

Sawbones 455: Marvel Anatomy —Infinity War

Published on May 9, 2023

[Listen here at themcelroy.family](https://themcelroy.family)

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 co-host, Justin McElroy.

Sydnee: And I'm Sydnee McElroy.

Justin: Um, and Sydnee, I am so excited to be here with you—

Sydnee: Oh, well thank you.

Justin: ... to record this great podcast.

Sydnee: Me too, Justin. I really appreciate... You did more work than me on this one.

Justin: Oh, I wouldn't call it work, Syd. I wouldn't. Because once again we are turning to the annals of the Marvel Universe to talk about Marvel Anatomy.

To get the perspective, insight, wisdom, all of it, of Doctor Sydnee McElroy, one of the leading experts not only in biology but superheroes. In superhero biology.

Sydnee: Well, I... I never... I've never claimed that. We try to alternate if we're going to do a heavier, more serious episode to do something that's a little lighter the next time around, to give you a break.

And we're going as light as we go, Justin's taking over... [laughs]

Justin: [saddened] Oh...

Sydnee: ... this one.

Justin: So it's kind of light to a point where it's almost sort of ephemeral? It's almost like not... not very important, you're saying?

Sydnee: I... No. It's very important. I—Well, let me say, I would... You would think that episodes like this would be among our least controversial, as compared to some of the heavier topics we cover.

But what I found the last time you did this is a lot of people [laughs] definitely have thoughts and opinions on the things that we say about Marvel characters. So, it is pretty controversial.

Justin: Okay. They can have whatever opinions they want.

Sydnee: [laughs]

Justin: Let me say something, if I'm reading to you from this book, this is canonically made by the Disney, Walt Disney Corporation, of which Marvel is a subsidiary. So this is just as legit as anything else that you might read.

Sydnee: Yeah, but what I'm saying is, when I start riffing on what I think that means from a medical or scientific or pseudo-scientific standpoint...

Justin: Keep it... Hey, hey pals? Keep it to yourself, alright?

Sydnee: No, that's fine. I appreciate it. I really, I do. No one's been mean. No one has been in the least bit—Like, I don't wanna give that impression.

Everyone's been very kind in their suggestions that perhaps there are other ways to look at these issues.

Justin: You wanna talk about Daredevil?

Sydnee: Sure.

Justin: Uh, Daredevil is a superhero. He is a lawyer. He does not... He is not sighted in the way that we, us, as common humans are sighted.

Daredevil is taking in his environment and the shape of his environment, what things look like with his extremely advanced other senses, okay?

Sydnee: Mm-hmm.

Justin: So, what I want to talk to you about is Daredevil's other senses. Because Daredevil was, I mean, depending on how you want... It was a chemical, okay?

Sydnee: Okay.

Justin: They doused him in a radioactive chemical.

Sydnee: Okay. So this is not... It is not just based on the premise that if you lose one sense, the other ones nat—Like this isn't naturally occurring.

Justin: It's a riff. I would say it's maybe a riff on that.

Sydnee: Like... Well, but, then they... They're enhanced in some way?

Justin: Correct.

Sydnee: Okay.

Justin: Because of chemicals.

Sydnee: Okay.

Justin: Daredevil. He's the defender of Hell's Kitchen, you know this. Which seems pretty gentrified at this point. I don't think any of it—

Sydnee: Like Gordon Ramsay's restaurant?

Justin: No, no, no, no, the neighborhood.

Sydnee: Oh, okay.

Justin: Um, the—

Sydnee: [laughing] Yeah, that seems pretty specific.

Justin: Yeah. And Hell's Kitchen is apparently, from what I've heard from people, very gentrified at this point. It's not really that in need of a specific defender, but...

Sydnee: Oh, okay.

Justin: He does have a day job, so maybe just doesn't have a lot of time.

Sydnee: Wait, he is... That's all he defends is just this one area?

Justin: If you do something outside of Hell's Kitchen, he's like, "No, um, that's fine."

Sydnee: Does that make him feel bad when you look at, like, Spider-Man's responsible for like, all of New York City? And you've got Batman over there in charge of Gotham, which isn't real, but like, looks pretty large.

Justin: I will say this, just to—I mean, Spider-Man is not in charge of all of New York, 'cause Daredevil has...

Sydnee: So he doesn't have to worry about—

Justin: ... Hell's Kitchen.

Sydnee: Minus Hell's Kitchen. Although at the end of the day, Superman defends the whole planet.

Justin: Yeah. But he's a metahuman, like, at a much more advanced level.

Sydnee: [laughs]

Justin: And is from a different—Like if you're Spider-Man... Okay. Here's... Okay, listen—

Sydnee: Doctor Who saves the entire universe.

Justin: Okay.

Sydnee: Repeatedly.

Justin: Okay. So listen.

Sydnee: [laughs]

Justin: I don't want to get off on this. But it does seem to me that if I'm Spider-Man and I got all of New York to worry about, if I see a crime happening in Hell's Kitchen, it is nice to be like, "Okay. That's fine."

Sydnee: [laughs]

Justin: [as Spider-Man] "Daredevil will do that."

Sydnee: [as Spider-Man] "That's not my area."

Justin: [as Spider-Man] "I have the other regions."

Okay. Daredevil has enhanced senses. Okay, first of all. What... What in his brain is helping him to process these sense. There's something—There's a brain part of this. There's different—

Sydnee: There's a brain part?

Justin: There's a brain part of this.

Sydnee: Yeah, well, our senses definitely have brain parts.

Justin: Yes.

Sydnee: But they're all different parts of our brain is what I—I mean, that's part of it. Like if we're talking about eyesight and smell and taste and sound and then like things like touch...

So I don't know if this also means, like, reflexes? Like, does he have enhanced sensation? Like whether it be like touch or reflexes or what?

Justin: It's a cortex. I'm looking for a cortex.

Sydnee: It's, I mean, like all over. Like that—I mean, we're talking about the entire central nervous system...

Justin: Right. So Dare—

Sydnee: And peripheral nervous system, in some of these.

Justin: Fascinating.

Sydnee: Yeah.

Justin: Fascinating, thank you.

Daredevil's somatosensory cortex, the area of the brain that receives and interprets sensory input, is exceptional in its ability to process incoming signals from his enhanced senses.

Sydnee: Okay...

Justin: That lets him—

Sydnee: But then what—

Justin: Yeah?

Sydnee: ... can he do with that?

Justin: It lets him assemble a detailed picture of his surroundings despite his lack of sight.

Sydnee: Right. Okay. No, I understand that part, but like, does he react faster? Does he move quicker? Does he... How...

Justin: I'm talking—

Sydnee: What is the output?

Justin: I'm talking—

Sydnee: That's the input processing...

Justin: Punching. Punching is the output. Punching is the output.

Sydnee: Okay. But like that—

Justin: He punches people better.

Sydnee: But that's a different piece of the...

Justin: Yeah!

Sydnee: Like, these are different pieces of the nervous system at this point.

Justin: I'm not talking to you about the punching!

Sydnee: I'm just saying, like the messages coming in and the messages going out might be different wiring.

Justin: Right.

Sydnee: And so the punching would not necessarily be enhanced by that.

Justin: Honey, I—Okay, listen—

Sydnee: That's all I'm... That's all I'm saying. I'm just talking about—

Justin: Okay, how can he smell that—

Sydnee: It's all just wiring.

Justin: How does he... How can he smell better?

Sydnee: Wear... perfume? Shower?

Justin: Come. On.

Sydnee: [giggles]

Justin: Is this what it's like to be—

Sydnee: You said how can he smell better!

Justin: This is this what it's like to be you? I'm so sorry. How can he smell better?

Sydnee: I mean... are we talking about, like his olfactory nerve is enhanced?

Justin: His olfactory receptors in his nose, there's a picture here, can you see?

Sydnee: [skeptically] Mm-hmm.

Justin: The olfactory—

Sydnee: Yeah.

Justin: [laughs] The olfactories seem to like, descend—

Sydnee: So, there's a—

Justin: ... way deep down.

Sydnee: There's an area at the top of your nasal cavity, the cribriform plate that like, connects up to your brain part.

Justin: Yeah.

Sydnee: You know, the brain pieces. And this like, perforated piece of bone through which these nerve fibers extend.

Justin: How good is it, Syd? He can identify virtually anyone he has ever met, by scent alone, even in dense crowds, and at up to distances of 50 feet. That... That seems too far, right? That seems like too much.

Sydnee: Well, I mean, I think what you're up against is like... And this is where I—If he has been super-enhanced by some sort of mythical chemical that we don't necessarily have in the real world, right? Like this isn't just like his—

Justin: Are you asking me if Daredevil technology is possible in our world?

Sydnee: What I'm saying is that our range of what we can smell, even if you enhanced our sense of smell... Which I mean, this is all based on the idea that we're not using all our brain all the time, which we are.

But even if you could enhance it, there's only so many different things we can smell and differentiate.

And so if you have people who, you know, use the same detergent or something... Like, there's a lot of ways where people could end up smelling fairly similar.

Justin: I have no smell. I don't have much of a smell, so I'm not sure he could track me. That's what I'm saying. I don't naturally have much of a smell.

Sydnee: You... You do.

Justin: I don't really have much of a smell.

Sydnee: You.. You do.

Justin: I'm not a very hairy person. I don't have a distinct smell, though.

Sydnee: [incredulous] What do you mean you're not a hairy per—What... What do those two thoughts have to do with each other?

Justin: You... You have more—

Sydnee: “I’m not a hairy person”?

Justin: You have more BO if you're hairier.

Sydnee: What?!

Justin: Oh, dang. Okay... [laughs]

Sydnee: [laughs] What?!

Justin: Listen. Aw, dang. Never mind. I guess that's wrong too.

Sydnee: Do—

Justin: Daredevil—

Sydnee: Wait, wait, wait, wait, wait, wait. I'm pretty hairy. Do I have more BO?

Justin: Listen, Daredevil’s parietal lobe—

Sydnee: [laughs]

Justin: ... processes sensory input at an exponentially higher rate than the average human brain. I wanted to bring the parate—

Sydnee: Parietal lobe in there?

Justin: Parietal lobe in there too, that’s part of it.

Um. Okay. Daredevil's inner ears can sense changes in sound and pressure, completely imperceptible to most humans. How is his... How is his ear different?

The inner ear and all that stuff. How is it different to allow for him to sense changes in sound and pressure completely imperceptible to most humans?

Sydnee: Changes in sound and pressure. Well I... You know what? I don't know. So much of the inner ear, what we're really talking about, is like balance and proprioception and position in space and stuff.

I'm not sure...

Justin: Well. There is no apparent physical augmentation. It's just a regular ear.

Sydnee: It's just an ear, but his—

Justin: He can't improve... I thought you would like that the Marvel people can't improve on the ear.

Sydnee: On the ear?

Justin: Yeah, one of our more elegant, elegant designs.

Sydnee: I can understand that it would be hard to improve on the ear.

I'm assuming they're just basing this on the idea that he's got, like, more neurons up there firing more, more connections, more synapses.

Justin: I have explained that bit already, I think. Through taste, Daredevil can identify almost any substance, including poisons and toxins at concentration as low as 20 milligrams. He could taste homeop—[laughs] He can taste homeopathy.

Sydnee: Ooh! He could!

Justin: He could taste homeopathy.

Sydnee: [sarcastic] What a useful skill.

Justin: Do you have any guess as to how he's able to do that?

Sydnee: He has more taste buds.

Justin: Incorrect!

Sydnee: [laughs]

Justin: There is no—

Sydnee: [laughs harder]

Justin: There is not an increased number of fungiform papillae. Is that right?

Sydnee: Yep.

Justin: So they're ready for you. They saw you coming.

Sydnee: [laughs]

Justin: It's likely due to the radiation induced development of specific genes related to flavor distinction.

Sydnee: He's a super taster.

Justin: He is a super-duper taster, I would say. Because we have super tasters. He's a super-duper taste.

Sydnee: Charlie insists she's a super taster.

Justin: To a super taster—

Sydnee: She is absolutely...

Justin: ... bitter fruits taste far more bitter, and sweets far more sweet.

Sydnee: She is insistent she is a super taster, that that is why she doesn't like to eat so many vegetables [laughs]—

Justin: We play the —

Sydnee: ... is because she tastes them so much more strongly than we do.

Justin: “John Lee Supertaster” is a They Might Be Giants song that Charlie got very into when she was a kid, 'cause she very much wanted to be.

Sydnee: She will tell you she's a super taster. And that she's allergic to dust, but she's not, so I don't know.

Justin: Daredevil’s skin can pick up on miniscule changes in the temperature and humidity of the surrounding atmosphere.

Now I was gonna ask you how it does this, but I'm just gonna tell you. Ultra-sensitive touch receptors. [laughs] I just don't—I don't think you would, I mean...

Sydnee: There's a lot of... That's... The, nnn... The way we sense touch as in like fine touch, firmer pressure, sharp things that cause pain, the sensation of an itch. These are all different sensations and different receptors responsible.

I mean, there's some overlap between some but like, you can't say on a broad—Like, you can't paint that with such a broad brush. They should know better.

Justin: Well—

Sydnee: They've demonstrated more competency in these areas in the past.

Justin: So well, Daredevil is, you know, he's his own thing. You gotta let Daredevil be Daredevil.

Sydnee: Well, I wasn't gonna try to stop Daredevil from being Daredevil.

Justin: Lucky for you. What do you think about their Daredevil overall? You excited to see him back out in action, he's going to get a new—

Sydnee: I've never seen anything with Daredevil in it, so I don't... I mean, I think it's an interesting—It reminds me of, do you remember the episode of *M.A.S.H.* where Hawkeye temporarily loses his eyesight because of a steam injury?

And then he's really great in surgery because he can smell that a bowel's been nicked when everyone else says there isn't, and he keeps insisting, "Keep checking, keep checking!"

And they find that yes, they did indeed miss a piece of shrapnel and he saves a soldier's life.

Justin: Yeah.

Sydnee: Because of his enhanced sense of smell.

Justin: Yeah. I guess we can all enjoy different forms of entertainment.

Sydnee: [laughs]

Justin: Do you want to talk about Captain America?

Sydnee: Sure.

Justin: [singing] When Captain America throws his mighty shield! All that oppose his mighty shield must yield! [singing ends] Okay.

Sydnee: Is that it?

Justin: [mumble-singing] When the red, white, blue... [mumble-singing stops] Okay. Captain America—Sorry, Dad used to sing all these, like goofy cartoon theme songs from the '60s. And they're so embedded into my psyche that I can't... Okay.

Sydnee: [laughs]

Justin: Captain America relies on his quick tactical thinking. So I'm going to go ahead and tell you that he's smart. Really, really smart. Okay?

Sydnee: Okay. He's very smart.

Justin: Do you know.... How much do you know about how Captain America, broad strokes, 'cause it's always presented in broad strokes, right? They're like—

Sydnee: He got... He got—

Justin: There is always a—

Sydnee: ... injected with a super soldier serum that Tony Stark's dad made. Right?

Justin: Sure. Yeah. I mean, that is definitely a version of it.

But in addition to the super soldier serum, in most comic adaptations, he was also bombarded with Vita-Rays.

Sydnee: What are Vita-Rays?

Justin: Well, hon, they're the rays that activate the super soldier serum [dissolves into laughter].

Sydnee: Are they... By Vita it sounds like vitamin?

Justin: Right. Yeah. Super soldier serum is activated by Vita-Rays. We had just discovered vitamins, I guess, whenever Captain America came around. So maybe we were really excited about `em.

Sydnee: This does sound like something from that era. Like, "Come sit in our super sauna and get exposed to Vita-Rays!"

Justin: Um, the Captain—

Sydnee: “Ladies, the men will be flocking to your side once you get exposed to our Vita-Rays!”

Justin: You'll love this, Syd. The Captain can run at speeds of up to 30 miles per hour and lift more than three times his body weight. He can easily master such diverse combat forms as judo, jujitsu and karate.

How is he able to maintain maximum exertion for long periods like this? How can he do it?

Sydnee: Okay. Well, I would just like to note, first of all, that like there are probably a lot of people out there who have learned multiple forms of martial arts. And they didn't need like, super serum to do it.

Justin: Yeah—

Sydnee: I just want to throw that—

Justin: Yeah but who gave them—

Sydnee: ... that concept.

Justin: Who gave them the idea? Captain America.

Sydnee: [laughs] Uh, no, probably not. But does it have something to do—

Justin: Do you think they—

Sydnee: ... with like his—

Justin: Do you think they easily mastered them? Because I said he easily mastered them. Do you think they easily mastered them? Probably not, right?

Sydnee: Yeah, some people, maybe. I don't know.

Justin: Not easily mastered multiple forms of martial arts. Not easily.

Sydnee: Well, but did he really do it easily? What's easily? That's subjective.

Justin: It said—I know he did it easily because the B-I-B-L-E tells me so.

Sydnee: Okay...

Justin: By which I mean Marvel Anatomy.

Sydnee: I'm guessing that it has something to do with, like, a lack of fatigue in his muscle fibers. Maybe like lactic acid buildup is not quite a problem for him.

Because that's what generally, like we start to get fatigue of our muscle fibers. We build up lactic acid that makes us feel achy and we slow down and we need to take a break.

And so there is something different in his structure that his muscle fibers do not fatigue.

Justin: Sydnee, I'm so impressed because this is one of my favorite ones they have in here.

Captain America's biochemistry is bolstered by optimized blood circulation and enhanced delivery of nutrients and lymph fluids. These heightened processes facilitate the flushing of toxins from his body at a much higher rate than any standard human, allowing him to maintain maximum exertion for long periods without buildup of lactic acid byproduct in his muscles.

Sydnee: You like that?

Justin: Well, you don't—

Sydnee: I just figured that out. You like that?

Justin: I like that. That's good.

Sydnee: Yeah.

Justin: Yeah.

Well, if they came to the same conclusion as you, it makes it feel more scientifically grounded. And it makes me feel like we're closer than ever to the Captain America future that we all deserve.

Sydnee: I'm assuming... Like that's the muscular part of it. There's certainly like a cardiovascular part.

I mean, the heart is also a muscle, but like his lung capacity and all that must be enhanced, you know what I mean? Like everything—

Justin: His lungs and heart function at optimized levels, far beyond those that most human specimens could ever achieve.

See the thing with Captain America is theoretically, he is operating at peak human potential.

Sydnee: Mm-hmm.

Justin: Like, in theory... It's a little bit like Batman. I mean, it's not, but like in theory, this is like the best anybody could ever do.

If you were like really on your macros or whatever. This is what you would be able to achieve, with Captain America.

Sydnee: Yeah, I don't know. I mean, I know what you're saying. And certainly like, as humans evolve, you see some changes. But I mean, they're slow. Obviously you don't see them like the next day.

But all that being said, it's still... I think that it's still sort of predicated on this idea that if we all just drank the right shakes and did the right number of reps that this would be there waiting for us.

Justin: Mm-hmm.

Sydnee: And that's probably... I mean, that—No, it's certainly not true.

Justin: Um—

Sydnee: Also, like running 30 miles per hour is pretty cool, but like we do have cars now.

Justin: That is a wild thing to say. That is a wild... That is a wild thing to say.

Sydnee: I mean, he's not the Flash. What I'm saying is like, yes, I can't run 30 miles per hour, but I have a car that I can get in and drive [laughs] over twice that fast and still not be breaking the law.

Justin: That's a great point. Um—

Sydnee: [laughs]

Justin: [sarcastic] That's such a good point, Sydnee. Gosh. Gosh that's a good point.

Sydnee: Well, what I would say is if Captain America was running by me at 30 miles per hour, I would say, "Get a car!" [laughs]

Justin: Yeah, that would drag him. I think he would have to take a second like, [Captain America voice] "I know I've defeated the Red Skull, but that really hurt me, Sydnee. That really hurt my feelings."

Do you know the Vita-Rays? How—The—According to this, what the Vita-Rats are messing with and what the super soldier serum, it is activat—It is changing epigenetic markers.

Sydnee: [skeptically] Mmm.

Justin: That is the theory behind... Like, the theory behind why this is a... That research worked.

Sydnee: Well, you're talking about like methylation, now. Gene methylation.

And that... You know what's wild about that is like, our technology is not at the point where we can routinely do that, obviously. But that is... Those are active areas of research today.

Because we know that so much of what happens to us health-wise, physical—You know, in terms of our physicality, does have to do with epigenetics.

Justin: Mm-hmm.

Sydnee: There's definitely research into altering, changing, reversing, that process now.

[laughing] Now I don't think anybody's doing it with Vita-Rays, but—

Justin: Yeah. Vita-Rays—That's a great point you just made, Syd. Vita-Rays are an untapped area of potential—

Sydnee: [laughs]

Justin: That I feel like we're not even really getting [crosstalk]—

Sydnee: It's interesting because they're hitting on something that is definitely an area of medical research.

Justin: We are going to take a break.

Sydnee: Yes.

Justin: And when we come back, we've got more great superheroes. But, Sydnee...

Sydnee: Let's go to the billing department.

Justin: Let's go!

[ad break]

Justin: Syd what do you know about the invisible woman?

Sydnee: She is invisible, and a woman.

Justin: Okay, that's huge.

Sydnee: I've never heard of the invisible woman.

Justin: You don't know... Do you know what team she's on, perchance?

Sydnee: A Marvel one? 'Cause that's a Marvel book. I don't know—No, I'm—Who is the—I don't know anything about the invisible woman. I've never heard of the—I mean...

Justin: The Invisible Woman is part of the Fantastic Four, Susan Richards.

Sydnee: Ohhhhh!

Justin: So if you've ever seen the blonde lady in the blue suit—

Sydnee: That's her thing, is she's invisible?

Justin: That is her thing.

Sydnee: Okay. I've never watched any Fantastic Four anything.

Justin: Her brother is the Human Torch.

Sydnee: Okay.

Justin: Johnny Storm, is her brother.

Sydnee: Okay, I assume he gets fiery.

Justin: Correct. And then Mister Fantastic, is strrrrrrettttcchhh...

Sydnee: Stretchy?

Justin: Stretchy.

Sydnee: Okay.

Justin: Yeah, he's stretchy. And Ben Grimm is The Thing. Sometimes—He's made of rocks. Sometimes—

Sydnee: He's just made of rocks, that's his thing?

Justin: I mean... He's hard to hurt, and he's strong, because of the rocks.

Sometimes they put Spider-Man in there. Sometimes it's a robot, you know.

Sydnee: I don't know anything about the Fantastic Four.

Justin: Sometimes... Sometimes Spider-Man has—puts a bag on his head and wears a Fantastic Four outfit, and that's the Amazing Bag-Man.

And that was like a low-rent disguise he had to use one time. I don't know. Look it up.

Okay, so Susan Storm is the Invisible Woman. She is... The way her power works is by changing... [sighs]

This is not biology, so I'm just going to say this part, Okay?

Invisible Woman can render herself completely undetectable across a range of electromagnetic wavelengths. It's not triggered on a cellular level, but it relies on her mental manipulation of light wavelengths.

So she can change the light around her so the light no longer reflects off of her. And rather passes through her, to make her invisible.

Sydnee: Okay. I mean, that would make something invisible.

Justin: Right.

Sydnee: Not that we are capable of doing that but like I understand what they're saying, at least.

Justin: Okay, but she experiences a change, likely, the research is not complete on this.

Sydnee: Yeah, okay.

Justin: She likely experiences a change in her vision when she does this. Can you think of what change... Can you puzzle out what kind of change might happen in her vision?

Now we are getting into some areas outside of biology with this, but I will tell you... I will tell you this. Her vision likely, we're not sure, becomes monochromatic.

Sydnee: I don't... I don't understand that because the light continues to bounce off of other objects around her, right?

Justin: Right.

Sydnee: Just like it did previously?

Justin: Yes. But colored light can't reflect off of her retina. Because she's invisible.

Sydnee: Because it's passing through it.

Justin: Because it's passing through it. So she can only see in black and white when she's invisible, maybe.

Sydnee: Mmm... I feel... Mmm... This... Okay.

Justin: Hm. Interesting.

Sydnee: I would wonder, if you're going to make that argument, how can she see anything?

Justin: It's not an argument, it's a fact, although, admittedly the research is still out [crosstalk]—

Sydnee: I think, why would it be monochromatic? Why wouldn't it just be, "She makes herself invisible, but she also can't see anybody"? Everything else becomes invisible to her. So she is physically still there?

Justin: Yes.

Sydnee: You can touch her?

Justin: Yeah.

Sydnee: She's just invisible.

Justin: She'd rather you didn't.

Sydnee: Well... No, I just mean like she still has physical form?

Justin: Yes. That's correct.

Sydnee: [grunts uncomfortably]

Justin: I just thought that was interesting.

Sydnee: No, it's very interesting. I think that's very interesting. I just think—And I think like—

Justin: I think it's an interesting thought experiment. Again, the research is still very early.

Sydnee: Well, and their concept of how she becomes invisible, that's... I mean, I get that. That's grounded in... Although, can I just say optics is like... That was my worst part of physics.

Justin: Oh, okay. Well, this is a good—

Sydnee: I mean, I still did fine in all of it. I'm just saying. Like this is a—
[laughs]

Justin: This a good brush up for you then, right? This is a good opportunity for you to flex those muscles.

Sydnee: That was an area where I was like, “Can I just get back to gushy things with cells? I’m... All of this refraction and reflection. I just... No thank you.”

Justin: Okay, Syd. Spider-Woman. Do you know Spider-Woman?

Sydnee: Personally?

Justin: No, that would be a wild thing to withhold from me this long in our relationship.

Sydnee: That Spider-Woman is different than Spider-Gwen?

Justin: Right. Spider-Woman is Jessica Drew and she is Spider-Woman. She's completely different.

And what's fun about the spider people is that a lot of them have explained—Like a lot of them have different reasons for why they have the same powers.

Sydnee: So she didn't get bitten by a spider?

Justin: No. Well, how the powers actually physically work.

Sydnee: [laughs] So she did get bitten by a spider?

Justin: How did she...? Man, that's a really good question. How did... How did she become...?

Sydnee: I just assumed this was a multiverse version. Where this person—

Justin: No, it's not a multiverse version.

Sydnee: This was the one who got bitten by the spider instead of Peter Parker.

Justin: Now I have to look this up. Okay, Syd, Jessica Drew lived in London and her family moved to a lab built by her father, and she became gravely ill because of months of uranium exposure.

Sydnee: [snorts]

Justin: To save her life, her father injected her with an experimental serum based on irradiated spider's blood.

Because the serum required a month's incubation, he placed her in a genetic accelerator. And then... I mean that... That's... Yeah, I mean, and then she's finally let out—

Sydnee: I mean, there's a lot of nothings in there, really.

Justin: Yeah. So anyway, spider powers. Um—

Sydnee: Okay...

Justin: But the way she has those powers is different. She is very good at... swaying people. She's very good at, like, bringing people around to her way of thinking.

Sydnee: Ooh... Oh, why?

Justin: Well, that's why I'm asking you.

Sydnee: Well, is that something spiders are good at? Because, generally speaking, when I see a spider, I am not swayed to its side. I'm running as far away from it as possible.

Justin: Unless it writes "Some Pig" and you're like, "Oh my God!"

Sydnee: Oh my gosh, is this like... [crosstalk]

Justin: It is some pig!

Sydnee: Is that where they got this idea with Charlotte's Web, the genesis of the idea that a spider could sway you?

Justin: I could say this with 100% certainty, no. This is a very different method of swaying, that Jessica Drew is able to conduct.

Sydnee: Is it like, pheromones? Is it like some sort of chemical that she's releasing?

Justin: Yes. She has glands beneath her skin that can produce potent pheromones that can alter the emotional state of those in her vicinity.

Sydnee: [sighs] Can I just say like... Men are so predictable. [laughs]

Justin: What do you mean?

Sydnee: I just... It's just, [sweaty male nerd voice] "She has special, like, scents that she releases and men are intoxicated!"

Justin: [laughs hard]

Sydnee: [sweaty male nerd voice] "They can't help themselves!"

It's [dissolves into laughter]

Justin: Fair. No, it's fair. No, no, no everybody. Calm down. Stop yelling. It's... it's fair.

Sydnee: [laughs]

Justin: Okay. She has—This is my favorite. This is the main reason I want to talk about this, Syd. And I don't even know if this is fair, but I did want to mention it, because it is a biological function.

Sydnee: Mm-hmm.

Justin: She produces her wall-crawling ability in a unique and honestly, even for comic books, pretty unhinged fashion.

And last time we did talk about Spider-Man and his ability to use his little... What was the word you used? Like little...

Sydnee: Like hair-like projections? Yeah.

Sydnee: Like, yeah.

Justin: Yep.

Sydnee: We thought we thought it was either that sort of thing. Like, almost like cilia or something. Or we thought it was like a gecko using like hydrostatic or whatever, you know?

Justin: Yeah.

Sydnee: Like that sort of thing. Those were the kinds of things we...

Justin: Yeah.

Sydnee: ... toyed with.

Justin: But she's got... Jessica Drew has one that's different from those.
[snorts]

Sydnee: Uhhh... Does she secrete something sticky?

Justin: Oh my god. Yes. [pause] [laughs]

Sydnee: She does?

Justin: [laughs] Yes.

Sydnee: That was a... That was just a rant. Like what else could you do to stick to things?

Justin: She... Honey, the secret—Ugh. She produces a biological secretion from specialized glands in her hands and feet.

Presumably they are vying for space with the... the...

Sydnee: The pheromone glands.

Justin: The pheromone glands. If accurate this would represent a dramatic departure from Spider-Man's theorized set—Setae-based? "See-tay" based? I don't know. His adhesion.

Sydnee: Yeah.

Justin: The secretion ex... exuded from her glands would need to quickly permeate the pores of the targeted surface. Whether it be a con—And they've listed some surfaces here.

A concrete slab, a stack of bricks or a wall of wooden planks.

Sydnee: You... You can imagine surfaces. You've seen surfaces, you know, surfaces.

Justin: You know surfaces. It would immediately dry, forming a solid grip between her digits and the material in less than a second. That's wild. That's a wild way of doing it.

Sydnee: But then immediately un-dry, I guess?

Justin: Yes.

Sydnee: So that she can lift her hand up and move it again.

Justin: Not dry so much that she... Yeah. It is honestly just wild. It is wild that that's the way it works, Jessica Drew.

Sydnee: I don't... Okay.

Justin: I'm very sorry about that.

Sydnee: Who made this character?

Justin: Wait, who made... Spider—

Justin: Where did this character come—

Justin: Probably—

Sydnee: I need to know about—

Justin: Probably. Oh, it's Archie Goodwin, who was a friend of my dad, actually, Archie Goodwin. Okay, well, yeah. Archie Goodwin, who passed quite some time ago.

Sydnee: Oh...

Justin: In 1998, actually.

Sydnee: Well, I'm sorry to hear that. I won't—I just... I won't criticize too much. I just... Again, I said like, you know of course the female Spider-Woman secretes pheromones that sway men to do her bidding.

And then, of course, also she's— [dissolves into laughter]

Justin: Now...

Sydnee: There's a sticky substance that comes out of her?

Justin: Now here's what I will say...

Sydnee: Come on!

Justin: She was co-created by, because I don't want this to get lost in the shuffle. She was co-created by Marie Severin, who was in comics for a very, very long time. Worked with DC Comics and Marvel. In Will Eisner Comics Hall of Fame. So she was co-creator.

She was an artist, though, so I don't know if she would have come up with the weird... [laughs] the weird hormonal secretions or her pheromones.

Sydnee: The sticky, sexy, heavily scented Spider-Woman.

Justin: Yeah. See, she looks just like this. Just about how you expected, I'm assuming.

Sydnee: Yeah.

Justin: Okay.

Sydnee: I mean, they all wear tight outfits. I'm not gonna sit here and get all... You know.

Justin: I always thought hers was cool. It's kind of got like an hourglass in the middle. I think her costume's neat.

Sydnee: Yeah.

Justin: Okay. We're gonna talk about the Lizard, before we wrap up here.

Sydnee: Alright.

Justin: You know the Lizard, right?

Sydnee: No. I mean—

Justin: He is a Spider-Man villain. He is Dr. Curt Connors, who—

Sydnee: Oh, okay!

Justin: He had—His—

Sydnee: He looks like an alligator, though.

Justin: His bit was he had lost his right arm and was doing—

Sydnee: Trying to regenerate it—

Justin: Exactly.

Sydnee: ... using like lizard technology 'cause their tails grow back?

Justin: Yeah. Now—

Sydnee: I remember this, I remember this.

Justin: When he becomes the Lizard, the changes are not only physical.

He has... It turns... It changes his cognition to that of a, it says here "beast," although it seems like he's trying... he's doing better with that lately, kind of is what they're saying here.

[laughing] Why does his brain become more like... Uh, why does he become more like, savage, when he's in his lizard form?

Sydnee: His... brain stem, hind brain, whatever. That region of the brain, the earliest region, becomes larger and his frontal area becomes smaller? Like the area responsible for executive function shrinks?

Justin: It's actually more of a bypass. His brain chemistry experiences radical rewiring as the cerebellum is bypassed in favor of the basal ganglia.

Sydnee: Mm-hmm.

Justin: The primitive reptilian complex of the human brain.

Sydnee: Gotcha.

Justin: And also it changes the shape of his brain, which I thought you would enjoy. It goes from a pleasing sort of, would you say, ov—Ovular shape?

Sydnee: Yeah.

Justin: Would you say is... To more of a squished—

Sydnee: To like an elongated...

Justin: Squished down, elongated—

Sydnee: ... helmet kind of thing.

You know what's interesting, though, is like... Is that just practical so that it fits in his head, because like his head gets that shape?

Justin: His head gets that shape, so maybe his brain changes that shape.

Do you know how the... This process, do you know [snorts] when it triggered, to make it work with the logic of this is?

Sydnee: No.

Justin: The hybridization process that Connors underwent seemingly activated vestigial DNA already present in the human genome, an artifact of our species' evolution from reptilian ancestors millions of years ago.

Is that how it worked?

Sydnee: Well, I think what they're trying to say is that there are pieces of DNA that are now being used to create proteins.

Justin: Mm-hmm.

Sydnee: Like we're using different data than the data that we typically use to construct humans, right?

Justin: Mm-hmm.

Sydnee: Like we read the instructions of DNA, it makes different proteins, and then these proteins build a human. First in embryology and then ongoing throughout our lifespan.

I'm guessing that like, we're reading the code differently, is what they're trying to say.

Because it wouldn't be like secret DNA that was also extra in there. It's just like, part of the code that's being read differently or that typically isn't processed, isn't transcribed. That kind of thing.

Justin: There is also an interesting side effect of that neural remapping, that I mentioned earlier, that has manifested recently.

And I love the way that books like this have to be written because they are trying to make... I mean, in some cases, decades, of backstory jive with like—

So they mention here... So everything happens like, “recently” or “it used to be that this happened and then recently he...”

Sydnee: [laughs]

Justin: So recently, Connors has recently, developed the ability to telepathically communicate with reptiles. Which is a skill that could be a side effect of his neural remapping.

So his brain is rewired and it somehow made it so he could talk to reptiles.
[laughs]

Sydnee: Now I am not... Okay, I am not a—

Justin: Even they must know that's a bit of a stretch.

Sydnee: I'm not a herpetologist. But do reptiles communicate with each other...?

Justin: Psychically?

Sydnee: ... telepathically? I mean, I know that animals have lots of ways of communicating that aren't talking because animals don't talk.

So like I understand that there's lots of communication methods that I, as a... I'm just a human doctor. I don't understand about animals.

But is telepathically one of them? 'Cause I didn't—I would guess not. But I... I'm not going to sit here and say I know anything. I used to have an iguana. This is as close as I get to any expertise on this.

Justin: A brief survey of available websites on that topic of reptiles communicating telepathically results in a broad spectrum of sites...

Sydnee: Of course, of course.

Justin: ... which seem to range in credibility. Quora is pretty high on there, which is never a good sign.

Sydnee: Yeah.... So then... I'm guessing they don't communicate telepathically, but maybe they have some sort of, I don't know.

I was reading, or I was watching, a TikTok recently about how they used to think that deer were led in directions by a single leader.

And what they realized after observing deer for a very long time is that if you watch a group of deer out in the forest, that they will look in directions as they're pausing.

And when a certain threshold of them are all looking up in the same direction, periodically, then as a group they will decide to go in that direction.

Justin: Hm.

Sydnee: So it's not a single leader. They use the direction that 60-70 percent of them are all looking to decide where the next place they go is.

So it's actually a group decision, but you'd only know that if you watched which way they all look.

Justin: Kind of like the American electoral system. Wow. Political.

Sydnee: [baffled] What?

Justin: Political insight, from me. Huh. Really you think, that one, Syd.

Thank you so much for—

Sydnee: [laughs]

Justin: [laughing] Thank you so much for listening to our podcast. We hope you've enjoyed yourself. Thanks to the Taxpayers for the use of their song "Medicines" as the intro and the outro of our program.

And thanks so much to you for listening. We very much appreciate it.

Syd, anything I am forgetting anything you'd like to say? We got some—

Sydnee: Oh, I just want to thank you for doing the research, as it were, for this episode so that I could take a break and next week we'll get back to business as usual.

Justin: That's going to do it for us. 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.

[theme music plays]

Maximumfun.org.

Comedy and culture.

Artist owned.

Audience supported.