Sawbones 594: Artificial Sweetener

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["Medicines" by The Taxpayers plays]

Justin: Hello, everybody, and welcome to Sawbones! A marital tour of misguided medicine. I'm your co-host, Justin McElroy.

Sydnee: And I'm Sydnee McElroy.

Justin: Excuse me, I had a little bit of a rasp there. You know what it is? It's that change in the season.

Sydnee: Mm-hm.

Justin: It's the change in the temperature. I—I—you know, even if I'm taking my Claritin, I still feel like the rasp has started to settle in. And now it could have been cheering on all of my favorite sports teams all weekend at all the different sporting events I attended and watched. Touchdown! That was me. Touchdown again! Our boys have done it. Way to go, touchdown guys! We've done it again! We've conquered the other teams on the gridiron.

Sydnee: I don't remember hearing you cheer.

Justin: It was so loud. I don't know how you missed it. The neighbors were asking me to tone it down, such was my effluence, my excitement over my various teams getting… into the red zone.

Sydnee: Well, with all that football watching, I assume you missed the coverage of the ESC Congress this year, in Munich?

Justin: The ESC Congress this year? I'm trying to remember because I have such a clear memory of watching one, but it may have been last year's. Was that the one where Uruguay did the great song about… No, I'm thinking Eurovision, actually. I don't—I—I didn't watch the…

Sydnee: This is, of course, the European Society of Cardiology.

Justin: Oh! Okay.

Sydnee: Yes, obviously.

Justin: Yeah.

Sydnee: So, some interesting things came out of it. I know that doesn't sound interesting, the ESC Congress, but I think you will be interested.

Justin: Is the C stand for Congress?

Sydnee: No, European Society of Cardiology.

Justin: Oh, okay. Gotcha. The E-S-C-C-C.

Sydnee: Yes.

Justin: C. Gotcha.

Sydnee: It's European heart doctors.

Justin: Gotcha.

Sydnee: And they talked about stuff that would impact our hearts.

Justin: It's crazy that they chose English, isn't it? European Society of Cardiologists.

Sydnee: Oh. Well… I don't know? Maybe there's—

Justin: French. I feel like French is the most European language.

Sydnee: Is it?

Justin: Do you agree?

Sydnee: I don't know—do you know statistically what language most Europeans speak, though?

Justin: No, but if you're asking me which one feels the most European, it's French. French feels the most European.

Sydnee: Well, but there's also—

Justin: Do you disagree? There's something true in there, isn't there?

Sydnee: It does feel very European. But I will say too, having been to different places in Europe, a lot of people also speak English—

Justin: Sure.

Sydnee: Because they know that us monolingual Americans are going to show up and not be able to speak anything else, and desperately need to know where the bathroom is.

Justin: Joke's on them. I'm not monolingual. I have a rudimentary understanding of the Python assembly language. So there.

Sydnee: Justin, we got emails about this Congress from both Larissa and Jorbeck.

Justin: Jorbeck? Sick. That's a new one. Cool.

Sydnee: And they wanted me to be aware that xylitol might be a problem.

Justin: Uh-oh.

Sydnee: Do you know what xylitol is?

Justin: I do actually know what xylitol is, because at different points in my life I have been on various diets and avoiding sugars. And xylitol is one of the big ones in terms of fake sugars. I'm not a big fan of it. To me, it has always had… I have pretty strong feelings on most chemical sweeteners. Strongest feelings reserved for the ones that do give me diarrhea. Those are on the no-no list for sure.

Sydnee: Which xylitol probably did.

Justin: Mm-hm. I mean, it's not one of the biggest ones, but yeah. Maltitol is the one that really takes you—

Sydnee: Yeah.

Justin: But xylitol, to me, always had a bit of a… This is going to sound weird, but like a cool taste, like a chemically like cool? That I can—like I don't—

Sydnee: Hm? Interesting.

Justin: Like a… like there's just something about it that feels like kind of cooling to me.

Sydnee: That's interesting.

Justin: It's weird, but I've ne—it's never been my favorite. There's something about it that has always felt kind of… faker than the fake ones.

Sydnee: It is a… So it's a sugar alcohol.

Justin: The other fake ones.

Sydnee: Yeah. And a lot of those can, if you—especially if you eat a lot of it, give you diarrhea.

Justin: Sugar alcohols are the ones that are notorious for kind of…

Sydnee: Upsetting your tummy.

Justin: Yeah.

Sydnee: But there was a study presented at the European Society of Cardiology Congress this year in Munich, right at the end of August, this is brand new stuff, that showed that xylitol has been associated with an increased risk of adverse cardiovascular events. So things like heart attacks.

Justin: Okay.

Sydnee: This is a big deal because we've all been concerned about artificial sweeteners I feel like on and off since they showed up. As I was researching, I'm going to talk about what's going on with xylitol, and then I want to talk a little bit about artificial sweeteners in general and where the research on them stands. Like the history of them, when did we make them and how'd we get here? But you see this sort of suspicion about artificial sweeteners like riddled throughout history from the moment we made any. It was like, well, what's the catch? There's ga—I feel like that's been our im—like our response to artificial sweeteners. Oh, sweet as sugar, but no calories? What's the catch?

Justin: Yes. And it's kind of life affirming, I think. There always is one.

Sydnee: [chuckles]

Justin: [laughs] There's not—we ha—there is—there is always one.

Sydnee: Not… Okay, I'm not—I'm—

Justin: There's always one!

Sydnee: I'm not saying that there always is, as we go through these artificial sweeteners, because everything I'm going to talk about has been listed as more than likely safe by the government—

Justin: I don't mean un—

Sydnee: And by all the studies so far.

Justin: I don't mean unsafe. I'm saying if there wasn't a catch, we wouldn't have sugar. It is just—

Sydnee: Ah.

Justin: There is sugar, and then there is every—there's always a catch. It could be cost, it could be health, it could be taste. It could be… I mean, like the miracle berry, where it just completely cooks your whole brain. You know. I don't know.

Sydnee: Xylitol specifically is, so there are tiny amounts of it already present in your body. It's just a byproduct of breaking down glucose. There are plants that have xylitol in them.

Justin: Mm-hm.

Sydnee: So there are places we can find xylitol in nature, it's not something that we just synthesize. But in the way we use it in foods, certainly that is something that we're synthesizing, because we're adding like a thousand times the amount, you know, to make a product sweeter, right? It's added to a lot of like mints, candies, gums, there are some beverages. A lot of dental products, specifically things aimed at teeth, have xylitol in them.

Justin: I was just looking up Certs, because I thought that Certs was a xylitol product. I remember that from my—from my—

Sydnee: Well—

Justin: Days on the low carb.

Sydnee: Xylitol has been so connected with dental stuff, there were even some like—there were even some studies that suggested that maybe it was positive for teeth, like it reduces tooth decay. And now I think what's tough about that is like, are you comparing it to sugar?

Justin: Which is—yeah.

Sydnee: Which, yes. You know, right? But anyway, so xylitol is in a lot of these things, and this study, by the way, it's impressive. So you see a lot of these sort of like clickbait kind of popular medicine studies.

Justin: Yeah.

Sydnee: This is an impressive…

Justin: You don't mean impressive like, whoa, you mean impressive like it's worth paying attention to.

Sydnee: It's worth paying attention to. So 17,710 participants, in an observational study, I will say, so this is not—that's not the strength of a, you know, a blinded trial where we are giving people something and then seeing what happens. This is we're looking at people who we already have this pool of people who have xylitol in them, and then these people we're comparing them to that don't. Okay?

Justin: Okay.

Sydnee: We didn't—we didn't design the people. [titters] We found people who had xylitol in their blood. And that's how they could—so it wasn't just like how much xylitol did you eat, we're actually checking blood levels. So that's good, right? Because if you ask people, you know, memory is… memory is fuzzy. So anyway, they basically took blood from two different groups of a lot of people, followed them for initially six years for the initial follow-up period, and then 30 years. So this is a *long-term* study—

Justin: Jeez!

Sydnee: Okay?

Justin: Somebody really had it out for this stuff! Wait, 30 years?!

Sydnee: Because—yes.

Justin: 30 years?!

Sydnee: Yes.

Justin: Are there scientists who are like, "Someday you'll have—come here, son! Look around you. See all these people? Someday you'll have to ask them how much xylitol they've eaten! You see? They'll carry on my work!"

Sydnee: [chuckles] They've been—well—

Justin: That's unhinged.

Sydnee: We had some old studies that showed that maybe xylitol will enhance your platelets forming clots—

Justin: "So Jeremy, what will you do when you grow up? I'll tell you what you're going to do. You're going to monitor these people's blood levels for xylitol! It's the family trade!"

Sydnee: [chuckles] So, the initial studies they did were like over three years, so they were like, we're going to blow those out of the water. Six years, 30 years. People—

Justin: And it was like thir— "Not 30! Certainly not!"

Sydnee: People with xylitol levels that were the highest were observed to have a substantially higher risk of major adverse cardiovascular events.

Justin: Can you get—

Sydnee: Death, heart attack or stroke—

Justin: Are you going to at some point get into what substantial and what higher means? Because like that, for me, if it's like risk of heart disease, I don't know what I need to qualify as substantial, but it's a pretty low bar!

Sydnee: I'm going to answer that right now.

Justin: Okay.

Sydnee: Over a follow-up period of six years, the risk of a major adverse cardiovascular event, again, that's heart attack, stroke or death, was 57% higher in those with the highest levels versus the lowest levels. And that was while correcting for things like age, sex, did they smoke, what were their other medical conditions like correcting for high cholesterol, diabetes, blood pressure, that kind of thing too. So 57% higher over six years. After 30 years, the risk was 18% higher in the highest versus lowest. So the point is we are definitely seeing a relationship between high amounts of xylitol in your blood and your risk of a cardiovascular event. Now, again, this is not… this does not prove causation. We can't with this kind of study.

Justin: Right.

Sydnee: But they did a lot of good science here that definitely suggests a connection. I think there is something concerning in this data.

Justin: Okay.

Sydnee: I think. Now, again, it's—and this is true—I'm going to talk about some other artificial sweeteners. This is true with a lot of these sort of food products and food additives. A lot of it is dose-dependent. They definitely saw this with xylitol. The more xylitol, the higher risk you were. So that doesn't mean like if you've ever had a Certs breath mint, you're going to have a heart attack, right?

Justin: Mm-hm.

Sydnee: It means are you eating Certs nonstop all day, every day? Because then your blood levels of xylitol will be higher. And right now we have correlation that shows a risk of heart attack.

Justin: Man, I wish the fine folks at Certs had wished I had brought up something else—

Sydnee: I know, I know. [chuckles]

Justin: They didn't want to be the post-it—there's xylitol in lots of stuff! I

don't want to single out Certs here. Certs also has Retsyn, whatever that was. They mention that in ads all the time. Maybe that causes cancer too. We don't know. I just want to lay off Certs, okay? I'm sorry, Certs.

Sydnee: I think—no. I think what a lot of people—

Justin: Nobody's eating Certs anymore. They're falling on hard times. [chuckles]

Sydnee: What a lot of the scientists who did this study, the doctors who were talking about it, kind of wanted to stress is that one, it's correlation, not causation. So that's important to remember. And two, we don't know as much about some of—especially as we get into the newer artificial sweeteners I'm going to talk about, we don't necessarily know enough about them maybe. And that probably doesn't matter for the most part, if we're eating them in normal amounts.

But I think the third point is where this all comes together. People tend to think of artificial sweeteners as healthy alternatives to sugar. And I think the problem is if you believe something is healthy, you may be more likely to consume it in large amounts because you feel like it's a safe—like this is a healthy thing. And I think even, I think we have like in the US this kind of attitude that like, well, if this is healthy and a little bit of it is good for me, then I bet a lot of it is really good for me.

Justin: Sure, yeah.

Sydnee: And I think what they're just saying is, we really need to think with artificial sweeteners, just because it's a no calorie sugar alternative, does not mean it's a health food, I think is their… But that is—that—that definitely is something worth paying attention to.

Justin: Yeah.

Sydnee: And again, there's a lot of—right? Like we're told to either drink coffee or drink less coffee, or more coffee or no coffee, like every five years. And so I tend to kind of take that stuff with a grain of salt. I think this is at least a reminder that just because something is like sugar-free, doesn't

mean it's a health food. And that sugar isn't necessarily unhealthy, depending on how much you're consuming.

Justin: I'm sorry, I have to… I went and searched for a little bit of added information on Certs, because I was so sorry about lambasting them. If you can just see—

Sydnee: I know—

Justin: What I've discovered here, that ingredient that I mentioned, Retsyn, that they used to talk about in their ads, contained partially hydrogenated **cottonseed** oil, which the US Food and Drug Administration banned after determining that artificial trans fats were unsafe for consumption due to link to heart… heart disease. So freaking Certs, man!

Sydnee: Oh, it was linked to heart disease?

Justin: Yeah! They took Certs—

Sydnee: Well—

Justin: Off the market because they're like, it's really—

Sydnee: Well—

Justin: Bad. They were—they didn't even know about the xylitol!

Sydnee: Now listen, that's a really interesting thing. And this is why it's always important to recognize correlation versus causation. So… those are two ingredients that were in cert brets… Certs breath mints.

Justin: Yes.

Sydnee: That both have been linked to heart disease now—

Justin: Yeah!

Sydnee: Potentially. So that's a confounder.

Justin: If all these people had been—

Sydnee: These are confounders.

Justin: Sucking down—sucking down Certs, maybe it was the Retsyn. Now, hopefully good science, they have control for that. But they took—

Sydnee: I don't know if they controlled for the cottonseed oil.

Justin: Well, I just, I—hopefully, and not everybody's eating Certs. You know.

Sydnee: In case you're curious—

Justin: What if we just blew this thing?

Sydnee: [titters] Xylitol has been around since 1890. That's how long we've had xylitol. It actually was initially isolated from beechwood. So xylitol naturally occurs in beechwood. And after the compound was isolated by Emile Fisher and—

Justin: If you could look—

Sydnee: Rudolph—

Justin: I worry about your eye strain—

Sydnee: Stahl.

Justin: So much. Thank you.

Sydnee: They named it xylit, because that's the Greek word for wood.

Justin: Huh.

Sydnee: So, xylitol is a sugar alcohol from wood, from birch.

Justin: Great.

Sydnee: So that's… And obviously it's sweeter than sugar. Initially, there wasn't a lot of—a lot of these sugar substitutes—and I'm going to talk to—I'm going to talk about some more of them. Since this interesting thing about xylitol came out, I want to talk about some of the other substitutes. A lot of the interest in replacing sugar came during times of war, because we had sugar rationing. So definitely, as we move into more modern times, I think we think of sugar substitutes as being tied to like diet culture, people are looking for like calorie-free alternatives to sugar. But in those early days, it was very much, "I can't get sugar because of the war—"

Justin: Mm-hm.

Sydnee: "And rationing. So… chemists are making these other things that are really sweet, and maybe we can stick that in food?"

Justin: Yeah, try it.

Sydnee: And there was a big pressure. So if you start to wonder like why do we not discover that things are bad for us until long after we've been eating them? Sometimes there's just economic and, you know, societal pressure like, get me that sweet stuff now, I can't get sugar, I need it.

Justin: Give me that sweet stuff. Now you sound like me.

Sydnee: Yeah.

Justin: Give me that sweet stuff!

Sydnee: So, I want to talk about some of the other popular artificial sweeteners and what we do and don't know about them right now.

Justin: Okay.

Sydnee: But before we do that, we have to go to the Billing Department.

Justin: Let's go.

[theme music plays]

[ad reads]

Justin: All right, Syd, you want to talk to me about other sweeteners. I got strong opinions on all of them, as long as the opinions are flavor related.

Sydnee: So, we do. There are currently, I believe, six sweeteners, like sugar replacements, approved by the FDA in the US. And then there are also sugar alcohols and plant and froos bay—fruit-based sweeteners. So there's a lot of different classes—

Justin: Yes.

Sydnee: Of sugar replacement. Okay? I'm going to talk about some of the biggest ones. Saccharin—

Justin: Vulgar. The worst.

Sydnee: Saccharin—

Justin: Shouldn't be sold.

Sydnee: As you may know it, Sweet'n Low.

Justin: Yeah, Sweet'n Low.

Sydnee: So—

Justin: The pink ones.

Sydnee: The pink ones.

Justin: Why are we still doing it? Give it up. Okay? Everybody hates it.

Sydnee: This is—this is what I love about these artificial sweeteners. Almost—I'm going to tell you how it was discovered, and this story… repeats itself.

Okay. There was a researcher at Johns Hopkins who was looking for uses for coal tar derivatives. And after… I mean, why was he not wearing gloves? This is a great question. This is in 1897. He's not wearing gloves. He's got a coal tar derivative on his hands. He doesn't wash his hands well enough before lunch. And when he raises his food to his mouth, he tastes something extremely sweet on his fingers.

Justin: Yeah.

Sydnee: And it is saccharin.

Justin: So what does he—

Sydnee: He did, allegedly, he went around his lab tasting everything to figure out what it was.

Justin: [laughs] You're so dumb.

Sydnee: It's actually benzoic sulfamide.

Justin: Oh.

Sydnee: But anyway, so it is 300 times sweeter than sugar. Saccharin is. Now, I will feel like—I do—I will say this will feel like… like a war of escalation as we keep going, because the artificial sweeteners just keep getting sweetener. Sweeter. Like they're just—it's like we were like, "300 times? What about 1000 times? What about 10,000 times?" I don't know why we need sugar to be sweeter than sugar.

Justin: Yeah, I don't know.

Sydnee: But that definitely is a theme.

Justin: Sugar seems pretty sweet, honestly, if you eat it, it's like, whoa.

Sydnee: [titters] Saccharin, after it was introduced, I mean, really quickly was put in a ton of foods. Like we're talking by 1907. So 1897, it's found in coal tar. [chuckles] And by 1907, we're like, "Saccharin for—

Justin: Yum!

Sydnee: "All!" There was a moment, though, that then it was banned. There were a bunch of changes around this time. We've talked about this, the FDA kind of like becoming a real agency at this point, like around 1912, where we actually start regulating things. There was concern that it was going to… that it was toxic, and that—and so it was recommended that it would be banned. Teddy Roosevelt stopped it.

Justin: Why?

Sydnee: Because he took it every day as part of his weight loss regimen.

Justin: Mm-hm.

Sydnee: And his doctor told him to, so he wanted to continue it.

Justin: Well…

Sydnee: So we kept saccharin.

Justin: [chuckles] All right!

Sydnee: It did get banned after a while, but then sugar rations brought it back. Again, this is kind of a theme, like we get these things and we're like, crap, why are we doing a coal tar derivative? Should we maybe ban that? We don't really know what it does.

There was a—there wasn't a study that said it was toxic that led to it being banned, it was more like, did we do studies to make sure this was safe? Which back before 1912, we didn't routinely do.

Justin: That's like pre FDA, right?

Sydnee: Yes.

Justin: So it's like, yeah, it didn't occur to us.

Sydnee: Right. And so, but then after World War I people were like, "I can't get sugar. I need something sweet." Saccharin comes back, and saccharin is around, as you know, to this day.

Justin: Still, we cannot bring it down.

Sydnee: I don't enjoy saccharin either. It's strange. I can't think of anything… Saccharin is one of the two… No. Is it one of the two that's in diet Shasta? Or is that sucralose? No, sucralose. Sucralose and something else is in diet Shasta, and that's when I can't.

Justin: Saccharin is the one that got a big rep for like it's—like it gave rats cancer. That was one of the first… like I remember that became a big, big deal.

Sydnee: Yes.

Justin: Everybody was talking about that.

Sydnee: But what they found is that even though there was some evidence that you could give a rat cancer with saccharin, that we at this point do not believe saccharin gives people cancer, at least not in the quantities we consume it. That was one of the first ones where we started to talk ab—I remember using this example before, to really—like you have to read the study. You can't just hear a blurb about it and think you know it.

You really—even what I've told you about xylitol, I urge you to go read this information for yourself to dig into it more deeply. I'm just giving you the highlights. But with saccharin, I think you would have to drink like… it was like 9000 cans of diet soda or something. I mean, it was a—or 900 maybe. Any—my point is, if you consume nothing but saccharin, conceivably, could you give yourself cancer? Maybe. We still don't know that for sure. But because they were feeding so much to the rats.

Justin: Mm-hm.

Sydnee: So you could give a rat cancer with saccharin—

Justin: Which is not their fault, they just love…

Sydnee: We currently—

Justin: Sweet tea.

Sydnee: Yes, we currently do not believe that saccharin causes cancer in humans. That is the current understanding of science.

Justin: Okay.

Sydnee: There was a sweetener after that called cyclamate. Do you remember cyclamate?

Justin: No? Doesn't ring a bell.

Sydnee: The only reason I like to mention it is that, for a while, it was Sweet'n Low.

Justin: Oh, really?

Sydnee: Yes. There was saccharin and then it turned into cyclamate. A lot of diet sodas at that time, this is like the 1950s, would use cyclamate. It was also discovered when a University of Illinois grad student took a smoke break while he was working in a lab.

Justin: [chuckles]

Sydnee: The—there—I mean like almost every artificial sweetener was discovered because somebody *licked their fingers* while working in a lab.

Justin: [titters]

Sydnee: Can I tell you, I don't think—I've worked in labs throughout my science career. I don't think I've ever licked my fingers.

Justin: Yeah…

Sydnee: I wear gloves! When did we…

Justin: When did we stop? When—

Sydnee: Why aren't we wearing gloves?

Justin: I feel like we should have gloves on when we're working with stuff that we don't understand that well. And we don't understand it that well if we don't know if it's sweet or not. Period. [titters]

Sydnee: So cyclamate, which by 1968, Americans were consuming more than 17 million pounds of cyclamate each year.

Justin: Dang! We love that stuff.

Sydnee: So super popular, very quickly. And then we were like, uh-oh, this definitely does cause bladder cancer in rats.

Justin: Ah, man!

Sydnee: And so it went away, and Sweet'n Low became saccharin once more. I wonder, I mean, you can't eat cyclamate now, it's not—it's banned. It's not out there. But I wonder—

Justin: Oh, the forbidden fruit that makes it all the sweeter!

Sydnee: [chuckles]

Justin: And it's already so much, so sweet!

Sydnee: Now we're getting to my personal favorite. Aspartame.

Justin: Mm-hm… No, okay.

Sydnee: Yeah, yeah, I bet you—I'm going to look at this diet Dr. Pepper I'm drinking—

Justin: Yeah, it's aspartame.

Sydnee: Yeah… aspartame. How did you already know?

Justin: What? Because I nu—because I… I think about artificial sugar *a lot*.

Sydnee: If aspartame is bad, if it is—if it turns out to be dangerous, I'm in trouble. Because aspartame is in both diet Dr. Pepper and diet ginger ale. And I live off of those beverages. I should drink more water. Aspartame came along once again when James Schlatter, a research chemist for G. D. Searle & Company—

Justin: Oh, he licked his fingers like a dirty dog!

Sydnee: Licked his fingers while developing an ulcer drug.

Justin: Y'all got to be careful about this! Please! Stop licking your fingers! Science!

Sydnee: [chuckles] Everybody's just licking their fingers!

Justin: Just licking your fingers!

Sydnee: It wa—it is a combination—

Justin: We don't—we—how many bittering agents have we discovered this way? Like, "Hey! This gives it a funky, bitter flavor." [chuckles]

Sydnee: I mean, I think that—well… the reason that we know these stories, because probably people lick their fingers and did taste bitter things at some point. But they didn't go looking for it, because they couldn't make money off of it.

Justin: Sure, right.

Sydnee: I mean, obviously, we have known for a long time that you can sell people artificial sweeteners. [chuckles] So if you can find something sweet, you need to figure out what it was.

Justin: Yeah.

Sydnee: Anyway, so he… by the way, aspartame is a combination of aspartic acid and phenylalanine. In case you're curious. This will become important. It is only 200 times sweeter than sugar, so we didn't go up. Maybe that's why I like it better?

Justin: Maybe.

Sydnee: Because it's not as sweet? I don't know.

Justin: Yeah, you can tell the difference, your refined palate.

Sydnee: There was a moment where there was concern that aspartame was going to cause brain tumors, but then the science said, no, it doesn't. In 1981, it started being sold. And I will say, I think it is—it is widely used, probably one of the most widely used artificial sweeteners currently.

Justin: Mm-hm.

Sydnee: Because it's in a lot of diet drinks. Now, the one thing that is true, because it has been investigated for a lot of different health concerns since the '80s. I mean, aspartame has been highly studied. And people will kind of come out with something that is suggestive that maybe it's not safe. And then they'll say, oh, no, actually, never mind, it is safe. Aspartame definitely does contain phenylalanine.

Justin: Mm-hm.

Sydnee: So that's why you have that warning on cans.

Justin: Yeah, there's some people that can't deal with that, right?

Sydnee: If they have phenylketonuria, then you cannot process phenylalanine. So it's important for you to avoid things like diet Dr. Pepper or anything else that contains phenylalanine. So that is a real health concern with anything—

Justin: Hm.

Sydnee: That contains phenylalanine.

Justin: Is that like an allergy? How would you discover you have that?

Sydnee: It's a genetic condition. It's just you don't have the right… you can't metabolize something at birth, you're just genetically different and you do not have the right enzymes to break that down.

Justin: Hm.

Sydnee: They test for it at birth. That's one of those newborn… Remember the—you know the newborn screen we do when babies are first born?

Justin: Yeah, yeah.

Sydnee: Phenylketonuria is on the newborn screen.

Justin: Oh! Okay.

Sydnee: It may have been… and I'm not doing an episode on this right now, so don't hold me to it. Maybe we need to. It may have been the first newborn screen.

Justin: Mm-hm.

Sydnee: One of the first ones we do. Like that we started doing routinely. Anyway, there was, I will say, the most recent data I could find on aspartame, the is it safe data, was that there was this sort of concern that possibly it's linked to liver cancer, but we don't really have evidence that it was giving cancer to experimental animals that would be like models for this. So we can't at this point—all we can say is it's possible, but even after these studies came out that it's possible it was linked to liver cancer, they looked at like how much could you eat still. [chuckles] God, I love us, I love humans. But I mean—

Justin: I mean, a little bit's fine.

Sydnee: Right. And they said, you know, even after we read this, we're not going to change our acceptable daily intake standards, which are up to 40 milligrams per kilogram of body weight. So, you can eat 40 milligrams per kilogram of weight of aspartame safely, currently. And that would be like, so if my diet Dr. Prepper contains 200 to 300 milligrams of aspartame, I could —I could drink nine to 14 cans a day and still be fine.

Justin: Cool. Congrats.

Sydnee: So… that is—and I know—

Justin: You're about—you're about there.

Sydnee: Yeah. No. I don't drink that much. I know that that's where I—aspartame is a—is really a subject of a lot of concern. I have had a lot of patients throughout my career who avoid it, because they do—they worry about like—inflammation is a big worry, I think, for people with aspartame specifically. They feel like if they have an underlying inflammatory condition, it makes it worse. What I've always said is, I mean, if—there is no health advantage to drinking or eating aspartame. So, if you notice that your symptoms are worse when you consume it, then I agree with the decision not to.

Justin: Mm-hm.

Sydnee: Right now, I don't have hard science to tell me that it's going to hurt people at normal recommended amounts. But I know aspartame is one of those like constantly…

Justin: Always keep an eye on it—

Sydnee: Everybody's always worried about it.

Justin: Because it's such a big—yeah.

Sydnee: Well, I also think it's because there's so much of it.

Justin: Right, right—

Sydnee: I mean, humans are consu—I mean like, it's replaced so much stuff. The other big one, Splenda, sucralose.

Justin: Pretty good. Like Splenda.

Sydnee: Yes. It's been around since—

Justin: Not my favorite, but it's up there.

Sydnee: 1976. Scientists found a way to put together sucrose and chlorine.

Justin: Yes.

Sydnee: And then after the first researcher said, "Hey, I made this chlorinated compound, I made this sucrose chlorine compound, could you test it for me?" The researcher number two misheard and thought researcher number one said, "Could you taste it for me?"

Justin: *Tsh*… The frick? Really?

Sydnee: Mm-hm. And found sucralose, Splenda. [laughs]

Justin: That's wild. Were—that's wild.

Sydnee: So the big advantage that sucralose had when it was introduced is that it's heat stable, which means… bake with it. That was the first one that was introduced that you could bake with. And I remember that. I feel like I remember that kind of being a big deal when like baking Splenda was introduced to everybody.

Justin: Yeah! I remember your mom had like a huge bag of it she was just dumping it into iced tea constantly.

Sydnee: She drank so much Splenda lemonade that she gave herselves—herself migraines.

Justin: Yeah.

Sydnee: So, I have noticed, I will say anecdotally, I get migraines from, again, I noticed it at the hospital with diet Shasta, which is I believe a combination of sucralose and… Ace K, acesulfame. I don't know if you're familiar with that one.

Justin: Take your word for it. No, I don't know that one.

Sydnee: Sweet One or Sunett.

Justin: No, I'm not sh—that's a… that must be an underground one.

Sydnee: Yeah. But that—that—so I don't know if it's that or the sucralose, but I feel like I've eaten sucralose and other things. But I know that that is something I hear a lot of people say, that certain artificial sweeteners give them headaches. There are new ones since then, Neotame, also called Newtame, I couldn't find what that's in. I was trying to google around and find—I mean, you can check your bags and cans and whatnot. And then Advantame has been around since 2014.

Justin: I like Stevia.

Sydnee: Which is—

Justin: That's like a plant-derived one.

Sydnee: Yeah.

Justin: That is big. I actually—

Sydnee: Yeah, these—

Justin: Prefer that a bit to Splenda.

Sydnee: These are all artificial—

Justin: Sure, yeah.

Sydnee: Sweeteners. And I will say, Advantame, by the way, is 20,000 to 37,000 times as sweet as…

Justin: Too powerful.

Sydnee: Sucrose.

Justin: Too much power.

Sydnee: Yeah.

Justin: You can't handle that.

Sydnee: It's so—it's so sweet. But… I mean, like you said, there's xylitol and there's other sugar alcohols, Mannitol, Erythritol, Maltitol. There are a bunch of other—

Justin: Those are rough.

Sydnee: You can find. And those are the ones—

Justin: You see all at the end. That's a tummy warning to me.

Sydnee: Yeah. I would be careful with those just from that standpoint. You see those marketed a lot towards patients with diabetes, I feel like. Like they'll say "diabetic candy" on the bag. A lot of them are these sugar alcohols. And then, like you said, there are the plant-based sweeteners, like Stevia and Truvia and… you know, and then like alternatives like monk fruit-based thing—you know, that kind of thing.

Justin: And Miracle Berry.

Sydnee: Miracle Berry.

Justin: Which is not really used for this, but that's what it's invented for.

Sydnee: Neotame, I did find this, is they're finding evidence of it in a lot of vape products.

Justin: Hm?

Sydnee: I will say that my concern with Neotame and the vapes are that eating something and doing studies to show that I can eat it and it won't kill me are not the same as doing a study that says I can inhale it and not—and it won't kill me. And I'm not saying it will, but we—I—they didn't do studies to see if you could inhale it. They just did studies to see if you could ingest it. So those are two different things.

So I found that somewhat concerning. But I think the big thing that we should remember with the xylitol headline, and which is true about all these sugar replacements, a lot of this continues to be propelled in our current society. Not by rationing, right? Maybe it was driven in those early days by sugar rationing related to times of war. But nowadays, a lot of this is driven by diet culture. And artificial sweeteners are seen as safe, healthy alternatives—

Justin: Mm-hm.

Sydnee: To sugar. You can eat as much as you want, and you won't gain a pound because they're calorie free. Most of them. I think it's a good reminder that… everything in moderation. There is no one—I mean, even water you can drink too much of. So it's impossible that I could drink endless amounts of diet Dr. Pepper and it would be healthy for me, because it contains aspartame and not sugar. Certainly I think this sort of backlash that says we should all eat sugar only—because I do think there's that other side of it these days, that health wellness culture that says don't eat any of these things, just eat sugar.

Justin: I mean, and sugar's got its extremely well-documented health…

Sydnee: Yes.

Justin: Effects as well! It's like not a—

Sydnee: Exactly.

Justin: I mean it's…

Sydnee: Yeah, no, so I don't—if you're looking at sugar as the natural alternative, I would say, well, we know there are negative health impacts from eating a lot of, you know, sugar, just including tons of sugar in your diet. So, I think that it's important to remember with all these artificial sweeteners, for now, while we don't know that most of these have any damaging health effects, and they may forever, that might be true, we should still consume them in moderation.

Justin: How are you supposed to deal with this though if you're like, if you… I mean, how do you reckon with the fact that it might be found out that it does cause heart disease after a 30-year-long study? I mean, what am I supposed to do with that as a consumer?

Sydnee: Well, I mean, it was dose-dependent. And so I think it's a good reminder that, you know—okay, Justin, when you first discovered sugar-free candy—

Justin: Mm-hm.

Sydnee: Candy without as much calories as sugar candy, do you feel like maybe you went a little ham on it?

Justin: Okay, I didn't want to tell this story here, but I guess I will. I bought a bag of Russell Stover's sugar-free peanut butter cups, and I almost pooped my pants because I enjoyed so many of them in one sitting. So there, Sydnee. You're welcome, you revealed me.

Sydnee: I wasn't going to point that out specifically. Thank you for sharing.

Justin: Yeah. It seemed like a safe… safe space.

Sydnee: I'm just saying that I think that when we start to think of things as healthy alternatives, it might encourage us to consume them in amounts that we wouldn't normally consume that product.

Justin: Okay.

Sydnee: And so it's important to differentiate between—

Justin: Tasteful.

Sydnee: Yeah.

Justin: Yeah.

Sydnee: Like this is healthy for me, or like some of this is fine to eat. Just like some sugar is fine to eat, right?

Justin: Yeah.

Sydnee: I think—I think these are important—

Justin: It's almost never a good idea to eat a bajillion of something. [titters] Every day.

Sydnee: You ca—right.

Justin: It's almost never a good idea.

Sydnee: I mean, I think that's the point. And then the importance of a functioning FDA, of a—

Justin: Oh!

Sydnee: Of a regulatory agency that oversees these products before they're included in our foods and beverages is—it's never more evident how important that is to us, and how damaging it is to our collective health and well-being when these regulatory bodies are, you know, understaffed and underfunded and undermined by… pseudoscience and charlatans, like RFK Junior.

Justin: Hey, thank you so much for listening to our show. I hope you found

it sweet. [laughs]

Sydnee: I hope it was 20,000 times sweeter than sugar. [chuckles]

Justin: Thank you to The Taxpayers for the use of their song "Medicines" as the intro and outro of our program. Thanks to the Max Fun Network for having us as a part of their extended podcasting family. And thanks to you for listening. I appreciate you so much. Until next time, my name is Justin McElroy.

Sydnee: I'm Sydnee McElroy.

Justin: And as always, don't drill a hole in your head.

["Medicines" by The Taxpayers plays]

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