

## Sawbones 472: Marvel Anatomy: Endgame

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**Intro (Clint McElroy):** 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 McElroy.

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

**Justin:** And, uh, it's been a rough week, Syd.

**Sydnee:** Yeah.

**Justin:** Yeah. It's been a rough week. Um, Syd's mom got COVID, which was rough.

**Sydnee:** She is okay.

**Justin:** She's fine.

**Sydnee:** I feel like when you say that, you need to preface right away. She is doing fine. She is through it. She is better. She is symptom-free.

**Justin:** She was a huge help to us with the kids during the week and this week, Syd— The same exact week, Syd was also on hospital service, so it's been a tough week here at McElroy headquarters.

**Sydnee:** Which is just, which— Can I take that opportunity, with those two pieces of information, then, to sort of springboard from that and remind everyone...

**Justin:** Yes.

**Sydnee:** ... that we are in a surge of COVID again, I think that that has been widely reported. And this would be a great time to consider masking in crowded public spaces.

**Justin:** Mm-hmm.

**Sydnee:** This would be a great time to, if you haven't gotten a COVID vaccine or if you haven't gotten the new COVID vaccine that is now becoming available... It's available in some places, um, we— I don't know.

It's available in some limited places in our area. Your area, you might have more, but it's out there! Go to the CDC website, follow the recommendations. If you haven't gotten it, you should get it, um...

And just be aware that if you have something that feels like a cold, it could be COVID and you should get tested and, you know, follow appropriate quarantining guidelines.

**Justin:** Well, if Sydnee is done on her soapbox, I would like to move forward with my episode of Sawbones, please. Is that okay?

**Sydnee:** I'm sorry— It was a very—

**Justin:** You just decided that that was the perfect place for that without really consulting me.

**Sydnee:** It was high on my mind after an extremely busy, busy, I cannot underline...

**Justin:** S'bad out there. Y'all...

**Sydnee:** ... busy week of inpatient hospital service that I have just finished, where our hospital was overflowing day after day.

**Justin:** Even if you think the flu's not a big deal, you keep— Don't take the risk of getting yourself in the hospital right now, it's not good out there.

**Sydnee:** Right, right. Well, because, I mean, it's not all COVID, of course.

**Justin:** Yeah.

**Sydnee:** There's lots of different reasons, but then when you pile on a lot of respiratory illnesses... So anyway, take care of yourselves.

**Justin:** So, today I'm dipping into our third and final chapter in the Marvel Anatomy, uh, series. Thank you, as always, to Marc Sumerak and Daniel Wallace, and illustrator Jonah Lobe for their pioneering work on this tome. Uh, at this point, I have covered most of the anatomical concerns of this book.

**Sydnee:** Anatomical concerns?

**Justin:** Anatomical concerns. And now I am, um, moving into a chapter that I'd think of as, like, ephemera which— By which I mean, this is just stuff that I'm gonna talk to you about comic books, um, and medicine because you didn't have time to research a show, so it's my show and I'm just gonna kind of hold you prisoner and talk to you about stuff.

**Sydnee:** Yeah. I love that.

**Justin:** Let's talk about Throg.

**Sydnee:** Who?

**Justin:** Throg. Briefly about Throg.

**Sydnee:** Throg?

**Justin:** Can you describe Throg?

**Sydnee:** Uh, it's a frog, but it looks like Thor. It's Thor-Frog. I get it! It's Thor-Frog!

**Justin:** Okay.

**Sydnee:** And by looks like Thor, I mean, dressed like Thor. Like, it looks like a frog.

**Justin:** This is gonna sound like a quiz, but these aren't a quiz that Syd could have any idea of the answers for, so I'm more asking her to theorize, not really putting her on the spot with any of this stuff, 'cause who knows? And it's all made up. Syd, is Throg a frog or a bewitched human? Is he a bewitched frog or a bewitched human?

**Sydnee:** I mean, he looks like a frog— Like, he looks... How big is he, scale? Like, is he human-sized?

**Justin:** He's more, like, frog-sized. [laughs]

**Sydnee:** Oh, he's frog-sized?

**Justin:** Yeah.

**Sydnee:** So he's a frog.

**Justin:** Yeah. It's unknown.

**Sydnee:** I mean, he looks like a frog and he's frog-sized, I don't know what... I mean, I can dress a frog like a human and it doesn't make it a human. I've never dressed— I don't know if I could dress a frog like a human... They jump.

**Justin:** Look at his anatomy. Can you see his organs in his body? It's amazing. All of his human organs in his body?

**Sydnee:** Oh, oh— I didn't know where I was looking. Um... Well, I mean— But why do you think those are human organs?

**Justin:** I have no idea, I'm just—

**Sydnee:** They're just organs.

**Justin:** Does that look like a human?

**Sydnee:** I mean, I see... [groans]

**Justin:** You see stuff you recognize, right?

**Sydnee:** I mean, that doesn't look exactly— I mean, I see what appears to be a heart and that I'm assuming is a lung over there. I don't know, it's very...

**Justin:** It's not meant— The parts are not labeled, anyway...

**Sydnee:** ... gooshy and solid. I mean, it might be lungs. I see the curly intestines on the bottom. Those are definitely intestines.

**Justin:** The answer is no one knows. [laughs]

**Sydnee:** So why'd you quiz me on...? [laughs]

**Justin:** It wasn't a quiz! I made it clear it wasn't a quiz before so that wouldn't seem like a trap.

**Sydnee:** I don't— Okay. You're gonna have to tell me that it has special powers or abilities because right now, what you just said is if I took our cat and dressed her as a human, would she be a human now who is, like, parading as a cat?

Or would she still be a cat who's just dressed like a human? And she would still be a cat, so does the frog do anything other than be dressed like Thor?

**Justin:** So this is the current theory. My prevailing theory is that Thor was, indeed, turned into a frog by Loki, as he claimed, unintentionally leaving behind a small sliver of his hammer's enchanted uru metal once the curse was broken.

If an actual frog came across the hammer's fragment and proved worthy enough to lift it, then he might have been imbued with a fraction of Thor's powers. So it's a possibility.

**Sydnee:** So does the— Hold on. Where does the frog— Like, does it do things?

**Justin:** Just, like, Thor stuff.

**Sydnee:** Like, it does Thor stuff?

**Justin:** Yeah.

**Sydnee:** Like, it's super strong and it can throw its hammer around and...

**Justin:** And he's still worthy, even when Thor was a frog, he still proved worthy of lifting Mjolnir, or at least a shard of Mjolnir.

**Sydnee:** So now the frog is always a little bit Thor? It's like a Doctor-Donna situation.

**Justin:** Yes, exactly. I wanted to ask, also, um, about Howard the Duck really quickly, um... But I don't— There is actually, um...

**Sydnee:** Is that— I thought these were all, like, superheroes.

**Justin:** Yeah, Howard the Duck is a superhero, in a sense, but, uh...

**Sydnee:** Is he?

**Justin:** ... there's actually nothing interesting about Howard the Duck.

**Sydnee:** Is he part of the Marvel... I didn't know that.

**Justin:** Yeah. Yeah, that's why he, like, pops in to Guardians. You, like, see him in there.

**Sydnee:** I didn't know that. I've never seen him in Guardians.

**Justin:** Um, I was gonna ask...

**Sydnee:** I've only seen the first of those movies. There's more, right?

**Justin:** Yeah, there's three. I— And the Christmas— You watched the holiday special. That was good, wasn't it?

**Sydnee:** I did watch the holiday special and I will tell you, having not seen so many of those movies, like, there's so many of that whole world that I don't know anything about, I found plot elements of it, a little confusing.

**Justin:** Um...

**Sydnee:** I didn't know what...

**Justin:** It is, there's a lot going on.

**Sydnee:** Star-Lord seemed sad.

**Justin:** Yes.

**Sydnee:** I didn't know why.

**Justin:** It's because not everyone follows his lord and savior Jesus Christ and they'll be going to hell and that bums him out. And that is a big problem.

**Sydnee:** I think you're maybe projecting a bit of the actor's... [laughs]

**Justin:** Yes.

**Sydnee:** The actor's, um, feelings onto Star-Lord, the character.

**Justin:** I think the— It's true, I think the same thing about Mario and Mr. Jurassic Park. [laughs] Whatever his name is.

**Sydnee:** Mr. Jurassic Park?

**Justin:** And Andy Dwyer, sadly. So it is... Um...

**Sydnee:** [sighs]

**Justin:** I know. It's such a bummer— Hey, listen—

**Sydnee:** Don't bum me out.

**Justin:** Do you, uh, do you like Cyclops?

**Sydnee:** He seems fine. I mean, I— Okay. Oh, my gosh.

**Justin:** He's kind of a butthead honestly.

**Sydnee:** I'm gonna say this, having not seen anything recent that has to do with these characters. Um, I always preferred Wolverine and...

**Justin:** Oh, you're a bad girl, huh? I love it.

**Sydnee:** I always thought, like, why doesn't Jean Grey stick with Wolverine?



**Justin:** You—

**Sydnee:** But this is the era of X-Men that I am speaking from, so.

**Justin:** Honey, honey, honey, honey...

**Sydnee:** Just accept that.

**Justin:** You married the least Wolverine guy that I know. Every man I know is more like Wolverine than myself. I am a Cyclops. I hate to admit it, it doesn't make me feel good, but I feel like I'm a Cyclops.

**Sydnee:** Honey, I'm enough Wolverine for both of us.

**Justin:** Oh, that's beautiful. You know Cyclops's power, though, right?

**Sydnee:** He's got the laser eye.

**Justin:** Yeah, he's got eye beams.

**Sydnee:** So he's got to— Now, are there two eyes under there or one?

**Justin:** [laughs] It's just one big— That would be rad, if it was, like, "actually, here's my thing. One huge eye." No...

**Sydnee:** Well, I don't know!

**Justin:** ... that's kind of what the— The idea is that the beam, the visor is, like, his one eye. Like, that's his—

**Sydnee:** Well, he has to wear it, right?

**Justin:** He does have to wear it. Now, this is... Now— Okay, oh, gosh, Sydnee, you're already ahead of the game here, this is fantastic.

**Sydnee:** Right.

**Justin:** Why?

**Sydnee:** He can't control it. So, like, if he takes it off, he's just shooting eye beams, right?

**Justin:** Okay—

**Sydnee:** Is that right?

**Justin:** Yes, that's correct.

**Sydnee:** Okay.

**Justin:** That's absolutely correct. It was rough going until Professor X was, like, "Try these ruby quartz glasses." It was tough at the, uh, Cyclops household.

**Sydnee:** Okay, okay, okay.

**Justin:** Yeah.

**Sydnee:** He was born this way.

**Justin:** Uh, yes. With his mutant abilities.

**Sydnee:** Like, did they, as soon as the first time he opened his eyes...

**Justin:** No. This is what's great!

**Sydnee:** I was gonna say, 'cause he would have wiped out everybody in the delivery room, in the hospital, and... Well, probably not the delivery room, he probably didn't open his eyes right away...

**Justin:** So...

**Sydnee:** But, like, early on, like, in the hospital.

**Justin:** Yes, while this varies, the... From my understanding as, uh, an only passing comic book fan, the mutant abilities tend to emerge, like, during puberty. It's like, uh, as you hit your teenage years, that's when your mutant abilities manifest. Now, Cyclops...

**Sydnee:** [laughs] 'Cause a baby with laser eyes?

**Justin:** Sweet.

**Sydnee:** No, terrifying!

**Justin:** Terrifying. But he can't control them, but why? I didn't know this until I started researching this. Think about Cyclops and imagine, like, a person who had incredible laser eyes. Do you know why he can't control it?

**Sydnee:** No.

**Justin:** He used to be able to.

**Sydnee:** Oh! He stopped being able to?

**Justin:** Mm-hmm.

**Sydnee:** No.

**Justin:** It says he sus— [laughs]

**Sydnee:** Wait, is this— Does it— Is there some sort of medical, like, I mean... You can't control your visual acuity. Like, it's not, like, I can... I am, my visual acuity is very poor, right? I'm 20-400, in case you're curious about how well can Sydnee see.

**Justin:** Yep.

**Sydnee:** Um, 20-400. So I have to, out in the world, or essentially all the time, wear glasses or contacts. I can't control that. Like, that got worse as I got older. My visual acuity got, uh, less and less and less, and I can't, like, will it different. I couldn't have exercised in some way to control it better. Is that why? Is it the same idea?

**Justin:** Head injury. Head injury.

**Sydnee:** Oh, okay. Well.

**Justin:** Um, uh, so you know, these are incredibly powerful blasts, right? One of Cyclops' full power blasts can puncture an inch-thick steel plate at close range and travel as far as two kilometers with proportionally diminished effects. Now, Sydnee...

**Sydnee:** Can it go through lead?

**Justin:** He's not Superman— [sighs] How can such— Now this is my question to you.

**Sydnee:** I was just curious.

**Justin:** How can such a force be generated inside Cyclops' skull cavity without pulverizing his cranial matter?

**Sydnee:** [laughs]

**Justin:** It's wild if you think about it, right? There's concussive blasts—

**Sydnee:** What is the laser made out of?

**Justin:** Concussive force energy.

**Sydnee:** So it's not photons? It's not a light laser.

**Justin:** It is only described as concussive energy, concussive force beams.

**Sydnee:** Okay, so why can we—

**Justin:** And the word concussive is right in there, but he doesn't get a concussion, he doesn't scramble those brains.

**Sydnee:** So they're waves?

**Justin:** Uh...

**Sydnee:** Not particles?

**Justin:** They are—

**Sydnee:** Why can we—

**Justin:** It's energy.

**Sydnee:** Okay. Why can we see it?

**Justin:** 'Cause it would be weird in the comics— Well, okay, the practical answer is that maybe the glasses make it red, but it's always been red, even when he's not wearing the glasses, so.

**Sydnee:** Yeah.

**Justin:** Yeah. So why doesn't it turn his brains to mush? [laughs] This is— I've got to just tell you because it's so wild.

**Sydnee:** I know, I can't even... I mean, like, I'm sitting here trying to, like, stretch my creative medical whatever that is...

**Justin:** One theory... Listen. I could stretch my absolute nonsense muscles as far as I could get them, and it still wouldn't get here.

**Sydnee:** I thought it was a light laser. Like, I thought, I mean we're talking about different forms of energy now...

**Justin:** The present? Okay. One—

**Sydnee:** Can I just say, by the way, physics is not my area. I just— I'm apologizing to listeners, like, I like the gooshy stuff, I like the oozy stuff...

**Justin:** Is this what it's like to try to get through a show?

**Sydnee:** I'm just— Well, I just want to let everybody know, I like the gooshy-oozy, I'm a biology person. Chemistry can get up in there, too. Physics, I'm weak there. That's my weakness.

**Justin:** [overlapping] Okay, that's fine— Not— This isn't for you!

**Sydnee:** [laughs]

**Justin:** Every other episode is for you!

**Sydnee:** Go ahead, go ahead.

**Justin:** One theory I've considered is that Cyclops' eyes act as, uh, miniature dimensional portals, allowing instantaneous access to an alternate reality rife with concussive energy.

**Sydnee:** I would never have guessed that.

**Justin:** Within his eyes, the presence of ocular retro reflectors, similar to those used by nocturnal mammals for light amplification, can potential cycle the ever-present concussive energy through amplifying tissue, perhaps optical crystalline of the type used for laser amplification, until Cyclops releases the energy in a focused blast.

Now, admittedly, continual reflection of concussive force beams could result in an internal trauma, uh, or perceptual disorientation, but perhaps there are biological safeguards in place I have yet to discern.

**Sydnee:** When you say "I" have yet to discern... Who is that?

**Justin:** The author.

**Sydnee:** Who is I— Oh, the author.

**Justin:** The author of this book is not— No. In fiction, the kayfabe is that it's, uh, Black Panther.

**Sydnee:** Oh, okay. Oh, okay.

**Justin:** So he's, like, he's studying up on...

**Sydnee:** 'Cause the use of first person there really threw me for a second.

**Justin:** Yeah, don't be afraid.

**Sydnee:** Uh, okay. Well, um. I would never have guessed that and also, um, again, like, multidimensional theory isn't exactly my area of expertise?

**Justin:** Listen, it really threw me for a loop, too.

**Sydnee:** But is there a— Are we presupposing there is a dimension that is just, like...

**Justin:** This is what I like the most about it.

**Sydnee:** ...a bunch of concussive energy and that's it?

**Justin:** [laughs] It's a bad dimension.

**Sydnee:** I'm assuming there's no living things.

**Justin:** No, just a bunch of groovy concussive force blasts that he's always tapped into. That would be a wild...

**Sydnee:** What...

**Justin:** Yes, that's— Yes.

**Sydnee:** Can you imagine what, like, butterfly effect... What choices would we have had to make differently to create the world of just concussive energy?

**Justin:** That's the world where Clay Aiken lost American Idol and then it just spiraled out of control from there.

**Sydnee:** I thought he did lose. No, I thought he did lose.

**Justin:** Then it's the world where Clay Aiken won. He was always a winner in my heart.

**Sydnee:** I thought— I mean, I know he has gone on to have a very successful career, but I didn't think he won.

**Justin:** He's a winner, yeah.

**Sydnee:** Oh, gosh, that was so long ago.

**Justin:** My mom loved Clay Aiken.

**Sydnee:** I loved Clay Aiken. And also everybody's mom did love Clay Aiken.

**Justin:** That's true. He was, like, yeah. Um, okay. Do you know about Beast? You know Beast? Big blue cat?

**Sydnee:** Yeah. Yeah.

**Justin:** Well, he's not a cat.

**Sydnee:** I know Beast.



**Justin:** He's a big blue guy.

**Sydnee:** No, he's a big blue guy and he's smart, right?

**Justin:** He's super smart.

**Sydnee:** That's—

**Justin:** You can tell because he's played by Kelsey Grammer in the original films.

**Sydnee:** Well...

**Justin:** Um, [singing] "Hey, baby, I hear the—" Yeah.

**Sydnee:** Yeah, we could debate Kelsey Grammer all day. Let's not— Let's not do that.

**Justin:** Hey, get this. Get this. "Hey, baby, I hear the blues a-callin'."

[pause]

**Sydnee:** Oh, so maybe that was a reference.

**Justin:** 'Cause he's Beast. 'Cause he's Beast!

**Sydnee:** Maybe that was a reference. I'm just saying there's more to smart than, like, being able to play chess or whatever. Listening to classical music. There's some other things.

**Justin:** Um, okay. Syd, um, Beast... His hearing overlaps with infrasonic and ultrasonic wavelengths, far beyond the human range of 20hz - 20,000hz. Now, from what you know of Beast, which is that he's blue, what would you— How would you guess that that happens?

**Sydnee:** That his hearing is so good?

**Justin:** Mm-hmm.

**Sydnee:** Well... Um. He's— I mean there are other animals who use, like, who have better hearing and so the fact that he's Beast... I don't know what kind of animal Beast is, like, in addition to human.

**Justin:** He is a man, Sydnee!

**Sydnee:** Well, I don't—

**Justin:** He's a man!

**Sydnee:** Like, he's— But we call him Beast, which...

**Justin:** If you prick him...

**Sydnee:** ... the connotation is that, like, he's something else, too. I mean, if we start to theorize that, like, he also has elements of, like, the inner ear structure of some sort of animal that has better hearing...

**Justin:** Okay.

**Sydnee:** Well, I mean, like, bats have, like, sonar and stuff, right? So, like...

**Justin:** Beast's ears contain more than three times the number of muscles in a normal human ear, allowing him to reposition them from maximum auditory reception.

**Sydnee:** Yeah. That makes sense— I mean, because there are animals that have better... Right? Like, dogs hear sounds we don't hear.

**Justin:** Mm-hmm.

**Sydnee:** So we don't even have to go into, like, outside— Within the mammalian world, there are better ears than ours.

**Justin:** Uh...

**Sydnee:** Although, our ears are great.

**Justin:** This is... So Beast also has much better vision, uh, than us. Um, much sharper and can see at a greater light range. How do you think that's achieved?

**Sydnee:** More rods and cones.

**Justin:** Uh, increased nerve density in his retinas account for his ability to collect sharper images, but his eyes are similar... If you look at his eyes right here...

**Sydnee:** Is it the shape?

**Justin:** Look, see the eyes right there, with the pupil?

**Sydnee:** Yeah. Yeah, you've got to think about it, again— Gosh, we keep getting to physics. You just have to think about, like, the shape and size of the eye and its ability to, like, focus. Reflect light and focus on distance.

**Justin:** It's, uh...

**Sydnee:** Kind of like a camera.

**Justin:** His eyes are similar to that of, uh, feline pupils. That those— This is just true, which I think is wilder than Marvel fiction, unless we're talking about how Cyclops's eyes work, which is the wildest thing I've ever read.

Um, Beast's eyes are similar to those of a domestic cat with vertical slits that can open and close with remarkable speed. Studies have shown that feline pupils are more than 20 times more responsive than human eyes when

changing between constricted and dilated states, allowing for superior night vision.

**Sydnee:** Hmm.

**Justin:** So Beast's eyes work in a similar fashion, as we understand.

**Sydnee:** That makes sense. Because he's other animal than human and we are also...

**Justin:** I mean, it makes a lot more sense than some of the things in this book, I will say that.

**Sydnee:** Now, are you gonna tell me more about Beast or are we moving on?

**Justin:** We're moving on.

**Sydnee:** Okay, well, before we move on...

**Justin:** Don't you dare.

**Sydnee:** Yeah, it's time to go to the billing department.

**Justin:** You're not allowed to do that! I'll do it!

**Sydnee:** Okay.

**Justin:** Well, Sydnee, I'm gonna tell you about it next, our next hero, and boy you're just gonna love it. This one's a lady doctor and she loves gardening...

**Sydnee:** Oh, it's me.

**Justin:** ... and this is just a great one. Yeah. You're gonna be so excited to hear about it. Are you ready to hear about it?

**Sydnee:** I'm ready!

**Justin:** Tough nuggies, because we're going to the billing department.

**Sydnee:** [sighs] Let's go.

[theme music plays]

[ad break]

**Justin:** Colossus, do you know Colossus?

**Sydnee:** Oh, I feel like I should.

**Justin:** You would know him, he's a big Russian guy.

**Sydnee:** I was gonna say, I bet he's big.

**Justin:** He's a big Russian guy, here's Colossus. He's a big Russian guy and his thing is metal skin.

**Sydnee:** Oh, I was gonna say, he looks scary, he looks like, um, a robot.

**Justin:** Yeah, he's not, though. He's a man, as I have to keep reminding you about mutants, they're people just like us. Well, they're homo superior. But you get the idea. They're not actually—

**Sydnee:** So, he's not— Okay, so his metal skin is not the result of, like, android or, like, partial human, partial something else, you know what I'm saying?

**Justin:** Yeah, no. So, this is confusing because Wolverine's, uh, adamantium bones are the result of that as his— thanks to the Weapon X testing.

**Sydnee:** Right. And Cyborg is a machine and man combined.

**Justin:** Yeah. Cyborg?

**Sydnee:** Yeah.

**Justin:** That's in DC, what are you even talking about?

**Sydnee:** Well, I was just... You know. Fictional...

**Justin:** Colossus— [laughs]

**Sydnee:** But, like, this is not that. I'm trying to, like, clarify, like, this isn't— This is, like, Terminator 2?

**Justin:** Yeah. Um...

**Sydnee:** [laughs]

**Justin:** It's exactly— No. Terminator 2 was all liquid metal. You're talking about the T-2000?

**Sydnee:** Yeah.

**Justin:** That was all liquid metal. Colossus just coats his body in metal.

**Sydnee:** Well, 'cause that was still made.

**Justin:** Yeah.

**Sydnee:** This is some... He was born this way.

**Justin:** Yes.

**Sydnee:** Gotcha.

**Justin:** Uh, now, this is what's— It's a thin layer of organic metal. He does not breathe in this state, which is interesting. Uh, which makes Black

Panther think that his skin might be permeable to oxygen, like, oxygen may be able to get through.

**Sydnee:** Hmm...

**Justin:** Um, so, when Piotr transforms into Colossus... How does that happen?

**Sydnee:** How does his skin become metal?

**Justin:** Think, yes.

**Sydnee:** Um... Well...

**Justin:** Because he— I shall also mention, he becomes, uh, he doubles his weight.

**Sydnee:** I don't know how that's possible.

**Justin:** Interestingly...

**Sydnee:** That's—

**Justin:** ... and I don't know why this wouldn't occur to you, he is likely unconsciously drawing from a store of mass located in an alternate dimension.

**Sydnee:** Of course it's an alternate dimension. I was gonna say...

**Justin:** Of metal skin!

**Sydnee:** I mean, because I can—

**Justin:** [wheezing with laughter]

**Sydnee:** I could, again, like, is he able to, like, mobilize... Because we have metals in our body, right? Like, we know that.

**Justin:** Yeah.

**Sydnee:** We know that there are trace metals and then, you know, there's iron in there. Like, we know there's metal and so, like, is he drawing from all the various sources of metal to the surface of his skin? No.

**Justin:** No.

**Sydnee:** He's drawing from an alternate dimension.

**Justin:** Can you look at this, um. There's a...

**Sydnee:** I wouldn't have guessed that again.

**Justin:** There's a really grody cross section of, uh, of Colossus's... I think it's his leg. Can you look at that diagram...

**Sydnee:** Do you think that's grody?

**Justin:** ... and just, like...

**Sydnee:** I mean I guess it is...

**Justin:** It's the prime— It's the fact that it's, like, a slice of his...

**Sydnee:** It does look like a steak. It looks like they made a steak out of his leg.

**Justin:** It looks like a Colossus steak. It's like a vertical slice of Colossus... Or horizontal slice of Colossus steak. How's the diagram looking, pretty good?



**Sydnee:** How's the diagram... So what do we— We have, like... It looks like a steak.

**Justin:** Mm-hmm.

**Sydnee:** And in the middle of the steak, we have the bone. So, like, the round part, roundish. It's a femur, so you know, it's femur shaped, but it's a cross section of a femur. And in the middle of the femur is bone marrow, which is... That's right.

**Justin:** Yeah.

**Sydnee:** We got bone marrow in the bones, so that's alright. And then around that is some, like, it looks, again, like steak. Just, like, red, um, but with, like, the fat through it and everything? And it says, um, "muscles and ligaments," is how that's...

**Justin:** That's accurate, right?

**Sydnee:** Yeah. So, like, that's all. That's how that's labeled. And then outside of it where you would see, like, the skin...

**Justin:** Or epidermis.

**Sydnee:** ... is a metal layer and it says, "organic steel skin." This is not— This doesn't tell you much.

**Justin:** That's accurate. No, that's— Yeah.

**Sydnee:** Well, it doesn't— I mean, I don't know what it's— What am I supposed to know, like...?

**Justin:** I do enjoy the extent to which it looks like a Colossus steak, though.

**Sydnee:** I would like to make that, um, into a cake, like we had to do with cells and...

**Justin:** Um.

**Sydnee:** In school, remember when you had to make a cell into a cake? Or actually, what they told you to do was make a model of a cell and everybody made a cake.

**Justin:** Yeah, I did that.

**Sydnee:** Everybody— I did it too.

**Justin:** It was fun.

**Sydnee:** We all made cakes.

**Justin:** Um, okay, now I'm gonna talk about Deadpool. And I'll just read directly, I don't have a question here, I'm just gonna read to you about this. Um, "super-awesomeness factor. Sure, Deadpool's healing factor can patch him back together once he's been diced up into itty-bitty pieces..."

**Sydnee:** Oh, he can heal really fast?

**Justin:** "... but his most important power wasn't stolen from a hairy little Canadian. This one he was born with: charm. Guy's just oozing with it. And he can pretty much convince anybody to do anything with just a wink and a smile. That's harder with a full face mask, but he's still working on the details. Anyway, what I'm trying to say is that Deadpool is a loveable scamp who is welcome in Wakanda whenever he wants to..." Hey.

**Sydnee:** I don't think he wrote that.

**Justin:** This was written by Deadpool!

**Sydnee:** I think Deadpool wrote that.

**Justin:** Deadpool got into this book somehow...

**Sydnee:** Aww.

**Justin:** You can tell the font is all wild... This guy's irascible!

**Sydnee:** Okay, but can I ask you a question?

**Justin:** Yeah.

**Sydnee:** Is charm something that Deadpool has a lot of?

**Justin:** I mean, yeah, he's the merc with a mouth.

**Sydnee:** Does he use it to manipulate others?

**Justin:** Yeah.

**Sydnee:** And get what he wants?

**Justin:** I guess, yeah.

**Sydnee:** I mean, 'cause I think what you could say is, like, that's not necessarily a superpower or, like, a mutant ability. Like, there are people who have... who are good at social engineering.

**Justin:** Mm-hmm.

**Sydnee:** Who are really good at, like, reading others and then adapting to what they need in that moment in order to get, like... I mean, like, what we're edging into are some of the aspects of, like, sociopathy.

**Justin:** Mm. Yes, right.

**Sydnee:** Now, that has to be coupled with, like, does Deadpool have a conscience?

**Justin:** Deadpool—

**Sydnee:** Like, does he feel guilt? You know? Or experience empathy? I don't know. I don't know those things.

**Justin:** Um... So Deadpool, uh, has... You know, he can heal himself, much like Wolverine. But it says here that damaged neurons within Deadpool's brain are regrown and replaced, but the new synaptic connections formed may result in obscured memories and altered thought processes.

I think that's interesting that the brain can regrow with a mutant healing factor, but it's... Even a mutant healing factor can't regrow it in exactly the same way. You know what I mean? I just think that that's interesting to think about, because the brain is so complex.

**Sydnee:** It's— It's also kind of, uh... It's also kind of, like, um, I think you could— Okay, to get deep for a second.

**Justin:** Okay,

**Sydnee:** I think it's kind of a lovely metaphor, too, for, like, Deadpool is someone who, because of his job, I'm assuming has experienced some trauma.

**Justin:** Yes.

**Sydnee:** Right?

**Justin:** Yes.

**Sydnee:** And I don't know his backstory. Is it a traumatic backstory?

**Justin:** It's not great. It's not great.

**Sydnee:** Well, then, I think that that's, like, kind of a nice way of, like, making a comic book version of how, after we've been through trauma, yes, we can continue to, you know, grow and change and function and have

wonderful lives, but, like, our brains are permanently changed by that. Like, the way we think and process information will always be different.

**Justin:** Yeah.

**Sydnee:** And that's not bad, per se.

**Justin:** No, just like Deadpool.

**Sydnee:** No. It shouldn't be stigmatizing. But it does... It is something to recognize as you move on through your journey in life, that your brain is a little different because of that experience. I think that's kind of lovely.

**Justin:** Um, I— Real quick. I just, I have to show you— There's a part I've circled here. Do you know Mystique?

**Sydnee:** Yeah.

**Justin:** Mystique is one of the mutants.

**Sydnee:** Yeah, no, I know that one from the movies.

**Justin:** Okay, Rebecca Romijn, uh, was Mystique and then somebody else... All these have two actors, because they've done, like, multiple generations with First Class and everything, but...

**Sydnee:** What?

**Justin:** I know the old ones 'cause I'm a old person. Mystique's power...

**Sydnee:** Yeah, no, I remember she's blue and she turns into other people.

**Justin:** Yes. Yes.

**Sydnee:** I thought it was Jennifer Lawrence in the new one.

**Justin:** In the second, that's what I'm saying, yeah. It's—

**Sydnee:** Okay.

**Justin:** Became Jennifer Lawrence and then she was the young Mystique and then older Mystique was Rebecca Romijn. Which I'm sure Rebecca Romijn was just wild about. Um, I...

**Sydnee:** Yeah, that you just said older Mystique? Yeah, that's great.

**Justin:** Yeah, thank you. So I just want to, real quick, rather than tell you about this, I just want to hand over this diagram and I've circled a part for you to specifically... [laughs]

**Sydnee:** ... Okay, so we've got a picture of Mystique and basically, it all looks like Mystique, except for we're looking inside her body at her heart...

**Justin:** [laughing]

**Sydnee:** ... is in her left upper thigh. The vessels are all kind of wonky, too. But whatever. And is that— Are those her intestines over in her left upper arm and shoulder?

**Justin:** [laughing] And does the text say, Syd?

**Sydnee:** Mystique's control over her anatomical structure allows her to shift the placement of her internal organs to avoid fatal injury.

**Justin:** [bursts into laughter]

**Sydnee:** So she moved her intestines into her arm which... [pauses]

**Justin:** I think it is kind of interesting...

**Sydnee:** There are exit points, though, for the intestines, so if you're gonna move the intestines into the arm... Where is the new exit point?

**Justin:** Right!?

**Sydnee:** Because it... Like, there are little pink tubes that are sort of going up her throat there, so you can imagine the entrance point has remained the same. There's her mouth.

**Justin:** Yes.

**Sydnee:** But the exit point is not diagramed and is unclear.

**Justin:** One would hope that before she has to make a BM, she's...

**Sydnee:** She'll move it back?

**Justin:** I do also—

**Sydnee:** Why is her heart in— I'm gonna say, like, putting your heart in your thigh... I don't think that's, um—

**Justin:** Honey, I think that's her brain.

**Sydnee:** That is not her brain.

**Justin:** Honey, I think that's her brain. Look. Look where it's connecting up to. She's moved her brain down into her arm. Why would it be a fatal injury— See, she's moved her heart and brain. Is... where you'd get a fatal injury—

**Sydnee:** Her brain got long and squishy? Like, long and smooshed?

**Justin:** Well, it's in her arm, honey! How else is it gonna fit? [laughs]

**Sydnee:** That's a brain!?

**Justin:** I think that's a brain.

**Sydnee:** It looks all coiled up, like a small intestine.

**Justin:** So, yeah, but I think it's a brain. Um, I—

**Sydnee:** Those are worse— Like, you're gonna get injured— Like, your leg? And also she's not wearing clothes on the leg. Like, her leg is unclothed even!

**Justin:** I think the idea, and this is what I'm trying to parse out, is a situation where my head is here, right? And there's some sort of damage coming towards my head. I'm trying to imagine a situation where it is faster for me to scoop my brain down or just, like...

**Sydnee:** Duck.

**Justin:** Duck! Just, like, not get hit.

**Sydnee:** Or throw your arm up in front of your face.

**Justin:** Something!

**Sydnee:** Okay, can I just say...

**Justin:** You can say anything you want.

**Sydnee:** Now, I— See, this is weird to me because a lot of stuff has kind of played with, like, the way the human body really works and then we sort of expand on that. Here's what I'm gonna say. Your heart sits inside something called your rib cage.

**Justin:** Yes.

**Sydnee:** We call it that because it kind of looks like a cage made of bone. Your ribs, right?



**Justin:** Yeah, right.

**Sydnee:** The reason that it's constructed that way, I mean, on part, it gives a shape... There's lots of reasons. but part of it is that it protects the vital structures inside of it, your heart and lungs.

**Justin:** Mm. Mm-hmm.

**Sydnee:** So it's a good place for internal organs to be, because they're very protected. What cage do you have in your upper thigh? None.

**Justin:** None.

**Sydnee:** So if you get, like, stabbed in your upper thigh, it's going right in there to everything important, whereas, like, you've got some, like, protection in your chest.

Moreover, your brain sits inside your skull, which is an incredibly, like... It's a collection of heavy, thick bones. Well, not all of them are, but, like, the one's around the brain are really thick and tough. It's why, like, when your kid bonks their head for the fiftieth time...

**Justin:** It's fine.

**Sydnee:** Well, I mean, generally speaking, you don't freak out because, like, your brains are well-protected. She has moved her organs to more vulnerable places in that picture, is what I'm saying.

**Justin:** Um, I'd like to talk to you about the Inhumans before we close.

**Sydnee:** Okay.

**Justin:** And the Inhumans are crappy. And they had a movie and I don't care because I think the Inhumans are stupid.

**Sydnee:** I don't know anything about them.

**Justin:** The Inhumans— Well, then, just briefly, here's Black Panther's research.

**Sydnee:** I will say that the Inhumans is kind of... Like, I don't love that name.

**Justin:** Well, they are— It is— So they're the result of Kree - Kree are an advanced space-faring race. Uh, they're the result of Kree experiments performed... They hate the Skrull. It's, like, Kree is, uh, Captain Marvel.

The result of Kree experiments performed on primitive humans approximately 25 thousand years ago. The Kree's test subjects became a new branch of the human species that was far more powerful and adaptable, provided they were exposed to a highly specific environmental trigger during adolescence... during adolescent physical development.

The unique ritual came to be known as terrigenesis. So, they inhale these... The terrigen mist and it changed their baseline inhuman DNA to, um, new proteins begin to form on a strand of inhuman DNA after exposure to vapors produced by terrigen vessels, okay?

**Sydnee:** I don't even know how they read those.

**Justin:** So, that is what the Inhumans are...

**Sydnee:** The ribosomal structure must be different.

**Justin:** They are crappy. Um, I just wanted to tell you briefly about, um, uh, some of the Inhumans 'cause they're all so crappy. Uh, the first is Black Bolt and he's the king of the Inhumans.

But if he talks, then, um, he releases incredible destructive force. The faintest whisper from Black Bolt generates enough force to rock a battleship. With a high decibel scream, he can decimate an entire city. So... Aren't there—

**Sydnee:** Kind of like Black Canary.

**Justin:** Yeah. But, like, better. Like, way more powerful. Uh, oh, oh, oh, oh, oh, oh, oh, oh. He creates the powers, okay? By producing particles in a part of his brain and those interact with ambient electrons to produce a wide variety of powers. What part of the brain do you think these particles are created in?

**Sydnee:** I— Like, to make sound?

**Justin:** Particles produced...

**Sydnee:** I mean, in your auditor— I mean, in your verbal processing, like, in Broca's area?

**Justin:** Whoa! Ladies and gentlemen, tell her what she's won! Particles produced in Black Bolt's Broca's area, the region of the cerebellum that controls speech, interact with a variety of electrons to produce a wide variety of powers. Honey, I know this isn't a quiz, but you did get that one right, and I'm so proud of you.

**Sydnee:** Are you proud of me?

**Justin:** I am so proud of you.

**Sydnee:** Are you impressed with how much brain knowledge I have?

**Justin:** So, I just want you to— I'm laying a— I'm also creating a case against the Inhumans and why they're so crappy. So that guy, you can agree, that sucks, right? But that is the man of the... The man leader, the male leader, Black Bolt, of the Inhumans.

**Sydnee:** Mm-hmm.

**Justin:** His power is that with a single word from his mouth, he can level a city, he can rewrite...

**Sydnee:** Does he also tap into a different dimension?

**Justin:** No, he creates particles in his Broca's area, try to keep up.

**Sydnee:** I really like, though, like, at some point, somebody said, "We're playing real fast and loose with, like, Newtonian physics here." Like, can you create...

Matter cannot be created or destroyed and... like, how are we creating matter wholesale within these people and so they found this loophole where they're, like, "Well, they're tapping into another dimension where the matter is coming from. So, we're not creating the matter, we're just pulling matter from somewhere else."

**Justin:** Um...

**Sydnee:** But in this case, we're just making...

**Justin:** Uh, I want— Now, okay, so... I want to make this point, so that's Black Bolt, the leader of the Inhumans, the king of the Inhumans. But let's meet the queen of the Inhumans, Sydnee. What do you think the queen of the Inhumans' power is?

**Sydnee:** Um... I couldn't even begin to—

**Justin:** Total hair control.

[silence]

**Justin:** The queen of the Inhumans' superpower is incredible hair.

**Sydnee:** Does— What year was this...?

**Justin:** Medusa's hair shafts are approximately five times thicker than human hair with internal fibrous structures analogous to steel cable. Strands of individual hair can be bundled together, reinforcing each to a point where she is able to use them to lift loads exceeding 1.6 tons. [laughs]

**Sydnee:** I mean...

**Justin:** The king of the Inhumans levels a city with a shout. The queen of the Inhumans? Fantastic hair.

**Sydnee:** Well, but I'm assuming she can, like, knock things over with her hair and capture people, probably kill people with her hair, if it's like steel cables.

**Justin:** Yeah, but, like...

**Sydnee:** She could probably decapitate you with her hair.

**Justin:** But you know that they're not real and so they're made up by probably a man and a man is, like, "King? Super voice. Levels a city with a single word, so powerful. Queen? Pfft. Super hair. Moving on."

**Sydnee:** I know. I mean, it definitely feels sexist to me. Um...

**Justin:** The very next...

**Sydnee:** It is a little fabulous, but it is sexist.

**Justin:** Yes.

**Sydnee:** But a little fabulous.

**Justin:** The very next Inhuman in this crappy collection of characters is Triton. that's Black Bolt's cousin. This is Triton. He's a fish man. He looks like—

**Sydnee:** Yeah, he looks like a fish.

**Justin:** He looks like Mr. Shape of Water. He's got...

**Sydnee:** He does look like Mr. Shape of Water.

**Justin:** Now, he has—

**Sydnee:** [laughs] Did they talk about his, you know.

**Justin:** His jumble?

**Sydnee:** Like, we talk about in the Shape of Water?

**Justin:** No. Um...

**Sydnee:** That was a weird moment in that movie, did not expect that.

**Justin:** Yeah. Um, now, I just want to talk about... Uh, so he prefers it underwater, right? He has to be in water, he has an external...

**Sydnee:** [laughing] He prefers it underwater.

**Justin:** He has an external water circulation system that he uses when he's outside, because he's got to be in water. Thanks a lot, terrigenesis.

**Sydnee:** Oh, so he, like, wears a suit with water in it?

**Justin:** Yeah.

**Sydnee:** Aqua suit.

**Justin:** Okay, but, where a lot of these—

**Sydnee:** Aqua socks?

**Justin:** A lot of these cats have increased, um, night vision, but Triton has increased underwater vision.

**Sydnee:** [laughs] I thought you were gonna say day vision.

**Justin:** He has increased day vision, he can see anything in the day time, no problem. [laughs]

**Sydnee:** [laughs]

**Justin:** When other people are, like, "too bright!" He's like, "perfect."

**Sydnee:** So, he has increased underwater vision which is, that's too bad, because we have goggles, so, like... We can keep up. [laughs] That's not...

**Justin:** But how?

**Sydnee:** We can master that one, that superpower.

**Justin:** No, no, no, he has much better...

**Sydnee:** Much better than goggles?

**Justin:** How? Yeah, how? How?

**Sydnee:** He has little windshield wipers on his eyes.

**Justin:** Hey, you're being silly. This is anatomy, okay? This is real, this is serious.

**Sydnee:** Um... Does he have, like, an extra film over his eyes, like, that focuses light better? Like, because I mean, that's part of it, like, you've got to find light sources while you're underwater.

**Justin:** Mm-hmm.

**Sydnee:** And the deeper you go, the less it, like... In order to see, there has to be light. Um, so is he able to, like, focus light sources better somehow? Pick up on light more efficiently?

**Justin:** Uh, so... He has increased quantities of L and M cones in his retina which significantly boost his perception of the green portion of the light spectrum, which enhances his underwater vision.

[silence]

**Sydnee:** Okay.

**Justin:** And I don't have anything to say about Gorgon, the next Inhuman, but look at this dork.

**Sydnee:** I'm assuming that's just— The diagram is why his leg looks that way and he doesn't always run around with his muscles hanging out.

**Justin:** [overlapping] He just has— He just has— He just has goat legs. And the next one's, like... The next Inhuman is Lockjaw, a big dog. I mean...

**Sydnee:** He's just a big dog?

**Justin:** He's just a big dog with a magic fork in his head.

**Sydnee:** Is he a human that turned into a dog or is he just a big dog?

**Justin:** It's a— No, he's the result of Inhuman experiments on canines.

**Sydnee:** Oh.

**Justin:** Yeah.

**Sydnee:** I think this is all very sad. I feel like this is sad, this storyline.

**Justin:** Yeah, all the...

**Sydnee:** Like, this isn't—

**Justin:** All the Inhumans are stupid and that's all I want to say.



**Sydnee:** I feel bad for them. I feel bad for them.

**Justin:** I feel the way about the Inhumans that you feel about most comic books, that it just— They're— It doesn't matter. I think the Inhumans are crappy, sorry.

**Sydnee:** Well, I don't feel that way about most comic books.

**Justin:** That's true.

**Sydnee:** It's not— I don't think they're crappy. I don't have...

**Justin:** No, I think they're goofy. I think the Inhumans are goofy.

**Sydnee:** Oh, okay.

**Justin:** Yeah. I can't take them seriously.

**Sydnee:** I do think some comic books are... But I mean, I read Archie, so, like, I'm not gonna sit here and throw shade on anybody, like...

**Justin:** Sydnee, as always, you have proven yourself to be a wonderful sport. Thank you again to the Marvel Anatomy, uh, book. Because it— Oh, good, our cat has just shut the door on us. That's normal.

Um... Thanks for listening to our show, thanks to the Taxpayers for the use of their song Medicines as the intro and outro of our program. Hey, this is a rarity, but you want to come see us perform live, you absolutely can!

**Sydnee:** Yeah, we never get to do that anymore, I'm excited.

**Justin:** If you head on over to [bit.ly/mcelroytour](https://bit.ly/mcelroytour), you can purchase tickets to our, uh, October 13th show with Sawbones opening, um, and that is going to be, uh, in conjunction with New York Comic Con, but you do not

need a badge. You can get just get tickets and come on out to see it, October 13th. So let's go! Please. Did I thank the Taxpayers?

**Sydnee:** Not yet.

**Justin:** 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! That's gonna do it for us, until next time, my name is Justin McElroy.

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

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

[theme music plays]

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