

Optimizing Healthspan through nutrition

Kashif Khan interviewing
Robert Wolf



Kashif Khan

All righty, everyone we're joined by Robb Wolf today. We're gonna learn some really cool stuff. We talked about nutrition here and there, but we're gonna dive a lot deeper because we have a brilliant mind that can help us learn what we need to learn. Really why are we all here? We wanna learn about how to optimize our health span, our longevity. Those are the key words we gotta focus on because it's one thing to say, I wanna live to a hundred, but do you wanna spend the last 20 years in treatment in a hospital bed or do you wanna be have your vitality and energy that you did when you were 25? And I don't think there's a better person to speak to about that than Robb was joining us here today, today. So thank you for joining us.

Robert Wolf

Huge honor to be here. Thank you.

Kashif Khan

You've been helping people globally with your thought leadership, and we're lucky to talk to you today and you've gone through this journey personally yourself, and that's part of your learning. So maybe we start there and tell us about how you got to where you are today and why you're able to help so many people.

Robert Wolf

Oh man, so I just turned 50 back in January, so I'm definitely pressure testing all of these ideas and concepts. But 23 years ago I was super sick. So by training, I had a background in biochemistry, more on the organic synthetic side, but I was doing kind of some bench level research in cancer and autoimmunity was tinkering with my own diet. And at that time I was eating a high carb, low fat vegan type of diet. And for me personally, it didn't work well. Like I ended up with ulcerative colitis, terribly badly was facing a bowel resection, immunosuppressant drugs. And I've gotta say also, like at that time I was doing everything wrong. So I don't wanna overly throw the dietary part under the bus. Like I have learned over time that I do better with fewer carbs and even not a ton of fiber and different things like that. But I was in this grad school mentality that sleep is for the weak, sleep when you're dead.

I was living in Seattle at the time. And so I would get up before the sun came up, get home after the sun went down, I had a basement apartment. I eventually got my vitamin D check ages ago. And it was barely above the level for rickets. I mean, I had super low vitamin D, so wasn't sleeping well, poor circadian biology, terrible vitamin D status. And I was eating a diet that was just not working for me, but in an act of desperation, I started doing research around the issues that I have. I have celiac disease, which is an autoimmune gluten intolerance had some other kind of food intolerances. And when I'm not even entirely sure how I arrived at this idea, but I was intolerant to kind of grains, legumes, dairy. And I was thinking about that. I was like grains, legumes and dairy. That's like agriculture.

Well, first I was kind of thinking, what on earth do you eat if you don't eat those things? But then I started thinking about, I'm like, okay, that's kind of agriculture. What did we do before agriculture? We were hunter gatherers and mind you, this was a 1998. And I had this idea of a paleolithic diet. Like I had heard this term paleolithic diet somewhere. And I went into the house and I turned on the computer and waited for the computer to boot up and do its thing. And then into a brand new search engine called Google, I put the term paleolithic diet and there wasn't a ton of information on it at that point, but there was a little bit, the information that I found was interesting. It talked a lot about gut and autoimmune issues because of a mismatch genetically between the kind of theory of foraging and hunter gathering as kind of the human

life way for so long. And then this transition to agriculture maybe introduces some types of foods that the natural predation protection chemicals that are found in these foods might be problematic for gut health. So I was so sick that I was like, okay, I don't have anything else to lose. And so I went on what is basically a low carb kind of ketogenic, paleo type diet. And for me, it saved my life. Like it ended up addressing 80, 85% of the issues that I had at that point. And then over time, I've figured out a few more layers, a few more layers, but it was so profound. The change that I had dietarily, at this point, I was looking to get it either going to medical school or a PhD track in research. But it struck me so powerfully that I wasn't really sure if I wanted to do either one of those things. And so I was kind of casting around a bit for what the next step would be in my life. And it was right around this time.

It was 2000, 2001. I found this weird workout online called CrossFit. And I started doing that with a friend of mine who's a retired Navy Seal. And we were working out in his garage and within about three or four months, we had about 15 people that we were training in his garage. And I loved it because I could talk about food and sleep and circadian biology, and then do this physical training stuff. And I reached out to Greg and Lauren Glassman, the founders of CrossFit and said, hey, we're training people using this methodology. We'd like to open a gym and formally call it CrossFit. Can we do that? They were like, yes, go be achieved. And so that was the first CrossFit affiliate gym in the world, CrossFit North.

And then I had a chance to move back down to Chico, California, which is where I did my undergrad in chemistry. And I opened a gym there, and that was called CrossFit NorCal, NorCal Strength and Conditioning. And I've kind of worked in and around that CrossFit scene and peripheral entities for the intervening 15 or 20 years that I've worked with Naval special warfare, working with the Seals and the special boat teams on, on their nutrition and circadian biology and whatnot, have worked with some high level athletes, but the main people I really like working with. And I think the reason why I've had pretty good success with them are folks similar to myself who have kind of complex gut and autoimmune issues. I think that there's a lot of different ways that people can lose weight. I think there's a lot of different ways people can kind of get fit and get in shape and whatnot. But when you start getting into this scenario where

people have complex gut and autoimmune issues, I think that there's a much more limited number of options that really legitimately work. And that's kind of been my sweet spot. And the reason why I have stuck there is because I continue to tinker with my own health. My health has improved remarkably, but I still have some stuff that I tinker with and fiddle with. And I think that that's a large part of the reason why I've been pretty effective at helping people, because I'm still in the trenches trying to figure out things to try to improve my situation as well.

Kashif Khan

And just so everyone knows, we're lucky to have Robb with us today. You're probably noticing that the connection is a little choppy and that speaks to Robb's lifestyle and where he's decided to put himself, right. So we're lucky to have access to him today and learn from him. But that's part of what you've done is you've positioned yourself in a place where maybe you don't have the best wifi, but you have the best health outcome and you're kind of giving up one thing to get something else.

Robert Wolf

Yeah, it's kind of funny. I live in a spot where Star Link doesn't work because the positioning of the mountains. So that sucks. And then the DSL that we are carrying this message over some of the wire that is carrying this message was hung in 1895.

Kashif Khan

Wow.

Robert Wolf

That's what we're working with, yeah. I think Montana technically has the worst internet of anywhere in North and Central America. Like you literally couldn't find a developing country that has worse internet than Montana does. So that's what we're dealing with.

Kashif Khan

That's incredible. Well, it gives you plenty of time to sit back and write and share and help. Right?

Robert Wolf

It keeps me offline that's for sure. Yeah.

Kashif Khan

Cool. So there's something you said there about gut and often when it comes to our diet planning and nutrition, and I know there's other things we're gonna talk about today, but we start with, what do I eat, right. As opposed to let's get the terrain or the body ready to even deal with that choice. And that's kind of what it sounds like to me is what you do is that expression of gut dysbiosis or whatever it may be, you're healing that like what's the point of eating the best food where you're not even absorbing the nutrients anyway.

Robert Wolf

Yeah. Yeah. And I mean, I think that that goes hand in hand because the gut microbiome is so dynamic based on what you are and are not putting in it. So like meal timing can change the gut microbiome, our circadian biology, like when we're out in the sun, when we're not out in the sun can change it, but it definitely changes dramatically in response to what we are actually feeding it. And that's one of the things that's been fascinating to get into this lower carb. And even sometimes like this carnivore space where, the common wisdom is that people need fiber as an example for optimum gut health. And I have no doubt that there are absolutely some people that thrive on fermentable fiber and do really well with that. But I've also just clinically seen a lot of people that do terribly. And I'm one of these folks like I've tried the green bananas, cook the rice the day before and then refrigerate it to get the resistance starch and everything. And I seem to do better with the less fiber that I get in.

Like I used to do a giant green salad all the time, and I'll do a little bit of fruit. I'll do a little bit of roots and tubers, but what I have found over time is that I do pretty well with like fish and meat and stuff like that, a little bit of fruit and that's kind of it. And so in theory, that should be really depriving my gut of the appropriate substrates for like creating berate and these things that feed the enterocytes. But I think that we've been finding that the gut is super adaptable. Dr. Tommy woods published a paper on this, talking about the metabolic flexibility of the human gut. And I think that the big takeaway that we have in all this is so long as we are feeding largely whole minimally processed foods to people, whether it's high carb or low carb, the gut tends to do pretty well. the danger zone seems to be when we get into exceptionally highly processed foods, right? Those scenarios tend to introduce a situation in which we deprive the gut of proper substrate. And we can foster dysbiosis and not provide the materials for the gut to feed itself and

produce like butyrate and propionate, and these short chain saturated fats. And it's kind of the classic low fiber, low protein, high process, carbohydrate diet seems be the way to get to there.

Kashif Khan

So it sounds like there's a sense of, so a lot of what people are doing today, one element that they may not be considering is the consistency. Meaning that the way you eat, sure, there's a particular diet plan you can bucket that in, it sounds more paleo carnivore, but it's also consistent meaning you're allowing the gut to flourish in that diet setting. Where today it's like Uber Eats, I'm having sushi for lunch and Thai food for dinner. And I may order an ice cream, it's just too convenient to have too much variety, which is not the way our ancestors ate.

Robert Wolf

Yeah. And I mean it's people can overplay the ancestral health angle, but I think that there's a lot of truth to it. Like we do well with some variety, but to your point, it's like if it's Belgian waffles for breakfast, sushi for lunch, Thai food for dinner, right. All run down with like a chocolate sundae or something like, most people aren't gonna do well with that. Like if you're 18 years old and an athlete, you might handle that, but you hit 30, 40, 50, like people start noticing significant gut issues and dysbiosis and a whole host of problems that emerge out of that. So ironically as much as I advocate for kind of dietary variation, I think that people overplay that card to some degree. And this gets out in the weeds a little bit. I've never been able to find this article, but there was an article I read 10 plus years ago, and it talked about explorers to the New World and it was kind of a sideline, but it mentioned all of these folks had horrible gut issues, eating the food here in the New World. Like they had gas and bloating and this and that because their dietary practices were very, very different than what they had in Europe. And so it's just kind of interesting. And I have looked everywhere. I could think of to try to find this thing 'cause I really found it fascinating and these folks were shifting from what is arguably a pretty minimally processed diet 16, 1700s in Europe and then a minimally processed diet in the Americas, but they still were experiencing all this like gastric upset and these other health problems. as a consequence of that, which I just find really fascinating.

Kashif Khan

So you speak a lot about various types of dietary restrictions and we're gonna talk about that stuff because that's where a lot of people start like as opposed to what should I do? It's what should I get rid of? But I wanna ask you a quick question, because you said that you focus on proteins and fruit, which I've heard from many people and I heard that they feel great. And then there's a lot of other people more from sort of the allopathic medicine world that say, well, you've only been doing it for a short time, just wait for your kidney problems to start. So what do you say to those people?

Robert Wolf

I mean, there's tons of research on looking at high protein diets and kidney function. And mainly what I say to those folks is they're clearly not well steeped in the literature because it's the correlation between kidney function, kidney damage and protein intake just is a nonissue. If somebody has existing kidney damage, which is usually caused by chronically elevated blood glucose levels, then additional protein can further exacerbate that situation. But it's usually a sign that they're really not well steeped in the literature on the topic.

Kashif Khan

Right. And there's some people that will also say that I'm not gonna eat fruits because it's loaded with sugars. And I know there's some understanding of fibers counteracting that's probably why you don't need all these fibers from vegetables as you're getting a lot for fruit. But do you see any challenge there with glucose spiking? I don't know if you're monitoring or?

Robert Wolf

So I personally, I'm talking like I maybe get three apples a day, breakfast, lunch, dinner, like my fruit consumption is very modest. It's usually 20 to 30 grams of carbs at a meal. If I do jujitsu or something, it might be a little bit more so mine, I know like Paul Saldino will get like 200, 250 grams of carbs from fruit per day. That would be way too much for me, like gastric issues. It would actually be too much fruit dose and too much fiber for me. Because I have celiac disease, many folks with celiac disease also have fruit dose mal-absorption issues. And so if they eat a ton of fruit with a ton of fructose, you get this fermentation process where you don't absorb the fructose, the gut bacteria start fermenting it into alcohol and other fermentable products. And

it's a disastrous bathroom visit around that time. So I really dose that very conservatively for myself. I don't do it exactly the same every day. If my activity level's really low, then I may not have any fruit at all. And it's mainly just protein and fat, maybe a little bit of super low glycemic load like carrots or something like that. So I've just kind of customized it based off of my needs specifically there. But I will say that just from a purely digestive health standpoint, it seems like the lower my vegetable matter intake, including fruit, the better my digestion is. The thing is, is that I start getting so bored that I'm liable to hang myself with piano wire. And so it's like just eating, eating a damn apple is pretty, pretty nice when all you've been eating is like meat and fish and stuff like that. So I do personally reach a point where just the boredom and I love a steak. I love seafood. I love all that type of stuff, but man, just having an orange, just having an apple, like it ends up being like a, the best dessert you've ever had because I've mainly been doing all this like protein, protein, and fat. And then I actually get some, something sweet, like legitimately sweet, like a good in season orange or Kiwi or an apple or something like that. Living in Montana, like when berry season comes in, it's absolutely incredible. So for me, it's a little bit just like psychological, the variety piece that I needed as much as anything else.

Kashif Khan

And one last note about all this, your personal diet before we get into restrictions is I also hear when it comes to this kind of protein focused diet people that are trying to train, you're like, well, I hit a cap, I can't build muscle. I can't get strength. You know, I need my carbs in heavy doses. Meanwhile, you're dead lifting 565 pounds and you're bench pressing nearly 350. So what's going on there? 'Cause you hear this from personal trainers that you need to have this much and it's usually a lot. So why the sort of disparity between what they're saying and your outcome?

Robert Wolf

Yeah. So my power lifting numbers are from a good, several years ago when I was doing more power lifting, but I ate low carb then. I'll be honest, if somebody is really trying to max out muscle gain, I don't think like a ketogenic diet is ultimately going to be best on that. But I also don't know that a low carb diet is going to be even 10% less effective. But I mean, when people are trying to, let's say you're a stud high school athlete and you could get a college scholarship and that college scholarship could maybe a lead you to professional athletics and you could, have a

seven or eight figure income. A couple of percentage points can add up to a big deal in gym performance and on the field performance. But all of that said, I mean, just as a simple byline, like this meat and fruit approach, you could eat a good amount of protein and then you could get two, three, 400 grams of carbs from grapes and bananas and mangoes, I mean, the more, and you would get far more nutrition than you would from rice or bread or something like that. But that said, for a really insulin sensitive, good gut health person, if you handle rice and yams and sweet potatoes, like kick your heels up, like do whatever you want to do with that. But there are plenty of examples of people building really impressive physiques competing at a very high level at lower carb intakes, and also low carb is super relative. Like I've seen folks within the CrossFit scene they were eating say 600 grams of carbs a day. But they start getting actually some metabolic issues from that.

But then we'll get them just eating about 200 grams of carbs a day, which is a third, it's 300% less than what they were eating. It's still higher than what somebody on the standard ketogenic diet is eating, but because of their physical activity, this person is still technically in ketosis. Most of the time they still have like a 0.5 to a 1.0 blood ketone level, just basically because they're lean metabolically flexible and their physical activity is super high. So what constitutes a high carb versus a low carb scenario is super situationally specific. You know, for a rather sedentary computer programmer, low carb is gonna mean probably fewer than 50 grams of carbs a day, for a jujitsu practitioner or a CrossFit gamer, low carb, maybe 200 grams of carbs per day. Like that may be half or a third of the carbs. They would've normally eaten and they feel better because they don't end up with the blood glucose, roller coasters and all that type of stuff that they had from the higher carbon take.

Kashif Khan

Yeah. So it's very, personalization is key. And we now have the tools. It used to be tricky to even understand that stuff, but you know work of people like yourself and others are bringing that to the forefront. Now we'll dive into longevity. And a lot of what you hear these days when it comes to diet is fasting, fasting, fasting, right? So you have some thoughts on caloric restriction, very specific thoughts. So maybe we start there and you have a term that you refer to as CRAN, what does that mean? And why do we need to know?

Robert Wolf

Yeah, so that's out of the academic literature, it's CRAN, caloric restriction, adequate nutrition. I think that now they mainly just go calorie restriction. But the first article I wrote on fasting was in 2005 and it was released to mainly a CrossFit oriented crowd. And by 2006, I just terribly regretted releasing this thing because these folks are already type A, they're already training, like right at the edge of human performance. And what I was recommending in there was just a very modest, like like 16, eight kind of kind of schedule, but these folks would look at it and they'd say, well, if 16 hours of fasting is good, then 22 hours of fasting has gotta be better. And I read a story about a guy that lost a hundred pounds on a ketogenic diet, I only wanna lose five pounds. So I'll keto even harder than that person. And so I did a talk right at the beginning of COVID.

And you might poke around on this and maybe stick it in the show notes, it's called, Longevity, Are We Trying Too Hard? And in that I really get in and look at what the claims are around fasting, calorie restriction and all this type of stuff. And looking at autophagy and mitigating mTOR and IGFs and all that. And I'm in the minority currently, but I've seen more and more people shifting this way. I think it's all bullshit. And I think that people have so misplaced, what things they're comparing there, the literature that looks at the benefits of fasting and calorie restriction in animal models, it's always looking at animals that tend to overeat in a lab setting. They're programmed basically to overeat. And so we are always, and it's understood that these animals overeat, like even in certain cancer research, they have to modify the standard diet of the animals because the animals will die of cardiovascular disease before they develop cancer if you feed them the wrong way.

So type two diabetes. So they have to feed them in a different way to keep them alive long enough to see the effects of cancer. these animals are fed such a poor diet generally, and are so prone to all these issues. But what they generally is that different types of dietary restriction, whether it's protein restriction, total calorie restriction, in some cases, glucose restriction slows the rate of aging. It confers some metabolic benefits. It seems to reduce the incidence of different types of cancer and say neurodegenerative disease and whatnot. But what they're not doing is comparing the calorie restricted group with a phenotypically optimized group. And what I mean by that is if we're gonna look at mice, do we look at a sick lab chow mice as the

control, or should it be a wild type mouse that is eating a species appropriate diet and living in a cognitively enriched environment with the appropriate community interaction and whatnot. And what do we see then? And there haven't been a ton of studies looking at calorie restriction while feeding an organism it's species appropriate diet, but the little bit that has been done, there's only a few studies that do that. But if you fed mice a hunter gatherer type diet equivalent for a mouse, nuts and seeds and beetles and whatnot, if you calorie restrict them in that scenario, they end up dying young. You don't see the longevity benefits and it's because they end up just kind of chronically underfed. So I really think that the bulk of the longevity research is asking kind of the wrong question or making the wrong comparison.

They're not comparing for humans for this idea about calorie restriction for me, or intermittent fasting to really have any significance, they should be looking at folks who are metabolically healthy, lean fit, and active, that should be your benchmark, not somebody who is metabolically unhealthy, overweight, overeating, and all the rest of that. And I'm just not convinced at all that significant calorie restriction or intermittent fasting is gonna provide any benefit above and beyond just simply being healthy and exercising and virtually every single adaptation that we see from fasting and from calorie restriction is identical to the adaptations that we get from exercise. We tend to see mitochondrial biogenesis. We tend to see some angiogenesis of blood vessels, release of BDNF, brain derived neurotrophic factor, some up-regulation of ketone bodies and whatnot. Like you could make kind of an interesting list, compare and contrast.

These are all the supposed benefits of calorie restriction and intermittent fasting. These are all the known and understood benefits of exercise. And they're virtually identical. The main difference being that when we exercise, we actually get fitter. Like we can perform more exercise later. Whereas the relative adaptations that we see with regards to intermittent fasting and calorie restriction, it may confer a performance benefit because we're a little bit lighter. We're not heavy or whatnot. The main benefit that I see around fasting is just that it is a tool for people to get some handle on their total calorie intake and can simplify your life. I'm an old fart now, or getting there. And I remember there was a period of time when folks suggested eating like six meals a day, like the Berry Sears kind of zone period of time. And that was madness, like all you

did was eat and snack all day long. And we also found that it wasn't particularly good for our metabolic health. Like having some downtime for our digestive tract to recover is really good. So at a minimum, what I find with fasting is that people may find that eating a meal or two, or maybe two meals and a snack. They're great with that. Like, they don't have to do three meals, but they also don't have to do six meals a day. Like if it just simplifies your life, but everything else is the same, then that's kind of a net win. So, yeah, I'm not sure if you want to dig more into like a mTOR or growth factors, cancer and all that. But I don't think that there's any type of magic awaiting us in general calorie restriction or intermittent fasting. That's anything different other than if we just figure out a strategy to not wantonly overeat, like an overfed organism is going to have higher rates of all of these chronic degenerative diseases. And so if we move away from the overfed state, then I think that we're going to get significant benefit regardless of what that strategy is.

Kashif Khan

Well, the people that tout intermittent fasting, and there's a lot of them right now are talking about both ends. They're saying you can get the right amount of calories. It's a way to restrict total caloric intake, but it also gives you time to be in a state of, like you said, mTOR and growth hormone. And so what you're suggesting is you can get that from exercise anyway, and also not abuse your body, I guess, by not getting enough nutrition.

Robert Wolf

And I mean, it, again, it's kind of whatever is gonna work for the individual. Like if people just like intermittent fasting, that's great. If it works for their lifestyle, that's phenomenal, but there were just a couple of pretty well done clinical interventions in humans, looking at intermittent fasting versus like basic stepped back calorie restriction. And there was no benefit to to the fasting protocol. Autophagy was not dramatically enhanced mTOR signaling wasn't significantly altered relative to to the baseline. And again, we know, we know for sure that just simply doing a couple of times a week of zone two cardio training seems to confer like a three to five year longevity benefit. Like it's shocking. It's really amazing. We don't have enough data to suggest that there's similar benefits with strength training. And there may not be overall like the huge benefit of longevity with strength training that we see with say aerobic training, but your quality of life, I

think is almost certainly improved like the likelihood of staying out of a rest home and maintaining muscle mass and all that type of stuff. So like the quality that the health span is better improved. We have great data on that stuff. Whereas on the fasting side of all this, it's super speculative. And again, so long as people are looking, feeling, performing good, like we're not seeing retrograde performance. Like if you have 10 pull-ups today, but you've been fasting and now you have eight and then seven and then six, I think we're going in completely the wrong direction. You know, I think that we're undermining some really important performance benchmarks there, but above and beyond that, I just, so here's an interesting aside, there's great data that suggests that getting appropriate sunlight on our skin, like you don't have to get burned. You don't need to turn yourself into a leather handbag, but just getting sunlight to optimize vitamin D levels and all the other things that come along with sunlight exposure, including the near infrared light exposure, that's good for mitochondrial health and whatnot. The difference between a person who gets adequate sunlight and inadequate sunlight, the difference in their health is as significant as a pack a day smoker and a non-smoker.

Kashif Khan

Wow.

Robert Wolf

So we know that just getting adequate sunlight is as beneficial for health as not being a pack a day smoker compared to the smoker. So these are things that are just easy to do. They improve our lives today. That's another piece of all this stuff that if you lift some weights, do some zone two cardio, maybe do something like a little bit of gymnastics or jujitsu, something that challenges you cognitively and also with your movement that definitely improves our lives today. And it's highly likely to improve our lives decades in the future. Whereas so much of this fasting, and I've seen people that were fasting at such a clip that they had lost significant muscle mass. Like they didn't look like they could fight for their lives very well. Like they were pretty, pretty rough shape. So they're hoping that they're gonna live really well in some long off moment. Whereas right now their lives are compromised. Like they're not living as optimized a life as they could now. So I know that's a lot of rambling stuff, this talk that I did, I had, I think 140 slides in it. It's super technical. I get into mTOR, IGFs, and the difference between like mTOR complex one

versus mTOR complex two, their interface and like cancer propagation and whatnot. And I jammed through this whole thing in an hour, like it is just.

Kashif Khan

Wow.

Robert Wolf

Yeah, it's pretty epic. It's a good talk. And I cover a lot of material and I've seen some people like Peter Attia, Rhonda Patrick, who are really big fans of fasting. I've seen them really pump the brakes on the fervor that they've had with it. You know, like Peter has dramatically reduced the amount of fasting that he does. And here here's something that I haven't seen anybody else, but myself talk about with this, there's this concept called the Hayflick limit, which in eukaryotic cells, complex cells, most complex life forms are, all complex life forms are eucaryotes. We have about 50 replications of our cells before the telomeres, the little organizing molecules at the end of our chromosomes. Once those telomeres are gone, then the chromosomes kind of break down. And that cell has a high likelihood of becoming senescent or dying, or potentially becoming cancerous. Well, we don't want to just burn through all of these stem cells, because once they're gone, they're gone. So this is one of the problems of like irritants, like asbestos or smoke. It kills tissue. So then our stem cells have to be used to replace that tissue.

You don't want that to happen at a super fast rate, but at the same time, you don't want senescent cells to sit, to be around and for them to start causing problems, 'cause they're super pro-inflammatory and can cause all kinds of issues. But the thing is that senescence isn't an on off switch. It's a spectrum. There's a whole spectrum of cellular processes that constitute what we would call senescence. Some of those processes are critical for normal functioning of an organism and you don't necessarily want to interrupt that. But when we fast, when we really significantly fast an organism, if a cell has gone from kind of an early normal state into any part of this senescent spectrum, that senescent cell will go through apoptosis, it will die. And it will be cleared. The problem there is that cell could have been used for months or even years before it went through its full senescent cycle and needed to be removed. But if we clear all these things out, we run out of stem cells and we will end up dying from multi-organ failure. And this stuff is

super well established in the literature. Like people are all fired up about fasting, but nobody talks about the reality that animals have been studied, where they are very aggressively fasted, not fasted to the tune that they are malnourished, but they're just exposed to a really significant fasting stress. And what happens is these animals die remarkably young and they die from multi-organ systemic failure. Because they no longer have the stem cells to be able to repair the damage that they incur from just day to day life. So even at that level, like there's, we have all these known benefits of exercise and sun exposure and learning new novel things like languages and musical instruments and stuff like that. There's all these known upsides to things. There's a ton of unknown around the fasting. And there's also some, some pretty well understood, but not popular downsides that folks don't really talk about in this stem cell depletion and Hayflick limit is one of these things that I've literally heard no one else talk about in the totality of like the health and wellness space.

Kashif Khan

You know, there's something you said in there about the zone two training, and then you mentioned Peter Attia, and that maybe put two and two together where I heard him saying he advises his high end clients, his direct personal clients to do it five to six times a week. And my thinking when I heard that was the oxidative of stress, the abuse of the body, and you're saying two times a week, so who's right?

Robert Wolf

Well, so I'm saying as a baseline.

Kashif Khan

As a baseline.

Robert Wolf

As a baseline. Yeah, if you're not at least doing that, I think it should be closer to five to six times a week. And the thing about the zone two cardio is it's super low intensity and it's purely fat oxidation if you're doing it right. And you're metabolically flexible. That's a whole interesting discussion there. Peter back ages ago, 15 years ago, when he would do his own two work, it was

almost purely glycolytic. It was almost purely glucose fueled because he was a metabolic disaster. You know, he was super insulin resistant and even his lowest intensity work was not fat fueled. It was glycogen fueled, glucose fueled. And when we get stuck in that glucose fuel pathway, that is where we get a massive amount of oxidative stress. Now it's not to say that we shouldn't do glycolytic work, but if we are chronically sick in a way that we cannot, when we're in a key, so one of the anti-inflammatory characteristics of a ketogenic diet or fasting for this matter being in ketosis from fasting is that we are avoiding the mitochondrial complex one pathway, which is glycogen based and tends to be very pro oxidative in its kind of status. So super hard, competitive cardio, six days a week. Yeah, there's definitely a problem with that. But the zone two cardio is where you can nasal breathe. You might be a little bit challenged to carry a conversation with it, but it's very modest in pace and it should be predominantly fat fueled, which is super comparatively low in its oxidative stress kind of situation.

Kashif Khan

And just for listeners, I don't know, just describe zone two, like what does it look like?

Robert Wolf

It would be, this will depend a lot from person to person, like I'm in reasonably good cardiovascular shape. And so for me to stay in zone two, it's about hundred, heart rate is a good indicator. And this is where like a chest strap something like that. But usually being able to just kind of barely remain nasal breathing while you're doing that physical activity is usually butting up against the outer edge of zone two cardio. For me, it's about a hundred forty, a hundred forty five beats per minute. And I'm in reasonably good shape. And so like, I need a treadmill that set it like if I'm not wearing a weight vest, it's maybe set at a 10 degree incline and I'm walking at like three, three and a half miles per hour, right? Like I'm humping, I'm moving pretty quick. And it's at a steep incline and that'll get me right about a 140 to 148 beats per minute. Like some somewhere in that scene. So somebody who's less conditioned, it may be walking more or less on flat ground that that would get them to that zone two cardio.

Kashif Khan

And how long you doing that?

Robert Wolf

Some days only 20 minutes, some days 60 minutes, really depends on what I've got going on. And I do just as an aside at the end of most of those days, I try to do between one and five zone five, like max effort, one minute on three minute recovery intervals at the end of it. And I stack it that way because the real goal of the zone two cardio should be enhancing fat oxidation as your primary fuel source and becoming very efficient with that. If you do any type of interval work early, it will impede and hamper your ability to access fat during that workout and do all that stuff. But if you do that at the end, so basically do your low intensity cardio first. And then if you finish with kind of a cherry on the Sunday, end of some really hard intervals, like a minute, pretty much max effort, three to four minutes recovery repeating that between one to one to five times, that's a pretty nice way to be very time efficient with your cardio.

Kashif Khan

So for a lot of what you just covered in the last sort of 20 minutes or so is really taking a lot of what people have heard and known and personalizing it to a degree that maybe they didn't know was possible. And all of a sudden you can be a lot more efficient in your outcomes. What would you say to the person who's getting started? Where do they get ROI? Where do they focus on if the intention is lifespan, I wanna develop habits and activities around lifespan and healthspan right. Like true high quality. Where do I start? What's what's gonna gimme my ROI.

Robert Wolf

Oh man, that's a fascinating question. If I could go back in time, I would think I would find it fascinating to orient my whole career around being the sleep guy, not the food guy. Because the food always creates these pissing matches, paleo versus vegan and all that stuff. And I really think the greatest ROI of everything out there is improving sleep. And if we every single thing that you do improved sleep quality, sleep duration. So it was kind of optimized. I think most people do far better at that like eight, maybe even eight and a half hours. Like lots of people think they do well with six. They don't, like almost nobody. Nobody does. There's very, very few people that are really genetically wired to be optimized at that level. But if we start from the kernel of let's optimize sleep, then we would look at diet and say, okay, well what dietarily can I do that would improve sleep? Well, normal blood sugar level really helps foster good sleep.

When we end up with blood sugar highs and blood sugar lows that can throughout the day, then when we go to bed, we have a tendency to eat near bed time. If we near bed time, our metabolic rate doesn't really slow down the way it should so that we can enter a deep restful state of sleep. So we don't produce the melatonin. We don't produce the growth hormone. We don't get that kind of restful type of sleep earlier in the night. And then later in the night, because we tend to be on these blood sugar roller coasters, our blood sugar drops, which causes a cortisol release, which then wakes us up. So poor blood sugar control is screwing up our sleep like coming and going just like left right and center. So it would really help to inform what we should do dietarily and the kind of cool thing about it.

You know, if we all agreed that sleep is like the most important thing to optimize. If you have gut issues with gluten, it's going to negatively affect your sleep. If you don't do that well with carbohydrates, it's going to negatively affect your sleep. And so it becomes very agnostic as to what methodology you're doing. It's like, well, it's fucking up your sleep. So we can't, we're not gonna do that. And so it's not the paleo guy, the keto guy or whatever, it's like, well, the sleep expert said too many carbohydrates is influencing my sleep negatively. And so we've gotta do that. It would encourage us to get out of the house early, to get as much sunlight on our skin as makes sense, and just be out in the outdoors environment because it sets up that circadian entrainment, zone two cardio helps to promote sound sleep. Strength training is just one of these great things that will make us physically tired and would improve sleep.

And you could maybe argue it's not as important as all the benefits of just being more physically strong and having both muscle, and muscle mass and bone density. But I think a great way to orient all of this stuff for optimized ROI is to think about how is any of this going to influence sleep and how can we improve sleep in a way that is usually going to bed a little bit earlier, sleeping for kind of a more optimized duration, which again is probably much more close to eight, eight and a half hours than it is that like six or seven hours that a lot of people like to think that they get away with. And I think that that's just gonna provide shocking return on investment. Like if people haven't done things like where some blue blockers in the evening do some blackout curtains on their windows, taking a couple of hundred bucks and installing dimmer switches throughout your house. So that in the evening you can turn your lights down

and getting the type of lights that will go more into the orange spectrum. And instead of the blue spectrum. It's just shocking. Yeah. And your sleep quality is so much better. And a good friend of mine, Dr. Kirk Parsley, who's a retired Navy Seal and he's a sleep expert. He makes the point that when we're young, the reason why we're young is that each time we go to bed, we go to bed with some amount of damage that we've accrued from that day. But then when we sleep, we repair that damage and then some, we become stronger from it. And aging is really this process of when we wake up in the morning, we're not quite as recovered and repaired as what we were the day before. And the day before and the day before, and we start accruing these kind of . And I've gotta say for myself, like at 50 years old, if I can sleep well, if I have the opportunity to sleep pretty well, I have pretty good performance. I motor along pretty well. I feel good, but I definitely, you know what, my daughter just got a puppy a couple of weeks ago, and we're crate training him and potty training him and everything. And I'm trying to pitch in and help on that. Man, you get a couple of days of like really suboptimal sleep and it's like getting kicked where it doesn't feel good. So I know we talked about a lot of other like food and related topics and it's kind of a hip switch to switch over to sleep. But the sleep piece I think, is where the rubber really hits the road. And if you could orient everything that you're doing to kind of optimize and improve sleep, I think you would be hard pressed to find any greater improvement off of just doing that.

Kashif Khan

The way you spoke of it, it kind of makes me think of how we started this conversation, which is around the concept of ancestral diet. Like let's do what we are wired to do. Like our DNA is 200,000 years old. We know that we talk about this all the time. That what we're designed for is not our current reality. And it's the same thing with sleep. There's ancestral sleep that the habits of people which is get up, get out, move, sun exposure. There's no lights at night. There's an amber glow that from the fire that would've stimulated melatonin production, there's no snacking at the pantry and looking at the fridge to wonder, is it ice cream or potato chips at night.

Robert Wolf

Right.

Kashif Khan

All of those habits we have are not our ancestral sleep habits, which if you're gonna understand, people listening already get this they're trying to find out what that ancestral diet is. But when it comes to sleep, we don't think of it that way. But the way you just laid it out, kind pokes its neck out, that's what you're supposed to do. We already know what our body's supposed to do. We're not doing it.

Robert Wolf

Yeah. And I just find the sleep topic, it's an interesting place to anchor things because although people will push back particularly like type a hard charger, like CEOs will push back on the sleep piece. But you know, when somebody says, well, what diet should I eat? And it's like, you should eat in a way that optimizes your sleep. They're kind of disarmed to that. Like you're not straight in paleo. You're not straight in vegan. And it becomes very objective. Like for me eating the carbohydrates that would come with a vegan diet, my sleep would be disturbed because I would be on this kind of carbohydrate rollercoaster. Somebody else might do great on it, but it's so interesting. It's a way to really disarm a lot of the culture wars around everything from like food to fasting, it's like, does fasting, does your HRV improve and your sleep quality improve when you're doing intermittent fasting? Yes or no. And it's like, yes, great. Keep doing it.

If it's no, well, then we need to reevaluate that, maybe we need to shift something around. Maybe we don't abandon it entirely. But again, we just know that sleep is so powerful as a, if we really wanna talk about health and lifespan, healthspan and lifespan sleep is it, I mean, yeah, we need to be physically active. Yes, we need to provide the molecular basis of life. You know, proper nutrition, that's all important stuff, but sleep is kind of where it all gets synthesized together. And so anything you can do that improves sleep is going to improve all the other outcomes. And so it's kind of an indirect way to sneak up on that stuff and kind of de-emotionalize it, it's like, well, my sleep is kind of optimized when I eat this low glycemic, low diet. And I notice that eggs tend to cause some gut issues that also throw off my sleep. And so like, all this magic kind of happens by just focusing on the optimization of sleep.

Kashif Khan

So one last thought. And thank you for your time by the way, this has been awesome.

Robert Wolf

Sure.

Kashif Khan

With all you're talking about, there's a lot of nuance kind of tracking and all this stuff, meaning that, because there's so much you could potentially do. For someone to listen to this whole talk, what are, or are there tools you're using technology wise? Like how do you round this out in terms of tracking, measuring? Are you even doing that?

Robert Wolf

Oh man, I'm not huge into that. And it could be because I was a biochemist to my past life and I just measured everything. And so I've really shifted more into the experiential mode. It's interesting. Like Peter Attia mentioned that he does far better dietary compliance when he has a CGM on a continuous glucose monitor because he just loves, he's that kind of neurotic engineer mind. And he knows like this flat line of glucose is his goal and that's what he wants. And so he says that he cheats more when he doesn't have a CGM. And I take him at face value that that's probably true. I found things like HRV to be interesting, but also kind of annoying. Like I would have different HRV platforms that I would wear and I would get ready for bed. And I've got on my blue blockers and the lights are low, but I'm reading a book and I fall asleep and I sleep wonderfully. I have good, good sleep.

I feel very rested, but my HRV platform would dig me. And it would say you have sleep latency because it would interpret my time reading the book as this long, abnormally long period of time before I fall asleep. So I'm like, well shit, I'm not getting my cookie, my bonus point, you know, my gold star because this thing isn't interpreting that. So then I started taking like my aura ring off or my whoop off and all that stuff. And then put it back on before I fall asleep. And then I'm like, well, this is bullshit. Like, I'm just like, I'm having to do this kind of weird song and dance around this stuff. Personally, I just didn't find beyond a couple of months. I didn't find it that helpful. One thing that's been interesting is helping people to understand the need for adequate sodium and electrolytes people who are tracking HRV they immediately see an

improvement in the HRV score. Like it it's just immediate and profound. They feel better. They perform better. And their HRV score goes up. And it it's just from making sure that folks are getting like five grams of sodium per day and their potassium magnesium, and it's magic. So it is cool. It is handy, but I've also found it to like professional athletes, the coaches hide the HRB score from the professional athletes. They don't tell them what it is because their best day, their best day of on road performance, may be on a day when their HRV thing says they're dog shit that day. And it's actually not. And so I think there's still a ton of interpretation that's necessary with them. And sometimes there was a interesting article that talked about how people will people seldom rise to the expectations of a good score, but they almost always crumble like if their numbers aren't good. They're like, oh, I suck today. And it goes like that. So, yeah.

Kashif Khan

Yeah, and it makes a lot of sense because one of the deep areas that we dove into when it came to genomic research and building the functional pathways like you described is mood and behavior. How does the brain actually work? What drives personality and behavior and compliance or interpretation perception is largely driven by the neurochemicals of your brain and how you are actually wired. And there are people for whom they need that catalyst. They need that goal. And there's some people for whom they're in tune with the experiential result, the outcome. And the process isn't as important as the outcome or vice versa. Then there's some people that need structure. Like some people that are kind of have a better relationship with dopamine, meaning it's very easy for them to experience pleasure and reward typically need more structure because they're not that driven towards reward. 'Cause it's just so easy to experience. All of a sudden, this is why you had the disparity or variability between what a tracker means to you. So it sounds like just listening to you, the best usage is probably getting started. Like how you on the first the first month, like when you're starting at ground zero, it's a great tool to create structure, to create compliance, to create a routine and develop habits. But once the habits are in place, it might become annoying. Like it is to you because all of a sudden you're tracking things you don't need to track. So that's a great answer, which I haven't heard before. And it is really helpful and practical, right? Like, let's get you started, but over time, you're already at a certain zone like yourself where it's not needed anymore. So this is awesome information, for

people to learn about what you're saying, because we just like tip of iceberg based on the knowledge you have and what you can teach versus what we had the time to talk about, that 140 page slide presentation, is that accessible to people?

Robert Wolf

Yeah, it is. And we could circle up after this and get a link for your show notes and folks can also search, but if you just search Robb Wolf longevity, right. You will find that hour, hour and a half long talk. I think it was at KetoCon that I was able to do it. I did it once at the Metabolic Health Summit. Then once online for KetoCon before COVID just like shut everything down. So this was like my 2019 going into 2020.

Kashif Khan

Okay, cool. And do you work with people still or you're more, I know you're authoring and you're out there global trotting and helping. And so for someone that wants to learn more, what's the best option, to go to your website, or what do they do?

Robert Wolf

Yeah, robbwolf.com is a good place to start. I do a weekly podcast with my wife and I, and we do Q&A, so like people will have a question, like many of the questions you answered today and they'll write those in. And I do my best job to try to put some context around it. Yeah, that's called the Healthy Rebellion Radio.

Kashif Khan

Very cool. Robb, this was awesome. Really refreshing in terms of your unique perspective and hearing a different spin on some stuff that we hear the same thing over again, but it was really helpful. Thank you for joining us.

Robert Wolf

Huge honor. Thank you.