

## Sawbones 368: Papaya Seeds and Parasites

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**Clint:** Sawbones is a show about medical history, and nothing the hosts say should be taken as medical advice or opinion. It's for fun. Can't you just have fun for an hour and not try to diagnose your mystery boil? We think you've earned it. Just sit back, relax and enjoy a moment of distraction from that weird growth. You're worth it.

[theme music plays]

**Justin:** Hello everybody, and welcome to Sawbones: a marital tour of misguided medicine. I'm your cohost, Justin Tyler McElroy.

**Sydnee:** And I'm Sydnee Smirl McElroy. Why did we do middle names this time?

**Justin:** I'm trying to lend it an air of legitimacy.

**Sydnee:** [laughs] Then saying our middle names makes it legitimate?

**Justin:** Science is under attack and who do we turn to? Neil deGrasse Tyson.

**Sydnee:** Well...

**Justin:** Uh, Carl...

**Sydnee:** That's a problem.

**Justin:** Carl Carl Sagan. His middle name was Carl.

**Sydnee:** I don't know that you know that.

**Justin:** Bill... Bill "The Science Guy" Nye. He's got a lot of names. That's where we're turning to, so I'm trying to legitimize us.

**Sydnee:** I like to think that the reason people might listen to me perhaps when it comes to matters regarding science is not so much my middle name as the... the doctor that comes before my name. Or perhaps alternatively, the M.D. that comes after.

**Justin:** Very 2015 of you.

**Sydnee:** Oh!

**Justin:** Very 2015, very outdated. It's all about attitude, confidence...

**Sydnee:** [laughs] What about the fact that I actually went and acquired the skills and knowledge and training necessary to understand and interpret this sort of infor—

**Justin:** You're only as good as your last fact, Syd, you're only as good as your last fact.

**Sydnee:** Okay. Alright.

**Justin:** Um, but this is Sawbones, this is our show where we talk to you about science. I wanna say up front, thank you to everybody who supported us in the Max Fun Drive.

**Sydnee:** Thank you, thank you, thank you.

**Justin:** Thank you, thank you, thank you. I appreciate you.

**Sydnee:** Uh, Justin, other than me, where do you like to go for your new health, wellness information... for new...

**Justin:** Hi, yeah, we've been married for 15 years.

**Sydnee:** [laughs]

**Justin:** I know a trap when I see one and I am not walking into that one, thank you very much.

**Sydnee:** Well, you know where a lot of people like to go these days? Social media. And not so much Facebook anymore, right? Like, that's the past. It's um— I believe the kids today would say it is... cheugy.

**Justin:** Whoa! Woo!

**Sydnee:** I believe.

**Justin:** Just breaking it off. Cheugy.

**Sydnee:** I don't really know. I think I'm cheugy, probably.

**Justin:** I don't know what it means. It sounds bad.

**Sydnee:** I'm still not clear, but uh, I don't think they're going to Facebook anymore and I feel like even Twitter is so yesterday, so yesterday. TikTok is where the health trends of the future are found.

**Justin:** Yeah. In 60-second bursts so it doesn't take you a lot of time to learn the information, which I love that.

**Sydnee:** Right. And that's how you know something's true, is that you can completely understand it in 60 seconds and master it.

**Justin:** If you can't teach—

**Sydnee:** [sarcastically] That's how science works!

**Justin:** If you can't teach it to me in 60 seconds, it's prob— that's too much time. I gotta have it in 60 seconds or I can't buy it.

**Sydnee:** So, we've gotten some emails, and some people at work actually asked me about this. I've had a few questions lately and I came across this organically, about papaya seeds and their popularity on TikTok.

**Justin:** Correct me if I'm wrong, I'm not a science person myself, but I believe those are derived from the papaya?

**Sydnee:** Y... yeah, that's great, Justin. You figured that one right out. Yes, so there is a new trend on TikTok, I think one user started it, showed like a drink she had made of papaya seeds, like a smoothie with other things. I forget, I think it was garlic and beets and some things in there.

**Justin:** Sound pretty chunky.

**Sydnee:** Well, I mean, if you blend it enough.

**Justin:** Yeah, that's true. You can blend anything. Will it blend? Remember that?

**Sydnee:** Yeah. If you've got a 'will it blend', which is what we call our blender... [laughs]

**Justin:** Yeah, for some reason, our 4-year-old got really into will it blend? She loves, like, old memes. [laughs]

**Sydnee:** So now she'll be like, "Can I have a smoothie in the will it blend?" Anyway, there was one user who basically ate like a half of a papaya's worth of seeds and then said, "Hey... guys. Hey guys, this is great because it cleansed me of parasites. That's what it's for, it will get all the parasites out of you, and I know that it worked because I saw them come out. And you should do this at home." And the instructions are pretty vague, like, because now— by the way, I don't know what the TikTok algorithm is exactly, but it's destroyed—

**Justin:** You've ruined your algorithm.

**Sydnee:** Mine is, I mean, it is smashed to pieces.

**Justin:** On another social media platform, Sydnee has [laughs] triumphantly sacrificed her algorithm for you, the people.

**Sydnee:** I have so many fake wellness videos coming to me now. But anyway, I watched a bunch of these and it seems like it's pretty vague as to exactly how you need to ingest the seeds. Some people just eat spoonfuls of them. They apparently taste bad, we'll get into that, so some people just swallow them whole.

**Justin:** [laughs]

**Sydnee:** Other people were making them into drinks and smoothies and whatnot. One way or another, the idea— everybody says the same thing. "I'm gonna do this," and then either they come back later and are like, "Well, that... I don't know if it did anything, my stomach was upset, I didn't feel great, but like, there you go," and other people are like, "I saw worms come out of my butt, it was awesome."

**Justin:** [laughs loudly] Totally, totally awesome.

**Sydnee:** Now, the reason why you might think, according to various users on TikTok and articles about this, the reasons you might think you have a parasite, what sort of symptoms might you be having? Things like bloating, cramping, diarrhea, constipation, fatigue, brain fog, weight loss, just generally feeling unwell.

**Justin:** Yes.

**Sydnee:** Any of these things.

**Justin:** Could be anything, folks. Let's be honest.

**Sydnee:** [laughs] Any of these things could be a symptom of a parasite that you didn't know you had, and if you can just get it out of you is kind of like unlocking...

**Justin:** The power.

**Sydnee:** All the health and wellness that you have thus far... of which you have been deprived.

**Justin:** Health is inside you. It's your right. You just need to claim it.

**Sydnee:** Mm-hmm. Why is everybody so certain that we have worms? That's my question. Why is— because this seems to be a common trope, especially when you get into, like, alternative medicine and then beyond alternative, which is just the straight-up trying-to-take-advantage-of-you fake stuff. Because I do distinguish between that, right? I mean, people who... the true believers, the good-faith efforts, and then the scam artists.

**Justin:** It's in our nature to believe that there's some lever that we have not pulled that if we pull it, everything will be better. It's just human nature to believe that, like, maybe it's hydration. Like, if I was just hydrating a bit more— and some of those are healthy, right? Like yeah, hydrate a bit more. That's like, 5%, I don't know, 10% better. I don't know. Meditate. Yeah, that's like 5 or 10% better. But there's not— but we're looking for like, if it's like, "Oh, I'm full of worms? Well clearly if I can just eliminate that, that's gonna turn the whole ship around!"

**Sydnee:** Yeah, well, and if you are—

**Justin:** "That's been my problem, is like, I've got a bunch of worms!"

**Sydnee:** And if you do have a parasite that's untreated, certainly you would feel ill. More than likely.

**Justin:** I think we're all in agreement there.

**Sydnee:** Now, first of all, let's explore this papaya idea. I wanna start there. Where does the idea that papaya seeds specifically are helpful? Because there is, like, a seed— heh, a seed of truth within the papaya seed myth.

**Justin:** Ah!

**Sydnee:** That this all stems from. So, there has been interest in the medicinal benefits of the fruit papaya, like the whole thing, for a long time. And this is true of a lot of fruits and vegetables, right? Like, I say papaya but you could replace that with a lot of different, you know, singular foods that have been, like, explored and like, used for all kinds of different health benefits, right?

Like, for a while it was avocado. Not just because people wanted to be mean to millennials, but also just like, "The avocado's a superfood and if everybody eats it, they'll feel great all the time!" It's like, well no, I mean, avocados are great but they're just one food, right? Like, there's a lot of foods that are good for you.

So, papaya, like many of these, has been explored for its health benefits. It has a lot of vitamins, it's got antioxidants, it's got fiber, I mean, there is no— there is absolutely truth to the statement that papaya, as part of a balanced diet, is certainly good for you and has good things in it.

**Justin:** Thanks, papaya.

**Sydnee:** Right? You cannot exist on papaya alone.

**Justin:** Mm. As the old axiom says.

**Sydnee:** But there is certainly nothing wrong with eating papaya. And you know, it's a— a lot of fruit is—

**Justin:** Within reason. Within reason. People get carried away with the papaya.

**Sydnee:** [laughs] Well...

**Justin:** I've bought in bulk. Costco had, you know, 30 papayas for \$10. I bought 30 papayas and it's all I'm eating.

**Sydnee:** If you eat enough of any one thing, you're probably gonna have problems.

**Justin:** There it is.

**Sydnee:** I mean, that's just the truth. Even water. Right? In excess, you can get sick. But are the seeds helpful too? So, the seeds, if you have explored papaya seeds, you know this. I don't think I've ever gotten intimate with papaya seeds, like, up close and personal, to try to figure out what their deal is, but I guess they're like, they're little hard, black seeds that are encased in sort of like gooey, wet, slimy, bubbly things.

**Justin:** Yum.

**Sydnee:** Yeah. [laughs] Delicious. I guess they taste kind of bitter and peppery. One person compared them to horseradish.

**Justin:** Nature's way of telling you "don't eat this", you mean?

**Sydnee:** They're not inherently bad for you. It's not like— we've talked about this on the show before, there are some things, there are seeds to some things that contain cyanide.

**Justin:** Apples.

**Sydnee:** That can be very bad if you eat enough of them. I don't have anything like that about papaya seeds to tell you. They do contain some nutrients, as does the rest of the fruit. There are some things. If you swallow them whole, you're not really gonna get that, just as a side note, because then you're just getting undigestible fiber that's gonna take a trip through you on its way back to the earth, essentially.

**Justin:** [laughs] "Whee!"

**Sydnee:** [laughs]

**Justin:** You turn yourself into a human Schlitterbahn.

**Sydnee:** [laughs] Just for these seeds. But um, so I mean, it's not like— I can't sit here and say, like, they're bad for you inherently, or that, you know, they're gonna harm you. I guess if you feel like you wanna eat some papaya seeds, I don't really have a strong reason to tell you not to. This probably stems from a 2007 study that was done—

**Justin:** It probably stems from a papaya plant.

**Sydnee:** [laughs] Wakka wakka.

**Justin:** [sighs]

**Sydnee:** There was a study done in Nigeria on 60 children who I believe were asymptomatic but were found to have intestinal parasites. And it's important to note, by the way, and we're gonna get into this more, but like, the way they knew that these participants in this study had parasites is that they did microscopic evaluation of their stool. Because that's what it takes to see a parasite. Microscopic evaluation of the stool.

**Justin:** Now, remember that. I'm assuming it'll be important later.

**Sydnee:** You have to know what you're looking for. So, they did that, they confirmed that these 60 participants did indeed have parasites, they gave half of them, um, air-dried papaya seeds. So not like, fresh out of the papaya. That's what they show you in a lot of the TikToks, it's like somebody like, cuts open a papaya and they're sitting there holding the whole half of papaya and they have a spoon and they're just spooning the seeds straight out of it and eating them.

**Justin:** [shudders]

**Sydnee:** In this study, they air-dried the seeds and mixed them with honey, and the other half of the kids just got honey. And then they checked their stools for a week. And in this one small study, they did see that the kids who got the papaya seeds had a higher rate of clearing the parasites than the kids who just got honey. So, interesting, right? Like, in this one study it seemed like for some kids, adding the papaya seeds to the honey made it more likely that you wouldn't find parasites in their stool a week out. So, what does that mean for everyone else? I have no idea.

**Justin:** [laughs]

**Sydnee:** It's never been replicated. It's never been validated, it's never been proven outside of this one small study. There is no, like, real-world, like, "Let's deploy it to the population as a whole and see what happens," none of that has ever— it is just this. There you go. Interesting, right? That's where science starts. You try something out, you see possibly something, and then you investigate further. It's just nobody's investigated further. Except for TikTok. TikTok took it upon themselves...  
[laughs]

**Justin:** Yeah, get in there.



**Sydnee:** To investigate further. This is all of the evidence. There has been, like, over time some in vitro studies, meaning in a lab studies, of like, "What if we take these extracts of papaya and put them on, like, inflamed tissue," in a petri dish or in a rat or something, or like, tumor cells or to stimulate the immune system, all these different things.

But none of this has been done outside of laboratory sort of initial investigations. No routine evidence has been derived from this that has shown it is effective on any of these things.

So, papaya seeds are not a cure for anything. They do not treat anything. They do not— please do not use them for cancer or parasites or inflammation, infection. Anything. We have no evidence at this point that they do that. So, where does all this... like, why? Because as I was watching these, I'm thinking, like, first of all, most of these users are probably from the US. I'm making this assumption, but at least the TikToks I watched. They have not— I mean, I hope, been recently traveling all over the world. There's a pandemic, so hopefully they haven't been traveling all over the place.

**Justin:** I thought they said they wrapped that up?

**Sydnee:** So, you almost certainly do not have a parasite, people in these TikTok videos. It's just, statistically, it is highly, highly unlikely.

**Justin:** There are countries, as we've covered, where it's pretty common.

**Sydnee:** Yes.

**Justin:** I mean, much more common than in the US.

**Sydnee:** And I'm not saying it's impossible.

**Justin:** Sure, yeah.

**Sydnee:** Certainly, you can get a parasite in the US. It is possible. And if you have recently traveled to a place where parasites are endemic, then yes, you possibly could've gotten infected with a parasite. And I have seen people here in the US who like, went camping and just drank out of creeks for a while and got something like giardia. Which is a parasite you could get. So like, it does happen, but it's incredibly rare.

**Justin:** Right. Not something everybody's struggling with all the time without knowing it.

**Sydnee:** No. Because, you know, we are very lucky in that most of us in the US, not everyone, but most of us have routine access to clean water, our food supply is for the most part safe and uninfected, we have shoes to wear, just things that prevent you from getting infected with parasites that we take for granted we have ready access to.

So, the chances that whatever symptoms you're having are related to a parasite if you live in the US are incredibly low. And beyond that, if you did have a parasite and it came out in your stool, you wouldn't know.

**Justin:** Cause they are microscopic.

**Sydnee:** Yes. There is a worm, and we've done an episode on it before, that you could see in your stool, called ascaris. Remember we talked about it? It's a big roundworm. And I mean it's obv— you know it, too. It's not like a, "Hey doc, do you think this is a worm in my stool?" It's a, "Oh dear God, there's a worm in my stool."

**Justin:** "What have I done? I'm gonna burn my toilet."

**Sydnee:** Yes, like—

**Justin:** "I'm moving."

**Sydnee:** Then you move. No, you know when it's an ascaris, and we did an episode about it, we've talked about this. But everything else, I even— so, as part of my training, I took a course on tropical medicine, a month-long course, and part of what I had to do was learn how to do stool evaluations for O&P, ova and parasite. Because they're really difficult to do. You have to look at a lot of them to get used to what the eggs look like in the stool, to what the actual little teeny forms of the parasite that you can see in stool, what they look like.

It's not as simple as like, just looking in the toilet and seeing it. It's a skill that it takes a while to develop. I am by no means— even though I've taken a whole course in it, I am not an expert in it either, because you really have to practice it for a long time to get really good at it. So, you wouldn't know. Whatever these people are seeing—

**Justin:** It ain't parasites.

**Sydnee:** They're like, "I think it's a worm." It's not. It's just not, I can tell you that. Also, papaya seeds can upset your stomach and give you heartburn. Again, I'm not saying they're deadly, I'm not saying, you know. But some of the TikTok users said that, like, they felt pretty lousy after attempting this. So, drawbacks, to be sure. But why is everyone so obsessed with de-worming themselves?

**Justin:** I dunno.

**Sydnee:** I wanna talk more about that question. But first, let's go to the billing department.

**Justin:** Let's go!

[ad break]

**Justin:** Sydnee, worm fever is sweeping this nation and uh, you were gonna explain it to me.

**Sydnee:** So, first of all I think it's interesting— do you know what the word parasite means?

**Justin:** Um...

**Sydnee:** I came across this. I don't think I'd ever looked up the... etymology.

**Justin:** Para means with or next to, right?

**Sydnee:** Well, it's from a Greek word.

**Justin:** Oh, I'm never gonna guess it then!

**Sydnee:** [laughs] Parasitos, which means "one who eats at the table of another". Ugh. Think about it.

**Justin:** Next to. I got that part right.

**Sydnee:** Okay.

**Justin:** Okay. That's gross.

**Sydnee:** One who eats at the table of another.

**Justin:** So gross.

**Sydnee:** That's because a parasite eats off of you. [laughs] And doesn't give anything back. That's the nature of a parasitic relationship. It takes and takes and takes, and just doesn't give.

**Justin:** Gross.

**Sydnee:** And I think there are several reasons why people are interested, obsessed, terrified, live in fear of this particular thing. One, is that the symptoms can range from, as we sort of already alluded to, the fairly obvious to the very, very vague.

If you are experiencing new onset of nausea, diarrhea, pain, bloating, weight loss, it could be pretty clear like, something is going on, I'm concerned. But if your symptoms are fatigue or a decreased appetite, a little bit of dyspepsia, like upset stomach, what we would call like, "I don't know, my tummy's upset today," that kind thing, or brain fog, I certainly don't think that's very obvious.

**Justin:** Yeah.

**Sydnee:** You know, when you see lists of like, "You might have a parasite if..." and these symptoms are in there, it's tough to know what to do with that information.

**Justin:** A lot of it is just like, it's called being human. [laughs] Like, honestly, especially right now, man. Everybody's more tired than they'd like to be, I think.

**Sydnee:** That's fair. Um, and I think it plays on a very obvious fear. That, like, idea that you've been invaded by something. I think that's scary. And there's something about, I think, for whatever reason, viruses and bacteria that although maybe the past year will have changed this, but I don't feel like you get that sort of disgust response. Especially like, if you think about a virus, it seems like such a s— it's not a sterile thing by nature, but it feels like this weird little half-living, almost mechanical thing.

**Justin:** It's more abstract, too.

**Sydnee:** Exactly.

**Justin:** I mean, it, you know, you don't see viruses running around and think, "Oh, it'd be so yucky if one was inside me," which with worms, I think that happens.

**Sydnee:** Yeah. You can see pictures of— I mean, if you look up pictures of what a tape worm looks like, like its little face and stuff—

**Justin:** I don't mean to use worms and parasites interchangeably, but you all know what we're talking about here.

**Sydnee:** Well, and I— yes. We shouldn't use them interchangeably, there are a lot of parasites that aren't worms, but I think for a lot of these people, laypeople who are trying these sort of at-home natural parasite cures, they are conflating the two, because a lot of them talk about worms coming out in the same breath that they say it's an anti-parasitic.

But there's also, like, a lot of misinformation out there that would urge you to think you do have one. It's not just if you go looking for it, if you have sort of the thought all on your own, "do I have a worm?" and then go looking for the information. Even if you don't have that thought, I feel like there's a lot of stuff out there on the internet that would make you think it.

**Justin:** Yeah.

**Sydnee:** I found an interview that Goop did.

**Justin:** [snorts] So you know it's quality.

**Sydnee:** Mm-hmm. With a naturopath. And it was titled, "You probably have a parasite. Here's what to do about it."

**Justin:** These frigging guys over there. These guys, I tell ya, at Goop. Just the pits.

**Sydnee:** In this interview this person estimates that four out of six of her patients have a parasite. Which I thought was interesting, that she didn't—

**Justin:** [laughs] Make it two out of three?

**Sydnee:** That she didn't reduce it. [laughs] Why didn't you reduce that fraction?

**Justin:** You know, twelve out of eighteen people have parasites. It's a fact.

**Sydnee:** [laughs] I thought it was so strange that it was four out six and not two out of three. Cause two out of three sounds more impactful, frankly.

**Justin:** [wheezes] I mean, I don't know. Four out of six.

**Sydnee:** So, four out of six of her patients, she thinks, have a parasite. And of course they don't know it.

**Justin:** Of course.

**Sydnee:** She also counts candida, yeast, as a parasite in this conversation.

**Justin:** Which I don't think is fair. They contribute a lot to North America and I don't think that label is fair.

**Sydnee:** [laughs] Yeast makes beer, so...

**Justin:** Oh, I meant Canada.

**Sydnee:** Oh. Huh.

**Justin:** Yeah.

**Sydnee:** Oh. This is when I'm gonna get emails where people say "can-dee-da" and I have to remind everyone, we've been over this, I looked it up. Can-did-da, can-dee-da, I think it just depends on where you're from. They're both fine.

**Justin:** Y'all, I beg of you, I beg of you, before you send an email attempting to correct my wife who, as we did outline at the beginning of this, is a physician and professional science communicator, *please* make sure you have your ducks in a row, because if you do not come correct in that email, which first of all, you may not need to send anyway, really just take a sec, but if you do not have all your ducks in a row you're not gonna hear about it. She's too nice. *I'm* gonna hear about it for the rest of the night. "This frickin'— can you believe this?"

**Sydnee:** And I would just like to say on that note, by the way, if I pronounce the name of a city or town or some place wrong, I'm very sorry. Sometimes it is confusing when you're not from that area and we have a place in West Virginia, a town that is named, if you read it, Hurricane, but it is "hurri-can", and if you say "hurri-cane" everybody will be like "Ehh, actually it's hurri-can." And so, just, you know. I'll cut you slack if you cut me slack. Haverhill, Massachusetts. Lookin' at you. Um, anyway. [laughs]

**Justin:** What's the one that was like a point... it was an island— um, Macanaw?

**Sydnee:** Oh yeah, Mackinaw. Not Mackinac.

**Justin:** Not mack-in-ack. And it's not mike-and-ike.

**Sydnee:** [laughs]

**Justin:** Don't make that mistake.

**Sydnee:** So anyway, in this article it says everything is caused by parasites, from rashes, to teeth-grinding, to arthritis. And it's curable, is the great thing, it's all curable with an eight-day goat milk cleanse. And then there's some herbs that she can prescribe to you, probably. Because it's like a bait and a trap thing, because she says that worms really love milk. She thinks goat milk is better than cow milk for reasons that cannot be— I can't really firmly understand.

But goat milk is better than cow's milk and so you put the goat milk in there and the parasites all come out of the walls of your intestines and are like, "Yummy, yummy, yummy, goat milk!" and they get killed by all of the herbs that will kill worms that are in there.

**Justin:** [annoyed groan]

**Sydnee:** It's preferable that it's raw milk.

**Justin:** Yeah, of course.

**Sydnee:** Cause who would wanna pasteurize this stuff?

**Justin:** Ugh.

**Sydnee:** And also, once you've killed the worms and de-wormed yourself, it's important that you stay away from heavy metals, EMF, chemicals, you know. Those things that make you predisposed to getting parasites.

**Justin:** It's hilarious that you're trying to get parasites outta your body and you're like, "Make sure it's raw milk. Because we don't want this pasteurized junk here. I want you to actually introduce something harmful into your system."

**Sydnee:** And I've found— there are a ton of websites like this. I just sorta went scanning, looking for like, what are people who peddle in this sort of thing, what are they saying about parasites? And there was another website from a functional medicine person who listed things like all digestive problems—

**Justin:** What does that mean?

**Sydnee:** Um...

**Justin:** Functional medicine?

**Sydnee:** Uh, functional medicine is one type of alternative medicine. It's fairly hard to define as one thing, it's kind of vague. It's like the idea that like, the root cause of a disease, which is what you have to get to, is based on like— it's like individualized to you and based on what's happening in your body as well as like, things from the outside and different systems. And so like, treatment plans can be individualized.

**Justin:** Okay, got it.

**Sydnee:** Which I know that sounds like a nice thing on the surface, like, well yes, I want my doctor to be listening to me and make a treatment plan that makes sense for me, but it's not like that. It's like, "We wouldn't cure this infection the same way in two people," when like, sometimes, no, you just use the antibiotic that works or whatever. You know what I'm saying?

**Justin:** Yeah. Yeah, yeah, yeah.

**Sydnee:** Okay. Anyway, so again, all of the things that could be symptoms of worms according to this functional medicine professional are things like digestive problems, gas or constipation, skin issues, itching,



rashes, muscle and joint pain, fatigue, never feeling full, constant hunger, which, I mean... that's me, I'm tired, I'm always hungry.

**Justin:** [laughs]

**Sydnee:** Which I just thought it meant I had kids. [laughs]

**Justin:** Yeah.

**Sydnee:** Iron deficiency anemia, again with the teeth grinding, anxiety, itchy butt.

**Justin:** Ha ha ha.

**Sydnee:** Yeah. Although, which, I mean— you know, when a kid has an itchy butt, I do worry about pinworm, so like... but a lot of kids don't come in and are like "I have brain fog and an itchy butt."

**Justin:** [laughs] That's me.

**Sydnee:** The solution is again, like, a list of herbs. Papaya seeds are on the list, but there's also pumpkin seeds or grapefruit seeds or oregano oil, wormwood, a lot of things like that.

There are also a number of like, personal experience type groups out there you can find. There are a ton of Facebook groups like this where people start sharing not just like, their experience with worms, but like pictures of what they think is the worm they found in their toilet. So, pictures of poop. And the recipes that they use, their herbal cures that they propose you should use, or maybe sell on some sort of... I don't know, MLM or whatever. [laughs]

And you know, I found one that the Facebook group got shut down because Facebook says they care about fake medical information, and so they reopened and started instead of saying they're worm cures, they started calling them fairy tales.

**Justin:** Gross.

**Sydnee:** "Can you give me a fairy tale for a five-year-old who has worms?" Or something. Yeah, they were treating kids in these groups, too.

**Justin:** Oh my God!

**Sydnee:** Yeah. And I think all of this drives more fear. Because when you feel sick and you don't know why, and maybe you've been to the doctor a few times and the doctor isn't sure why you feel sick either and you're having— you know, it's a process sometimes. Some things are really easy to diagnose, some things need a few different visits, some different testing, it takes a while to get there.

And if you're feeling frustrated and then you see somebody on the internet who's telling you, "Oh, well here are all these symptoms," and you're like, "I have those," and they're like, "Yeah, it's just a secret worm and the doctors don't want you to know." Which I don't— why would I not — anyway. Then, you know, it can really fix that fear, the "Oh, that's what it is."

And in some patients we see that manifest as delusional parasitosis, meaning they have this fixed, incorrect belief that there are a number of or a singular parasite inside them and its causing all these symptoms and we need to get it out. Which I think would be the subject of a whole other show. I don't wanna get into that too much, because there's Morgellon's is in there and there's a whole bunch of stuff that that has to do with.

But at the root of all this is the simple fact that you almost certainly, if you live in the US, don't have a parasite. And if you do have a parasite, if you do have symptoms that you think are consistent with that, if you have had some sort of like, if you've traveled somewhere where you think you've been exposed to something or if you have been like, like I said, out in the woods drinking unfiltered creek water and you're sick, you should go to a doctor.

Because there are actual, real diagnostic tests we can do where we can investigate your stool and look for it. There are tests, there are labs. I mean, this isn't hard to diagnose. We can diagnose this. And there are actual, real medicines that treat it and make it go away for good.

It's not a process, you don't have to do any sort of cleanse. It has nothing to do with toxins. All of that is fake. It is that simple. It is an infection that occurs very commonly in other parts of the world, and it is incredibly easy to diagnose and treat if it's there.

I thought this was interesting, as I was reading into this, I got into this whole conversation about this fear of parasites and this need to like, that people will put out there to sell you things that you need to cleanse yourself of parasites led to this conversation about what if all parasites vanished?

**Justin:** Ooh.

**Sydnee:** What if we could rid the world of parasites?

**Justin:** Wouldn't that be a great world.

**Sydnee:** No.

**Justin:** Huh.

**Sydnee:** I thought this was really interesting. First of all, everything has a parasite. Not just humans. There are parasites that, you know, feed off of all organisms, right?

**Justin:** Okay, right.

**Sydnee:** So, if you rid the world of parasites, initially it would look really good because in places in the world where people can get infected with deadly parasites, they wouldn't. Which is great. So that's a good thing.

**Justin:** There's probably a lot of plants that would be doing better.

**Sydnee:** But then there are also a lot of predators that are kept— their numbers are kept lower because of parasites. There are lots of things that eat crops whose numbers are kept lower because of parasites. So, eventually what would happen is like, all of our food supplies would be devastated, ecosystems would collapse, the oceans might become like, swampy green mats of plants and things without parasites.

**Justin:** Wow.

**Sydnee:** It would— I mean, it would be bad.

**Justin:** Sounds bad!

**Sydnee:** In the long run, without parasites. Like, parasites are part of our ecosystem, we've evolved alongside them. And there's a lot of interest in, um, I started getting into, like, evolutionary biology, and this

evolutionary biologist Leigh Van Valen came up with this red queen theory. Have you heard of that?

**Justin:** No, I have not.

**Sydnee:** If you're into evolution, then you've heard of all these theories. But basically the idea— it's based on a line from Alice in Wonderland where the Red Queen says to Alice, "Now here, you see, it takes all the running you can do to keep in the same place."

The idea is that you're not more— a species isn't more likely to become extinct over time. It has the same chance of extinction all the time, it just has to continually adapt and change based on pressures from other species to avoid extinction.

And that's like, why we, you know, keep evolving and changing and adapting too, because another species will, so we do, so then somebody else does, you know what I'm— all these species working together to avoid extinction.

**Justin:** Like an arms race.

**Sydnee:** Yeah. To stay in the same place, which is— I don't wanna say on the brink of extinction. The same chance of extinction at all times. An arms race is exactly how people have described it. Which I thought was really interesting.

And it also led to this concept that this means that sexual reproduction is absolutely necessary, because sexual reproduction is a way of creating more, like, genetic biodiversity, right? And that gives us the opportunity to evolve and like, continue traits that are preferable, you know, that are more likely to help you survive and that kind of thing. So, what all of this could lead to is the idea that if we didn't have parasites which force us to evolve in all these different ways to adapt and change and survive then we wouldn't have sex.

**Justin:** Wow.

**Sydnee:** We would just reproduce asexually, because all that, you know, genetic diversity would not be as necessary.

**Justin:** Wow!

**Sydnee:** Which could mean that only those of us who can bear children would continue to survive and just like, asexually reproduce, and those of you Justins who cannot...

**Justin:** Yes. But without the Justins, who would get rid of the spiders?

**Sydnee:** ...Well, certainly we're not gonna have parasites to do it.

**Justin:** That's true. You don't have parasites to kick her out.

**Sydnee:** There's also the less exciting thing, which is the hygiene hypothesis, which I think we've talked about a little on the show before. The idea that it's necessary to be exposed to a certain amount of like, parasites and bacteria and viruses and all these different things, and dirt and stuff when we're younger so that we avoid like, auto-immune conditions and allergies and stuff as we get older.

And without parasites, that would be a problem. So, there are lots of reasons why parasites aren't so scary. They're part of the ecosystem. In many ways, they are necessary to continued global survival of all life. Um, but at the same time, you don't want them inside you. I get that.

**Justin:** [laughs]

**Sydnee:** But you probably don't have 'em. I mean, you still don't. And eating papaya seeds might make you feel lousy for a couple days. It's probably not gonna harm you in any real way, but you don't have parasites to begin with, so...

**Justin:** So no worries.

**Sydnee:** Just eat the papaya.

**Justin:** Yeah. Compost the seeds. Compost 'em.

**Sydnee:** Yeah. Or go plant them? I don't know.

**Justin:** Maybe? Get a new papaya? I don't know.

**Sydnee:** Yeah. But just like, eat papaya, because that's yummy, and don't get medical advice from TikTok. Or Goop, as long as we're at it.

**Justin:** Yeah, or anybody but Sydnee.

**Sydnee:** No! No, no, no, don't, [laughs] don't say that. Just, if you are concerned because you have non-specific symptoms that you're not really sure what's causing them and you need help...

**Justin:** It's probably not a parasite.

**Sydnee:** Go see a medical professional and discuss it with them.

**Justin:** Yeah. Thank you so much for listening to our show. Thanks to The Taxpayers for the use of their song "Medicines" as the intro and outro of our program. And thanks to you for listening and for your support in the Max Fun Drive. Again, thank you so much. You're the best. We'll be back with you again next week, but until then my name is Justin McElroy.

**Sydnee:** I'm Sydnee McElroy.

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

[theme music plays]

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