Sawbones 578: Milk, Part 1 - Lactose Intolerance

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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. Who are you waving at?

Justin: I'm in my Jeff Probst T-shirt, and I'm ready… to shine, because it's Max Fun Drive.

Sydnee: It is Max Fun Drive.

Justin: And I'm excited about that.

Sydnee: Yeah, me too.

Justin: What does that mean? Well, we've been doing this incredible show, Sawbones, since 2013. And—

Sydnee: That's a long time.

Justin: That's a long time. And we come to you, and we say, hey, if you like the fact that we're doing this, can we have a little bit of money every month? And you're like, "Absolutely, my friend!" And then you type in maximumfun.org/join, and you come over, and you can pledge five bucks a month to help this content and other stuff in the Max Fun Network get created. And the majority of your donation goes straight to the shows you listen to. So, you know, if you kick in five bucks a month, there's going to be

literally hundreds of hours of bonus content for you to enjoy, plus a lot of other great gifts, right, Syd?

Sydnee: This is the time, if you like what we do and you want to support us, this is the moment.

Justin: Yup. We got two weeks to come to you and say, hey, please help us keep making this. I feel like now more than ever, the stuff that Sawbones is doing, the education that you are doing, Syd, is really important. So—

Sydnee: Aw, thank you.

Justin: I hope you will help us keep that going. Go to maximumfun.org/join, and we'll talk more about it after the break. Cool, wow. You know, Syd, it's funny, I… I talk so much. Worked up a bit of a thirst.

Sydnee: Oh, yeah, are you thirsty? What are you thirsty for?

Justin: Well, you know, it's a—it's a—what always hits the spot for me, Syd—

Sydnee: Mm-hm?

Justin: I love… I love water, I love a bitter mountain rush Gatorade.

Sydnee: Uh-huh.

Justin: But I love more than anything, a nice call—a tall, cool glass of milk.

Sydnee: Yeah! I've always known that about you—

Justin: Oh! You know, I actually did partake in that until, I mean, pretty late in li—I mean, pretty much into my twenties I was still like, oh, I'd love to honk down 18 ounces of the lord's good milk. [chuckles]

Sydnee: Did it—was that—do you—

Justin: A big cup. [chuckles] Just a big cup of milk!

Sydnee: Were you raised with that? Was that like—

Justin: Oh. Oh.

Sydnee: At dinner? Did you have milk with dinner?

Justin: 100%. Every time.

Sydnee: Yeah?

Justin: I remember, hon, I remember the first time I was at a… I was at a drive through with a friend who was not part of our family, and they ordered a water to drink with dinner. And I thought—I wondered if they had like allergies or something.

Sydnee: Well, what's interesting, Justin, is that… maybe they—maybe they did. In fact, not allergy, but maybe they were intolerant to milk.

Justin: Mm-hm.

Sydnee: Because, statistically, most people on the planet are.

Justin: Yeah.

Sydnee: We're going to talk about lactose intolerance.

Justin: Okay, I'm—I—this has been a hot topic around our house. At some point, Charlie decided she was—and we decided on part—in part, because every time she had something with milk in it, she would get sick. So, we kind of labeled her as lactose intolerance. And—intolerant. And then it's been kind of a moving target ever since, Syd.

Sydnee: Well, I mean, the problem is, and we'll talk about this, but there's lots of stuff with lactose in it that tastes good. And especially—

Justin: Yeah.

Sydnee: If you're a kid.

Justin: Mm-hm.

Sydnee: There's—you know? Like your willpower. And the… you know, the symptoms—and again, we're going to get into this more. The like what you get in return, the consequences are not always that bad. So, maybe it's worth it, I think, is the problem. So, I don't know. Is our kid lactose intolerant?

Justin: I don't know. I hope by the—

Sydnee: Possibly. [chuckles]

Justin: By the end of this episode, I'll have a better answer to that question.

Sydnee: Possibly. But I thought in light of that—I know this doesn't sound like an exciting topic, but it kind of is, I promise.

Justin: I'm excited about milk.

Sydnee: Because, and this was—this is part of what—part of what inspired this is that our oldest daughter thinks she's lactose intolerant. And then our youngest daughter maybe is following in her footsteps. I'm not sure.

Justin: Yeah, it's a proud tradition.

Sydnee: I also got an email from one of our listeners, Hannah, thank you, Hannah, titled, "Is School Milk Racist?" Which, it was very—that was a very exciting—

Justin: Yeah.

Sydnee: Email to receive.

Justin: Sydnee loves to find out things are racist.

Sydnee: [chuckles] No—no? And I don't—I like—I mean, I like to understand if something—

Justin: Sorry, I was—I must have misunderstood. You just told me that you got a milk that said milk was racist. You got this email and you were like, "Absolutely, yes." You were excited about it, so I just guessed—I just assumed that whenever you find out things that you thought weren't racist, are racist, you get pretty excited about it. So you could tell people like, "Hey, that—it ends up that's racist."

Sydnee: [chuckles] Well, I'm not excited that the thing is racist, I'm excited that I now know—

Justin: And excited to tell people, I would say.

Sydnee: Yes, I do like to tell people that things are racist.

[both chuckle]

Sydnee: Not in an accusatory way, but in a—

Justin: Purely educational.

Sydnee: Yeah, in a helpful way.

Justin: A helpful way. That's what they say.

Sydnee: And then also—

Justin: Helpful Syd, they call her.

Sydnee: Also, very recently, the secretary of Health and Human Services was sitting in a hot tub with Kid Rock, drinking milk.

Justin: Yup.

Sydnee: So…

Justin: In that—that's the scene from Idiocracy, I remember that—

Sydnee: No, that's—

Justin: What happened in real life. [chuckles]

Sydnee: That happened in real life.

Justin: Oh, dagnabbit.

Sydnee: Yeah. Your tax dollars paid for that. Did you think about that?

Justin: No.

Sydnee: Yeah.

Justin: Not the worst thing my tax dollars have paid for, though. Honestly, recently, it's middle of the road. [chuckles]

Sydnee: True. Okay, so, I think it's a fair question, we're going to talk about—so many humans cannot tolerate lactose, and yet so many humans drink milk. So, how did this—how did we get to this? We have probably been consuming milk for around 10,000 or so years. Prior to that, milk consumption would have been kind of erratic, main—like probably—

Justin: Erotic?

Sydnee: Not erotic. [chuckles]

Justin: Okay.

Sydnee: I don't—personally, I do not think milk consumption is erotic, personally. But it would have depended on being around animals from which you could get milk, right?

Justin: Yeah.

Sydnee: Like… you would have had to be near a cow.

Justin: Yes. And I would—

Sydnee: And then think to drink its milk.

Justin: And I would assume that you have to have—like the resources have to be plentiful enough that the cows are producing in excess, right? Milk. But I don't really know how cows work.

Sydnee: Well, I mean, we're just taking the milk.

Justin: Yeah, but like—

Sydnee: So, I don't think—

Justin: But we wouldn't take the milk if they didn't have enough for the baby cows, because then all the cows would die. You know what I mean? So they had to have extra milk lying around. [chuckles]

Sydnee: Well, what—I think—I think where you're going is that we didn't start drinking a lot of milk until we started farming.

Justin: My—

Sydnee: Because then we were domesticating these animals and like intentionally keeping them near us, and feeding them and raising them.

Justin: Sydnee, my ignorance of medicine is dwarfed by only one topic. [chuckles] Well—

Sydnee: Cows?

Justin: Not one topic. There's many topics. Automotive is high on the list. Agriculture is a huge, huge spot of ignorance for me. I mean, you may think I'm dumb about medicine, folks, but I have an E-I-E-I-O level of understanding of agriculture. [chuckles] It is—it is extremely, extremely bad.

Sydnee: Farming is a science all unto itself—

Justin: Incredible!

Sydnee: And I do not know—yes. And I am not an expert—

Justin: Incredible history.

Sydnee: I'm not an expert either, I just, I know that when we started settling down and farming in certain parts of the world, we started drinking more milk. Because then we had these cows around us and we were like, "Well, we should drink that." And specifically, we have evidence that like we were not just drinking milk, but turning milk into cheese, and eating the cheese.

Justin: I guarantee milk consumption started after a milking session. And then the milker thought, "God, I'm thirsty." [chuckles] And then they're looking at the—

Sydnee: "Looks pretty good!"

Justin: And then they look at the bucket and they're like, "I know I shouldn't, but man alive, do I want to drink it!"

Sydnee: But honey, no, then—

Justin: No, wait, hold on!

Sydnee: This is a chicken and an egg thing, because why were they milking the cow—

Justin: Why were they milking the cow?! Right!

Sydnee: If they weren't gonna—[titters]

Justin: [laughs] They were milking it to make butter.

Sydnee: Well, but what—

Justin: It never occurred to anybody—

Sydnee: To drink it.

Justin: To stop. To stop at that point in the process. [chuckles]

Sydnee: Now—

Justin: [chuckles] "We're making ice cream. I know it seems wild, but what if we drink it before the sugar and the eggs?"

Sydnee: Now, listen, here's what's weird. So, okay, first of all, we have humans around cows and goats, things that you can drink milk from.

Justin: Yes.

Sydnee: And largely, we're looking at like European farmers. It's interesting because as you kind of figure out—and we're going to follow this pattern into like where is most of the lactose intolerance today, where is most of the ability to drink milk today like, you know, genetically.

Justin: Mm-hm.

Sydnee: Most of it kind of starts in Europe. You see these northern and western European farmers who are drinking milk, and then that kind of traces who can—who can tolerate milk today. There are other areas of the world where farming started happening and we didn't see this same effect, even though people were drinking milk, which is kind of interesting. It shows where like some of this is evolution and some of this is like the lottery of genetic mutation.

Justin: Mm-hm.

Sydnee: You know? Sometimes it just—in this group, this is where the mutation arises, and it doesn't there, even though they're both farmers.

Justin: Mm-hm.

Sydnee: You know? Anyway, so, milk was probably a good food source for early humans.

Justin: Yeah.

Sydnee: It's got fat, protein, calcium, carbs, it's got a lot of micronutrients—

Justin: Sugar.

Sydnee: Sugar. It's got lactose, sugar. And the—but even though it was a good food source, the vast majority of these early humans would not have had the necessary enzyme to break down the lactose. At this point in history, when we started drinking milk, chances are the person drinking milk was going to get sick from drinking milk.

Justin: Hm.

Sydnee: So, it's a good source of nutrients and whatever, but also, it would have made you gassy and bloated and… maybe have diarrhea. So, why—before we get into how did this change, what is lactose intolerance? What are—what are we—what is happening in a person's body who drinks milk and doesn't feel good later, and in a person's body who feels fine?

Justin: I know this is an oratory device that you use in many episodes of Sawbones, but it's one that never fails to cause me panic. I of course don't know.

Sydnee: You don't know.

Justin: You know I don't know.

Sydnee: I thought ma—well, I thought maybe you did because of the medicine that—

Justin: And you often say "I thought maybe you did" or "I assumed everyone did" or "I'm sorry, I thought that was common knowledge" or—I know, I know, I understand the oratory device. I just beg you to—

Sydnee: To just answer.

Justin: Just to make it a little bit more like—

Sydnee: It's rhetorical.

Justin: Rhetorical.

Sydnee: It's rhetorical.

Justin: [chuckles] Just please don't look straight at me after you do it!

Sydnee: When we are born, when we are first born, the vast majority of us, this is something that can be a congenital mutation as well, but for the vast majority of us, we have an enzyme in our gut called lactase.

Justin: Mm-hm.

Sydnee: Lactase's job is to break down lactose.

Justin: So, does human breast milk contain lactose? Is this something we need to digest human breast milk?

Sydnee: Yes. Yes. So, that is the reason, when we are born, we have lactase in our gut—

Justin: Okay.

Sydnee: Is because—and if you think—there's a lot of—that's giving you a little insight into the naming of enzymes. So, there's a sugar called lactose. The enzyme that breaks it down is called lactase. You find that in a lot of—there's a lot of enzymes that are named that way.

Justin: Mm-hm.

Sydnee: So, there's a little helpful hint to understanding the science language. That "ase" means, "hey, we're going to break that lactose down."

Justin: Okay.

Sydnee: So, yes, human breast milk contains lactose. We need to be able to break it down, so we are born with lactase. So, this makes a lot of sense. But we don't drink breast milk for very long… probably.

Justin: Right.

Sydnee: Typically. And so, we don't really need lactase for very long either. So, we are built to stop producing lactase as we get older.

Justin: Oh, because we won't be consuming the milk, so we—yeah, it makes sense.

Sydnee: We are not consuming breast milk, so we will not be consuming lactose, because lactose is a sugar that is not—like, there are lots of other forms of sugar, and you don't find—you know, you—in different foods that you eat, sugar is in a different form.

Justin: Mm-hm.

Sydnee: It's not in the form of lactose. So, we don't need lactase if we're not drinking breast milk is the thought.

Justin: Okay.

Sydnee: So, we don't have lactase as we age. So, we cannot break down the sugar lactose. And so, if we ingest lactose from breast milk or any other source that has lactose in it, cow's milk, goat milk, et cetera, we can't break dow—break that down either. So, then we get symptoms. Why do the symptoms happen? So, you ingest the lactose, it gets to your gut, you don't have the enzyme to break it down. So, now the sugar just passes through into the intestine, right?

Justin: Yeah. What happens?

Sydnee: When it gets to the colon, and the lactose is still just lactose, it has not been broken down into simpler sugars, your colon bacteria get to work on it. And they actually ferment the lactose. We know—

Justin: Turn it into farts.

Sydnee: Yes. I mean, yes. We know that a byproduct of fermentation are gases, and so you get bloating and you get gas from these bacteria fermenting the lactose. Also, lactose is a large sugar, and so it has an osmotic effect in the colon, which means that it pulls water in.

Justin: Mm-hm.

Sydnee: So, you get this large sugar molecule being fermented, creating gas, pulling more water into the inside of your colon, which creates loose stools diarrhea.

Justin: Okay.

Sydnee: So, that's why—

Justin: That's why.

Sydnee: You get symptoms. If you don't have lactase, the lactose passes right into the colon and it causes all these symptoms. Okay? Does that make sense?

Justin: I'm on board.

Sydnee: It's usually like 6 to 10 hours after ingesting the lactose, which is what has always made me suspect about our child's claim of lactose intolerance.

Justin: Because it seems to be so rapid.

Sydnee: Yes.

Justin: It may be simple overconsumption of lactose-included—lactose-bearing desserts. [chuckles]

Sydnee: I don't think—because, I mean, if you like eat a whole bowl of ice cream, and five minutes later you're like, "Oh, my tummy."

Justin: "Ah, I'm gonna sh—I'm gonna poo my pants!"

Sydnee: Yeah, that's not lactose intolerance.

Justin: [chuckles]

Sydnee: This—because what you—I mean, you gotta think about it. It can't happen until the lactose hits the colon.

Justin: Sure. That makes sense.

Sydnee: So, that's like—

Justin: That's a longer journey—

Sydnee: 6 to 10 hours.

Justin: I remember when I was in school, in health class, in a gym. Like, that is—that's how clear of a sense of memory it was, when they told me it takes 12 hours for food to go through your body. That rocked my world. That reordered my entire way of thinking.

Sydnee: Really?

Justin: Legitimately—

Sydnee: Did you think it was faster?

Justin: I thought it was like an hour, until that point. So, it was like—it like really—like that day I have a very clear memory of like, "I'm glad I came to

school today. I really did learn—[laughs] I really learned something today! This is good."

Sydnee: Did you—you must not have felt that way very often if you have a clear memory of a day you did feel that way.

Justin: No, no… no. [chuckles] That's true.

Sydnee: No.

Justin: No, I—yeah, no. No, yeah, no.

Sydnee: So—

Justin: STD stuff.

Sydnee: Okay?

Justin: Some of that.

Sydnee: Yeah, that's useful. Helpful.

Justin: I learned how to do the printing, where you carve out some of the plastic and then you dip it in ink and then you print that on paper. And I learned how to make blueberry muffins. I remember that pretty clearly.

Sydnee: Stop, drop and roll.

Justin: Stop, drop and roll.

Sydnee: That's a big one.

Justin: Honestly—

Sydnee: [chuckles] American elementary schools are great at preparing children in the case they catch on fire. I know exactly what to do if I catch on fire.

Justin: I had a world history teacher who said—who just told us the golden rule at the beginning, he who has the gold makes the rules. And they're like, that's the whole bit. [titters] And I still remember that like, whoow! That's all of history?

Sydnee: Wait, what—how old were you?

Justin: This was—I was a—would have been a sophomore in high school.

Sydnee: Oh, okay.

Justin: Yeah.

Sydnee: I'm still thinking elementary school. I'm imagining like a fourth grade teacher walking in—

Justin: No, no, no! It's like when—

Sydnee: "Listen, kids."

Justin: No. But it is learning in so—the sophomore year of high school, somebody's like, "It's all about money." And I'm like, dang… it's all about money. [chuckles] It really blew my mind.

Sydnee: You got real angsty.

Justin: And I really, really—yeah, man… it's all about money.

Sydnee: So, 6 to 10 hours is about—

Justin: Where were we?! [chuckles]

Sydnee: Yes. That's about when the lactose can hit your gut, you get symptoms. Or hit your colon, you get symptoms. Now, it can be slower, and so you could have symptoms for up to two days after, like… like they could start two days after the consumption of the lactose—

Justin: Now—

Sydnee: So, it really just depends on how fast it gets to the colon.

Justin: Is there a—is there an amount kind of deal here? Like if you had—

Sydnee: I mean—

Justin: One scoop of ice cream or two scoops of ice cream, are you going to feel two scoops is bad?

Sydnee: I mean, more lactose is going to create more fermentation—

Justin: I didn't know if it was like a—

Sydnee: More osmotic effect, yeah.

Justin: I know there's some things like that triggered an allergic reaction that aren't necessarily like that. You reach a… this isn't necessarily an allergic—

Sydnee: This is not an allergy. Yeah, it's really important to know, it is—that's why it is specifically lactose intolerance. You're intolerant to lactose, your body doesn't have what it needs to break it down, and so you get symptoms.

Justin: Yeah.

Sydnee: Because the digestive process isn't working the way it's supposed to. But you're not allergic to it, it's not—I mean, I don't want to say it's not going to kill you, because I guess, in theory, you could eat enough lactose to have enough massive diarrhea and then not replace your fluids. I mean, you know, like I could concoct something that would be catastrophic. But for the most part, it's not something that is going to permanently harm you, but you're going to feel really lousy.

Justin: Yeah.

Sydnee: And most people who have lactose intolerance, this is exactly why. You had lactase as a baby, you grew out of it, you don't have lactase anymore. And so, you don't have the enzyme, you can't break it down. There are people who can get secondary lactose intolerance, if you have some sort of disease of the gut. So, something inflammatory or an injury to the gut—

Justin: Or if your dad drinks a lot of milk around you. [chuckles] He might be like, "Ugh… No, sorry, I have a secondhand milk intolerance."

Sydnee: No, you're collateral. The—but so—

Justin: I watched my dad drink too much milk and it got stuck in his mustache, and now I have secondhand milk intolerance. I can't—I can't deal with people drinking milk around me. [chuckles]

Sydnee: So, there are—there are people who develop lactose intolerance who may not have had it to begin with. And then very rarely, an infant can be born without the lactase. Like we said, babies are supposed to be born with the lactase. It is—there are mutations where—

Justin: Everything can happen.

Sydnee: Yeah, so, there are other reasons, but the main reason most people have lactose intolerance is because they're just doing what our bodies have been programmed to do since the beginning of time. We stop making the lactase. So, I just want to—the default—the default is that we don't have lactase as adults. The thing that shifted was that some people do. Okay?

So, if the vast majority, though—we're going back to these European farmers around 8,000 to 10,000 years ago. The vast majority of these individuals did not have lactase, could not break down the milk. They would have been getting sick when they drank the milk. And yet, we know that they did consume dairy. We know that they were doing this. So, I guess, think about this, if you are lactose intolerant, if you are listening to this. Do you ever just go for it anyway?

Justin: Well, do you?

Sydnee: Think about—if we're trying to understand how did we get to where we are today, where many more people can tolerate lactose than could then, it must mean they were just doing it. So, do you ever just do it?
Justin: Do you?

Sydnee: Well, think about that. And we're gonna talk about Max Fun Drive.

Justin: Yeah! Normally, this is when we would go to the Billing Department in a given episode, but let me tell you, friend, we're not doing that this time. You know why? Because it's Max Fun Drive.

Sydnee: Absolutely.

Justin: And you know what? Some weeks in the history of this show, the sponsors don't show up. Sometimes it works out that the money for the ads isn't there. But you know what's always there, is your support of these shows. That's why we don't have to take advertisers that we don't feel good about on Sawbones. We're really particular! A lot of shows say this, but it's really true about Sawbones, we get *a lot* of advertisers that would like to advertise on Sawbones, that we don't feel comfortable with.

Sydnee: Mm-hm.

Justin: And we have the freedom to do that because of you, because of your support. So, it's really amazing for us.

Sydnee: Absolutely. Your support has helped us not just consistently do our show, but hopefully create better quality shows, not just through things like audio equipment, but the research that I'm able to do. More and more articles are behind paywalls these days, and it can be hard for me, unless I subscribe to every single journal out there, to get the kind of—I want the evidence to bring to you, to make the quality of what we present better. And you help me do that.

Justin: Now, if you go to maximumfun.org/join, and you want to support us, there's a lot of different ways you can do it. You can join. If you're new,

we'd love to have you. And even just five bucks a month, you're going to get hundreds of hours of bonus shows, videos, audio.

You can also boost or upgrade. If you want to go to that next level, there—you can get the rewards that are tied to that. Or if you just want to boost a little bit, that's awesome too. We are so appreciative for any support, especially in these trying times. Having a source like Sawbones that you can count on, I feel like is really important, so—

Sydnee: Well, I also really enjoy doing it, so—

Justin: Yeah, I agree. And I appreciate the support that people have given us. But it's not just about your support to us, we're going to give something in return to you. We mentioned that bonus content. What do we got for people this year? Sawbones listeners who join or upgrade, you know, the members of the Max Fun Network, what are they going to get this year, for their bonus content in Sawbones?

Sydnee: Well, Justin, we took a tour of my greenhouse. So, I wanted to share with everybody. It took us—it took us a while to get this greenhouse up and running. And I'm growing tons of plants out there, stuff to eat and stuff for, you know, looking pretty. And then some stuff that has like medicinal uses. Although, you know, we don't really… do that on Sawbones. But I do like to talk about it. It's interesting.

Justin: You can—you can—

Sydnee: It's fun.

Justin: There's a—there's a sub podcast in there called Fast and Furious and Justin and Sydnee, where we review all the Fast and Furious movies. We **answer** medical questions from kids. If you can give $10 a month, you not only get the bo-co, but you're going to get one of 43 different enamel keychains, designed by Tom DeHa. Ours, the Sawbones one, is just a bunch of different things you shouldn't put in your ear.

Sydnee: Mm-hm. Nothing smaller than your elbow.

Justin: Yeah, it's really, really cool. And also, this is new and exciting, you're also going to get ad free feeds at $10 a month. This is something people have been asking for for a long time. But if you want to enjoy your Sawbones without ads, you can do that now.

Sydnee: Hey! Yeah.

Justin: There's other stuff. At $20 a month, there's a very cool toiletry bag or a rocket visor. But the gifts are cool, it's really the coolest thing is that you're supporting the stuff that you like.

Sydnee: Absolutely.

Justin: And we really appreciate it. We appreciate you so much. We say it all the time, but we really mean it. Maximumfun.org/join. Don't wait! Just go do it right now. Or else you're going to be thinking, "Dagnabbit, I meant to do that." And you'll put it on a list and the whole—just do it right now. You know what I mean? Maximumfun.org/join. Just do it right now!

Sydnee: And thank you.

Justin: But do it right now.

Sydnee: But also thank you.

Justin: Especially do it right now.

Sydnee: Thank you.

Justin: Where were we, Syd?

Sydnee: Okay, so you were all admitting to yourself, you were all having a dark moment of the soul. [titters]

Justin: Yeah.

Sydnee: Where you admitted to yourself—

Justin: Sometimes you go for it.

Sydnee: That you just, you drink—sometimes it's dairy, and you want it, and you do it. And you know, that's okay. I know our kid does. And I—you know what? I would too. I'm going to go ahead and say that, I—

Justin: If you like. I feel like you're—

Sydnee: I mean, not for milk. I'm not like a big milk person.

Justin: Yeah.

Sydnee: But for ice cream.

Justin: Yeah.

Sydnee: Yeah, I would do it. I would do it for dairy. Anyway, and that's probably why early humans just, they did. There were—

Justin: They just went for it.

Sydnee: There were human—they were just drinking the milk. And some of them would have been fine. Because we know—we have now looked through the evolution of lactase persistence. So, from a scientific perspective, I'm going to introduce this term to you—

Justin: This is the split now. After the intermission, there's no more lactose intolerance. [chuckles]

Sydnee: Yes. I am—I am about to give you some numbers that may surprise you, how many humans can and can't comfortably drink milk. So, if the majority of the population, and I am now telling you 65% of current humans, we're now in the now, 65% of humans cannot tolerate lactose. They're lactose intolerant, is what we would call them. But that's the majority of humans!

Justin: Mm-hm.

Sydnee: The 35% of us who can tolerate lactose—

Justin: You're the weirdos.

Sydnee: Yeah. Because we are lactase persistent, meaning the lactase in our gut did not go away when we were babies. It persisted into adulthood.

Justin: Mm-hm.

Sydnee: So, we should probably flip it! We probably shouldn't call people lactose intolerant, we should call people who can drink milk lactase persistent, because they're the outliers, right?

Justin: Or we just like get rid of labels.

Sydnee: [chuckles]

Justin: You know?

Sydnee: Let's stop worrying about it so much.

Justin: Just stop worrying about labels!

Sydnee: So, lactase persistent people, that mutation probably is like 20,000 years old, but it was probably pretty sporadic. It was just this random thing that some people could drink milk, but there weren't that many people drinking milk 20,000 years ago, so who cares? So, but this really did matter when we get to a point 8 to 10,000 years ago, where more and more humans are drinking milk, the people who are able to tolerate it are gonna do better than the people who can't. And what we see now is selective pressure to allow lactase persistence to not just continue, but thrive. So—

Justin: Evolutionarily speaking.

Sydnee: Yes, from an evolutionary perspective, what we see now is that there is some advantage to drinking milk. Because this mutation goes from a small percentage of the population have it, to now currently 35% of the population has this mutation. So obviously—and this is, in evolutionary

terms, this is a really fast jump. I know I'm talking like 8,000 years, but from an evolutionary perspective, that's, I mean… that's a speed race. Like, that is very fast.

Justin: Makes you wonder if there's the other factors that we've talked about, the sort of like… sociological factors are playing into that selection.

Sydnee: So, there are some theories. There are some theories as to why would there—what is the evolutionary advantage of drinking—

Justin: It feels like we're GMO-ing ourselves a little—a little bit, you know what I mean?

Sydnee: Yeah.

Justin: Like we're ex… we're expediting the process because the people who can hang with this are the people who are also like creating the resource.

Sydnee: So, when we look at Northern Europe, where a lot of the lactase persistence like comes from—

Justin: Mm-hm.

Sydnee: And this also informs like why people with different like specific genetic backgrounds, like where their lineage comes from, are more likely to be lactase persistent today, versus people who aren't. Specifically, if we look at the region of the world where this started, it's a lot of people of European descent. So, people who aren't of European descent are much more likely to be lactose intolerant. Basically, these farmers in Northern Europe came from the Fertile Crescent area originally, and they grew things like wheat and barley. When they got to Northern Europe, these crops were more likely to fail.

Justin: Mm-hm.

Sydnee: Because of the weather, shorter growing season, okay? And then the climate also lent itself to refrigeration. So, you're looking at a situation where you might not have as much food because your crops aren't growing

as long, you're not used to it. Also, you can keep things colder. If you leave your milk out, it's still cold. Whereas where you lived before, if you left your milk out—

Justin: Hm.

Sydnee: It's gonna spoil. So, one, you can drink fresh milk more easily because it stays cold longer. And two, you need it more, because there's a famine.

Justin: Huh.

Sydnee: And if you can't drink milk, you might die. So, people who can drink milk comfortably, and who don't get diarrhea from it, there's a selective pressure for them to, you know, live, have children, pass along their genetic mutation, and you start to see lactase persistence grow.

Justin: Mm-hm.

Sydnee: Does that make sense?

Justin: Yeah.

Sydnee: Yeah, so that would be a theory as to why would drinking milk be an evolutionary advantage.

Justin: Makes sense.

Sydnee: Yes, right?

Justin: Okay.

Sydnee: So, you look at famine, you look at the fact that milk staying cold makes it easier to drink for longer, and you have a reason why these people might have, you know, outcompeted the others. I hate to say it that way, but I mean that's what we're talking about evolutionarily. And there's some other stuff, like milk is probably safer than if you look at like water sources at the time. Was all water potable? If you could drink milk instead of water,

that may have given you an advantage, because you weren't exposed to the stuff that was in contaminated water sources. It's the same thought where like so many people drank beer for so long. It was safer than water in a lot of cases.

Justin: Yeah.

Sydnee: There's also the thought that milk had stuff in it that might have given you a fertility advantage, not that milk makes you fertile, but that at the time somebody who was able to get all of the different, like I said, the fat and the carbs and the protein from milk, and somebody who couldn't and maybe it was malnourished, that person might be more fertile than the other person.

Justin: Oh, that makes sense.

Sydnee: Yeah. So, needless to say, it was advantageous, because from that point, we see this dramatic increase. And by about 3,000 years ago, we have steady evidence from that part of the world of lactase persistence, to the point today where we are at 35 percent of the population.

Justin: Is this like other evolutionary things where it's like, this is the trend that is going this way, are we assume? Or are we like headed towards full milk consumption? Is that the direction?

Sydnee: Well, you know, that's the next—that is—that is exactly what I wanted to address next.

Justin: Oh, okay.

Sydnee: Are we still—is there still evolutionary pressure to drink milk? We aren't sure. Because I mean, there's some—there's some really natural questions that would arise. If you're like, okay, so, I just painted this picture of people who were largely dependent on their farming and growing their own food. And they're subject to like drought conditions and famines and, you know, diseases that we now have cures for and… they didn't have other nutritional sources that we now have in abundance. So, none of that is true

anymore. So, do we—we don't need to drink milk. I don't drink milk. I don't particularly care for milk.

Justin: Yeah.

Sydnee: I'm fine.

Justin: You talk about that a lot, actually. A lot of—anybody who will listen, you're pretty, pretty vocal about it.

Sydnee: And there are still—it's still pretty concentrated. It's people who are descendants of these European farmers today who can drink milk. So, ar—and there are a couple of specific areas in Africa and the Middle East where we also see a lot of lactase persistence.

Justin: Hm.

Sydnee: But most of Africa, Asia, South America, most people in these regions, again, 65% of the global population. So, most people in these regions or of that descent cannot tolerate lactose. And still, it is not a huge part of their culture, in most regions. They just don't—they don't drink milk. It's just not a thing.

Justin: Mm-hm.

Sydnee: And that's probably because it makes them gassy and bloated if they do, so they don't want to. They drink other things. So, there was a study in 2018 where they looked at a very specific group in Chile, who there was a group of a farming community, the—in the Coquimbo region, where they started to see more and more people with lactase persistence.

And they thought, "Huh, maybe we are seeing like this little tiny micropopulation is having—we can like look at what is evolution doing here." More and more people are tolerating lactose here, they are passing along lactase persistence in this group. So, there still is an evolutionary pressure. But it was a very specific community where milk is a big part of their diet, so that would make sense.

If you try to generalize that to the US, I mean, here, is there any reason why I would drink—I would—I would have to drink milk, I would need to drink milk to get protein, to get carbs, to get fats? I mean, is there any reason? No. We have—and if you need any of those things, not only do we have like a bar or a shake or a smoothie or a supplement for every single one of them, we also have all different kinds of milk now, right?

Justin: Mm-hm.

Sydnee: So…

Justin: Almond, oat.

Sydnee: Right.

Justin: Coconut.

Sydnee: So, there's not really a selective pressure on most of us.

Justin: Pistachio. Cashew. There's all kinds of milk. [titters]

Sydnee: There's so many mi—[titters] you—do you wanna—

Justin: What's your favorite milk? What's your favorite non-milk milk?

Sydnee: My favorite non-milk milk?

Justin: What's your favorite non-milk milk?

Sydnee: Coconut.

Justin: Coconut's good.

Sydnee: Yeah, I like coconut. Yeah.

Justin: Tie for me, coconut and oat. Oat—

Sydnee: I don't really like oat.

Justin: Oat, it depends on the processing a little bit. I like oat, okay?

Sydnee: I like cashew.

Justin: I think all the nut ones are supposed to be like super bad for you?

Sydnee: Are they?

Justin: For the environment—

Sydnee: They're ba—I think they're bad for the environment. I don't—see, I don't—

Justin: I don't—I never drink them. I've like sampled—almost every one, my experience is like, oh, that's interesting. [chuckles] Then I don't have it anymore.

Sydnee: I'm going to tell you—I'm going to tell you that the only milk that is in our fridge right now is the lactose-free milk. The milk-milk, without lactose in it. And that is—

Justin: For cereal—

Sydnee: Was for cereal.

Justin: And cooking.

Sydnee: I mean, that's why, yeah.

Justin: Whole milk for cooking, but yeah.

Sydnee: Yeah. But that's it. We don't… we just don't—we're not a—we're not milk drinkers. Never really have been. Anyway, will this change though, now that Kid Rock and RFK Jr. are trying to get us to drink milk?

Justin: God, I hope so.

Sydnee: I don't know, maybe. And I do want to say, when—because I just talked about the genetics of lactase persistence, if we look at the push currently to drink more milk, and there are a lot of reasons for that, and I'm not going to get into that now—

Justin: Yeah, I'm going to talk about that next week.

Sydnee: That's right. I don't—I was going to get into all the ways that America has tried to make Americans drink milk, but I'm gonna let Justin—

Justin: It's too much about advertising—

Sydnee: It is.

Justin: I had to do it. Got milk?

Sydnee: It's all about advertising.

Justin: Oh my god, I'm going to talk about got milk so hard.

Sydnee: Right. And there's a long history. America, as soon as we had pasteurization, Americans are like—America's like, "Drink milk, Americans, please." But if—specifically to Hannah's question, is school milk racist? So, if we are now seeing this push to put whole milk back in schools, and to like encourage students to drink milk again--

You can see where only certain students of a specific genetic background would be likely to drink that milk comfortably. Whereas students of different ethnic backgrounds would not—I mean, so that's really what we're talking about, is if we're going to make everybody drink milk, students who are black are much less likely to tolerate that milk. They might, but they're less likely than a student who is white.

Justin: See how excited she is?

Sydnee: So—

Justin: You weren't—you weren't going to wait that whole time. And look, look at the payoff. She's so excited to tell you that milk is racist.

Sydnee: I mean, it—I'm just saying. I'm just—and milk is—milk is not inherently racist! I don't mean like the be—like the drink. I'm not going to blame this liquid. But—

Justin: [laughs]

Sydnee: But milk is, I mean, if you—if you are white, it is statistically more likely that you are able to tolerate milk.

Justin: Yes.

Sydnee: So—

Justin: The only—liquid can't be racist. The only—the only racist liquid is Sydney Sweeney's bath water.

[both chuckle]

Sydnee: I…

Justin: It's just a joke, Sydney. Friend of the show.

[both chuckle]

Justin: It's just a joke.

Sydnee: I'm going to let you talk about the advertising next week, the—needless to say, milk consumption has fallen steadily in America for a long time, except maybe in the last two years, it's picking back up and—

Justin: Yeah.

Sydnee: This is why all of this is a concern.

Justin: Yeah.

Sydnee: I do want, briefly, there is hope for all humans who can't tolerate lactose. If you want to, right?

Justin: Yeah.

Sydnee: We know what this—this one is a—this is—this is common knowledge.

Justin: Yeah, you take lactate, right?

Sydnee: You take lactate. So, why do we have lactate? Well—

Justin: So Slice can eat ice cream when we go to Epcot together. [chuckles] No, why do we have—why do we have lactate?

Sydnee: Alan Kligerman operated a dairy farm, and he knew that a lot of people couldn't tolerate his product, right? He knew this was a problem. So, he went to Virginia Harris Holsinger, who was a scientist with the USDA—

Justin: Mm-hm.

Sydnee: In agricultural research, who specifically worked on things like whey beverages. So, alternative beverages. And said, "Can you create a milk substitute for people who are lactose intolerant?" So, Holsinger started working on it. Basically, the reason that we know that lactose passes into the colon fully, not broken down, that's the problem. So, if we can create a milk where the lactose is already broken down, then no problem. So, she used lactase from fungi and broke down all the lactose.

Justin: Mm-hm.

Sydnee: And then made a milk that just had glucose and galactose and all the things that come from lactose.

Justin: Sorry, did you say galactose?

Sydnee: Galactose is a sugar, yes.

Justin: That's awesome.

Sydnee: So, basically we use fungi lactase to break down the lactose ahead of time, and then we create milk that is lactose-free. And that's how we get lactose-free, and that's also where we eventually got the supplement lactate. Kligerman's lactate milk and lactate supplement started in the mid '80s, and Johnson and Johnson eventually brought them—bought it. And that's why we have lactose-free milk today, and lactate that you can take. So, basically what you're doing is you're taking the enzyme and putting it in your body before you put the milk in your body, right?

Justin: Mm-hm.

Sydnee: So, that's how lactate works. You're just giving yourself the enzyme that you don't have. Holsinger went on to help the military so that they could distribute like a powdered lactose-free milk for soldiers who were lactose intolerant.

Justin: Cool.

Sydnee: Which is very cool.

Justin: I guess.

Sydnee: I mean—

Justin: I mean, it's powdered milk, but it seems cool.

Sydnee: You know, it's cool though. And then Holsinger also made Beano.

Justin: Hm?

Sydnee: So that you could, you know, not be as gassy after you eat foods that make you gassy.

Justin: What a—huge strides in our consumption of things that we probably shouldn't be eating.

[both chuckle]

Justin: Amazing.

Sydnee: She also, one more thing, she developed reduced fat mozzarella cheese.

Justin: Fantastic!

Sydnee: So, there you go.

Justin: Look at that!

Sydnee: I know! So—

Justin: Wow!

Sydnee: Dr. Holsinger is the reason.

Justin: What a pioneer.

Sydnee: She's the reason that you can—that Slice can eat ice cream with us at Disney world—that Charlie can tolerate her lactose indulgence—

Justin: Sure.

Sydnee: Today. So, there you go, that's where lactate comes from, and that's… why we have it.

Justin: And you're the reason that we're here. Thank you so much for listening to the show, and thanks for your support in the Max Fun Drive, if you're able to do it. Head on over to maximumfun.org/slash join. Remember, just five bucks a month and you are going to be helping to make these shows possible, you're also going to get a bunch of bonus content. At $10 a month, you're going to get the bonus content and also an incredible key chain. But more importantly, you're going to be supporting shows that are trying to do something good, you know?

Sydnee: Mm-hm.

Justin: And I really appreciate it.

Sydnee: Yeah. We are so thankful for your support. It means so much to be able to do something that we love to do, and for you to enjoy it enough to want to help us do it more.

Justin: Yeah. Thank you so much. Be sure to join us again next time for Sawbones. Until then, 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]