

TPWKY – Episode 195 - Salt Part 2

EAU: "Intake of salt is a biological imperative, inextricably woven into physiological systems, human societies, and global culture. However, excessive salt intake is associated with high blood pressure. The crucial question is whether salt exerts a causal influence on patient-centered health outcomes such as myocardial infarction, stroke, and death. However, this issue is controversial and fiercely debated. Despite the controversy, two broad points of consensus exist. The first is that the uncertainty could be resolved by better quality data, that is, large, randomized clinical trials with sufficient follow-up to assess robust cardiovascular outcomes. The second is that the barriers to performing such trials are so substantial that they will be rarely, if ever, surmounted."

EW: Okay. Um, so many questions.

EAU: Mm-hmm.

EW: that from? When was that from? Who wrote that?

EAU: I can't wait to tell you. Okay. So that was, I pulled clips, like little bits from the intro and from later in a paper. Uh, from a very recent paper. Uh, I have to scroll. Why didn't I put this up? I'm scrolling all the way to the bottom of my notes, uh, from Nature Reviews, nephrology from 2022 by Hunter et al, titled, the Impact of Excessive Salt Intake on Human Health. And this paper, that little intro, that's the end of my

EW: I mean, that's, that's what, like, that's what kills me is that I feel like that could, the reason I asked where, when is it

EAU: mm-hmm.

EW: that could have been from so many different points

EAU: Correct.

EW: over the salt debate. We need better data.

EAU: Mm-hmm.

EW: randomized control trials, we need

EAU: Mm-hmm.

EW: data sets and follow up.

EAU: That was from 2022.

EW: uh,

EAU: So that's what we're gonna talk about today in this episode.

EW: Hi, I'm Erin Welsh

EAU: And I'm Erin Almond Updyke.

EW: and this is, this podcast will kill you.

EAU: Welcome back to Salt

EW: Salt.

EAU: part two.

EW: Yeah.

EAU: we go again. Um, I'm really excited, uh, about today's episode.

EW: Me

EAU: don't know if I'm gonna answer any of your questions, but I think, I think we'll come to some clarity. I honestly really actually do at the end of this.

EW: I, I, am hopeful. I know that there is an, a thread to be pulled, you will find it and yank it out

EAU: I do. I yank. Yeah, I do.

EW: I'm thrilled for this.

EAU: Yeah. If you missed.

EW: wanna start an asking questions and that is a first, like, that is early for

EAU: Yeah, good. I can't wait. I can't wait for you to ask me questions and then I'll be like, that's the one I don't have an answer for. Or like, oh my God, now I have to scroll a hundred years in my notes. I can't wait. I have 15 pages of notes here, Erin, so like I've gotta have answers to something. Um, but first it's quarantine time.

EW: It is, it is, uh, we're again drinking the grains of salt, which is based on a salty dog.

EAU: Mm-hmm.

EW: a salty dog, which is

EAU: Is this something?

EW: and vodka or gin, whichever you prefer. Make sure your rim is salted unless you're dealing with high blood pressure. No, just kidding. I don't know. But, um, that is the technical recipe. Also, this reminds me that if you are just now tuning in and you didn't see at the top that it says salt part two, you really don't have to listen to the first episode.

EAU: you should.

EW: There's, it's not like there's a narrative that you'll miss,

EAU: But you, you'll miss a lot. Let's be honest.

EW: it'll help you with trivia.

EAU: Mm-hmm.

EW: It's got some cool,

EAU: It's a great episode.

EW: you wanna learn where the term grain of salt comes from? Check it out.

EAU: You gotta listen to that episode. We're not gonna tell you now. Mm-hmm. Anyways, we'll post the recipe for the drink on our website, this podcast with kill you.com and our social medias. So make sure you're following us there. You find lots of other cool stuff on our website too, like transcripts and a

bookshop.org affiliate account, and a good reads list and merch and, uh, all the sources from all of these episodes. Boy, do I have a long list for this one. Um, blood Mobile, who does our music? You know, contact us form. Okay.

EW: it out. Is there any other business or can

EAU: No,

EW: straight to things?

EAU: do this right after this very short break.

EAU: Life evolved in the oceans, which are salty.

EW: I love this. I'm like, wait a second. Have I said this before?

EAU: No, you haven't, but it is the most Erin Welsh way to start a thing ever. That I was like thrilled that you didn't start that way and that I could do it.

EW: I, I did think about going into the evolutionary origins and then I was like, stop.

EAU: Yeah, no, I'm not going any further than that. Life evolved in the oceans. The oceans are salty, and with the evolution from single celled organisms to multicellular organisms, salt became a major component of our extracellular fluid that is the fluid that is on the outside rather than the inside of our cells. Our bodies are basically just made up of tiny little water balloons. Bathing in more water.

EW: yeah.

EAU: Okay. And all of the water inside and outside of our cells is salty water. But the salt on the inside of our cells is mostly potassium. So the ions that make up the salt mostly are potassium. And the salts outside of our cells mostly are made up of sodium. So as we moved from our ocean homes to land, and by we I mean like you know, creatures, not like humans or anything.

EW: evolutionary we, yeah.

EAU: Exactly. We were no longer bathing in sodium all the time. Right. And thus we had to find ways to ingest it. So animals evolved, taste receptors to be

able to detect salt. And in general, like you kind of mentioned Erin, most animals have actually a pretty consistent, like upside down, U-shaped preference curve for saltiness. Right? We think it's Yeah. Upside down U. So like it's delicious right in the middle. If it's not salty enough, it doesn't taste good. If there's too much salt, ugh. Also doesn't taste good. Right. So when we talk about salt in this episode, like you said last week as well too, I'm talking about sodium chloride, NaCl. I mean, when I said it in the bodies where there's other salts in your body, you know, and there's other ions that are important. But from now on out, I'm just talking about sodium chloride.

EW: Okay. I can, I already ask a question

EAU: Yeah, give it to me.

EW: potassium is on the inside and

EAU: Yeah, Uhhuh.

EW: the outside. Uh, what happens then?

EAU: Okay. Yeah. Let me, let's, let's talk a little bit more about it

EW: Yeah, it was not a

EAU: and

EW: just like a Tell me more.

EAU: Yes.

EW: Tell me more.

EAU: Let me continue setting the scene and then I will, I will get into that very shortly. Um, well, we're talking mostly about sodium chloride today. Lots of other salts exist in chemistry. Salt, like table salt. Sodium chloride is about 40% sodium,

EW: Yeah.

EAU: like by weight, so 10 grams of salt. This is important for when we're, 'cause like all of the dietary guidelines and things talk about sodium, but then a

lot of studies just talk about salt, so we can use these interchangeably. 10 grams of salt, four grams of sodium. That's the equivalence there. Okay.

EW: what it, there are like online calculators that I had to use to be

EAU: So many times.

EW: are we? I would be like, how much salt does the average American eat? Oh, you know, however, 3,200 milligrams of salt or sodium. And I'm like,

EAU: right?

EW: but how much salt are we

EAU: How much salt is that? Yeah, exactly. Uh, also then some studies like to use millimoles just to make them sound more smart. And you're just like, now I have to convert from millimoles to milligrams. Like, stop it. It's unnecessary. But, so the questions that I wanna answer today in this episode are, number one, why do we give a crap about sodium? And that's gonna get at your question of like, sodium, potassium. What does that mean? What does it do in our bodies? Why do we actually need it? What is the problem? Or is there a problem with excess sodium? And how much, what does excess actually mean? And why is there so much debate about this?

EW: Yeah.

EAU: gonna be a big part of the episode. What I am not going to talk about is hypo and hypernatremia. That is when your blood sodium is too low or too high, I'm not gonna talk about it in any great detail. If you are a medical student or resident, you're welcome for not making you listen to that. If you don't know what that means, you can watch some Dr. Glaucomflecken videos because they sum up both my knowledge and also why I have no interest in talking about those things. 'cause it's,

EW: acute stages?

EAU: they can be acute or chronic. Yeah, and it's all just a mess. But you will understand why it's important. When I tell you why do we have to give a crap about sodium, right? At its core, at its most important sodium is what determines our total body fluid balance. So because it is the most abundant, cation, positively charged ion in our extracellular fluid. It is what determines how much fluid volume we actually have in our bodies. And because the salt on

the inside of our cell bags is mostly potassium, and the salt on the outside is mostly sodium, it doesn't matter which is which, as long as their concentrations are the same. Our bodies have to keep a balance of these fluids, so the concentration of particles on the inside of our cell has to match the concentration on the outside. If they don't, like, if you were to dump a bunch of sodium into your bloodstream, into your extracellular fluid, then your body would have to compensate by extracting fluid from cells in order to make up for that. Okay? And vice versa.

EW: the identity of sodium versus potassium doesn't necessarily matter. I imagine. It does at a point.

EAU: It does. It does, absolutely. But it doesn't for the purposes of just understanding that like at its core, you just have to have balance. It so happens that potassium is what exists inside of our cells, and sodium primarily exists outside of our cells and our cells do a lot of transmitting sodium and potassium back and forth through these ATP ion channels. And that is all very important. But to understand fluid balance, you need to know that potassium's on the inside and sodium's on the outside and they gotta be concentration wise, balanced right. Sodium is also an incredibly important cation outside of fluid balance. It's a neurotransmitter. It is essential for our muscles to be able to contract. And so it's something that our cells also use in communication with other cells. So make no mistake, we cannot exist without sodium. Right. It is necessary for life, and the volume of our fluid in our bodies is proportional to our total body content of sodium.

EW: right?

EAU: So in order to, if you lose a bunch of volume, for example, if you are bleeding or if you are even just peeing out way too much, or you're sweating, or you're having diarrhea, in order to replace the volume that you've lost of fluid, you have to also replace sodium. You cannot replace it with just water. It will not work.

EW: Right.

EAU: We lose sodium predominantly through our kidneys. In fact,

EAU: shout out to our kidneys. They are so stellar at this that they excrete about 90 to 95% of what we ingest, regardless of how much we ingest. Ah, isn't that interesting?

EW: Wait, so, okay. But you said it's a proportion that they excrete out, or is it,

EAU: 90 to 95% of what you ingest, you're gonna pee out in your kidneys.

EW: let's say, oh, we're talking about sodium.

EAU: Sodium, yep.

EW: say that you, you know, going back to last week's episode

EAU: Mm-hmm.

EW: we, the, the ridiculous estimate,

EAU: Yes.

EW: of 100 grams of salt

EAU: A day.

EW: a day, let's say. So that's 40 grams of sodium

EAU: Uhhuh. Yeah.

EW: That 90%, that's excreted out. You've got a lot more salt remaining in your body than if you're

EAU: Oh, Erin, you're so right.

EW: Thank

EAU: Ah,

EW: me perfectly to that

EAU: you did it all on your own.

EW: Oh my God.

EAU: Yes, exactly. Exactly right. Proportionally, 90 to 95% of what we ingest, regardless of what we're ingesting, we're gonna lose some through our GI tract, via your poop. You're gonna lose some via sweat, et cetera.

EW: Okay.

EAU: And our kit. Most of it's kidneys and our kidneys, they do a really good job of deciding how much to kick out and how much to keep, depending on how much we eat. 'Cause it is gonna be variable, right? If you are not getting enough, if you are deficient in your sodium intake or if you've got other reasons that your body decides, Hey, we need to hold onto this, your kidneys can actually keep almost all of it. They can, they can keep almost a hundred percent of your sodium if they need to,

EW: Two questions.

EAU: okay?

EW: What are some of the conditions that your kidneys might keep more sodium than is necessary,

EAU: Mm-hmm.

EW: How often does someone actually not consume enough sodium in like the, your, like a normal day to day,

EAU: Such great questions. How often in the year 2025 is someone not getting enough sodium? Very rare. It's very hard to not get enough sodium for most people.

EW: Yeah.

EAU: Um, you, if you, for example, were to lose a lot of blood or lose a lot of volume for any reason, then your blood pressure would probably drop. Then your kidneys would say, Hey, we need to hold onto blood pressure. We're gonna do that by holding on all of our sodium. We're not gonna let any sodium go. And that's going to help. You're gonna need to ingest sodium either via like IV fluids or just eating salt in order to make up for those losses. But your kidneys are also gonna react very quickly to hold onto as much as possible. There's other like disease states for example, if you have like issues with your adrenals where you're not producing certain hormones, because it's a lot of very complicated.

It's your kidneys, it's your brain, it's your blood vessels and sensors that are in your blood vessels. It's hormones that are controlling all of this.

EAU: So if you have deficiencies in certain hormones, then your kidneys might flip on and say, Hey, we need to hold onto all the sodium. That's possible 'cause we are. You know, at risk of losing it or whatever. Or maybe you have deficiencies in hormones and you can't do that, and so you're losing a lot of sodium. So then you might have what so many animals have big bone lick steak park, and that is what's called sodium appetite. And sodium appetite is this idea that we know exists in ex in animals, that in a state of sodium deficiency, animals will exhibit these pretty extreme sodium seeking behaviors and they will do extra work to seek out and consume salt. And we see this in a lot of different animals. Mice, rats, rabbits, pigeons, goats, we learned kangaroos, sheep, cattle, monkeys, horses. So the question is, does this sodium appetite exist in humans? And we think probably yes, though the data is based on a few cases of like, for example, kids who had no functional adrenals. So they were salt wasting. Their kidneys could not hold on to salt. And so they had an increased need for salt. And exhibited these kinds of salt seeking behaviors in the literature. These are like really old single case type studies. Um, but then, yeah, so tho those individuals in those studies did exhibit that kind of sodium seeking what we would call sodium appetite. That's not the same thing as what we experience now, which is sodium preference, where we like it. So we eat it because it tastes good. That does not mean that we are sodium deficient.

EW: Right.

EAU: Yeah.

EW: though it feels sometimes like the same thing.

EAU: Hard to distinguish perhaps.

EW: Um, okay. I have a question about, you said like salt appetite, this instinctual drive to find salt.

EAU: Mm-hmm.

EW: What, and you said that they tested out in kids that lacked adrenals.

EAU: Mm-hmm.

EW: that would, what, what's happening there is their kidneys aren't holding on. Like, yeah.

EAU: Yes, exactly that. So your, your adrenals, they, they do a lot, but one of the hormones that they make is called aldosterone, which is a very important part of mediating the resorption of sodium in your kidneys. And so without being able to make that particular hormone, then you can't have a signal to tell your kidneys to hold on to sodium. And so you're basically sodium wasting. And there's other conditions as well too. There's like genetic conditions or there's maybe damage to the kidney. There's medications, um, that can make you lose more sodium in your urine through your kidneys. So yeah, but a lot of it is under that hormonal control. So that's why it was in kids who had like, not, either they didn't have adrenals or they had non-functional adrenals. I can't remember which one, but,

EW: Hmm.

EAU: and your adrenals do a lot more than just aldosterone, but that's important for salt.

EW: And your kidneys do a lot more than just sodium too,

EAU: Yes, they do. But, so this all begs the question, how much sodium do we actually need?

EW: How much Erin?

EAU: This is my favorite question that I've asked myself in a while, and it is very hard to come to an actual answer on this. So you mentioned Erin, and I'm so glad that you did in last episode, that our early hominid ancestors, their estimated amount of salt intake was about one gram of salt per day or less. That's 400 milligrams of sodium.

EW: Yeah.

EAU: Now there also was a study that came out in the late eighties called Interal, and this was this one of these big, big observational studies that first showed a relationship. Not first, 'cause you said it was like, you know, in the early 19 hundreds and 18 hundreds, but Right. Correct.

EW: hard pulse, that hardens.

EAU: Yeah, but this was one of the, like a big important observational study that looked at a bunch of different populations with variation in their average salt intake, and found a very strong relationship between higher salt intake and blood pressure. In this study, they also looked at several remote human populations in Brazil, Kenya, and Papua New Guinea. And in those populations, people, yes, had very low blood pressure, but they also had substantially lower sodium intakes compared to what we see today. One to three grams of salt on average, which is 400 milligrams to 1.2 grams of sodium per day. So.

EW: be hard, I feel like, in our, like in the US to eat that, to select that diet.

EAU: Listen, we'll get there. It's very hard, but it, this all becomes really important because as I'm gonna talk about later, there is a lot of weird debate about what our quote unquote physiologic need actually is. Okay. And we'll get into the people who are claiming things that they're claiming. But it is very clear from these early, you know, these estimates of early hominid, we can't, we can't have exact data on that, right? But these estimates based on the sodium content of the types of foods that early hominids would be eating, plus the fact that there are, or at least in the eighties and seventies were societies in which people were consuming very minimal amounts of salt, and they were. Living, surviving, maybe thriving, I don't know. But they, their bodies were functioning just fine. So physiologically, most estimates say we need, at a minimum, about 500 milligrams of sodium a day in order to continue our bodily functionings to keep up with losses from our kidneys, from our sweat, from our GI tract. And that's gonna vary based on how much you're sweating, how much you're pooping, and how great your kidneys are at retaining sodium.

EW: Um, what about potassium?

EAU: Great question. Potassium is incredibly important and actually plays a huge role in this sodium, blood pressure, et cetera, debate. Um, and I didn't write down the exact, like what the RDA, the recommended amount of potassium that you get is. So I don't know the exact numbers of that, but potassium is absolutely essential to consume every day as well.

EW: and were, but I'm, I'm asking about the intra salt study. Were those populations, the remote populations, were they consuming some other types of salt, you know, potassium or whatever.

EAU: They were probably consuming more potassium than what we consume or what a lot of other populations consume, because foods that tend to be low in sodium are often high in potassium.

EW: That's very interesting.

EAU: Mm-hmm. Because whole foods are very high, like fruits, vegetables, these kinds of things tend to be very high in potassium. Okay. We'll get there. So that's how much salt we need, like bare minimum to survive we think, right? How much salt do we get? On average? Global daily salt intake is estimated. Most estimates and by the World Health Organization are about 10 grams of salt per day, which is about four grams of sodium. There is a lot of variation, so the average ranges from just over two grams to just over five grams per day based on different populations. And of course there's a lot of individual and day-to-day variation.

EW: Mm-hmm.

EAU: Now, the World Health Organization recommends a limit of no more than two grams of sodium a day, 2000 milligrams. That's five grams of salt. The American Heart Association in the US recommends for all adults, absolutely no more than 2.3 grams of sodium. And for anyone with high blood pressure or at high risk for cardiovascular disease, they recommend a limit of 1.5 grams of sodium. Other countries have slightly different recommendations, but they're all in this ballpark of around two grams of sodium, around five grams of salt, and yet globally, on average, we are getting more than double the amount of what most major medical societies recommend. Why is that? What impact is this having and why is there so much controversy about this still?

EW: This is so fascinating because I think the question being how much salt do we need

EAU: Yes.

EW: how much salt is too much, I feel like is really diff Those are two entirely different questions.

EAU: They are.

EW: And I also want to like understand where, how we arrived at this, at this number, these recommended numbers, which have been revised down

EAU: Yes,

EW: 50 years.

EAU: yes. They have been revised down to me. Most of the data that has led to the revising down. Of these numbers is based on blood pressure because there is honestly very little at this point controversy left about the data. That pretty clearly shows that a reduction in salt intake from that about four grams of sodium, which is our average reduction from that, reduces blood pressure, especially on a population level, and in most studies it reduces it to what would be considered a clinically relevant degree. So like about the same amount that you would see if you were starting someone on an antihypertensive medication at a low dose. Right. So not quite as good as blood pressure medicine, but you know, at a population level, you're going to be reducing blood pressure by reducing sodium intake from that current average of about four grams. The exact amount that you're gonna get is gonna vary. Study to study. There's a lot of individual variation. Not every person gets the same degree of benefit, but across the board, like studies don't argue that lower sodium diets, both interventional studies and observational studies agree that a reduction in sodium intake and lower sodium diets reduce blood pressure. Now, blood pressure is one of the major risk factors for cardiovascular disease, including heart attack, heart failure, stroke. Death from cardiovascular disease. High blood pressure is one of the major risk factors. So the biggest risk of diets that are high in sodium is an increased risk of cardiovascular disease, and this is where so much of this controversy lies.

EW: Is now the time to

EAU: Mm-hmm.

EW: mechanism is between sodium intake and blood pressure.

EAU: Great question. Yes. Now is a great time to ask. So there, there's a complicated answer, which is a lot of like, we don't quite know, and the mechanisms, dah, dah, dah, dah. And then there's a simple answer, which is that when you consume more salt, because you're not excreting 100% of it, some additional salt is going to stay in your body. And that is going to tell your kidneys to hold, not even tell your kidneys, kind of force your kidneys to hold onto water because water follows sodium.

EW: Yep.

EAU: And so as your blood volume expands and your extracellular fluid volume expands because it will, because you're holding onto water by holding onto sodium, that is going to cause an increase in your blood pressure because you're increasing the volume in your blood now,

EW: is shooting through those vessels?

EAU: right? You've got more sodium or holding onto more water, so now you have more fluids, so you have more pressure. Now, most of the time. If your kidneys which sense this increase in volume and sense, this increase in blood pressure, what they should do is excrete more sodium because they can sense this and they can say, oh, we need to get rid of some sodium in order to get rid of some water because our pressure is too high. So what exactly happens in these, especially long-term high sodium diets, because this is not like a today, tomorrow type of situation. This is like a long-term trend that we see, especially in places where there are high sodium diets for a very long time. There's been like an increasing effect of a high sodium diet with age and with time. And so what exactly is going on and what other miscommunications are happening between, you know, our renin-angiotensin system and aldosterone and all of these hormones and our kidneys and the receptors in our carotids that are also telling our kidneys in our brain how much blood pressure we have. Like there's some miscommunication that's going on that leads to, over time an increase in blood pressure.

EW: And so our kidneys are just not there, is it our kidneys that aren't responding as well, or is it.

EAU: That's part of what we think is that it's like for some reason or another, there's a, uh, a loss of some of this feedback where they're not able to sense this increase in blood pressure or in some cases they even maybe go, Hey, let's activate this system and, and actually increase blood pressure more, or something weird like a, like a paradoxical kind of response. So it's not like a super clear cut, but at its most basic, you can think of it as you're increasing the amount. Sodium, therefore you're increasing fluid, therefore you're increasing pressure.

EW: Why does age play a role?

EAU: I mean, age plays such a huge role in our cardiovascular health overall, we see like a decrease in elasticity of the vessels. So is it that they're not able to expand to that increasing volume? Um, there's a chronic inflammation that's going on. Like there's, so, there's so much, so that's, that's a different question.

EW: Okay.

EAU: Um, but yeah, so that's how we think that blood pressure is like involved with sodium. Right. So then the question is if we know that blood pressure is

such a huge risk for cardiovascular disease and diets that are high in sodium, increase your blood pressure, do they increase the risk of cardiovascular disease? And that question has been fraught with so much controversy.

EW: Yeah, it has.

EAU: So let me try and break it down a little bit.

EW: Okay.

EAU: Nearly all of the like, large scale meta-analyses that have been done to look at this question,

EAU: does reducing sodium intake decrease cardiovascular mortality?

EW: Mm-hmm.

EAU: All of these large scale meta-analyses do show a significant reduction in risk of stroke, heart attack, cardiovascular disease, and mortality from cardiovascular disease. The quality though of this data is not as good. As the strength of the data that we have for this direct association between sodium and blood pressure. We don't have long-term randomized clinical trials because that is very hard to do. As I said in the firsthand account, the estimates that I have seen are that to get really good data on this, you would have to enroll between 17,000 and 37,000 people. You'd have to follow them for a number of years because you need to have enough, unfortunately, bad cardiovascular outcomes to be able to get that data and it would cost between 400 and \$900 million. So I know some people who could fund that, you know what I'm saying? Not like personally, but But

EW: are, are they willing?

EAU: are they willing? But what it also seems to me is that a lot of this controversy about the strength of this data and whether it is real or not, hinges on a couple of. Types of data and a couple of studies that have come out. One of them, it's not just one study, but a few studies, like one type of study has found that there might be an increased risk of cardiovascular disease or death from cardiovascular disease at very low sodium intakes closer to that 1.2 grams of sodium that a lot of people actually recommend.

EW: right, right. Right.

EAU: So there are some studies that suggest who have looked at like the lowest, the intermediate and high sodium intake levels. Some studies suggest that actually the risk of cardiovascular disease is very clear above like four to five grams of sodium intake a day. Okay? So like eight to 10 grams of salt. That is too much, but the recommendations should be more like three to four grams of intake and not this super restrictive 1.5 to 2.3 grams of sodium intake. That's what some of these studies say now. The critics. I know you have questions like why, what the critics, what's the mechanism? Great question. I don't know.

EW: Okay. Okay. Okay.

EAU: know. They have not offered a mechanistic explanation and some of the critics of these studies that have looked at what they call this JS shaped curve, right, where like lowest intake is, is potentially harmful and higher intake is potentially harmful. So there's a sweet spot in the middle. Some of the critics of this say, look, in those studies that have looked at low intake or that have shown low intake to be potentially dangerous, that could actually be from what's called reverse causality. Because in those studies, they included a lot of people who also already had known cardiovascular disease or high blood pressure or heart failure. Those people might be more likely to be on a low sodium diet because they've been advised to cut out salt from their diet and then they die from cardiovascular disease.

EW: that's very interesting that that is not something that would've been controlled for

EAU: Right. I don't, yeah, exactly. So maybe we just like actually need some better studies on this stuff. It's bananas. Um, they also criticize some of the like, methodological issues with some of those studies because they relied more on like spot urine rather than 24 hour urine, which is how we measure sodium intake more reliably. But that's just like a lot of like, ah, it all just points to the fact that like these people say, this data's not strong enough to show a strong link. And these people say, this data's not strong enough to show a strong link. And it's like, my goodness. Okay.

EW: Oh,

EAU: I don't know.

EW: I think like, also in, in the context of evolutionary history, like our hominid ancestors. But at the same time though, like how cardio, ugh, I, I don't even wanna, like, this is like a, such a can of worms.

EAU: Okay. Listen. There's multiple cans of worms that you're about to talk about, and I wanna get at one that you're saying this evolutionary history thing because listen, the other camp of people who seem super adamant that we should not be pushing for lower sodium, that we should not be having our medical societies have a push for sodium, it should not be a public health goal. They seem to be in this group. Get, get ready for this. I get, I'm like too excited. They claim based on their data, they have done all these studies. Uh, they've looked at like 50,000 people using these really great high quality 24 hour urine studies across, uh, a number of different countries with different cultures, et cetera. And over the last 50 years, they say there's been no substantial change in our salt intake over time. And it follows a normal distribution between about 2.6 grams and 4.8 grams of sodium a day. And therefore they say, that is our physiologic need of salt. Because for the last 50 years it hasn't changed and because it follows a normal distribution, that is what our physiologic requirements are. This is a true argument that people are making in a bunch of studies. It seems to be mostly one dude who makes this argument and then gets cited over and over and over in all the studies that are saying, well, this J shape curve and don't you know our physiologic need? And I'm like, you cannot tell a human's physiologic need from 50 years of data. That's all post-industrial revolution. Are you kidding me?

EW: Mm-hmm.

EAU: I was aghast.

EW: I mean, I'm not surprised the, this is one of the most heated debates,

EAU: It really is.

EW: also doesn't feel like a debate too. It, or like, it feels like the, the arguments for we are like, that is a ridiculous. Claim to

EAU: And yet, Erin. It is so cited. Okay, this JHA curve, it seems like we need to investigate a little bit more. What is the ideal amount of salt consumption that is at its core, the, the major question. There is no doubt that diets very high in sodium, especially over that four grams of sodium, which is what's average, are gonna increase your risk for blood pressure and almost all the data also agrees that that will increase your risk for cardiovascular disease. Between this like 1.5 to four grams. There's people who just wanna like fine tune this debate, which makes sense at a public health level. Like we need to have recommendations. Right. But like I just, the arguments that are trying to be made, I just, I'm like, I get,

EW: I

EAU: it's a mess.

EW: 50 years, how many people are smoking cigarettes?

EAU: Okay. Also,

EW: that's a physiological need?

EAU: right. Do you know what also the rates of hypertension have also been stable over that exact same time period in which our salt consumption has been stable. So like that doesn't tell us anything. It literally doesn't tell us anything. Our awareness and treatment have actually improved, so that's nice. But like, come on. Um, it's not just blood pressure. Also, there are more and more studies and more and more data coming out that. Diets that are high in sodium are also linked to a number of other potential diseases or whole body system changes that might result in disease. We see increases in inflammation.

EAU: We see a potential for increased risk in autoimmune diseases. We see changes in the gut microbiome and we see associations with certain cancers, especially stomach cancer. And we don't fully understand the mechanisms of these. Um, but we know that more and more data is coming out that these exist. And so people are looking into like, what could these mechanisms be? It seems to be that there's like changes in our T-cell response. There's this like pro-inflammatory state. There's an increase in smooth muscle contraction, et cetera.

EW: That's, I think that's, that's interesting too this, this argument about, well, this is our physiological need. If we have less than this, then we'll die. And this is what we, whatever like that. Also, I think, doesn't it, it. Dismisses these health, these potential health risks as something that is not linked to salt, but it, because otherwise we would be eating less salt, right?

EAU: Correct.

EW: or we would've adapted to consume more salt somehow the human species over the past 5,000 years. But the other thing too is that these, all of these chronic conditions, for the most part, like you said, there's this age component to

EAU: Yes. Mm-hmm.

EW: case, like it, it just is, yeah, it doesn't make sense.

EAU: I know it's, there's also an argument that's like, well, we can't consume a lower sodium diet in our current society, and it would require such a societal shift that therefore we shouldn't recommend it. And I'm like, what? It's too hard to do, so we shouldn't do it. High sodium intake is also associated with an increased risk of osteoporosis and kidney stones, and we think that it's by a similar mechanism because when you are consuming more sodium, then you will have increased excretion of sodium and calcium follows sodium the same way that water does. So there's that.

EW: Okay.

EAU: Um, and overall, the World Health Organization estimates that there are nearly 2 million. The most recent data I saw said 1.89 million excess deaths every year that are due to excessive sodium consumption.

EW: Okay, so I have some questions

EAU: Uhhuh, give it to me,

EW: So like we talked about there is variation individual sensitivity

EAU: correct? Yes.

EW: the impact of sodium. What are some of the reasons for that, and how does that sort of just come out in the wash when we're talking about the levels of sodium that we're talking about?

EAU: This is a really important question. So there's this, uh, phenomenon that is talked about in the literature of like salt sensitivity, so-called salt sensitivity. Um, and the thought is that maybe it's like 50% or or less, or some studies say more of people whose blood pressure specifically actually responds to an increase in dietary sodium. So they call those people salt sensitive. That is not. A term that can be easily measured. There is not an agreed upon degree of salt sensitivity. How much of an increase in your blood pressure do you need to have to be considered salt sensitive? That's not a, there's not a metric for that. Um, but overall, yes, it is the case that not everyone's blood pressure is going to increase necessarily as a result of an increase in salt intake. Some people might have very low blood pressure on average, and in fact need more salt in their diet in order to maintain their blood pressure. And they could be at risk of

hypotension having too low of blood pressure if they're not getting enough dietary sodium.

EW: What is clinical hypotension.

EAU: Oh, it depends on your age, but, uh, and, and it depends on your, if you're symptomatic or not, but. Yeah, so there's not,

EW: faint or like

EAU: yeah, you could faint, you could pass out. Um, but it kind of depends.

EAU: Usually if you're talking about like under nineties, over sixties, that's, that's pretty low. But someone who's, you know, always quite a lot higher than that and suddenly drops, then you might consider that hypotensive. It kind of just depends.

EW: Okay. Okay.

EAU: Um, but yeah, so, so it, it does depend, but there it is the case that not every person needs the exact amount of salt in their diet.

EAU: Public health recommendations don't apply exactly to every single individual equally. If you have certain conditions you might need to follow slightly different recommendations than what is like the World Health Organization. The CDC. The FDA, they are making recommendations for the general public and it's estimated that over 70 to 80% of adults are consuming significantly more than 2.3 grams of sodium per day. So the advice to reduce sodium applies to most people, not to everyone. Which is also why you shouldn't be taking medical advice from podcasts or Instagram content creators because it doesn't apply to everyone.

EW: Mm.

EAU: There's also another huge confounder that we haven't even talked about yet, and that is that this is true of all nutritional studies, but it's very true in all of these studies that look at blood pressure and cardiovascular disease and sodium, and that is that you cannot change only your sodium intake.

EW: Yeah. How difficult? Like what? Yeah. The foods that you're

EAU: The foods that you eat will change. There is a very solid amount of data that shows an inverse relationship between potassium intake, for example, and blood pressure and cardiovascular disease. Meaning for most people, not true for everyone. 'cause if you have kidney disease, this might not apply. But for most people, increasing your potassium intake can reduce your blood pressure and in some cases offset some of the effects of sodium. A lot of our nutrient dense whole foods like fruits, vegetables, legumes, whole grains, these are high in potassium. Also, many of our salt substitutes, if people are going to swap out their salt that they're sprinkling or cooking with for a salt substitute, they're switching their sodium for potassium.

EW: What are some of these salt substitutes?

EAU: Oh, I, I don't know. You just buy them at the grocery store. It's called like salt substitute. It's a potassium salt. Sometimes it's just like pure. Yeah, sometimes they're pure potassium, sometimes they're like a mixture of sodium chloride and like a potassium chloride or a potassium, another potassium salt. Um, there's been some really interesting data actually on using those. And then some of the really strong data is from like a big study in China where they took entire villages and they were like, you guys are getting salt substitute and you guys are getting real salt. And they saw significant decreases in cardiovascular mortality and strokes and all of these things, and decreases in blood pressure in the salt substitute group. But you can't quite disentangle the effects of potassium and sodium in that, right, because they're connected.

EW: they're connected and also like you do a sub salt substitute, but most people don't. Most of the dietary salt that we consume is not from salt that we sprinkle on foods. It's from the salt that's in the foods

EAU: In the us. That's absolutely true. In this part of China where they were doing it, most of their sodium actually does come from discretionary sources, so that's why it's an interesting study in that case. But yes, you're right. For us, for most people in the us, in Canada, in Europe, our sodium consumption is mostly coming from things that are not the salt shaker on our table. It's, I think it's, most estimates are like 15% or something of our sodium intake comes from adding salt to our foods. Most of it comes from the fact that every single food that comes in a package has sodium added to it.

EW: Yeah,

EAU: And so there is something to be said for the fact that all of the trials that have looked at long-term sodium trends do not find that people are able to

reliably stick to low sodium diets. Usually less than 10% of people in these studies can stick to these limits of less than two grams or so. I do not buy the argument that this is physiologically driven at like a, an evolutionary level. This is a reflection of our food systems and the fact that it is very difficult even when you're trying to avoid sodium. But that doesn't mean it's not an important conversation, right? Because if you're recommending 1500 milligrams of sodium, and it's impossible to do that in our grocery stores, you're setting people up for failure. So that's a problem too.

EW: Yeah. And it's also like more time consuming, more expensive, often. Like it's like you're Yeah, it's, it's

EAU: Yeah. And like at the bottom line to me. Okay, can I, if I can conclude.

EW: please.

EAU: The biggest problem, the unspoken piece in all of these conversations about sodium and health and blood pressure is the same story as food dyes. This is one single piece of our food system. Erin,

EW: Yeah. Yeah.

EAU: there's some really interesting data. That there's these long-term studies that have been done on, um, Japanese Americans living in Hawaii and Japanese people living in Japan, and they look at cardiovascular disease and blood pressure and all of these rates we have and die from cardiovascular disease in the US at substantially higher rates than people in Japan. Like when you compare us to Japan data. Ja, Japan has some of the best health metrics out there. They also consume so much sodium, significantly more sodium on average than in America than in the us. And in these studies that have looked at Japanese men and women and Japanese American men and women living in Hawaii, we see higher blood pressure in Japanese populations living in Japan, and yet higher cardiovascular disease in Japanese Americans living in Hawaii. 'Cause guess what? It's not just sodium. That's different in their diets. There's higher intakes of Omega-3 fatty acids. There's higher total cholesterol intakes. There's also, interestingly, higher rates of smoking and alcohol use, but lower intakes of total calories and protein and fat, including saturated fatty acids. Nothing that we eat is in isolation. Right.

EW: Yeah.

EAU: So yes, it is important to have these dietary guidelines, but these exist in the context of so many other foods and it is one single part of your overall food system.

EW: This is fascinating and I feel like is a, to me, there is like a clear answer in

EAU: Yeah. Are you gonna cut your sodium?

EW: Yeah. Am I,

EAU: Yeah.

EW: Honestly, while I was reading, I was trying to use less, I use a lot of salt.

EAU: Hmm

EW: but I think, I think you're right, like, like my, yes, I can reduce my discretionary salt, but am I still gonna want, you know,

EAU: mm-hmm.

EW: salty crackers and

EAU: Yeah.

EW: Yeah. So I'm gonna try eat less, uh, or at least try to eat more whole foods like

EAU: I mean, we all need to be doing that.

EW: That's true. Yeah. But yeah, I think, I think it's like, because the, I am, I, I feel like I have, the more salt I eat, the more I want, and then it becomes like a, a problem. So maybe I'll try, you know what, you know what I do, kind of wanna try it to the salt alternatives.

EAU: Yeah. My husband Brett got really into those for a while. We had a lot of potassium salt in the house for a while.

EW: Yeah. I'm, I'm intrigued.

EAU: Yeah.

EW: Yeah.

EAU: Well, if you're also, intrigued and wanna learn more about this debate or whether you should reduce your salt intake or not. Um, my favorite paper honestly, was the one that I pulled that firsthand account from, and, uh, it was by Hunter et All in Nature Reviews, nephrology 2022, the impact of excessive salt intake on human health. Um, I thought that they did a really good job of explaining all of the controversy of providing the data. You know, not on quote unquote both sides, but like providing all of the data. They definitely have a bent, they think that we're eating too much salt. Um, but I, I really enjoyed that paper. I also read it piecemeal, and I wish I had just read it all the way through at the beginning because it was, most of my stuff ended up coming from there, but I was like reading it and then I found other. Anyways, it's a great paper. There's also some interesting ones about like our regulation of salt appetite and like the, you know, the salt drive and everything. So I have a couple of papers on that. Um, and then literally, I mean, so. Just so many papers. I think another great one was from 2018 by he at all the role or he and McGregor. It was the role of salt intake in prevention of cardiovascular disease controversies and challenges. I enjoyed that one, but there's so many, um, including all of the controversial ones. Um, you can find them on our website, thispodcastwillkillyou.com under the episodes tab.

EW: Thank you to Blood Mobile for providing the music for this episode and all of our episodes.

EAU: Thank you to Lianna and Tom and Pete and Brent and Jessica and everyone else at exactly right for making all of this possible.

EW: Thank you. Thank you, and thank you to you listeners. Uh, hope you liked these episodes. Let us know what you think.

EAU: Yeah. I'm very curious.

EW: yeah.

EAU: How much sodium do you eat? You don't have to tell me that.

EW: You don't.

EAU: There's no judgment here. Uh, and a special shout out as always to our patrons. Thank you so much for your support. It means the world to us.

EW: next time, wash your hands.

EAU: you filthy animals.