabolism, but if your thyroid becomes dysfunctional and hypothyroid underactive, it starts affecting your lipoproteins because underactive thyroid will have an effect on your LDL receptors.

Yes. And the LDL receptors is like a docking station to grab the lipoproteins as they go by. A lipoprotein is basically the cargo ship that takes your cholesterol. Through the liquid blood stream because the cholesterol is waxy. It's a fat. It's not going to float in your blood much like Lauren vinegar.

So in my office, I always use a tennis ball for anybody who's watching that. The lipoproteins, you know, zip through and then the elder receptor, which is like the docking station, then grabs it and then pulls it into the liver and breaks it down. If you're hypothyroid, those receptors, you don't make as many of them.

And I, of course, I'm checking not only TSH, I'm checking free T4, free T3. Reverse T3 in both of the thyroid antibodies because you will be surprised if you look at enough people, how many people you pick up with Hashimoto's autoimmune thyroiditis that had no idea that they were headed down that way. And if you have one autoimmune condition, you often have more.

But hot immune conditions are always associated with more risk of vascular disease because they help regulate the immune system and then the glycocalyx kind of gets damaged as the innocent bystander. So I check the thyroid in every patient. If you look at the association of Underactive thyroid and cardiovascular risk.

There's a really clear association there. And it kind of drives me crazy when a friend will call me and say, I went to the, the cardiologist and they want to put me on a statin, like, well, did they check your thyroid? Did they ask why the system is this way? And when they don't like, maybe you want to find a functional cardiologist who's going to help you out here.

Because if you regulate thyroid, which controls mitochondrial activity and mitochondrial activity. controls cardiovascular risk and thyroid controls LDL receptors. Maybe you just need a little bit of thyroid because your TSH is four. It should not be four. It should be like one. And TSH is a not the best indicator.

It's just the easiest one thyroid. What are the numbers you like to see for longevity in TSH and 3T3? So I believe it was the Hunt trial that showed that people who had TSHs under 2 tended to do the best. So that's what I usually shoot for. And then, depending on the lab company, you know, I want to see the free T3 be in the mid range or higher.

And that's mid range for a healthy 25 year old, not mid range for a 75 year old? That is true. And that's also always the challenge, is that who is the reference range you're comparing yourself to? I always just want to say, And if you get called for jury duty, well, it's supposed to be a jury of your peers.

Like, are these really your peers? And it's the same on these lab testings. People are so chronically sick right now. They just move the ranges. So the range for optimal or for longevity or for sports performance, it doesn't seem to have a relation to the numbers, especially when they say, Oh, it's normal for people to have, you know, really high, fat in their liver and to have crappy arteries when they're 70.

So therefore you're healthy. You're like, no, that means I'm aging like that. Undo that. You make it better. And I, I really get that in your work that you just have that mindset, like what's the best that you can make it not what's average for your age. Tell me about a couple of success stories that you've had by using circadian biology.

To reverse heart disease, I don't know. So I would say it would 100 percent is the primary link to reverse heart disease, but I just don't think anything else that the person does is going to work well unless they get that dialed in nutrients and supplements. You know, there's a circadian mechanism to what time of day those should be coming in.

You know, some of the prescription medications should generally be given in the evening time because of the way cortisol rises in the morning. L. Blood pressure is supposed to drop while you sleep. If it doesn't, then you're at higher risk of stroke and heart attack. So I think it's all linked, but I don't think it's like It's just getting rhythms and automatically heart disease goes away, but it's very hard to get the heart disease to be optimal without doing that.

Okay, makes sense. So let's say someone says, I don't want to do statins. Um, and well, we'll talk about sentence in a minute, but so I don't want to do that. I don't want to go on a blood pressure drug that gives me higher risk of dementia like most of them do. I'm going to do the circadian biology thing.

I'm going to follow some of these other recommendations. What kind of changes do you see and how quickly? Well, for blood pressure, it's more about, um, you know, honestly, UVA exposure. The more sunlight that people get exposed to, the more the dermal pools release nitric oxide and the blood vessels dilate.

So I almost always think about like people have high blood pressure. Not enough sun too much EMF first until they fix that problem There's no reason to keep kind of going down the rabbit hole But once they fix that problem, then you can do the different genetic snips to figure out like are they more predisposed to hypertension?

Is there some other type of hormonal issue that the person has that you need to address? Then you can kind of get to the root cause like as I would tell people like, you know, hypertension has an ICD 10 code It's a disease But hypertension is just a normal response to something disordered in that person's environment.

And you just have to be the detective to get to the root cause of what's driving that process. Now, I love it that circadian biology is on your list because it's a problem more than you'd think. And so are EMFs. And the answer is sunlight and grounding. What about though, when I lived in Canada? So six months out of the year.

Sunlight is a distant memory. I mean, it, sun doesn't come up until eight 30 or nine. It's weak when it's up and it's usually gray anyway. And it gets dark four o'clock. How do you stay healthy in that environment? You still get the benefit from grounding during that time of year. You still get the electrons by doing that, even though you have no UV light at that high of a latitude, you're still getting other.

Red wavelengths of light that is still beneficial to the mitochondria might just not have it for as many hours But this is why the people who like in Finland in Norway, they embrace the sauna culture, you know They got into cold plunging, you know before it was called, you know, bow actor type of tool Right cold makes you release heat from the inside.

You're basically releasing sunlight from the inside when you're doing these cold therapies So plunges or cryotherapy becomes Correct. That's funny. Upgrade Labs is doing so well in Canada. We've got one opening in Calgary, got one in Oakville outside of Toronto. Um, one's coming in in Vancouver. And I think it's because Canadians all winter long, I gotta, I gotta do something.

So red light therapy seems to be good. What I did when I lived up there is I actually had a reptile light that had UV light in it in my dining room. And there's stickers all over warning and do not expose skin. Do not look at this ever, but your lizard or your snake can just bask under it and they'll be fine.

Something's not right here. So what do you think about people supplementing either with a tanning bed or getting some extra UV light during winter, if they can't get any outside? It's a good point. And the key is that, you know, you, nature would have never had UV in isolation. And so that's the problem with.

Conventional tanning beds, you would have never just had UVA and UVB light hitting your skin. You would have always had red light with it. So if you're a true biohacker, you'd have your red light panel on plus your spur DD and you're getting almost all the wavelengths at the same time. Um, so can you do tanning healthily in the winter with artificial beans?

Yes. You do tend to have to know what you're doing with some of these home devices. Otherwise you're going to give yourself a second degree burn with some of them. And then the other concern is with like the actual tanning beds. It's just how much EMF, some of these things put off. So unless you are somebody who has your own meters, you're going to have to kind of trust the person says like this thing's wired appropriately, it doesn't have a bunch of fans in it, that's going to be kicking off all this non native EMF.

It's a definite concern. I'm really hopeful. There's a couple of companies working on LED based local tissue UVBs. I think ultraviolet is necessary for health. And I've seen the studies that show a normal healthy dose of ultraviolet light helps to reverse or prevent nearsightedness. So if you go outside in the sunlight with sunglasses on all the time, you're not getting that, but you don't want to sunburn your eyes and stare at the sun at noon and all that kind of stuff.

It's about a moderate, healthy, normal amount that you would have if you lived outdoors. That's a good, very good point is that, you know, your eyes are, you know, the windows into, you know, the world. There's other receptors in your eyes other than the visual receptors. There's receptors in there that, you know, are sensing how much blue light is coming into your eyes, how much UVA light is coming into your eyes.

And if you're always wearing sunglasses, well, then you're gonna have a mismatch of that information between your eyes and your skin. And if you do that, you're much more likely to get, you know, burned on your skin and have all sorts of problems and they're going to blame the sun causing the problems.

That's because your eyes need to be matching up with what your skin is sensing. I've seen this one guy who says he's a longevity doctor. But also says you can't extend human lifespan. And in his book, he says basically if you want to live a long time, you should take statins. Well, what's your take on statins?

I always tell people they're tools, and there's certain people that may benefit more than others. And those people are always going to be people who are the sickest, who've already had multiple cardiovascular events. They've had their chest opened up and had bypass surgery. They got multiple stents. Then in that case, stans are trying to reduce them from having recurrent events.

Where the real gray zone comes in is for the people who are, quote, primary prevention. They have, quote, high cholesterol, but they've never had a cardiovascular event. The data is not always as clear in those populations, particularly in younger people, and particularly in women. So often I would shy away from using statins in those individuals.

Cholesterol, again, is not the problem. It's, you know, there's usually something that's, quote, raising it. You know, there's some oxidative stress or inflammation that you just haven't figured out yet. And when you figure that part out, The cholesterol should go back down to a normal homeostasis for that person.

But I often do multiple different genetic tests to figure out, okay, is there truly an issue with this person's LDL receptor? Is there an issue with their gut? Is it like one of the binding assets is abnormal and they're just reabsorbing a lot of cholesterol through their gut? You can use the Boston Heart Lab panel to kind of get an idea.

Is it more an issue that the liver just cranks out a lot of sterols? Or is it more the gut is reabsorbing a lot of the sterols? If they're a hyperproducer, then that's the patient who potentially could benefit from statin therapy. But it always has to be a shared decision with the patient. If the patient understands the risk benefits of taking the medication, I'm okay with them taking it.

But what I don't really get on board with is the paternalistic idea that like, cholesterol is high, you must take a statin no matter what the side effects are, otherwise you're going to die of a heart attack. And that's just absolutely not true. You know, when I was still an invasive cardiologist doing procedures.

Often, patients would come to the cath lab with heart attacks, and they had, quote, normal cholesterol. Are they already on a stat? If stents are all magical, nobody would be having heart attacks anymore. So I think that was the piece that was kind of an aha moment, was that it has to be more than just cholesterol.

It has to be something about, you The glycocalyx is what I later figured out or something affecting, you know, the underlying intima. Okay, that's really where you got to go looking at. Some people still potentially could benefit from statins, but it's definitely not something that should be in the water where we're all taking these things.

I love that nuanced approach. I believe it or not, I'm not opposed to all statins. Um, there are times when, actually surprisingly, sometimes with cancer or even some fungal things, sometimes they can have magic effects. And there might be a time where it's worth it, but if your cholesterol is at 220, which wasn't even high, and you have no inflammation of your arteries, it seems like inhibiting mitochondrial function might be a bad strategy.

Agree. And, and I think the, the, the muscle side effects sometimes get downplayed. I think more people actually have weakness and pain and they just don't understand that it's potentially the side effect from the medication. What about people with higher apolipoprotein? So particularly it's the apolipoprotein B.

The ApoB is on all the particles that potentially damage the arteries, so that's going to be your LDL particles, your VLDL particles, which are mostly high in people who are diabetic or insulin resistant, the high LDLs, which are not high in the majority of people, and then LPLA, which up to 20 percent of the population has lipoprotein little a, and LPLA is like LDL on steroids.

It's twice as likely to damage your arteries. But when I use the tennis ball analogy to explain to the patients, this is how I explain what ApoB is. Thanks. The particle is the tennis ball. The ApoB is the structural protein, it's the white stripe on this tennis ball that holds this thing together in a sphere.

And then ApoB acts like a little key, it binds into the different receptors. So ApoB is on all the things that potentially would, quote, stick to your arteries and get retained in the artery lining. And there is a kind of range where normal ApoBs will fall. You know, an ApoB of 100 is approximately the 50th percentile.

So, 50 percent people would have values lower than ApoB 100. 50 percent people would have higher levels than an ApoB of 100. And I always will start with, how healthy is the arteries? Do they have good endothelial function? And they do some type of imaging that shows that they don't have plaque in their carotid arteries or their coronary arteries.

very much. Then I'm probably going to work on lifestyle alone or potentially supplements for them. But if they got like a five alarm fire in their arteries, then sometimes you're bringing out the bigger guns to put the fires out. Okay. That makes sense. What are the top three labs that someone should order to lower or at least assess their risk of cardiovascular disease?

So I only get three. Okay. So, um, cause usually I, as I check probably about 300 labs, but if I only had to pick three, um, and it's somebody who's never had advanced blood work done, I would check lipoprotein Because up to 20 percent of the population has it, and this is the number one genetically inherited particle that increases vascular risk.

If your level is normal per reference range, you don't ever have to repeat it. The second lab I'd probably reject would be HSCRP. It's not perfect. It's a rough estimate that, you know, how active is your immune system. If your CRP is 5, 10, and you haven't had a recent infection, Do you have an odd immune condition?

Do you have cancer? Like why is your immune system so turned on or something wrong with your teeth? It's such a common thing for infections. And then the third lab probably would check, um, some of that affects nitric oxide. I probably would look at a DMA asymmetric dimethyl arginine. Okay. Because if that's low, then you need more nitric oxide.

Yeah. If asymmetric dimethyl arginine is high, It inhibits the enzyme that allows your body to make nitric oxide. So high ADMA drives nitric oxide low. Okay, got it. So you need to have a low for that number. I oftentimes recommend just for general biohacking that includes cardiovascular, a homocysteine panel because it's easy to fix.

If your homocysteine is high, your heart attack risk is going to be higher. And that's a problem with DNA methylation. Take the right B vitamins, it usually is going to resolve, right? And that's definitely included in my panel. And it also links to ADMA. If your homocysteine is high, it drives the ADMA up.

Okay. So those are connected. The other one that for years, especially at the beginning, when I first told people, you know, put butter in your coffee, I got so much pushback for that, even though there's pretty good evidence that it works and does all kinds of good things, they were just saying, well, but the cholesterol and, and what about my arteries?

And this is not even a reality based question. It's a fear based question, but I would oftentimes say, well, if you believe that your cholesterol levels are causing damage to your arteries, wouldn't LP PLA2 go up, which is an enzyme that's released when there's damage to your arteries? Is that a good lab for assessing the actual state of your arteries?

It is a good one. Yeah. You limited me to only three labs, but that one is always in the, uh, the inflammatory panel that I check. Because as you noted that that enzyme is generally elevated if you have thickening of your intima and that there's active lipoprotein being deposited in the lining of the arteries.

I will often really check that lab in patients who have lipoprotein A. Because I get a lot of patients come in with high levels of LPA and they're very scared because they hear that, you know, they're more likely to have a heart attack or stroke. But not everybody who has high LPA ends up with plaque in their arteries.

But those that tend to will have high LPLA2 activity, they'll have high oxidized phospholipids. And they often will have high interleukin 6. If you have that trifecta, those three things high, then LPA is probably more of a problem for you. But I really do like the LPPLA2 activity, particularly in patients who are, um, statin naive.

If you're on treatment, it doesn't really give you as much insight of what's going on. But if that's high, they got a fire in their arteries and you got to go find it. Are there any emerging cardiovascular or longevity drugs that have you really excited? Um, I mean, not in the kind of integrative functional world that I would say, but there are some traditional drugs that are coming out, but those are gonna be for the sickest, the sick patients.

I mean, there's a lot of interesting lipoprotein management drugs that are on the horizon, particularly for lipoprotein a, the, uh, the antisense all nucleotides, you know, basically wipes LP A out, they're in phase three trials right now. You know, they've already shown that it lowers LPA significantly.

They're still trying to prove that it. Reduces the risk of events that people care about, like not having a heart attack, not dying, if it can prove that it does that, then those drugs will be very beneficial for those patients who are at higher risk. Um, there's more about like this early detection, I think is probably what I'm more excited about, particularly how AI is going to potentially help a lot of this.

You know, you'll probably be able to dump all the labs into some type of AI, large language model. And this way we're going to tell you, like, this is the exact protocol you should consider for those persons. Nutrition, their supplements and their medications. I think that'll be something in my near lifetime, but there's a lot of AI applications that will help look at the actual health of the vascular system.

And one I've been using for about three years is the, uh, the clearly CT corneal angiogram. Yeah, the CT angiogram is. Essentially, the non invasive way to look at your heart arteries and figure out how much, quote, blockages you got. Knowing how much blockage you got is interesting, but not really that useful unless you have a 70 80 percent blockage that's causing symptoms.

Because often the blockages that cause heart attacks, you don't feel them. They're the 30 40 percent blockages that eventually rupture and then your blood clots. So the CLEARLY scan can see not only how much stenosis you got. But it tells you what type of plaque is in your artery. The hard plaque is stabilized.

It's not going anywhere. If it builds up enough, maybe it's going to occlude flow and maybe they're going to put a stent in you. But it's not likely the ones that are going to rupture and cause a heart attack. It's generally that softer plaque or necrotic plaque. And that's what you're really wanting to see.

Like when somebody comes in and they're like, am I at risk of a heart attack? I'm like, let's find out how much soft plaque you got. You got a lot, let's figure out how best way to lower that. So I think that's what I'm most excited about is finding people who had no idea that they're at higher risk because somebody could look perfectly quote healthy on the outside and be completely rotten on the inside.

How much is it going to cost me to get a good picture of my cardiovascular risk? The clearly scanned is probably about 1, 500. Okay, that's pretty pricey. If I only had 500, how much can you tell me for 500? I'd probably want you to get a home blood pressure cuff, admire your blood pressure every day and show me that your blood pressure stays less than 120 over 80.

And then with the remaining, you know, 450, check a couple of those labs we talked about earlier. Okay. The things like homocysteine or C reactive protein, or what was the other one you liked? Uh, like A D M A. Uh, a BMA, a DMA, asymmetric dimethyl arginine, and those things are relatively available. And you don't even have to go to your doctor.

You can order a lot of these tests online now and just say, I'm going to get my numbers and then I'll call my doctor, which is the cost effective way to do it. And I'm to the point where I don't count on my insurance company to do any of this stuff. They don't care. Um, you know, if I get hit by a car, I need them, but anything that's going to really help me.

Uh, it's probably something I'm going to have to do with a functional medicine doctor and the insurance company is going to say, you're not sick, therefore I don't want to pay. So why am I going to call them and ask permission to get a lab? Right. I mean, the insurance companies are there for when you have the heart attack.

Yeah. I would rather take the bet that I'm going to invest in my own health, invest in my own time to figure out what's going on. I'm not waiting to have the symptoms where then the insurance company is going to pick up the bill. Yeah. That's the way to do it. Maybe one day we'll fix that system, but so far, I haven't seen a lot of positive momentum in that direction.

Um, who knows? Maybe depending on who wins, uh, in the government. Um, I kind of laugh about this idea of having, uh, Bobby Kennedy running the FDA. That would be one of the most humorous and awesome things I could even think of. Just because he's, he's already said straight up. We're going to put all of the budgets for these organizations into preventative stuff.

And I'd love to see that. I'm not a partisan guy. I just want to see a fix in the medical system. What percentage of your business is through insurance versus direct pay? It's been out of insurance for five years now. I left the matrix a long time ago. There you go. And guys. If that kind of triggers and you're saying, well, it's not going to pay relying on your insurance company to pay for preventative stuff, it doesn't work.

It's an investment. You're like paying for your gym, your insurance company doesn't pay for that. Uh, so I will say 90 percent of the top functional medicine doctors that people are really making a difference. They stopped taking insurance a long time ago and they did that because the insurance company, the real business model is they're going to consume as much of the doctor's time as possible to get paid.

Yeah. To make it so the doctors want to do it and they're going to consume as much of your time as possible. So they create a lot of friction because friction makes the money because we throw up our hands and, and just give up. So that means your doctor has to have a couple of people working for him or her.

In order to just manage talking to people at the insurance company. So it just doesn't work. So when I see a doctor says, you know, I have a better rate for direct pay. And if you want to go through insurance, I'm, you know, 1 billion an hour, or I just don't talk to insurance companies because I like to help people.

I'd kind of respect that. And it, it's not awesome, but none of us should need insurance to get quality medical care. It's just overpriced. Um, I'll get off my soapbox after that, but no, no, it's fine. And that's definitely, it was my thought when I was leaving the matrix is like, you're always going to need insurance for the most part when you have the heart attack, which you hopefully never have because the hospital systems, it's a red game.

If you're going to a hospital with a heart attack, They're going to ding you for somewhere between 50, 000 and 200, 000 if they, you know, if you're paying cash for it. So you definitely probably want to have insurance for that part. The preventative side, it's not as expensive as you think. Most of the things I was talking about with Dave today.

They're free. Go see a sunrise. Put your bare feet on the ground. Eat some protein and fish. Yeah, I would like whatever it means to you. You don't have to go super fancy for that. Like a lot of these things are very simple, but if you want to do some of these testing, yeah, there's going to be some out of awkward calls for it.

But I think one of the big challenges is with The kind of the system is that it's just, it's the time you can not educate somebody on circadian biology and talk about how are you going to use photo modulation to decrease your inflammation in a five minute office visit. It's just not going to happen.

There's going to be a number that they show you. Your blood pressure is high. Here's the blood pressure medicine. LDL seems high. Here's your high dose STED. Next patient please. And that medicine burns out the doctors as well. And so the doctors who, you know, exit the system, they want to do the best for their patients.

And it often takes education. I mean, I think my whole job right now is basically just educating patients how the cardiovascular system works, how circadian biology works, and ideally, they don't really need me after they learn the things I can teach them. They may still want to come by to get their blood test to see, okay, like, everything's getting better, and is my arteries getting more elastic by doing these nitric oxide monitors?

Great, happy to do that. But we're really trying to just educate the patient because you're your own doctor. You know what your body needs, and when you get yourself in nature. Things tend to get better. Very, very well said. Dr. Twyman, thanks for coming on The Human Upgrade and just talking some real stuff about cardiovascular risk that almost no one hears anywhere.

The connection of circadian biology, it's so profound, not just for cardiovascular function, but for diabetes, which is a precursor, and for all the other things that we're dealing with. So I really appreciate it that you're willing to go out on a limb. And do the biohacking and the cardiovascular stuff and you'll consider the drugs and you'll get 300 different lab results and just go deep because this is possible.

It's not even that hard. You just have to know what to do and you spend a lot of time going deep on it. Thank you for sharing. Thank you for the opportunity. You guys can find out more about Dr. Twyman at drtwyman, t w y m a n dot com. Check him out. There's all kinds of cool stuff about. What happens when you get the right sleep and cardiovascular risk and so much more.

We'll see you on the next episode. See you next time on the human upgrade podcast.