

**Nicki:** It's time to make your health an act of rebellion. We're tackling personalized nutrition, metabolic flexibility, resilient aging and answering your diet and lifestyle questions. This is the only show with the bold aim to help one million people liberate themselves from the sick care system. You're listening to The Healthy Rebellion Radio. The contents of this show are for entertainment and educational purposes only. Nothing in this podcast should be considered medical advice. Please consult your licensed and credentialed, functional medicine practitioner before embarking on any health, dietary or fitness change. Warning, when Robb gets passionate, he's been known to use the occasional expletive. If foul language is not your thing, if it gets your britches in a bunch, well, there's always Disney plus.

**Robb:** Welcome back wife.

**Nicki:** Hello, hubs. Welcome everyone to another episode of The Healthy Rebellion Radio.

**Robb:** Yes, I agree.

**Nicki:** Long awkward pause.

**Robb:** Yes.

**Nicki:** Yes.

**Robb:** Good old Ed McMahon throwback. Okay, so what's going on?

**Nicki:** Oh, I remember Ed McMahon.

**Robb:** Yes.

**Nicki:** I wasn't getting it when you were doing that, but now that you say his name, I get it now. Yeah.

**Robb:** Yeah, that's going way back, which is kind of just reflective of where I am in my life cycle where they're all these cereal jingles and stuff from the '70s, '80s, '90s that I can remember, and then a host of other things that I simply cannot remember. Can't seem to stick anything new into my brain.

**Nicki:** I think it's part of this sort of information overload era that we are all currently in. I think that's part of it.

**Robb:** All attributed to that. It is, definitely there is so much shit to stay on top of.

**Nicki:** That whole shallow, opposite of deep work stuff that kind of makes your brain atrophy a bit.

**Robb:** Yeah. One of the competitors for the news topic du jour was that paper thinking in 140 characters, which was shared with me from a good friend who has a very high level security clearance within the United States government. And the thing was written in 2013, but this thing is really going like wildfire through the security circles, because this abbreviated communication style coupled with the onslaught of just massive amounts of information, people are just unable to get in and do deep work, like sit down and read a whole paper and whatnot. Yeah, but that's not actually the news topic, but I guess we mentioned it nonetheless.

**Nicki:** We can talk about it in a future episode too.

**Robb:** We can circle back later. It is interesting. Yeah.

**Nicki:** Yeah, it definitely is. I wanted to share that we've seen our bald eagle or... We don't know if it's the same one or if they are multiple.

**Robb:** Pretty good bet.

**Nicki:** But we saw him again this morning. I'm saying him. I don't really know if it's a he or a she.

**Robb:** Looks like a him.

**Nicki:** He's quite large. And he flew right and landed in a tree right off of our back deck, and it was pretty spectacular.

**Robb:** And he's big.

**Nicki:** He's a huge, he's very huge.

**Robb:** Huge.

**Nicki:** In fact, somebody in the rebellion shared an article that bald eagles are back and they're looking for your-

**Robb:** Better than ever.

**Nicki:** Looking for you pets. And so, I'm certainly not worried about Dutch getting carried away by a bald eagle, but we do have two, mostly outdoor, cats that...

**Robb:** Nicki was down by the water fiddling around and one of the cats was uncharacteristically nuzzling and loving on her while this thing was swooping around.

**Nicki:** And the eagle was... There was one soaring and so I stayed right by him, Thor, because the last thing I want to witness is my cat-

**Robb:** Him getting carried away.

**Nicki:** ... getting carried away. Spectacular as these birds are, I don't want him to take my pets. So we'll see. We'll see how that goes. The girls and I, I was taking them to jujitsu yesterday afternoon and we were driving, and I drove over... I didn't know what it was, there was something in the road and we straddled it and then I looked in the rear-view mirror and it was a turtle crossing the road. So we promptly pulled over and went back to help scoot that little guy across the road.

**Robb:** Which apparently was a good thing, because there's some building going on around here, and some of the contractors drive like absolute assholes.

**Nicki:** Yeah, and so we were on the side of the road and I moved him over, he was three quarters of the way across, going, I don't know, to the north, I think that was north. So I just moved him... Actually it was a female, further over off the side of the road in the same direction she was going. And we did learn how to tell whether turtles are males or females. It's pretty exciting.

**Robb:** Because this is kind of the kid's summer science nature project we're going to do.

**Nicki:** We have a lot of turtles. So we're kind of... The ones that we encounter, we are tracking their size and their sex, and the girls are giving them names. What else?

**Robb:** That's it, but we're going to teach them a little bit of data collection, and then a tiny little bit of data analysis, we'll do some charts and graphs at the-

**Nicki:** Be able to tally the number of males versus females and size ranges and whatnot.

**Robb:** And try to take some pictures and then possibly put all this together in some sort of like a Costco book, the year of the turtle, year 2021, Kalispell. Yeah.

**Nicki:** Yeah. Okay, I think that's all I wanted to share on that. Did you want to talk about that?

**Robb:** It's fine.

**Nicki:** Okay. I want to share some upcoming things happening inside The Healthy Rebellion coming up in June, beginning on June 7th. One of our rebels, Ash, is going to be leading a seven-day breath work challenge. So super, super excited for this. It's one of the simplest interventions available in health and wellness, working on your breath. So Ash has been doing this a long time, he's going to lead us through this. He led us through our cold shower challenge for several months.

**Robb:** Did he do a grip challenge also-

**Nicki:** Not yet, that's another one-

**Robb:** ... or was that just... That's on the... Yeah.

**Nicki:** ... that he's been talking about. Also on Sunday, June 13th, we are going to have a guided group meditation led by one of our rebels, Matt, who has extensive background in meditation, so we're super excited for that. So some fun stuff happening in there. We also have Basis returning, Sarah and Grayson from Basis New York will be returning later this summer, and doing another strength program with us. Lots of fun stuff coming up. As far as where we're at, we're on day 24 currently of our 30 day rebel reset, so I wanted to share some pretty cool highlights from some folks that are participating in that.

**Nicki:** Susan shared her tight jeans test. We have this thing called the tight pants test where we have people put on a pair of... find a pair of pants that are sort of tight. And if you've done the keto masterclass, or you're involved in the rebellion, you've heard of this before, but basically you start with a pair that you can't get up over your hips or that are snug in one way or another, and then that's sort of a benchmark, other than the scale that you can kind of gauge how your body composition is shifting. And Susan says the jeans are on, they're zipped, they're buttoned, and I'm wearing them today. Whoo hoo, time to find a pair of tighter jeans for the next goal.

**Robb:** Awesome.

**Nicki:** So that's pretty darn cool. Maryann shared more good stuff happening earlier this year when I weighed in at around 149 pounds and body fat was 34%. My working heart rate for what I call an easy run was between 141 and 144. This morning, I did an easy run and my average heart rate was 132 for four miles, this is what losing 15 pounds and an 8%

drop in body fat does for you, you become more efficient, and I am certain that the two months of strength training has played a huge role.

**Robb:** Right on.

**Nicki:** So that was super cool. Then one last one here, from Summer, she says, "I feel like I'm starting to hit the slowdown in weight loss stage now that I hit my first goal of losing 15 pounds. I made that goal nine weeks ago. While I would still like to see the scale show a smaller number, today I'm celebrating the non-scale victory of fitting into an old pair of size six jeans and wearing a size medium T-shirt that I bought this weekend. I was wearing size 12 jeans with extra large shirts back in March."

**Robb:** Shit. Wow.

**Nicki:** So this is a huge one. And I just wanted to... And there's several comments on this post in the rebellion to this effect too, that the clothing victory is huge, because as we've talked about before in responses to other people's weight loss plateau questions, sometimes that scale number doesn't budge much at all. And the main thing is, is your body composition continuing to move in the direction that you're wanting it to go in?

**Robb:** That's amazing, yeah.

**Nicki:** Summer clearly... That scale number might not be exactly where she wants it to be, but the fact that she has dropped some clothing sizes is a huge win.

**Robb:** Not just some, six jean sizes. And then XL down to a medium shirt, that's pretty big.

**Nicki:** Super cool. We're just on the tail end of this 30 day rebel reset and the next one will begin in September. So for any of you listening who haven't yet jumped in on one of these, mark your calendars, and you want to jump in on this.

**Robb:** Yeah, but here's my hard sell on all those, we have a ton of cool stuff going on over the summer. The summer is a time to relax and reflect and recharge, but it's also a time that people can slide and lose some of the gains that they get in spring. So we still have some spots over at the healthy rebellion, we will cap that thing at some point, but right now there's still some mojo that can be had there. So strongly encourage you if you're thinking about it, go give it a look.

**Nicki:** Yep. Okay, I think that's all the beginning stuff that I wanted to touch on. Hubs, what do you got for our news topic today?

**Robb:** I don't know how deep you want to go into this one. But we're actually linking back to the 80th DarkHorse podcast live stream, What COVID Reveals About our Leaders, and talking specifically, it's a great podcast all the way through from cicadas to everything, but they dig into the topic of ivermectin. Which, just throwing out the term, ivermectin probably causes some sort of a visceral reaction in some percentage of the folks listening. This has been, I guess, kind of the MO since hydroxychloroquine got bandied about by the Trump administration at some point. And in all transparency, the hydroxychloroquine theory seemed to not pan out all that great with regards to mitigating the effects of COVID. But this absolutely does not seem to be the case with ivermectin.

**Robb:** Heather, in this podcast... And if you go to our show notes, and then you will go to their show notes, then you will get links to... There's a ton of links that they had there. They

point out to two main pieces. One is that some researchers, actually two sets of researchers, independently did very similar study, which was the following. They looked at countries in Africa that routinely use ivermectin as prophylaxis against a host of-

**Nicki:** River blindness.

**Robb:** River blindness and other parasitic infections. Some countries use that, the ivermectin, some countries do not use ivermectin but use other anti parasitics, and then some countries use effectively nothing. What they found was that the incidence of cases of COVID and death were stunningly lower within the countries that routinely use the ivermectin. Usually, the protocol on the ivermectin is about once a week or once every two weeks. So it's not even like a super onerous schedule. So that's an interesting thing. It doesn't prove anything, but it's an interesting data point. A separate researcher did largely the same study, ostensibly pulling from the same data but arrived at a similar conclusion. So that's interesting.

**Robb:** Then another piece of researchers out of Chile administered ivermectin prophylactically to 800 frontline medical personnel, and then had a 400 person control group with no ivermectin. The control group had a 50% development of COVID at some point, I don't know that they really looked at mortality associated with that, or maybe it was not that much. But within the 800 folks that were given prophylactic ivermectin, there was no reported case of COVID. So, really interesting and a couple of things that they pointed out, there are currently effectively no studies underway within the United States sponsored by the NIH NIAID at all around ivermectin and its potential efficacy on the COVID disease state.

**Nicki:** Which means you ask why? Which is what Heather was getting to in this episode.

**Robb:** This is where I'm... I don't want to go super deep because-

**Nicki:** They do a fabulous job of this. So if this is at all interesting to you-

**Robb:** And it should be.

**Nicki:** And it should be.

**Robb:** I don't care where you are in this story, because here's the deal, what she really dug into with this was that if there had been any viable alternative treatment or not alternative but any viable treatment for the COVID-19 disease state, then the Emergency Use Authorizations legality would have made it impossible for these vaccines-

**Nicki:** The only way to get emergency use is to have no viable alternative.

**Robb:** Is to have no other viable treatment. So this includes, now that I think about it, nutrition and diet therapy would have made it illegal to offer these emergency use authorizations, vitamin D would have made it illegal to-

**Nicki:** Which is why we never heard-

**Robb:** A Goddamn thing about it.

**Nicki:** ... "Hey, everyone, let's get as healthy as we possibly can. If you're overweight, let's try to lose 20 pounds. Clean up your..."

**Robb:** Oh, by the way, ivermectin, which they go on to detail, has been used for nearly 50 years. The toxicity is very well understood. It is used even in children, it is had safety and efficacy studies over decades in children-

**Nicki:** Children over 30 pounds.

**Robb:** About 30 pounds, 15 kilograms.

**Nicki:** About 30 pounds, 15 kilos. Yep.

**Robb:** So it's super well understood and there's a little interesting niggles in there. Merck pharmaceuticals, which originally held the patent on ivermectin, but the patent expired, they still manufacture about 5% of the global supply of ivermectin.

**Nicki:** The thing about ivermectin is it's easy to make, every country can do it, it's super cheap, and it's been used for 40 plus years.

**Robb:** And just billions and billions of doses of it administered.

**Nicki:** Yes.

**Robb:** When discussion around ivermectin started getting bandied about as it relates to COVID, Merck said that... There was some truth, they said, that it has not been studied for efficacy in this topic-

**Nicki:** Specifically for COVID.

**Robb:** Specifically to COVID, which is true, although it is understood to have remarkably broad acting effects on infectious agents ranging from bacteria to parasites to viruses. So we don't know for sure that it's going to, but then we start finding all this other stuff. But Merck said, "The safety is questionable, even though these people have administered billions of doses of ivermectin globally," and then right on the heels of this, they received nearly \$400 million to begin researching vaccines.

**Nicki:** Merck says, "Ivermectin is not safe, essentially." And then they get a huge chunk of money to work on their own vaccine.

**Robb:** So I encourage everybody to listen to that. And again, I don't care which end of the political spectrum or the COVID spectrum... I guess we've probably chased off people who are of one particular flavor out of this thing, just because of our insistence on asking questions. But both Brett and Heather maintain a very professional demeanor in general. But Brett really lost his shit on this. And I think rightfully so, because it raises a lot of very thorny questions. I've said almost from day one, none of this makes sense. The singular focus on a vaccine doesn't make sense.

**Nicki:** But it all makes sense now, when you think about-

**Robb:** When you put it in that context, it all starts making sense. This thing questions all kinds of things, like we know that some people have died or have been significantly injured from the vaccines, and maybe they didn't need to. We know that many, many, many people died from the virus, and maybe they didn't need to. So the irony in all this, is that maybe some bottom feeding lawyer or group of lawyers, collects enough people that had problems both with the vaccine and with the virus, because there was a potentially

viable alternative to... The ivermectin could have been administered virtually day one as a prophylaxis. And this is-

**Nicki:** Across the world.

**Robb:** Across the world.

**Nicki:** Because it wasn't like we were lacking materials to make it. It's-

**Robb:** No, it's super easy. Apparently backyard chemistry type deal. Do we want to say anything else about that? I mean, I am so-

**Nicki:** I think the main thing is we encourage all of you to listen to this particular episode. They, Brett and Heather, they're phenomenal in their presentation of information. And it's like being in a lecture hall with two of your favorite professors as they talk about this stuff and kind of go back and forth and correct each other. And their, what do you call it, their report, obviously, they're husband and wife, is fabulous, I think. We always learn a ton. And again, they're very professional in how they handle this stuff. So it's a great... The content is great, and then their delivery is also perfect.

**Robb:** And just as a little side note, one will frequently find themselves de-platformed from YouTube for talking about ivermectin at all. And this is something that they mentioned, they're like, "Just the fact that we're going to talk about this, we could end up being de-platformed, because it is in the terms of service."

**Nicki:** Because YouTube's de-platformer will remove videos if it goes against the WHO guidelines. And WHO doesn't recommend ivermectin. So, there you have it on that.

**Robb:** Yep.

**Nicki:** All right, let's move on to our iTunes, our T-shirt review winner, this week it goes to JJ Wellemeyer, the prodigal listener returns. My fitness journey started over 11 years ago when I joined the army and started CrossFit. Naturally, I was introduced to Robb's writing and materials but most importantly The Paleo Solution podcast. Although I consider myself one of the original six listeners, over the last three to four years I've strayed away from the podcast and the fundamentals of eating well. Fast forward to today and needless to say, I'm back. I chanced upon an interview with Robb on Ben Bergeron's podcast and reminded me of what I liked most about him and his teaching style.

**Nicki:** I've gone back and listened to all of The Healthy Rebellion Radio Podcast, I'm absolutely re-hooked. I love the dynamic between Robb and Nicki and the occasional parenting advice, but most importantly, the information they convey is absolutely worth your time each week. I've been so impressed, I recently joined The Healthy Rebellion and haven't looked back. Five stars is not enough for something that will undoubtedly move you towards a healthier lifestyle.

**Robb:** Very nice.

**Nicki:** That was a super awesome review. Thank you, JJ. Send us an email to [hello@robbwolf.com](mailto:hello@robbwolf.com) with your T-shirt size and your mailing address and we'll send you a Healthy Rebellion Radio T-shirt. And The Healthy Rebellion Radio is sponsored by our Salty AF electrolyte company LMNT. And the summer months are just around the corner, it's heating up, so it's important, especially if you're eating low carb or keto, to

stay hydrated with LMNT. And Robb, I know we've talked about this a fair amount but people frequently ask how much sodium they should be getting.

**Robb:** And it depends, it's ironic that the dosing recommendation is maybe the most difficult thing to pin down. If you're on the lower carb side of things, or just really minimally processed food, probably about five grams a day is a good starting place. And then from there, we just kind of have to look at clinical stuff like do you feel lethargy, lightheaded, cramping, those sorts of things, and that's a great place to get in and tinker with your electrolytes and by the love of God, it doesn't have to be LMNT, it could be pickle juice or chicken bullion cubes or whatever.

**Nicki:** You can home brew your own.

**Robb:** Home brew your own. We have that available at the LMNT website. So our main push here is to make sure that people are properly hydrated and hydration doesn't mean water, it means water and electrolytes. So by hook or by crook, tinker with that.

**Nicki:** Especially if you are highly active, if you live in a hot, humid climate, then your needs for sodium can definitely increase.

**Robb:** It can double or in some cases even triple off of that five gram per day baseline.

**Nicki:** We talked about last week the guy, I believe his name was Sean, who ran that nine hour race. It was like 50 miles in about nine hours and he did 10 packets of LMNT during that because it was such a demanding-

**Robb:** It was fairly warm. He was moving for nine hours straight and yeah, there you go.

**Nicki:** So be sure to stay hydrated this summer, put together a value bundle with all your favorite flavors, you can choose between watermelon, citrus, raspberry, orange, chocolate, lemon habanero and mango chili and of course, the raw unflavored. When you buy a value bundle, you pay for three and get the fourth box free. You can go to [drinklmnt.com/robb](https://drinklmnt.com/robb) and put that value bundle together again, that's drink L-M-N-T .com/ R-O-B-B.

**Nicki:** Okay, it's question time. Our first one is from Sheila about fasting and inhibiting muscle growth. Hi guys, I'm a 56-year-old woman, very lean and fit, 5ft5 and 120 pounds. I do primarily weightlifting six times per week, I eat low carb, higher fat, mostly animal protein, above ground veggies and healthy fats. I also do intermittent fasting, fasting between 16 and 20 hours, I usually lift around 11:30 am, I also do some aminos before my workout while fasted and have my first meal around 1:00 pm, a post workout shake and then two food meals.

**Nicki:** I do prioritize protein, making sure to get enough, 100 to 140 grams. I love my eating style and the timing, but I'm wondering if the intermittent fasting could be slowing down muscle growth. I'm specifically trying to make booty gains, lol, and it's going very slow despite training this muscle group three times per week. I'm not sure if it's just my age or what, and the fact that I still sit all day other than my lifting and short walk after dinner. But I heard something in a podcast about it being better to eat more frequently for muscle growth. But I hope that's not the case, because I love intermittent fasting. Would love to hear your thoughts.

**Robb:** This is one of these things where I think people can do the fasting too much, too much of a good thing. I definitely like and lean far more towards the 16 hour mark than the 20

hour mark that Sheila's relating here. I don't know how you get a shake and two reasonable meals in, in a four hour period. I just feel like I would be backed up the whole time.

**Nicki:** Well, you'd be eating straight for four hours.

**Robb:** You'd be eating straight through, yeah, for four hours, which itself doesn't really seem all that fun or particularly healthy in a lot of ways. The more intermittent that we eat, the higher the protein dose is that we need to get adequate signaling for muscle maintenance, to say nothing of muscle growth. So that's a thing and that's where I would definitely err more on the 16 hour side of this. The shake, we've talked about shakes a lot. I'm not a huge, huge fan. She might be sneaking in as much as 50 grams of her... It's probably more like 25 grams. But what if she's sneaking in 50 of her 100 to 140 grams of protein as part of a shake? Not doing her the greatest benefit, tends to not stick well with you.

**Robb:** A 25 gram protein shake, and then everything else from real food is definitely going to work better. It's super laudable that she's training six days a week, but I kind of wonder what she's doing. This is where following something like the Basis strength training program, if you're really getting after it, you are not training six days a week. And if you really want to grow muscle, you actually have to lift heavy, like doing a lot of super high rep, high volume stuff isn't really... It has its place, but it's not the place that you really want to build significant muscle mass, you got to lift heavy and you have to have some progressive overload. So I'm kind of wondering if maybe even... So a couple of things. I would narrow down the fasting window-

**Nicki:** Fasting window.

**Robb:** ... so that it's not closer to the 20 hour, I would definitely stick closer to the 16 hour. I'd be careful how much she relies on the protein from the shake and get as much as she can from real foods and three meals a day, two meals and a snack, that seems totally reasonable. And then on the training side, I would really question whether or not the six days a week are doing her some good benefit. Three days and some sprints, three days in some sled drags, something like that, three or four days. But lifting heavy, if you get after it sufficiently on your day one, on day two, you're like, "Oh, I'm glad I'm just foam rolling and stretching today," because you're not really in a spot to get back after it. Yeah.

**Nicki:** Okay. Our next question is from Shawn on controlling insulin and colon polyps. Hi, Rob, longtime listener of the podcast. I've read both of your books and really enjoy your perspective on diet training, and especially your jujitsu journey. I myself started out with a more of a powerlifting template around the age of 28. Currently, I'm 41 and doing more of a CrossFit type training session two to three times a week, along with the old man jujitsu twice a week. My question surrounds insulin and glucose levels and colon polyps. I had my first colonoscopy at 33 due to family history of colon cancer. They found one precancerous polyp the first time around. Five years later, they found four.

**Nicki:** I recall Dr. Steven Gundry making the statement that he never saw a patient that had colon polyps that did not also have a high fasted insulin. My fasting glucose is usually in the upper 90s. I've never had a fasted insulin test, but I plan to. My HbA1c has looked good at around 5.0. My diet is predominantly lower carb, but I've always struggled with performance if I go too low. I've heard others recommend metformin for helping keep glucose and insulin levels more in check as well. I just wanted to get your take on the relationship between glucose, insulin and the risk of colon polyps and cancer. Love the

Q&A format, please keep doing what you're doing. And I'd love to train BJJ with you, if ever the opportunity arose.

**Robb:** Come to Kalispell, and we can make it happen. This is interesting stuff, and this is actually something that I put on Loren Cordain's radar back in the '90s. It was probably '98, '99, but I had tracked down a linkage between EGF, epithelial growth factors and elevated insulin levels, and this is where things like skin polyps, skin tags, people get them under their arms and sometimes under trunk and whatnot, really track tightly with elevated insulin levels as do colon cancer polyps. So this kind of unchecked abnormal growth tracks really tightly with this.

**Robb:** What's interesting around some of this stuff, this is a situation... So I'm always kind of shit talking fasting, I'm kind of like, "People are doing too much, you're doing too much." Anecdotal, but I have seen folks who had... It's not as obvious clearly on the colon polyp deal, I am not doing colonoscopies on folks. But we've had clients that had skin tags, did some fairly aggressive fasting, like a five day fast, seven day fast, and a few shorter, say like 48 hour, 72 hour fast, and a little battery of that and these skin tags go away. It's kind of fascinating.

**Robb:** The thing is, is that I think once you've kind of... Once you've done that, I see it as kind of a reset button. I think we've kind of brought things back to a baseline and then I, again, don't know that tons of fasting is really going to do a huge amount of good. A little bit here and there, absolutely, that's great, but again find-

**Nicki:** More is not better.

**Robb:** More is not better in this thing. I think that we start getting in a very retrograde scenario. I think about this a little bit like skin cancer potential, and I may be completely out to lunch on this one, I'm reaching here, but it's understood that if one experiences a sunburn, and then subsequently does not expose that skin to the sun, that the likelihood of cancer is actually higher, skin cancer. There's some sort of an interesting reset mechanism that occurs when the individual gets over exposed to the sun, they allow the skin to heal, but then subsequently, that area is exposed to the sun, it appears to be kind of a genetic reset, because the skin is designed to interface with UV radiation.

**Robb:** I see this a little bit like that, maybe our youthful diet, which was producing maybe an atherogenic blood profile and elevated insulin levels, maybe that sets up some things that are heading in that cancerous or precancerous direction and perhaps a really hard reset of some fasting or maybe application of metformin could tinker things in the right direction. We've been digging into that cell paper, the Hallmarks of Health and it talks about this really, non-negotiable interplay of recycling regeneration, cellular circuitry networks, it- And this is where getting this balance of growth and repair right can be really powerful.

**Robb:** On the metformin front, there is some interesting research that's underway, doing some fairly low dose metformin in the evening as a means of further goosing down blood glucose and by extension, insulin levels. Could be interesting. It's being used in some adjunctive cancer therapies also because it has some kind of mitohormetic stress elements. That's one of the weird things about metformin, it is a mito toxicant. So is that good or bad long term? I've long held that metformin is one of the most incredible drugs that humans have ever developed, in part because of this broad action, but I've also kind of wondered if it's not just a finger pointing the way, should you do metformin or should you do everything diet and lifestyle wise that bring you to the state where metformin kind of brings you? It decreases the production of glucose out of the liver, it

decreases insulin levels, it enhances the insulin sensitivity at the muscular level, decreases blood glucose levels. So I mean, it's got all these really interesting laudable characteristics about it. But again, I'm not sure, there's a risk, reward profile with all this stuff.

**Nicki:** With everything.

**Robb:** Yeah.

**Nicki:** Okay, our next question is from Kristi, and it's about basement dwelling and skin. She says, "Hi, I love the podcast. So I'm a 27-year-old female and I spent most of my youth, junior high, high school, up until I was about 25 fearing the sun and sunburn. I would obsessively wear sunscreen and I was as white as a ghost. I did catch a couple of bad burns in junior high, which horrified me at the time, I didn't want to become one of those monster grandmothers that they showed in the future-face cameras. After a bit of college, I spent several years as a literal basement dweller, I woke up in time to play World of Warcraft with my team at 5:00 pm. I even did most of my grocery shopping at night.

**Nicki:** However, the problem was with this was I was pretty depressed and I soon learned that sunlight and sleeping more can be important factors. When I was about 25, I started coming around to my old enemy, the sun. This year, my goal has been to get as much sun as possible during the short Canadian summer without burning and store up some vitamin D for winter. However, when I meet new people and reveal my age, they don't believe me. They think I'm 18 or 20. Was this because of my basement dwelling? Was I preventing wrinkles, like they say? Should I even care because I now know how wonderful the sun feels? Maybe it's just genetics. My parents look pretty great and they're around 58. But still, I kind of like looking 20 years old. Thoughts?

**Robb:** I remember there was a picture of a monk in his 80s and he had spent virtually his whole life indoors, and no, no wrinkles, seemingly very youthful skin. And I kind of wonder how the guy didn't die from vitamin D deficiency and all this other stuff. But there's definitely a trade off in this whole story. I've been using the app dminder, which you put in your skin type, it will figure out your latitude and then gives you kind of a prescription for how long to be out in the sun. And I did this last year when we were in Texas, it's starting to get sunnier here in Montana, and so I'm using that as well. But what I kind of committed myself to is getting...

**Robb:** The theory behind the way that dminder operates is that there's a diminishing return with regards to the period spent in the sun. Yes, some amount of skin damage occurs with sun exposure. But this is, in my mind, a little bit similar, some amount of muscle damage occurs with exercise, there is some expectation of this stuff occurring, and the body adapting to it and whatnot. And what the dminder app does, is it tells you, "Hey, you just maxed out your vitamin D. And now anything beyond this, you're accumulating skin damage at an increasing clip." That's one piece to this. Another piece to this, and I haven't been able to dig in this but Bret Weinstein has talked about that simply being out in the sun, and then having a brief period out of the sun presses kind of a genetic reset button where the accumulated skin damage, it doesn't really add up the same way.

**Nicki:** And brief period, do you mean like out in the sun for an hour and then in for-

**Robb:** Five minutes or something. And then you can go back out. Yeah.

**Nicki:** Okay.

**Robb:** I have not dug into that. I don't know the ins and outs of it. But that's a really interesting thing. Let's say you were out for 20 minutes in the sun, away from the sun for five minutes, and then out for 20 minutes and then away for five. It appears that there's kind of a reset there where the accumulated genetic damage, oxidative stress and whatnot, is less, I almost look at it like interval training. If you interval train, you can go at a total aggregate of higher intensity so long as you're allowed to have periods of rest in between. So it kind of makes sense a little bit that intermittency deal. It's hard to do. I know if I go out paddleboarding or spear fishing or something like that, I don't want to come back in in 20 minutes. So with that, it just-

**Nicki:** Some activities don't lend themselves to-

**Robb:** That intermittency. Yeah.

**Nicki:** That intermittency.

**Robb:** But I've long made the point even in noodling on using tanning boots, the goal isn't turning yourself into a leather handbag. In my mind, the goal is maximize vitamin D, get all those other kind of cool benefits of dopamine release and feeling good and better cognition, enhanced immune function.

**Nicki:** And we just know that being outside is really, really good-

**Robb:** So good for you.

**Nicki:** ... for not just your physical body, but your mental state as well. Being in nature.

**Robb:** Right. And another piece to this, let's say you're very light complected, get a little bit of sun and then if you want to, put on a long sleeve shirt and a hat-

**Nicki:** Wear a hat.

**Robb:** ... but just be outside, there's that whole other piece to this, of just getting the circadian entrainment of being out in the sun, even if you have a big brimmed hat but you're sitting outside, the photo exposure you're getting inside your eyes is just so many orders of magnitude greater than what anything we experience indoors. So I think there's a lot of layers to this, I will also throw out there that a low glycemic load diet is fantastic for skin aging. The crosslinking caramelization, the Maillard reaction of our skin's proteins bonding to sugars and then getting crisped up like toasting, that's a real thing. And this is a strong case for figuring out an appropriate glycemic load so that we're not getting these crazy blood sugar excursions.

**Nicki:** Okay, so Christie, enjoy the sun this summer.

**Robb:** Just not too much.

**Nicki:** Just not too much. It's time for The Healthy Rebellion Radio trivia. Our sponsored drink, LMNT, is giving a box of element recharge electrolytes to three lucky winners selected at random who answer the following question correctly. So Robb, we've been doing a lot of turtle research in the Wolf household. And so your trivia question today is, what do you call the bottom shell of a turtle?

**Robb:** It's what you would call a drunk robot, a plastron.

**Nicki:** Like a plastered-

**Robb:** Tron.

**Nicki:** Tron.

**Robb:** There you go.

**Nicki:** Okay. It is a plastron, that is correct. And that is the answer to this week's trivia-

**Robb:** Plastron.

**Nicki:** I'm not sure about your robot joke.

**Robb:** You don't need to be sure about it.

**Nicki:** All right, to play, go to [robbwolf.com/trivia](http://robbwolf.com/trivia) and enter your answer. We'll randomly select three people with the correct answer to win a box of electrolytes from drink LMNT. The cutoff to answer this week's trivia and be eligible to win is Thursday, May 27th at midnight, and we'll notify winners via email and also announce on Instagram as well. This is open to residents of the US only.

**Nicki:** Okay, our fourth question this week is from Chris, on Neanderthals and carb loading. Chris says, "I've been dabbling in the keto, Paleo, carnivore world for several years, I lost 30 pounds after reading *Wired to Eat* just by eliminating grains. I'm not really strict right now but I drank the carnivore kool-aid for a while, and I believe eating nose to tail and perhaps a little bit of fruit and non-starchy vegetables is probably the best way for most people to eat. So when I read the article, titled Neanderthals carb loaded, helping grow their big brains, that someone posted on Facebook, it set me off just a bit. Their premise is that human brain development is a result of bacteria in our mouths, converting starches into sugars, the only macronutrient that we do not need to survive, because our brains need glucose to grow, and not that humans cooking and eating meat, fat and organs, which our bodies can readily digest, and use without the bacterial go between caused our brains to grow. I need someone way smarter than me to argue this one. My emotions wouldn't allow me to have a civil discussion or debate. Thanks for all you do.

**Robb:** Yeah, it's an interesting piece. It's newsy, it's at [sciencemag.org](http://sciencemag.org), at least the link to this. And the piece opens up with this kind of funny... I guess, kind of reveals the... maybe not the intent, but reveals something. Basically it's like, "Well, we thought that these folks were just meat eating brutes, but it turns out they were refined and ate carbs too." Which is just kind of ridiculous. I mean, it's clearly reflective of the misunderstandings biases or what have you of the author, but it goes through and it makes this case around some copolyte finds and the fossilized turds and also some dental findings that suggested that this a particular group of Neanderthals were consuming some things like oats and some tubers and whatnot.

**Robb:** This has been one of these challenges of defining the Paleo diet around no grains, no legumes, no dairy. So you find one exception to it, and it's like, "Oh, there you go." Hypothesis invalidated, and I guess some of the stuff that I would throw out there, a couple of thoughts. Richard Wrangham, who's an evolutionary biologist from Harvard, I believe, had the book *Catching Fire*, and he has done extensive research in this area. And he makes the case that humans are cookivores, that the reason why we developed

a major part of our evolution, is the fact that we cook food. Hard stop, done, doesn't matter whether it's plant material, doesn't matter whether it's animal material.

**Robb:** And this is one of the funny things that you will sometimes see out of vegan land where they're like, "Well, we don't have incisors. Therefore, we're not meant to eat meat." And it's like, "Well, we make stone tools." And even on the consumption of plant material, it is routinely mentioned that, "Oh, by the way, we find that these folks developed stone tools for the milling and processing of these carbohydrates to make them edible," even with the addition of the amylase gene in our genome, and then the adoption of bacteria that can break down starch more effectively, you have to cook and crystallize this starch in a way that makes it amenable to digestion, even by bacteria. So the cooking piece is a major factor in all this.

**Robb:** I guess one of the really interesting confounders here is that when we look at stable isotopic findings of Neanderthal and particularly Northern European homo sapiens, they appear to eat at a trophic level, a protein level that's similar to that of the Arctic fox, virtually pure carnivore. You kind of have to triangulate in on this. And this is where getting emotional about this stuff doesn't really do us any good. If this is where the information is, then that's what it is. But there are confounders here. So if we're seeing that the isotopic level in the bones and the teeth, a level of protein, and taking a type of protein is not coming from plants, it's coming from animals, and we can see that pretty clearly, because we know the dietary patterns of contemporary hunter gatherers and also contemporary animals and study their isotopic residues, we have a pretty good sense of what that looks like.

**Robb:** But we also can't throw information like this just out because it doesn't fit our conception of what humans did or didn't eat. Then finally, it's all very interesting information, but it doesn't really inform what we should or shouldn't do today. We can use it as a guidepost, for sure. And if you find that you do well with some oatmeal, then great, but using the fact that Neanderthals ate some wild oats isn't... You can use that as justification, I guess. It's kind of goofy and squirrely. I think that the anthropological record is really, really powerful for creating some context. If no other thing, what is some context here? They weren't eating boxes of breakfast cereal, breakfast cereal is not harvesting grains by hand and milling them on stone. And so that's some important demarcation on all of this stuff. If you want to eat your lucky charms by collecting the material whole, milling it on a stone, milking your own milk, collecting your own sugarcane, and then you want to somehow construct all that with stone age tool technology-

**Nicki:** And some beets for coloring.

**Robb:** Then fucking knock yourself out. If there's any lesson to be learned from that, it's this is still very minimally processed, high energy input for the obtaining of these items. And still from a nutrient density perspective, yeah, this maybe provided some degree of calories, but on the optimum foraging strategy piece, animal products still end up playing a really major part in all this. We just bought a foraging book for this kind of western area, western mountainous area, like the Rocky Mountains and associated areas. And it's really interesting, very early in the book, the guy talking about this stuff. He makes the case that there's all kinds of highly nutritious plant items that you can find around here, and none of them will you spend the days foraging and end up in the positive on calories, that you have to end up doing some amount of trapping, catching, hunting of animals to be able to get to a point where you could be breakeven or a little bit north on calories.

**Robb:** So like collecting miner's lettuce and the berries and all that type of stuff, very nutritious, lots of nutritional density, but also, at the end of the day, calories do end up mattering. So I've kind of wandered far afield on this. I think this stuff is interesting. And if anything, we keep pushing back. How early did humans eat meat? Well, it keeps pushing back. How early did humans exploit grains? Well, it keeps getting pushed back. It's interesting.

**Nicki:** Our final question this week is from Andrew on using mice in human diet experiments. He says, "In your opinion, is it ever valid to use mice as good data for experiments revolving around human diets? I'm confused because they're used all the time. But I thought that mice naturally eat grains, oats and fruits. It seems to me that anytime you feed them a diet involving meat proteins, that it would be unnatural for them and affect their bodies vastly differently than human bodies. Honestly, though, I know nothing about mouse biology. So I might be missing something obvious here. Seems to me like mice experiments involving diet and humans are totally useless."

**Robb:** So do I think mice could ever play a beneficial role in the study of human diet? Maybe, but I think that the case for it is getting more and more dubious and difficult to draw anything from at this point. And I mean, I say this with some bit of hesitancy. But do we need to know anything more about type two diabetes right now? I'm working on a piece for LMNT and in 2018, there were 16,000 peer reviewed articles published to PubMed with the topic type two diabetes in it. Now there's a huge spectrum of stuff, some of it's reviews, some of it's practice guidelines and stuff like that, but 16,000 peer reviewed articles on it.

**Nicki:** Have any of those changed any outcomes on how people in our country are dealing with type two diabetes?

**Robb:** No, not at all. And so there's a big question there, and this kind of extends to the food frequency questionnaires and stuff like that. Do we need any more of those? And I would argue no, and mouse physiology is sufficiently different from human physiology, that that's really problematic. Tommy Woods did a piece recently talking about that fact, and it's been pointed out to feed a mouse a ketogenic diet and not make them obese is really challenging, but that doesn't necessarily mean that a ketogenic diet is inappropriate for humans, we have a really different... Mice are almost guaranteed to get obese or overweight from eating significant amounts of fat. In their ancestral landscape, they eat a very low fat intake. Humans are varied, some human populations eat very low fat, others eat pretty high fat and it seems to be a very different story. Then we have the piece that, again, like this whole podcast virtually is an ode to the DarkHorse and-

**Nicki:** Weinstein.

**Robb:** ... the Weinsteinian family-

**Nicki:** And Heying family.

**Robb:** Yeah. This is a paper that Brett co published in 2002, the reserve-capacity hypothesis: Evolutionary origins and modern implications of the trade off between tumor suppression and tissue repair. And it's this amazing observation that mice that have been bred in captivity have had a powerful selection towards exceptionally long telomeres. And what this appears to do is provide a massive selection bias for the ability to heal in youth but be prone to cancers in older age. When we consider say toxicity studies, or maybe even fasting and its implications for health and longevity, these mice

may be so misdirecting us with what actually makes sense. This may be in part why drugs go through these mice studies, and they get a hat tip because they follow certain toxicological profiles. But these things may be causing massive tissue damage in these animals being toxic, that we only then later discover in humans, and it's stories like Vioxx, and the damage to the heart muscle and whatnot.

**Robb:** It's just ripe within the medical literature. And this is at a point... I know, this isn't the topic of discussion, but an additional, I guess, arrow in the quiver of my hesitancy around over-use of fasting in humans, there's all this interesting data that comes out of rodents. But if these rodents are selected to have exceptionally long telomeres, and then we expose them to the stress of fasting, which causes massive apoptotic turnover, and burning through of stem cells, these animals can deal with that much, much longer in a relative timescale than humans can. And this is the point that I made in my talk from 2020, Longevity: Are We Trying Too Hard? I have seen no one who's the big swinging dicks within the longevity scene mention the Hayflick limit, and that we have a limited pool of stem cells, and a replication of about 50 times before we're done with our telomeres. And if you burn through your stem cells, if you whittle down all the telomeres in these cells, you're done, you have nothing left to repair anything.

**Robb:** There's a dynamic trade off between we don't want to be overfed and end up with cellular senescence, but also we don't want to goose apoptosis and autophagy to such a degree that we just burn through all of these cells. And there's a whole bunch of cellular processes that need quasi senescent cells to even work, like cancer identification requires cells that are technically heading into the senescence cycle, but they're still useful within our body and our physiology, and you don't necessarily want to just hammer them with this giant fasting dose and stimulate autophagy and apoptosis and just clean them all out. That too, is going to cause problems. And so I think that this mouse data... I don't know maybe listeners can come up with something but I'm really at a loss as to why we would do any more mouse data on any of this stuff. The ethics are questionable, the outcome is really questionable, and now, when you add this telomere story into it, we may have selected a group of animals that are so completely unrepresentative of the rest of biology, particularly human biology, that it's like, "Why on earth are we wasting these resources on this?"

**Robb:** So yeah, I would be really, really hard pressed, because even prior to learning about Brett's position on this, I would have said actually... Because I've got a little background and toxicology. Would've said, "Well, they could still be useful for defining toxicological limits," and now it looks like that is absolute bollocks. You need to go out and collect a bunch of wild type mice and then use them. But then the way that mice are bred, the economic incentives for the way that you breed mice or animals in general for these lab settings would produce exactly the same situation. And this paper describes how that whole thing marches forward.

**Nicki:** And we'll link to Brett's paper in the show notes on this episode. Then also I just want to mention that if you want to see Robb's talk, Longevity: Are We Trying Too Hard? where he talks about fasting and the Hayflick limit, members of The Healthy Rebellion, that's available in the vault and if you're not a member of The Healthy Rebellion, you can go to robbwolf.com and download our... What do we call it? The Healthy Rebellion annual review 2020, and there's a link to that video in that as well.

**Robb:** Cool.

**Nicki:** Cool. Well, that was our fifth and final question for this week. Anything else you want to share?

**Robb:** If you have questions, send them in to us.

**Nicki:** Yep. If you have questions, you can submit them at [robbwolf.com](http://robbwolf.com) on the contact page, question to the podcast. Thank you guys for joining us. Be sure to check out our show sponsor LMNT. You can try our new watermelon flavor or grab any of our other flavors at [drinklmnt.com/robb](http://drinklmnt.com/robb), that's drink L-M-N-T .com/ R-O-B-B. Any other, anything else, hubs?

**Robb:** Time to go get choked.

**Nicki:** Time to get choked. Okay, it's do jujitsu time. All right, everybody. Have a great weekend and we'll see you next week.

**Robb:** Bye everybody.