

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.

Nicki: 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+. It's another episode of Healthy Rebellion Radio, hubs.

Robb: That beginning was much worse than even the beginning that we cut off of this, but I guess we'll keep it. How are you?

Nicki: I'm good. I'm good. It's chilly here in Texas for this next week.

Robb: It's going to be down to seven degrees on Monday.

Nicki: I know. I know. Crazy. Crazy weather. Bipolar weather, as we've learned.

Robb: Within seven days ago, it was 80 degrees and within seven days going forward, it will be 75 degrees.

Nicki: Seven. Yeah.

Robb: Or seven and then-

Nicki: Well, seven degrees and then back up.

Robb: Then within 10 days, it'll be back up to 75. Yeah, I have never seen ... Living in the high desert, you get a large variation-

Nicki: During the day.

Robb: -day to night.

Nicki: A high during the day and then the night drops. Yeah.

Robb: Holy shit, man. Within a two to three-day period, you can get literally 100-degree temperature spread, which is kind of crazy.

Nicki: Yeah. Yeah. Yeah. Let's see. Let's do our little high-level overview-

Robb: We are getting old. We're just talking about fucking weather.

Nicki: Yes.

Robb: "Freezing rain out there the other day."

Nicki: There actually was freezing rain.

Robb: See?

Nicki: But we'll move on from that.

Robb: See, we're just talking about the weather.

Nicki: Yeah. Yeah. See. Healthy Rebellion, the Reset, is going well. This is our final week of community here. Gosh. Last week, we had Jack Ruston from Rustons Boneyard, our resident meat expert. He did an amazing Valentine's Day meal demo and he's really funny.

Robb: Jack is super legit.

Nicki: The video that he created for this was pretty cool. The Rebels really enjoyed that. Oh, goodness. I didn't do what I was supposed to do before this episode.

Robb: What was that?

Nicki: Well, we have our annual review ready to go that includes our top 35 articles that we discussed in The Healthy Rebellion last year and exclusive access to your talk, Longevity: Are We Trying Too Hard, that we are-

Robb: We can still slip it in the show notes.

Nicki: Actually, you know what? I can talk about it right now because this episode isn't going up. It's not live, so I can make my URL redirect. Folks, if you want to get ahold of our Healthy Rebellion Annual Review, including Robb's talk, Longevity: Are We Trying Too Hard, which was the talk that he gave last year at The Metabolic Health Summit, was going to be his talk for Paleo Effects and all the other events, but of course we all know how 2020 went down, that talk is available in The Healthy Rebellion for members, but it hasn't been made available for anybody outside of The Healthy Rebellion.

Robb: Even within The Healthy Rebellion, we have constant questions that end up getting answered by referring folks to that talk. It digs into is consuming protein going to give you cancer, is fasting going to make you immortal and the long and short of it is that I think people have lost their minds about all this stuff. I'll give you a little bit of the punchline. Once you figure out a way of eating such that you don't overeat, you get adequate protein, you know whether you run better on carbs or fat or a combo, I don't know that there's much god damn upside to much fasting. Maybe a little bit here and there, but the way that folks are going after it ... I had a friend of mine relate to me this last weekend. He's a well-known "bio hacker", which I still-

Nicki: You mentioned that in the last episode.

Robb: I did? Okay. Well, I'm losing my mind so I can't remember that and it's worth mentioning again. The guy almost died. The guy ended up in the hospital with convulsions because he had to do a three-day fast and it was water only-

Nicki: He wasn't taking care of his electrolytes.

Robb: -and wasn't taking care of his electrolytes and all the rest of that stuff. I just think people are really missing the bigger picture with all this stuff. Some intermittency to eating? Great. Some intermittency to fasting? Also probably great, but lift your weights, eat your protein, get some sun on your taint and all the rest of that stuff, which I do cover that briefly.

Nicki: I forgot about that part. There is a little funny slide in your talk.

Robb: Potentially funny.

Nicki: Potentially funny. Anyway, the URL that I'm ... The redirect that I'm going to create such that you can get this annual review and the talk for free is robbwolf.com/annualreview.

Robb: That's original.

Nicki: Well, it's easy to remember.

Robb: Indeed.

Nicki: Okay. That was that.

Robb: Cool. Professional as always. We're totally on top.

Nicki: Oh, goodness. Lots going on in our world. Okay. What's our news topic for today?

Robb: News topic is a really cool Atlantic piece called "We Broke Phosphorous." Ages ago, the limitations around phosphorous got on my radar when I was following Chris Martenson and the Peak Prosperity folks, and I really, really like them, although I do think that they tend towards a little bit of the resource scarcity mindset, like peak oil and it ended up being that the problem was peak cheap oil and then that ended up not even being the problem. Now when you look at our world, we have apparently too much oil. So we need to just make sure that we don't use it for a whole variety of reasons.

Robb: Phosphorous is really interesting in that it is this non-negotiable piece of life. Throughout a big chunk of human history, phosphorous was a pretty significant limiting factor in agriculture and just food production and whatnot. This article traces the history of how we industrialized phosphorous extraction out of our environment, and also ended up damaging the environment, both in the process of extracting phosphorous but also in the way that we now dispose of it, which is basically down the toilet.

Robb: Where once, most of our phosphorous use was actually reused ... We captured night soil and the poo from animals and whatnot and that got wrapped into our agricultural practices. This thing talks about possibility of running out of phosphorous, but also the promise of just simply recycling our phosphorous and that we're reaching a point where phosphorous is becoming sufficiently expensive, both in terms of extracting it but also in terms of the damage of just dumping it into our waterways and whatnot. There are legitimate reasons that we should invest in extraction. I wasn't even aware of it, but several European cities now are re-absorbing the phosphorous out of their sewage.

Nicki: Wow. Interesting.

Robb: They have kind of a reverse osmosis process, where they're pulling the phosphorous out of there. Really cool. This is where I think that if people don't nuke our economy and they allow markets to function the way that they should and also hold feet to the fire ... Bret Weinstein makes the case that markets sort problems out better than anything else, and I believe that that is just an irrefutable fact of nature. What it doesn't tell us is what to value. What problems to sort out.

Robb: This is where we need to provide some direction around, "Hey, maybe we need to raise our food in a way that doesn't destroy our waterways," and whatnot. They had a great I

guess two paragraphs here from this piece. "Throughout most of human history, farmers raised crops and animals side-by-side, which allows them to easily recycle manure as fertilizer. During the 20th Century, however, agricultural specialization separated livestock operations and green growers, often by distances too large to transport to manure. This geographic rift effectively severed the last remaining strand of the human phosphorous cycle and it led to a surplus of phosphorous in areas of intense animal agriculture, exacerbating pollution problems in places like the Chesapeake Bay, the waterways of Wisconsin's dairy country and Lake Erie. According to a recent study by Metson and others, 55 pounds of phosphorus are released into the environment for every pound of phosphorus consumed in U.S.-raised beef, more than half of which comes from manure. (For wheat, the ratio is roughly 2 to 1.)"

Robb: It just makes this pretty profound case that animal agriculture ... This is some of the stuff where when people rail on and on about, "Well, how are you going to feed the world and how are you going to do this and that?" We're not going to run out of phosphorous, but it may become shockingly expensive to extract it. There are already places in the developing world where the increased prices of phosphorous are making it very difficult for people to get the phosphorous that they need for what they're doing.

Robb: There will be absolutely limitations on that, although if we look over at the oil industry and fracking, oftentimes people figure out novel solutions that actually bring the prices down on things that are seemingly in ever shortening supply. So there is the possibility that we figure out how to extract more phosphorous out of our environment. This doesn't address all of the ecological damage being done from phosphorous just getting dumped into waterways in the ocean and whatnot.

Robb: This really makes a pretty powerful case that if you want a sustainable system ... Sustainable by definition means that it can go on indefinitely. You need to weld animal husbandry back into the production of plant-based food stuffs. This is another one of those ... It's a very simple, elegant argument that you can't run planet of the vegans without animals. You can't do it. You maybe could give it a decent go by simply recycling the phosphorous excretions from humans, but once you start running all the math and the animal inputs and outputs become really important and there's all kinds of other important features here, like the soil microbiome, which is regenerated with the animal interface. Interesting article, important article and another kind of I guess arrow in the quiver of the regenerative ag scene, if you have the eyes to see it that way.

Nicki: Cool. We will link to that in the episode show notes. Let's see. We have our T-shirt review winner for this week goes to Cat in Louisiana. Her title is "Procrustean Bed." "The Healthy Rebellion Radio introduced me to this term and it is a perfect framework around which to build a review. The steps of the scientific method are make an observation, formulate a hypothesis, design a sound experiment, perform the experiment, collect and analyze data, come to the conclusion that the data suggests, re-observe and repeat the entire process."

Nicki: "A Procrustean bed is a conclusion that bends the evidence or cherry picks data to support the desired conclusion. Another term I've heard is 'torturing the data.' This podcast consists of Robb and Nicki showing how prevalent this is and then applying the actual scientific method, critical thinking included at no cost, to topics ranging from organic chemistry, health and fitness, economics to anthropology and beyond. Unfortunately, theirs is an incredibly unique perspective. This is not the podcast to miss." That's a great review.

Robb: Very cool.

Nicki: Cat in Louisiana, thank you again for your review. Shoot us over an email to hello@robbwolf.com with your T-shirt size and your mailing address and we'll send you a Healthy Rebellion Radio T-shirt.

Robb: Cool.

Nicki: The Healthy Rebellion Radio is sponsored by our salty AF electrolyte company, LMNT. Robb, in our last episode and also in the beginning of this episode, you talked a bit about your friend who ended up in the hospital with hyponatremia. We actually just had an LMNT customer write in about her experience with hyponatremia, which I'll share, but I was hoping that you could first explain who is typically affected by hyponatremia and what are they doing that is potentially bringing this about?

Robb: It can happen a lot of different ways, but one of the I think unfortunate ways that this occurs is in otherwise health-minded individuals consuming far too much water relative to their electrolyte status. This is where every year, Iron Mans, marathons, military boot camps, double days at football, people get sick, sometimes die by consuming huge amounts of water absent adequate electrolytes, specifically sodium. The hyponatremia is a too low of sodium environment. When the sodium concentration starts dropping, the body will start shedding potassium, trying to balance that. It is a nasty downward spiral and people can get very sick and can easily die under a circumstance like this.

Nicki: As you mentioned with your friend who was fasting, that's what brought his bout, especially if you're not eating any food. Then you're not getting whatever electrolytes you would potentially be getting from food.

Robb: Yeah. Fasting is doubly problematic in that insulin levels are super low. So we're not retaining hardly any sodium just naturally and then we're consuming no electrolytes at all. You're not eating anything.

Nicki: Not eating anything.

Robb: Yeah. Interestingly, this gets out a little bit into some of the dodgier arenas, but some people really recommend dry fasting, where you rely on the production of your body's metabolic water and you could maybe make the case that this is going to be less likely to dilute your electrolytes to a degree that would potentially become dangerous, but even this is just like, "Fuck, man." People are doing this, trying to extend their life and you are screwing with things that have only PHs maybe more tightly regulated than electrolyte status and can kill you in very quick fashion if you get it wrong. The dry fasting ... God, I'm so hesitant to even mention it because people are fucking idiots at times. You know?

Nicki: Don't do it. We're not recommending it.

Robb: God. If you do do it, really educate yourself and have a safe word or something so that when somebody sees you flopping around like a fish, they know that ... What's going on. Part of the deal is that people try to stay active while fasting and stuff like that. This is what got my friend into trouble. He was doing a bunch of yard work, wasn't lifting weights, wasn't doing cross fit, but he was outside working. He lives even in a place that even during the winter is reasonably warm and he was outside working all day long over the course of three days. He got progressively sicker and sicker over the three days. By the third day, he ended up hospitalized.

Robb: Yeah. It's a no joke deal. Even LMNT aside, for the love of God, just put some ... A scoop of salt and no salt in your ... A teaspoon of each in your quart jar of liquid, mix it up and drink it. You're really playing with fire, doing a fast, particularly while active and just consuming no electrolytes. You are really, really playing with fire. As big as fasting is getting, as many people are doing it, just nervous ... It would just suck to have people die because of this or get sick. It's a very easy remedy. Just get some god damn electrolytes. Yeah.

Nicki: Well, I wanted to read a message that we received from one of our LMNT customers, Hilary. She said, "Not only do I absolutely love LMNT, I think it has truly saved me. I've had two episodes of hyponitremia within a four-month period that put me in the hospital, and I wish so badly I knew what was going on and had your products then. Now I drink LMNT every day and it's been seven months and I'm feeling great. Thanks for all of the education on your page, too. It's a lot more than my doctors were able to explain."

Robb: Cool.

Nicki: That was a really nice review.

Robb: You want to take over the stewardship of this?

Nicki: Long story short, folks, make sure your electrolytes are on point. Grab some LMNT. Go to drinklmnt.com/robb. The best value is in the value bundle. You can buy three boxes and get the fourth one free. Again, that URL is drinklmnt.com/robb. All right. You ready for questions?

Robb: Let's do it.

Nicki: All right. Our first one is from Kara. She has a question on fasting, blood sugar and tooth enamel.

Robb: Kara managed to sneak in two questions in just one.

Nicki: Two questions. "Hey, Robb and Nicki. I've been enjoying the Q&A podcasts and you answered a question recently that is similar to mine. I'm writing because I am still struggling. While all of my other readings are in a healthy range, my fasting reading is always in the low 100s. I've tried eating carbs at dinner, taking carbs out of dinner and more recently extending my fasting window, but I can't get it to go down. My A1c has been creeping up in the past couple of years as well. In the summer months, I train in the mornings and eat most of my carbs then, but when I'm working ... I work a school schedule. I train around 4:00 in the afternoon and have my carbs at dinner."

Nicki: "I sometimes struggle with sleep and was having a snack before bed. I stopped the snack due to this issue and I often wake hungry, but I don't eat to ensure I have a 12-hour fasting window. I'm naturally up between 5:00 and 5:30 and I eat breakfast upon waking. When I'm working, I have to eat this early as I get up and leave for work. I have contemplated fasting in the mornings to extend the window longer, but I'm truly very hungry when I wake. Some details: 40-year-old mother of two boys." She had gestational diabetes with both pregnancies. She's been testing blood sugar since *Wired to Eat* came out. Body is very sensitive to stress and then she eats 75 to 100 grams of carbs per day. The 100 grams are when she's very, very active. What are you thinking?

Robb: Two things: reducing carbohydrate intake further. Keto or lower carb is not always the solution, but for a lot of people it is. She mentioned that her A1c has been creeping up, but it would be interesting to know what that is specifically. Is it creeping up from 4.7 to 4.8 or are we in the fives and creeping up towards six? I think that would all be important stuff. Interestingly, probably electrolyte status would be interesting to know and addressing that around bedtime. If she's mentioning that her sleep isn't good and that alone-

Nicki: That she's waking up hungry.

Robb: Waking up hungry. Just wondering around that stuff how much protein is in the mix here.

Nicki: That was my question because if she's waking hungry, it's like, "Look what ..." She's having a snack before bed. What is the composition of your meals?

Robb: Right, because I've got to say I'm reasonably active, reasonably muscular for me personally. There's huge variation. You could get by on 75 to 100 grams of carbs pretty easily, although you rarely eat that much just because I do the bulk of the cooking and there's not that many carbs around, but you could. For me, I'm hard pressed to eat that much. So what else is missing in the mix? Can we throw our dear friend Dave Dooley under the bus?

Nicki: Sure.

Robb: Is this bad? It's not bad.

Nicki: No. I think we mentioned it before, anyway. He's not been feeling great and we've been harping on him to get more protein.

Robb: And it was mainly blood sugar-related issues.

Nicki: Protein. One of his breakfasts was salad with bacon for breakfast. He was eating-

Robb: Virtually no protein.

Nicki: -virtually no protein throughout the day. In the last couple weeks, he's significantly increased it and he's feeling a lot better. I'll just say, Kara, too, I know you've probably heard us say this a lot on the podcast, but every single reset, people who actually track their protein, they are blown away. They thought that they were fine on their protein. They're like, "I always hear Robb and Nicki talk about protein. I eat a lot of protein. I'm good on the protein. That's not me," but then when they actually track it, they're amazed that they are really pretty far off the mark. Definitely looking there would be a good start.

Robb: Maybe to summarize, really look at protein and make sure, again, in that gram of protein per pound of lean body mass all the way up to a gram of protein per pound of body weight. Maybe you reduce the carbs, but definitely make sure that you're getting that protein and then look at sodium and electrolyte too, particularly around that bedtime period.

Nicki: I know you seem pretty focused on having this 12-hour fasting window, but Robb has mentioned this before in the past as well. If you can, if you're able to, scoot your dinnertime as early as possible.

Robb: Sounds like it may be tough because she eats ... Or she works-

Nicki: During the school year.

Robb: Then she works out. Yeah.

Nicki: Yeah. Okay.

Robb: Let's look at protein.

Nicki: Okay.

Robb: If we just did one thing, make sure that we're on point with protein. Yeah.

Nicki: Okay. All right. Let's get to the second question that she squeezed in. She said, "I heard you mention enamel loss from apple cider vinegar. Do you have any tips for preventing further loss or rebuilding enamel?" I have experienced the same.

Robb: There's some folklore in the Weston A. Price world that if you eat enough butter and calcium-rich foods that you can precipitate some calcium out of your saliva into your teeth and there's some claims around that. I really don't know the truth or lies around that. The way to avoid it, it kind of stinks because apple cider vinegar is a really handy thing to use, but it'll hammer your teeth. Apple cider vinegar capsules, but they don't work as well. You've got to take a big old whack of them to get anywhere with it.

Nicki: Okay. Alrighty. Our next question is from Ben on LP little a and cardiovascular disease risk and says, "First time, long time. Love the show. It's my go to podcast for workouts and clinical documentation time. I'm a physical therapist. I am 35 years old, male, 5'11" and 185 pounds. I'm not sure on the exact body comp, but I ..." I'm not going to read that part. Oh, god.

Robb: You've got to read that one.

Nicki: Do I have to read it?

Robb: Oh, you're turning red.

Nicki: I read this before in the question and I almost edited it out, but then I didn't, so now-

Robb: Oh, just read it.

Nicki: Okay. "I'm a 35-year-old male, 5'11", 185 pounds. Not sure on exact body comp, but I have a pretty solid dick root, so it's good. Okay. CBD history of bicuspid aortic valve. I understand that I'm staring at increased wear and calcification on that valve as I age. No changes on echo cardiograms so far. I've been eating paleo primal, occasionally keto for three-plus years now and have had great body comp changes, abs generally and feel pretty damn good. My lipids have been elevated and I opted for an LP little a assay to more accurately assess risk."

Nicki: Then he has his numbers here. "Apo B: 111 milligrams per deciliter. LP little a: 81. Regular lipid panel total cholesterol 251, HDL 84. Triglyceride 61 and LDL 155. My questions to you are have you come across any LP little a lowering protocols? Also, any ideas on reducing general calcium buildup over a lifetime?"

Robb: That's a good one. We'll tackle the calcium one first. Getting adequate vitamin K2 in addition to the vitamin D is definitely important. I think it's hard-ish to do, but if we over consume vitamin D, that causes us to retain calcium, but it doesn't necessarily tell the body where to put it whereas the K2 tells ... Gives more direction about where to partition the calcium. You don't actually want it calcifying your arteries and whatnot. Just really being on point with that.

Robb: I'll refer to Chris Masterjohn on all things related to that. He's super buttoned up there. It's interesting. In theory, LP little a is not supposed to budge with regards to dietary interventions. His LP little a is pretty high and it does ... It's interesting. LP little a seems to be an advantage with regards to bleeding, hemorrhage. People with higher LP little a, all things being equal, are less likely to bleed to death if they're injured or whatnot, but it also seems to be disproportionately atherogenic.

Robb: Again, in theory, it's not supposed to change with regards to dietary interventions, but we have seen it monify in folks, both going lower carb and elevating carbs. It just depends on the person, but we have seen it change under those circumstances. Chris Kresser has his high cholesterol action plan, where he recommends a number of supplements, including some vitamin E like substances, tocotrienols and whatnot, and a number of other items that can reduce LP little a and then just statins. This is one of the things that docs in a clinic in Reno would do. They put people on a very low dose of something like Crestor, like five milligrams a day, alternating days. It would absolutely plummet the LP little A. Some folks are very convinced that this is 100% a gradient-driven process. So if you reduces these numbers, then it reduces your cardiovascular disease risk.

Robb: I think there's compelling stories around that, but then it's still ... Some people like Malcolm Kendrick have great pushback on this, which is that if all the ... He comes from the vascular endothelial damage model that if the endothelium is damaged by something, mainly like smoking, high blood pressure, elevated blood glucose levels, then those lipoproteins, which actually play a role in healing the vascular damage, it becomes an out of control forward mechanism. It's almost like the clotting cascade in a way. Still confused on that and continue to be confused.

Robb: Some people much, much smarter than me definitely put significant stock in the gradient process. I'm not dismissing that, but it still is intriguing to me. This may just be one of these stories where it's an evolutionary trade off. You've got protection against ... Also, it's worth mentioning people with elevated LP little a tend to have lower rates of autoimmune disease and if they do develop autoimmune disease, it tends to be less severe. There are evolutionary trade offs with this. Maybe the benefit of being less likely to bleed to death and also if somebody's immune modifying characteristics of LP little a specifically, there's a benefit there, but then one of the downsides is increased cardiovascular disease risk.

Robb: Then what additional risk is one taking on, say, like using a statin to knock that LP little a down? Some of these other things, like PCSK9 inhibitors and whatnot are really interestingly, because they're not operating at the level of blocking cholesterol synthesis. In theory, we shouldn't have the same problems with down regulating CoQ10 production and some of these other elements and it's also worth mentioning that the cardiovascular disease protective elements of statins appears to be maybe not completely decoupled from the way they change lipoproteins, but significantly decoupled. This circles back again to the PCSK9 inhibitors. If this is 100% a gradient-driven process, these PCSK9 inhibitors can reduce lipoproteins by 50%. It can cut them in half. It does not reduce cardiovascular disease potential by 50%.

Robb: This is the stuff that just makes my head spin. It's like, if it's just a gradient-driven process and we can cut lipoproteins in half, specifically LDL particles, which is what the LP little a is a fraction of, then we should see a 50% risk reduction and we don't. There's still more going on to it. God, it's so funny. When I wrote The Paleo Solution, I didn't even ... I got ready to turn the book in and then Erich, our publisher was like, "Hey. How do you address cardiovascular disease?"

Robb: At that point, I was naïve enough that I was like, "Oh, if you eat paleo, you're never going to have a heart attack." So I had to actually get back in and do some lipodology research and put all that material in there and my assumption then was probably inaccurate. I think some sort of ancestral diet almost certainly decreases cardiovascular disease risk. It doesn't make it just go away entirely. That was one of many Dunning-Kruger moments.

Nicki: Alrighty. Our next question is from Hannah on cold plunge. She says, "Last year, I used my pool for cryotherapy. Cold plunge. This time of year, the temperature is 45 to 50 degrees fahrenheit. I've been doing it on days I don't lift for five minutes. As I continue to recover and restore my hormones, is this a good practice or too stressful on the body? Would it be better to just stick with the sauna or red light therapy? Any passive options I can do to induce a hermetic response on my off days from the gym without stressing my hormones too much?"

Robb: What do you think about this? You read the Wim Hof book and all that.

Nicki: Yeah. He seems to think there's great benefit to regular cold plunge and the breathing that goes along with it. Obviously, you have to ramp up into it and acclimate your body. You're not just jumping in with two feet. He recommends the shower version. When you start with the warm shower and then you turn it to cold and you start with 20 seconds and then the next day, you add 10 seconds and you slowly build up to two minutes or more in cold. I think if you do it right, it can probably be something that you acclimate to and it's not a stressor, although-

Robb: 48 degree water seems like a big lift.

Nicki: That's really cold. Yeah. Even if you turn your shower to cold, it's not-

Robb: It's probably not that cold.

Nicki: Not that cold.

Robb: Depends on where you live. Yeah. Hannah, I don't know. Whether or not it's too much is going to be really individual. You're mentioning-

Nicki: You're mentioning restoring your hormones, but we're not sure ... You didn't describe what's going on with that, so we're not-

Robb: Assuming some sort of thyroid or adrenal or something like that. Definitely the poison to some degree is in the dose. That is a big-

Nicki: Five minutes is a long time as well.

Robb: Yeah.

Nicki: A long time.

Robb: He recommends more like two minutes.

Nicki: Yeah. He himself can go very lengthy sessions.

Robb: He is the Wim Hoff, too. Yeah.

Nicki: Yeah. I guess, Hannah, would heart rate variability to help-

Robb: HRV would be a helpful tool.

Nicki: To give her a sense of how her body's recovering or if it's a significant stressor for her.

Robb: Oura Ring, Morpheus. One of those things. Yeah.

Nicki: Yeah. That might be something to do. Maybe just journaling or paying attention. Do you feel erect after it or do you feel ...

Robb: I know when I did it, when I could coax myself into doing it, immediately afterwards I had that kind of euphoric thing. It was like, "Oh, that was awesome." Then about three hours later, I was laid out. Yeah. Yeah. It was too much for me.

Nicki: She's also asking if there are any other passive options she can do to induce-

Robb: I do like the sauna. Again, I think that sauna can be overdone also, but it just ... I don't know. Maybe it's my personal preference, and God help me, why am I moving to the arctic north here very soon? But the heat stuff seems to not zap you in the same way that the cold has, but I've also not dedicated the time to this gradual reintroduction and doing the breathing and whatnot to support that process. I will be soon because I'm going to need some cold inoculation, for sure.

Nicki: Okay. It's time for The Healthy Rebellion Radio Trivia. Our Healthy Rebellion Radio sponsor drink LMNT is giving a box of LMNT recharge electrolytes to three lucky winners, selected at random, who answer the following question correctly. This question came from one of our Healthy Rebellion live chats that are super fun. They are the free flowing conversation.

Robb: The random access. Yeah.

Nicki: They usually start with an actual health-related theme or topic and then-

Robb: Somebody derails it.

Nicki: They go off the rails. There's like five different conversations happening at once and they're just ... They're super fun. Anyway, somehow we got on the topic of animals with penis bones. Robb, this week's trivia is name one animal that has a penis bone.

Robb: I just like the juxtaposition of penis bone and beaver.

Nicki: Okay. The answer is beaver.

Robb: Beaver.

Nicki: Yeah. As another interesting note, this is something that we learned recently, is apparently in some really high end or fancy or ... I don't know. Eclectic cocktail bars, they include a penis bone as a stir stick in your cocktail.

Robb: Seems odd.

Nicki: Lots of trivia going on this week.

Robb: Seems very odd.

Nicki: All right. To play, go to rebels.com/trivia. Enter your answer and 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, February 25th at midnight. I'm reading it really fast, kind of like the normal people that do the really, really fast things. I'm trying, anyway. Winners will be notified via email. We will announce the winners on Instagram as well. This is open to residents of the U.S. only.

Robb: Bam.

Nicki: Okay. Fourth question this week is from Bill on muscle soreness on Carnivore. He says, "My problem is extreme muscle soreness. A little background: I was diagnosed pre-diabetic in October, immediately started low carb via Primal Blueprint and was doing well and learned of Carnivore. I started Carnivore the day after Thanksgiving and since then, since Carnivore, the day after a workout, my muscle soreness is way above what it should be. I cut my workouts to about 25% of what I was doing prior to Primal to anticipate for the lack of carbs. I'm a 51-year-old male, 210 pounds and 6'3". I consume about 200 grams of protein a day and the same amount of fat. I mix a teaspoon and a half of salt in water during the day along with a quarter teaspoon of potassium chloride and about 700 milligrams of magnesium."

Nicki: "My question is about the excessive soreness. As an experiment, I waited until my legs were fine and then I did 10 air squats. The next day, the soreness was at about the level of an intense leg day. Is this normal and I just need to wait longer or am I doing something wrong?"

Robb: This is absolutely not normal.

Nicki: No.

Robb: It's intriguing that just going from Primal to Carnivore was problematic, although what I'm noodling on here ... The change may be independent of what the problem is. When I hear about this extreme muscle soreness, we had a good friend that had been dealing with problems like this for a long time and then was diagnosed with familial hemochromatosis and this is a situation where the body retains too much iron. The iron starts getting deposited in the soft tissues. It is incredibly pro-inflammatory, which also could have been a factor in the pre-diabetes scenario because this inflammatory state that iron overload can really dramatically impair the insulin-

Nicki: Because 6'3" and 210 isn't significantly overweight.

Robb: No. No, it's not. I mean you can have varying body compositions within that, but yeah. Yeah. 51-year-old male. So, motoring along for the better part of a hunter gatherer lifetime plus 50% and probably not donating blood. I would recommend going and getting your iron levels checked. If you do ... I can put in the show notes, I forgot to do it,

but a functional medicine look at iron status, iron overload, ferritin, iron saturation, the full picture, so that we can understand what's going on there.

Robb: If I were putting some money on this, I would put a little bit of ... I'd put \$100 on the notion that this is a hemochromatosis scenario or an iron overload scenario. I would recommend investigating that, and then it would be awesome if you could get back to us. If it's not that and you're still having these problems, then we need to talk some turkey, but it's ... Part of the reason why I'm doing this is I just can't understand why else this would be the case. Under Primal Blueprint, there's some carbs, but not that many carbs, so ...

Nicki: It's not like you went from eating 600 grams of carbs a day to nothing.

Robb: Correct. Yeah.

Nicki: You're already low carb for the most part and real foods.

Robb: Yeah. It's hard for me to imagine that 50 to 100 grams of carbs is that big of a difference with regards to the way that he's responding to this.

Nicki: Well, and it shouldn't be protracted. Right? He's been training.

Robb: Right.

Nicki: This is clearly an abnormal response to exercise for him.

Robb: Right.

Nicki: He didn't have this before.

Robb: Right. Yeah. What's his name again?

Nicki: Bill.

Robb: Bill, get your iron levels checked. Get back to us. I'm really curious about that. If that's not it, then we can go plan B and maybe it just involves reintroducing some things, like fruit or honey or something like that. See if that resolves things, but I would definitely be curious. Male, extreme soreness, middle-aged male, all that stuff. Even if he doesn't have familial hemochromatosis, just the basic iron overload, if not bleeding consistently like we're designed to do. That could be a problem.

Nicki: Okay. All right. Our final question this week is from Annie on the link between sodium intake and calcium excretion. "Hi Robb and Nicki. Thank you so much for all the knowledge you provide your listeners via your awesome podcast. I'm wondering your thoughts on the link between sodium intake and calcium excretion. Knowing your thoughts on sodium and how important it is to maintain electrolyte balance, I was concerned when my endocrinologist recommended I decrease my sodium intake because it maybe contributing to calcium excretion in urine and thus increasing my risk for osteoporosis to my bones."

Nicki: "I did a 24-hour urine calcium test and results indicated I was slightly higher than the normal range. I do have osteopenia due to early menopause at 38, and no hormone replacement therapy until seven years later when I finally realized that my low estrogen needed to be addressed despite my MD telling me that it wouldn't help, that I would

need to go on bone medication. No other health issues and blood sodium last time tested was 138, which is lower end of normal range. Low end was 135 for the lab test that I used. Also, blood pressure has always been on the low side. 90 over 60. No issues with lightheadedness, et cetera. I eat a whole foods diet and was using Redmond's Real Salt to taste. I've recently been trying to limit my fluid intake to no more than 80 to 96 ounces a day. I may have been unintentionally over hydrating in the past. Not sure how much this would affect the calcium excretion. Thank you so much."

Robb: I put a couple of papers in here. The first one is "Kidney and Calcium Homeostasis," and it just goes ... It's a really nice review paper looking at just the way that the kidney handles calcium. The other paper is "The Effects of Dietary Sodium on Calcium Metabolism and Premenopausal and Postmenopausal Women." As sodium intake increases to higher levels, there does appear to be a proportionately smaller increase in urinary calcium. It appears that postmenopausal women adapt to high sodium diet by replacing the increased urinary excretion of calcium with increased bone reabsorption.

Robb: There is a tendency to go towards increased calcium loss with increased sodium intake, but it's very, very small and it's inconsistent. The same paper studies in young men and women have shown that on high sodium diets of 200 millimoles compared with low sodium diets of 10 millimoles, urinary ... I'll skip down. Sodium calcium excretion increases, but so does calcium absorption, showing that an increase in urinary calcium does not necessarily indicate bone loss.

Robb: Oftentimes the vegans or the people in the acid alkaline world will say that high protein intake is injurious to bones and it's not because even though urinary calcium excretion increases, reabsorption, both from the gut and within the body increases. The caveat to this, what gets kind of interesting when you drill down into this, is that the big determinant in whether or not this seems to be a net osteoperonic process versus stable state or even reversing it is hormonal status. The real big problem that pops up here is in postmenopausal women, which she is.

Nicki: Yeah.

Robb: Annie is. She appears to be on hormone replacement now. That really wasn't addressed in the literature I was able to look at. A couple of different things here. When they were comparing these high versus low intakes, there were two orders of magnitude difference in the intake. I didn't retro engineer what the 250 millimole versus 10 millimole would represent with regards to total grams of sodium, but it's a significant difference. If we're just in a scenario where we're generally salting food to taste and whatnot, I'm just at an absolute loss that this would be at the higher end of that.

Robb: All of that stuff said, the addition of estrogen seems like it should be favorable, particularly if you were resistance training. If you're concerned about bone density at all and one is not resistance training two or three days a week, then one should not be concerned about bone density because one has given up on that topic. Should be two or three full body, hard sessions a week. Doesn't need to be long, but you need to lift some significant loads and do it in a horizontal pressing, horizontal pulling, vertical pressing, vertical pulling, squat, lunge, hinge, rinse, lather, repeat.

Robb: That would be a question I would have in this whole story also. What type of resistance training are you doing? Are you getting adequate vitamin D and vitamin K2? Then I think if literally where you are is just salting food to taste, I just can't conceive that that would-

Nicki: Be a problem.

Robb: -be a problem and push this into a dangerous direction, particularly when we understand that even in women without hormone replacement, postmenopausal resistance training is effective at both bone maintenance and in minimizing loss and maintaining muscle mass. It seems like proper hormone replacement improves all that stuff. It shouldn't be entirely surprising, but yeah.

Nicki: All right. Five questions down for this week.

Robb: That was kind of quick, even though they were kind of technical.

Nicki: They were. Yeah. Thanks everyone for joining us. Make sure you check out our show sponsor, LMNT, for all of your electrolyte needs. You can go to drinklmnt.com/robb. That's drink L-M-N-T.com/R-O-B-B. What else, hubs? Any final closing thoughts for this week?

Robb: That's it. That's all I've got.

Nicki: Okay. All right, folks. That's a wrap. We will see you next time.

Robb: Bye, everybody.

Nicki: Bye.