

TPWKY – Ep 219 – Brown Recluse

[00:00:00]

EAU: "Mrs C.S., aged, 24 entered the hospital because of a spider bite on the ulnar side of the right elbow and a rash over the entire body with the exception of the face. She stated that while riding in an automobile, November 5th, 1928, she suddenly felt a sticking sensation on her right elbow. She removed her coat, ran her hand into the sleeve, and withdrew a small object which dropped to the floor of the car and which, when recovered, was found to be a rather small, tan spider.

Her arm began to pain at once, the pain becoming progressively worse. On returning home an hour later, she examined her arm and found a dark red spot surrounded by an area of pallor. She slept well until 3:00 AM without a sedative, when she awakened with pain in her right arm and a generalized rash, which was most pronounced on the abdomen and back. Her arm at this time was aching and had swollen somewhat. The next day the swelling was very pronounced. Four days later the rash seemed to be fading, but the following day, it was as bad as before. Before entering the hospital, the patient had a rapid pulse, but her temperature reaction was mild, never much over 100 degrees Fahrenheit. She entered the hospital five days after having been bitten.

The patient was anxious and restless. The arms, legs, abdomen, and chest were covered with a scarlatiniform rash with a few small pustules on the legs. On the inner surface of the right elbow was found a small reddened area with a yellow center, resembling a small pustule. The area around the elbow was swollen and tender. The entire abrasion was not more than one-fourth inch in diameter. The treatment was essentially palliative, consisting of sedatives internally and starch and sodium bicarbonate baths. A solution of 0.5% lead acetate was used in wet packs applied to the area of the bite.

The spider was identified by Professor C.R. Crosby of Cornell University as a specimen of *Loxosceles refescens*, a species usually found in Texas, Florida, Mexico, Costa Rica, Europe, and Japan. As yet little reference has been made in the literature regarding its toxicity. So far as my search of the literature enables me to judge, no case of poisoning from its bite has been reported from this region."

EW: Well, well, well.

EAU: Well, well, well,

EW: How about it?

EAU: how about that, Erin?

EW: That was, uh, excerpted from a paper in 1929 by the, uh, by a doctor LF Schmaus,

EAU: Okay.

EW: called Case of Arachnoidism

EAU: Oh, a spider bite.

EW: in JAMA. And this is what a lot of papers point to as the first likely reported scientific, like clinical case study of a bite from a brown recluse.

EAU: Hmm.

EW: a spider nerd, and you heard the scientific name in the firsthand *Loxosceles refescens* is that I think is what it initially was called before they changed it to *reclusa*. I don't know the

EAU: Okay.

EW: of

EAU: also, there's another species that's like the Mediterranean recluse that's like *refuscens* now today. So like who knows which species it actually was at the time, but they're similar.

EW: But yeah,

EAU: Yeah,

EW: you go.

EAU: there we go.

EW: hi, I'm Erin Welsh

EAU: I'm Erin Allmann Updyke.

EW: And this is, This Podcast Will Kill You.

EAU: Today we're talking brown recluse bites.

EW: We are.

EAU: I'm really excited about this actually, Erin.

EW: Me too. I, it's, it's so interesting how large the fear looms in

EAU: Yeah. Mm-hmm.

EW: and infamous, I think is like,

EAU: That's a correct. I think that's a correct and like I can't wait to tell everyone how undeserved the infamy really is.

EW: we're gonna dispel some myths here. We're gonna try to do a little bit of like reputational rehab

EAU: Exactly. Exactly.

EW: um, but also acknowledge that like, you know, they, as you will learn, the bite can be quite

EAU: It can be bad. Yeah, it can be bad.

EW: But there's a lot to cover.

EAU: I'm really excited. We should

EW: finish

EAU: things. Exactly. First up, it's quarantini time.

EW: Is this week we are drinking a tangled web.

EAU: A tangled web.

EW: it is. Hold on. I wrote in my notes 'cause we picked this out. Cherry juice, lime juice, soda, water, and marascino cherry syrup.

EAU: A little bit reddish, a little bit bloody maybe.

EW: Sure.

EAU: Sure.

EW: Yeah. It's delicious. It's refreshing,

EAU: We'll post the full recipe on our website. This podcast will kill you.com and on all of our social media channels, so make sure that you're following us there if you're not already.

EW: Yes. Uh, website has lots of good resources, including actual resources for our each episode transcripts, links to various things like music by blood, mobile, bookshop, uh, et cetera. You know, check it out

EAU: It out.

EW: of your, this podcast will kill you. Needs.

EAU: Mm mm-hmm. Rate, review, and subscribe. We'd like to remind you, shall we get into [00:05:00] this?

EW: do it

EAU: Okay.

EW: quick break.

EAU: So today's episode is not about all spiders by any means because spiders are incredibly varied. There are somewhere between 40 and 50,000 species that we know of, and probably another 90,000 species we have yet to discover or name, and they exist in every ecosystem on the planet except for Antarctica, et cetera.

EW: Yep.

EAU: what we are talking about today is one specific spider, which is the brown recluse *Loxosceles reclusa*. Now, this is one of a handful, literally just a handful of spiders that are considered medically important. In fact, there are at least a hundred related species of *Loxosceles*. Many of the venoms of these different *Loxosceles* species all act very similar. So I'm gonna focus on the brown recluse today because this is like one of the most infamous spiders aside from the

EW: Black widow.

EAU: Black Widow, which I couldn't remember the name of real quick. In the US I feel like the Black Widow is like the most famous. And then the Brown Recluse is also the most famous. I feel like they're equal.

EW: Sure.

EAU: I don't know,

EW: I have no

EAU: I don't have a statistic on that,

EW: yeah.

EAU: But the brown recluse is actually not found in very much of this country. It's really only found across the south central US from like the lower Midwest, like halfway through Illinois. Um, and then down into the Gulf, it goes as far east as like Tennessee, and then as far west as like just to the edge of Texas kind of.

EW: Yeah, it's like not quite in Colorado, for

EAU: No, it's not in Colorado. It's not here in California. There are a few other species in the us, one that is called *Loxosceles deserta*, that is in like Arizona, New Mexico, and a little bit of California.

EW: Hmm.

EAU: Um, and there are a number of other species of, again, medical importance throughout central and South America, including *Loxosceles*

intermedia, gaucha, laeta, and rufescens, which is actually the Mediterranean spider that has been invasive in a number of areas as well.

EW: Hmm.

EAU: So all of these recluse species are these kind of small-ish brown spiders. They're maybe like one to two centimeters in total, including their legs. Some of the older ones could get up to like three centimeters, so they're really not large.

EW: small.

EAU: Yeah. Um, I think we're gonna have to find some pictures to, to post of these too. So

EW: We

EAU: we will. Um, but their legs are very long and slender.

EW: Yeah.

EAU: And they don't have one of those real globe like abdomens that we see in black widows. Their abdomen is a bit more elongated, and their whole body, the celo, thax, the top part and the abdomen, they're quite a bit flatter than other, like real hefty looking spiders. And they tend to sit with their legs quite outright, so they're not all bent up. And that's because they like to hide in teeny tiny little cracks and crevices. So they're really a flatter spider than some big, like, you know,

EW: Right tarantula looking

EAU: exactly. They can vary in color from a like lightish, yellowy brown to almost a gray. Um, or as they get older, they darken, which I think is really interesting. So they can be quite dark brown if they're an older spider,

EW: Yeah.

EAU: And they're very famous for having this so-called violin pattern on their celo, thax or fiddle, a violin or a fiddle. So they're often called violin or fiddleback Spiders. I don't see a violin as hard as I try. In theory, it's like the neck of the violin points towards their abdomen and the body of it is towards their head. I don't think it looks like a violin at all. Um, and there's plenty of

other spiders that have similar like violin patterns, so really that's not a good way to identify them. What is a good way to identify them is that number one, their abdomen and their legs are one color. They don't have patterns on their abdomen or on their legs. So if you see a spider that has a pattern on their belly or their legs have speckles and splotches, that's not a brown recluse, and they have six eyes.

EW: have that as a fun

EAU: So fun.

EW: Yeah.

EAU: In three pairs. So they have these two in the middle and then two on either side is kind of cute and ridiculous looking. Um, and so that's how you can kind of identify them. They make webs like pretty much most spiders, but they don't make those beautiful like Charlotte's web kind of webs like you think of, or wery types. In fact, they make these really tangled mish mush sheet webs that they use to just kind of cover little cracks in [00:10:00] bark or under rocks or holes in the ground, or maybe in a pile of lumber in your backyard or

EW: bookshelf

EAU: bookshelves in your basement, whatever it is, and they can live for a number of years.

EW: That's another of my fun

EAU: Oh, I'm so sorry.

EW: talk about.

EAU: I won't say anything more. Okay.

EW: no, they, it's okay. You can keep going.

EAU: That's all. Literally all I have, Erin. That's the spiders themselves. Okay. So the most important thing about spiders for humans is that they make venom. All spiders make venom. And the last time that we talked about venom was in our Snake Venom episode. Was

EW: Yeah,

EAU: long time ago.

EW: to do more venoms.

EAU: Know. Um, and to distinguish a venom from a poison, which I feel like is important,

EW: Yes.

EAU: A poison is a toxic substance that's produced in nature, so by a plant or an animal that usually can produce symptoms via any kind of contact. So contact with mucus membranes or via ingestion. Whereas a venom is a specific type of poison that is delivered via this specialized system where it has to be injected. Okay. Most venoms are used either for prey capture or as self-defense. And while all spiders have venom and venoms are by no means unique to spiders or even arthropods, lots of animals make venoms. Spider venom is really interesting because it can vary really widely across the spiders. All spiders.

EW: Yeah.

EAU: But in all of them, they're housed in this specialized pair of appendages called the chelicerae, which I think are very cute. Um, and they're basically, they, they, I think people think of them as the fangs 'cause it's what sticks out from a spider's little face. But if you think of like your hand as the actual chelicerae, and then your fingers are the fangs fang sit, tucked up underneath their chelicerae. And then the venom glands are located in the chelicerae. They have a duct that goes down to the tip of the fang and they're surrounded by muscles and nerves. So the spider can actually control how much venom it releases with each bite or whether it releases any venom at all.

EW: Interesting.

EAU: Mm-hmm. And so basically when a spider is ready to, it flicks its fangs out and then stabs 'em in and then releases whatever type, whatever mixture of whatever amount of venom they decide to do.

EW: What are the fangs made of?

EAU: Oh, I don't know.

EW: Okay.

EAU: I don't know.

EW: Just like, is it specialized chiton? Like, why,

EAU: Yeah.

EW: how do they actually penetrate human skin, for instance,

EAU: Yeah.

EW: you know, does it And, and, yeah.

EAU: That's a great question. I don't know. I didn't look that much into detail of it. Most, I mean, spider exoskeletons in general are made of mostly chitin, so I imagine it's just like a specialized, extra hardened chitin. They do have to be large enough in diameter and sharp enough to be able to penetrate human skin. Most spiders, their fangs are not sharp enough or large enough to penetrate human skin.

EW: is, it is, and this is where I didn't even get into, I didn't look into this at all, but it's, it's interesting to think about like brown recluse spiders being quite little.

EAU: Yes.

EW: Why do they have fangs that are capable of

EAU: do that. Yeah, it is interesting. Yeah, I don't have an answer for that little, little beat Bobs. I mean, black widows are real small too.

EW: Yeah, they are.

EAU: Yeah. So I don't know.

EW: Huh. But then similarly sized or larger, spiders don't,

EAU: Don't necessarily. Yeah.

EW: Yeah.

EAU: or maybe their venom is just not as potent.

EW: Not as potent. I

EAU: if their bite can penetrate.

EW: bites. Yeah.

EAU: Yeah.

EW: Hmm.

EAU: So let's talk about the venom of the brown recluse, shall we?

EW: Let's do it.

EAU: It is a lot like, there are a lot of different enzymes contained in this venom. It is not just one thing, but the most important of which we think for human, like the kinds of symptoms that we see from a human bite is called sphingomyelinase D, which is just one type of enzyme. But what it does is it attaches to our cell membranes, especially on our red blood cells, but also on like our endothelial cells. So that's the cells that line our blood vessels and lots of other cells kind of indiscriminately. And what it does is disintegrate these cell membranes so it causes our cells to lyse and break open that not great. And that in our body is going to cause the release of a huge amount of inflammatory markers, right? It's going to stimulate our immune system because we're like, why are our cells breaking open? It's also going to trigger our clotting cascade, which see our hemophilia episode for all the details on that,

EW: four or five years ago, who

EAU: at least, if not more. And so what this means is that things like our red blood cells are being hemolyzed, they're breaking open. The [00:15:00] stuff that's in our red blood cells are spilling out, and our clotting cascade is being activated. And so this can cause both bleeding and a coagulopathy. So blood clots that can form. So then what we can see is surrounding, surrounding the area of the bite where this venom has penetrated, we can see tissue death or necrosis. And as this venom diffuses through our bloodstream, we can see more serious symptoms depending on kind of how far it goes and how rampant the immune response really is.

EW: And does that depend on location of bite?

EAU: It's such a good question. It probably depends on a lot of different things. The location of the bite, how much venom was injected, or whether venom was injected at all. And I tried to get a sense of like, how much venom does a spider bite give you? And I couldn't, I dunno if you found that anywhere. I found one paper that said that the approximate amount of venom per bite was 2000 nanograms. But the citation on that was like a personal communication with some dude who raises spiders. So,

EW: also like that number has no

EAU: It has no meaning exactly like how many milliliters. I don't,

EW: but I, no idea.

EAU: It's a very, very small amount, right? This is a teeny spider. It's injecting a very small amount, but it's very potent venom, right? So it's gonna depend probably on the amount, on the, on the location, on the age of the person. So kids seem to be more adversely affected than adults,

EW: Okay.

EAU: When they get bitten. And then probably other things too, especially when we talk more about the symptoms, if you have something like diabetes that's gonna delay your wound healing to begin with, right? So there's gonna be a lot of individual factors that play into how bad this bite ends up being. And the thing is that, as scary as that venom sounds, right, this venom is diffusing into your skin and blood vessels and disintegrating cells as it goes. It sounds pretty bad.

EW: leaving a trail of destruction.

EAU: You are so unlikely to be exposed to this venom. All right?

EW: Yeah.

EAU: First of all, these spiders are nocturnal. They're not out and about wandering around When we are, they're holed up in teeny tiny cracks and crevices. They are not aggressive spiders.

EW: They're really not.

EAU: These are

EW: recluse for a reason.

EAU: Right. They are really not aggressive. Like there are spiders in Australia that will chase you around the room or like rear up and attack you. And these spiders really don't. Um, they really, really try to avoid contact with you and they will bite you if they are, for example, wrapped up in your summer towels that you finally take out and then wrap yourself around in and they get squished between you and a towel. Those are the kinds of situations that they bite within. Um, but despite their quiet nature, their venom can pack quite a punch. So it's often called necrotic arachnidism or gangrenocutaneous arachnidism, or even *Loxoscelism*.

EW: Yeah, I've seen that a lot.

EAU: When you get inated by a brown recluse. And most of the literature kind of splits the array of symptoms that we can have into four kind of categories. One is no symptoms at all. One is minor injury. I guess that's number two. Three is like a slightly worse skin lesion that may leave a scar. And then finally you can have systemic symptoms. So we can kind of go through all of those. Often the bite itself is not necessarily painful, which can mean that it's hard to know right away if you got bitten. You don't necessarily feel the moment that those fangs puncture your skin. But usually within a few hours of a bite, you might see redness or swelling, and you might have a kind of burning pain or itching, not dissimilar to any other like insect bite really. And then at some time over the next few hours or couple of days, you might see a central area of kind of necrotic tissue or this dead kind of tissue that starts to develop.

EW: Yeah.

EAU: It might look just like a kind of duskier color, uh, that doesn't necessarily look like dead skin. It's just sort of like a duskier color with like a reddish ring around it. Or it could look like kind of a blood blister in the center, right?

EW: All Googleable pictures. If you would like to see for yourself.

EAU: Although so many pictures on Google are like, probably not actually a brown recluse bite.

EW: Well, yeah,

EAU: Yeah.

EW: the story of Brown recluse.

EAU: Um, and then this can progress to basically like a necrotic area of tissue that's usually really well defined. Um, and then surrounded by redness, which depending on the area, could spread like a good ways up, say your arm or something over the course of a few days. Or it might just be right around where that wound is. And even though this can result in an ulcer that eventually kind of sloughs off and takes quite some time to heal, [00:20:00] it generally will heal on its own even without any major medical interventions. And I think it's easy for us to hear the word necrotic tissue and think, that's really bad. I'm gonna need surgery, et cetera. But it's usually just the first couple of layers of skin and that like little bit of dermis that gets affected. And so this usually heals completely on its own.

EW: It's interesting. I was gonna ask about like which proportion, you know, how, how do all bites fall into these different categories of no, you know,

EAU: No symptoms. Yep.

EW: Uh, but I would imagine that it's really difficult to get accurate numbers given how many bites are misdiagnosed, uh,

EAU: Yep.

EW: you know, wounds are misdiagnoses as brown recluse

EAU: Yes, the number that I saw over and over in the literature, and I don't know how they came up with this, but they said that 90% of the time there's like no need for medical intervention at all. So it's only 10% of the time that a bite from a brown recluse would need some kind of medical intervention. And even that doesn't necessarily mean it's severe. It might just mean wound care, right?

EW: Yeah.

EAU: There can be more systemic symptoms like was described in our firsthand account. This like generalized rash, this like red splotchy, little, little bumpy kind of rash that almost looks like an allergic reaction or something. Even that is usually self-limited. So even that, you usually don't necessarily need to seek medical care or people don't need a lot of medical intervention. However, there can be more severe systemic symptoms from a brown recluse

bite. As this venom diffuses through the bloodstream and causes this immune system activation and the hemolysis the breaking open of our red blood cells, we can start to see signs like fevers, chills, nausea, or vomiting. People might show signs like jaundice and dark urine, which means like massive level hemolysis or red blood cells breaking open, and that eventually can lead to renal damage. So kidney failure, even cardiovascular failure, like edema in your lungs, which makes it really hard to breathe. And this can, in the literature it says lead to death, however.

EW: has it?

EAU: We don't really know because there were eight reported deaths in the US that were attributed to brown recluse bites between 1983 and 2004. None of these were actually confirmed by spider identification. So there are reports in the literature of brown recluse bites being fatal, but I couldn't find any that were like really, really confirmed that there was a brown recluse. Either we saw a bite or there was a spider recovered shortly after these symptoms started, and that spider was identified to be a brown recluse. So it's a little unclear if those systemic symptoms really were from a brown recluse bite or not. And that's the thing that makes this so hard

EW: Yeah.

EAU: really hard to definitively diagnose a brown recluse bite.

EW: Or, or any kind of spider

EAU: Any spider bite? Yes.

EW: and like you have to make the right diagnosis,

EAU: Yeah.

EW: do that?

EAU: Do you do that? And technically the, to actually diagnose a spider bite properly, you have to save the spider. So you have to have the spider with you. That spider needs to be identified by somebody who actually has some degree of expertise in identifying spiders, because us as the general public, are really not good at it. There's some interesting papers about people sending in brown recluses. Most of them are not brown recluses. And a lot of times you might not feel the bite initially, so if you didn't witness the spider bite, or if you didn't find

a spider very close to you, or like in your bed when you woke up with a bite or something like that, it's really hard to directly connect those two things. And there are so many other conditions that can mimic these bites.

EW: gosh, so many.

EAU: A staph infection, a strep infection, cutaneous anthrax, a vasculitis, some kinds of cancers, atypical mycobacterial infections, diabetic ulcers, septic emboli. Other bites and venom stings from other kinds of insects. The list really does go on. And brown recluses are not ubiquitous across this country. So they're often diagnosed in areas that they don't even actually exist, which is wild to me.

EW: Yeah.

EAU: But because we don't learn the distribution of spider species in med school, so just saying

EW: learned about brown recluse

EAU: brown recluse bite. And so you see a thing and you're like, and, and someone comes in and says, I think this was a spider bite.

EW: bite.

Yeah.

EAU: So it's it, they're really hard to diagnose. We also don't have any like specific treatment or any specific diagnostics to be like, can I identify brown recluse venom in your blood? We don't have that.

EW: Yeah.

EAU: Um, and there's really no consensus on how we actually treat this. So it's really just depending on what someone's symptoms are, what you're going to do to treat it, which I think is interesting too.

EW: Okay, let's say that you [00:25:00] have some sort of necrotic skin lesion. Does your course of treatment differ based on whether that's caused by a spider bite versus something else? I mean, yes, it, it could,

EAU: It could.

EW: it is kind of interesting, like how, I don't know, like, does, does it?

EAU: Right.

EW: when would you, I mean, maybe if it's like MRSA, you're using antibiotics and

EAU: Exactly.

EW: like,

EAU: I think that's the biggest thing is like whether we need to use antibiotics. If it's just a spider bite, you probably don't, but it might really look like something that you would wanna use antibiotics for. So it is, it is. It's one of those that just is gonna need monitoring. Right.

EW: Right,

EAU: Yeah.

EW: Um, did you you see anything about immunity?

EAU: I did not. Did you?

EW: I did, I mean, only minorly, and I don't know if I actually wrote it down anywhere, but there was a study that looked at, um, exposure like, of rabbits to spider bites, multiple spider bites.

EAU: Okay.

EW: they did say like, okay, yes, this can kill a rabbit,

EAU: Yes.

EW: but.

EAU: have a lot of good animal studies on the effects of, of the venom in animals. Yeah.

EW: but then they also said that those rabbits that did not die from the spider bite then re-exposed, tended to have less severe reactions.

EAU: so interesting.

EW: like, it was not, I don't, I don't think this was a recent paper, and I don't think this was like a super, it was just sort of like discussed.

EAU: Right.

EW: know that degree of immunity

EAU: Yeah.

EW: that was demonstrated clearly or just suggested.

EAU: Oh, that's so interesting.

EW: Yeah.

EAU: Well, Erin, that's brown recluse. can you tell me about these spiders and our, our long, I assume it's a long history with, with these, although I don't know. What is it?

EW: I, you know, that's a great question.

EAU: Okay.

EW: let's, let's see what we can find out.

brown recluse spiders, like we said, are infamous. They are widely feared. They are hated even, I would say there are not a small number of people who actively hate, not just, not just

EAU: Not just brown recluse.

EW: But it is, it is fascinating that of the 53,000 or so species of spiders on this planet, they're, they are only one of a handful with name recognition.

EAU: Yeah.

EW: name a few other ones. Uh, Wolf Spiders.

EAU: spiders. But does, do you, I feel like I can say wolf spider. I don't know that I can picture Well, probably,

EW: I can, um, tarantulas,

EAU: Tarantula, orb weavers beep up. Mm-hmm.

EW: but then there are different types of orb

EAU: I know.

EW: jumping spiders.

EAU: Jumping spiders, they're my favorite.

EW: very,

EAU: They, mm-hmm.

EW: Uh, but, but yeah, these are, these are definitely one of the few celebrities of the Spider world. And based on what you told us, Erin, about these painful necrotic wounds that their bites can cause that fear is understandable. Like, I'm not gonna say it's completely unreasonable to fear spiders, but it is also out of proportion to the actual risk that they pose to most people.

EAU: Yeah.

EW: Like we said, if you compare a map of the range of brown recluse spiders with one of diagnosed bites, a bunch of those bites are well outside the range. Like there was, I think a paper that was describing brown recluse bites in Colorado saying that they are a common seasonal occurrence and it's like they don't exist

EAU: don't exist here.

EW: if they, if they do exist here, they're like transient. And, and I'll get into why, why their, why their spread is not, not very likely.

EAU: Mm.

EW: but anyway, their scapegoats for a lot of different things. Like you mentioned, there have been, uh, diagnosed brown recluse bites that are actually strep, chickenpox, diabetic ulcer, chemical burn, syphilis, Lyme disease, Steven Johnson syndrome, fungal infection. And even in that 2001 Anthrax bio-terrorism, that's when it was misdiagnosed as a brown recluse bite.

EAU: That's wild.

EW: it didn't happen. Like the person who who had this anthrax, cutaneous anthrax did not live in an area where Brown recluse exist.

EAU: But if you don't have anyone who knows that

EW: Right,

EAU: on your medical team, then why? I mean, anthrax isn't exactly common either, so why would that be the first thing that you think of? So like, yeah.

EW: This is, it is sort of like a, it's like when you hear hoofbeats, you think horses not zebras, but I do feel like a lot of the time zebras are brown recluse and everyone thinks zebras

EAU: 100%

EW: don't think zebras, don't zebras

EAU: we treat them like horses, but they're actually zebras. Yep.

EW: Yeah. Um, but yeah, there's, there's, uh, one report that I thought was really interesting showed that of the 600 people, they did like a survey who sought help for a spider bite at hospitals in LA and Arizona, 80% of those bites were caused by other arthropods entirely. so like, not spiders.

EAU: Not spiders.

EW: But the, the reputation of brown recluse spiders is these deadly beasties, just like laying in wait to necrose your limbs. That's actually a relatively recent reputation that they got. [00:30:00] So reus spiders were suspected of causing. Necrotic skin lesions as early as the 19th century in the medical literature, at least, no doubt, people had made the connection long before and been like, spider bite is not. Good.

EAU: bite, avoid.

EW: One, yeah, no one, no one wants a spider, right? the brown recluse itself was first implicated in that 1929 case report that was in our firsthand account, that 24-year-old woman in Kansas who sought medical care after being bitten.

EAU: Okay.

EW: And in that case report, like at the very end, he says, the, well, you know, no case of poisoning from its bite has been reported from this region. So that's, that's not that long. It's less than a hundred years ago. And occasional reports trickled in, in the years that followed. And in 1957 is kind of when things really shifted. So a case, there was a case that confirmed that a bite from *Loxosceles reclusa* could cause necrotic skin lesions. So that kicked off a slew of others. And you can actually see the rise in how often the phrase brown recluse was used starting in about 1960. So have you ever used Google's ngram tool?

EAU: Uh.

EW: Oh, it's like, it's like a tool that shows you how often a certain word or phrase or whatever is used over time. So you plot it and it's like a little bump, and then it's like 1960, it starts to rise

EAU: Oh, that's so interesting.

EW: Commonly used, but it is, it is interesting. Suddenly the world had begun to take an interest in this shy spider. So 1960 and beyond led to this uptick in, uh, fear of this spider. But what else did we learn in this time? I've got a few spider fun facts. A few, I think I have a couple of remaining six Eyes got got that terrible vision. Their nest are not, or their

EAU: Know they had terrible vision.

EW: not very great. Their nests are not super impressive. They can't balloon. So the way other spiders use their silk to like catch a breeze and they'll traverse some distances. So if you think of spider's web, and I think Darwin even called them little aeronauts,

EAU: Okay.

EW: Something like that. But this, this actually keeps their potential for dispersal pretty low. So when specimens are found outside of their typical

range, it usually means that they were transported by human activity. So like, here's a load of lumber, here's a shipping container, here's whatever.

EAU: Okay.

EW: And so is it likely for them to get established in that new area also, probably not based on just environmental conditions. And so actually I found a paper looking at what people think the distribution might shift to as climate change happens.

EAU: saw that one.

EW: north, it's doesn't, it's not range expansion, it's range. Just

EAU: Shift. Yeah.

EW: Um, see, what else? They're super shy. Naturally it's in the name, but even among other brown recluses, there's not a whole lot of aggression. Like they're not social spiders by any means. There are some spiders that are more social, but they're not gonna cannibalize each other if there's, if there's enough food to eat and enough crevices to hide in,

EAU: Okay.

EW: Which is kind of interesting, um, they can grow quite abundant within dwellings. So there's a, there was a house in Kansas that was 270 meters squared, or about 2,900 square feet,

EAU: Okay, big house.

EW: 2055 spiders were recorded over six months. So one researcher caught more than 80 spiders in under an hour by hand. Yeah. yeah, so they do quite well in human habitats and sometimes you, you will find that in the edges of their ranges, like of their geographic range. They're only found within dwellings, like human dwellings because outside maybe it gets too cold

EAU: environment's not great for them. Hmm.

EW: And so they're harder to detect in nature. also can live for a surprisingly long time, even though they are quite fragile and many throughout their lives

will become injured while capturing prey. So they will lose limbs and they don't grow back in subsequent molts. Yeah.

EAU: aw, babies.

EW: There was an experiment that showed that in, in under house, like environments or conditions with like temperature control and stuff, male spiders lived on average 646 days and females lived on average 794.

EAU: So that's like, 2-3 years?

EW: Mm-hmm. But 25% of females lived for more than 1000 days, and the record was 1,755. It's a long time.

EAU: That's a long time. A

EW: are

EAU: very long lived, but just hanging out in your bookshelf in the book you never read.

EW: chilling. Yeah. Uh, because they're, they also do really well under, with very low resources. So. that was with food and water that 1700

EAU: Okay.

EW: But another experiment found that spiders, these spiders can live for six months in airtight containers without food, water, or air.

EAU: What?! [00:35:00] So they just like shut down metabolism entirely. They're just like, we will rest. We are really good at that.

EW: Yep. Yep.

EAU: Oh.

EW: Uh, but when they do dine, they prefer dead prey. Over live prey. And that dead prey could be freshly killed, several months old. Maybe it was killed by insecticides or another brown recluse it. They, that's what they like.

EAU: Okay. Sorry. Then why do they have such intense venom?

EW: I don't know I, I really tried to find like evolutionary blah blah

EAU: Yeah.

EW: ecological role for Brown recluses specifically, and maybe my search terms were off. I don't know,

EAU: Probably not.

EW: maybe we are just unlucky that like, there's like the compatibility that Venom just happens to be really compatible

EAU: With our blood

EW: I don't know.

EAU: breaking. That's just so interesting. If they're mostly eating dead stuff and they're not aggressive even to other spiders,

EW: Yeah.

EAU: Or is it like, 'cause I know, and I, I wish that I had looked into this more, but I know there's like, you know, the, the people who want all to be less afraid of spiders will say how much more potent certain spiders venoms are, but they can't penetrate our skin. Right. Like daddy long legs and stuff. And I, I don't, I've never looked into the veracity of those claims, but like maybe that is the case. And so it's just like combo of bad luck. They've got super sharp little.

EW: wish I wish I knew more.

EAU: So interesting.

EW: But yeah, they're very much sit and wait. Even if so, they'll like kill something and then wait and come back to it later, whatever. But 92% motionless, uh, of their lives, not Motionless

EAU: motionless, imagine.

EW: quite relatable. Yeah. And I'm just like, many days I feel like 92%. Uh, on the reproductive front, they're not very prolific compared to other spiders.

EAU: Okay.

EW: their egg sacks contain, uh, like 50 eggs, about half of which hatch. But there are other spiders that, hundreds to thousands of, of egg sack or that of eggs in their egg sacks. Yep. So these spiders, as you can see, have rich lives beyond their venomous potential, but I will acknowledge that yes, their venom is one of the more interesting things about them. So let's talk about it, uh, in a little bit more detail.

EAU: Okay.

EW: you covered it, all the ins and outs of this specific venom, of the brown recluse. And so what about spider venoms more broadly? Again, they are incredibly, varied. They all spiders produce them? Well, sorry. The vast, vast majority

EAU: Oh.

EW: All spiders produce venom. There are, there's one family that has lost, that had once had apparently the ability, but they've, they've lost the ability to make venom

EAU: Interesting.

EW: Yep. And across the over 50,000 spider species that make venom, they make a bunch of different kinds. Uh, how many? We have no idea because spider venom is relatively understudied compared to things like, uh, snake venom or even scorpion venom.

EAU: Mm.

EW: Most research looking at spider venom has been directed towards these handful of species that are medically important. So why do spiders make venom? Why does anything make venom? It usually falls into one of three reasons. There's defense, there's competition, and there's predation. So most spiders make venom to incapacitate and kill their prey, but defense also, of course, plays a role. So, for instance, uh, some research has found that in some species, males and females make different kinds of, have different types of venom profiles

EAU: What.

EW: With females making more complex, but less, less toxic venoms in

EAU: Huh.

EW: This might be due to how males and females of different species live. So maybe males of a species are more likely to encounter a wide range of prey. Maybe they're, uh, they have more generalist venom, for example, maybe females of a species move around more and carry an egg sack, need to eat more, so they might have a more powerful venom for defense. Venom composition can also change from individual to individual and across the spider's lifespan. Venom is costly to make, so they're typically gonna be very economical with like, there's been studies that show that the amount of venom injected by a spider or deployed by a spider correlates sometimes to prey size.

EAU: Ooh.

EW: So, if a prey is smaller, they're gonna use less. If the prey is bigger, they're going to use more.

EAU: So they're like really making a decision and controlling those.

EW: Well, decision is, yeah.

EAU: Okay.

EW: They modulate how much venom is, is used,

EAU: Oh, how interesting.

EW: they typically will only deploy it as a last resort. So especially in a defensive situation, they're like, can I, can I just run away without, without wasting all of this venom

EAU: Yeah.

EW: Do I have to use it? And so that's why like brown recluse, it's like only in the last resort they're trapped. Oh my God. Yeah.

EAU: Do they? Do we have any evidence? Do they dry bite the way that sometimes snakes do?

EW: think that they do.

EAU: Okay,

EW: I think that's what I read.

EAU: so interesting.

EW: yeah, [00:40:00] spiders can inject their venom with a bite. They can imbue it into their silk so that if a little critter comes, they can start acting to either immobilize it or kill it.

EAU: What.

EW: there's even some spiders that can spray it defensively. Similar to like spitting cobras.

EAU: Outta their fangs.

EW: Yeah,

EAU: Oh, wow.

EW: But however they deliver the venom, whether it's specialist or general, spiders do it well. They are some of the most successful and abundant predators on this planet each year. This is, if you walk away with one fun fact, this is it.

EAU: Okay.

EW: Year spiders consume between 400 and 800 million tons of insects around the globe.

EAU: Whoa.

EW: By comparison, humans consume around 400 tons of meat and fish every year.

EAU: Seriously.

EW: that's what I read. I.

EAU: I am, I am astounded by those numbers.

EW: that's a lot of biomass.

EAU: lot of

EW: a

EAU: biomass.

EW: And most of that is other insects, including those characterized as agricultural pests. A healthy ecosystem means lots of spiders.

EAU: Yeah.

EW: a big role in food webs as both predator and prey.

EAU: Food webs, (drumroll)

EW: Exactly. I mean, we use web for so many different things. I

EAU: I know.

EW: yeah. Um, but they, and in, in cultivated areas like farms and orchards, they are of tremendous importance in keeping down numbers of critters like aphids or, uh, other, any other like pests. Like none are coming to mind right now. But they're especially helpful in areas that are pesticide free. 'Cause you, if you're, if you're like, if you can avoid just like spraying and spraying and spraying, spiders are your friends.

EAU: They are.

EW: Uh, they've also been used in other contexts for biological control of pests. So for instance, some studies have explored the use of spider species that prey on brown recluse to keep numbers down within dwelling. So they're like. Brown recluse do have natural predators. If you don't want a house infestation, that's understandable. They do, they do pose, you know, a medical risk.

EAU: Yeah.

EW: And so you could, so there's been some studies saying, what if we introduce or have present the other spiders that occur in this area that prey on brown recluse?

EAU: I love it.

EW: Great idea. another study found that, uh, they, when they introduced spiders, it's an old study, but they introduced spiders in houses in South Africa that preyed on flies. And this is not brown recluse related, but they found that cases of GI infections declined with the declining fly population

EAU: Interesting.

EW: they would

EAU: Move their poop grossness around.

EW: But spiders are on the decline. Like insects, populations of arachnids also seem to be decreasing over the past decades, across the entire globe. And what that will mean for ecosystems is unclear. Can't be good.

EAU: No.

EW: But one of the major hurdles though in conservation of spiders, just like in conservation of parasites, is the widespread dislike and fear that surrounds this group of animals.

EAU: Yeah.

EW: So there's one study that found that between, uh, 20 and 30% of people in the UK felt anxious or fearful around spiders. And an estimated three to 6% of the global population has arachnophobia.

EAU: That's actually lower than I expect. Three to 6%.

EW: Well, I think it's to have it be characterized like

EAU: Like

EW: an,

EAU: as an actual illness. Yeah.

EW: illness, yeah. It has to reach a certain threshold. There are questionnaires that try to assess this and

EAU: Yep.

EW: physiological responses, but I do think that like that 20-30% of people was specifically in the uk, I think that that's probably fairly standard,

EAU: Yeah.

EW: under

EAU: Yeah.

EW: in some areas. Higher in others. fear of snakes is up there too, as well as like one of the other common phobias. I would guess that more people know the word arachnophobia than they do the phobia for snakes. Do you know the one for snakes?

EAU: Nope.

EW: Oh, see,

EAU: Reptil phobia? No, that's too general.

EW: ophidiophobia

EAU: ophidiophobia?

EW: Ophidiophobia

EAU: Didn't know that.

EW: Yeah. Me either. A fear of spider, like why do we fear spiders? Right? And it's been suggested that it is evolutionarily ingrained within us because they're, the spider bites can be harmful,

EAU: Right.

EW: But the number of spiders that actually pose threat to humans is pretty low. This is kind of a false equivalency, but you are 2,500 times more likely to be killed by a human than a spider. As an example, uh, this fear is also heavily tinged with disgust, which is, is kind of interesting in the context of other ever other animals that we fear, right? Like I don't think snakes is highly associated with [00:45:00] disgust.

EAU: Right. It's just fear. Yeah.

EW: and some researchers have suggested that this presence of disgust points toward it being a learned fear, like

EAU: That's so interesting.

EW: carried down in culture over the years and historically in many regions of the world, spiders were thought to carry disease and transmit disease.

EAU: Huh.

EW: And so maybe fear and disgust linger towards spiders lingers because we thought that they caused disease

EAU: That's so interesting.

EW: It could be both. It could be partially evolutionary, evolutionarily ingrained. It could be learned.

EAU: I always just thought it was the way that they move. I was scared, you know, I was very scared of spiders for most of my entire life and had to unlearn that fear

EW: In Panama.

EAU: In actually, even before Panama, like in part, just doing entomology, having to be able to hold a tarantula to show to little kids. Um, and then, yeah, and then it was just like, I didn't, I was embarrassed to be an entomologist in training and be afraid of spiders. Um, and then having kids, I was like, I don't want them to be afraid. And

EW: Yeah.

EAU: So now I like really have to be like, I'm not afraid at all, but there is just something deep that lingers where when I, like, I will always pick them up and take them outside. We'll look at them. Oh, these are so fun and cool. Look at their little body parts. But there's just something that,

EW: you're freaking out.

EAU: yeah, hide it very well.

EW: it. Conceal, don't feel.

EAU: Yeah.

EW: Yes.

EAU: Thank you, Elsa.

EW: I, I don't feel I like spi. I've never had an issue with spiders. cockroaches and house centipedes have really been my,

EAU: Interesting.

EW: absolute terror.

EAU: Creep out. Yeah.

EW: Vomit. V like feeling like nauseous and cold sweats all over.

EAU: How interesting.

EW: Yeah. But I mean, growing up in Florida we would have the palmetto bugs and they, I was one that like crawled into my shirt and so like, I just, I have, don't like that. Still to this day. Panama was, was rough on the cockroach front. I would find them on my toothbrush.

EAU: yes. Toothbrush.

EW: everywhere in my life

EAU: I remember that.

EW: on my one crawled up my naked leg. Anyway, so, um, but we all have spider stories, it

EAU: do.

EW: Yeah. And spiders loom large in many cultures around the world. In Navajo and Pueblo creation stories, Spider Woman wove into existence, the world and everything in it. And everything she created remains connected to her through spider silk, ensuring continued access to her wisdom and her protection.

EAU: Hmm. That's really nice.

EW: There's the Greek myth of Arachni, a talented weaver who was turned into a spider by the envious goddess Minerva. Mm-hmm. Mm-hmm. She was like, you wanna weave? Here you go.

EAU: Here you go. Weave forever.

EW: But these spiders show us this so many different things. Like there's no one word or personality trait that we ascribe to spiders continuously, right? Like sloths are lazy. Foxes are sly, spiders are everything. They're, they're, this is interaction, this intersection between horror and beauty.

EAU: Hmm.

EW: They're solitary. They're treacherous. So many different things.

EAU: Interesting.

EW: Shelob in Lord of the Rings. Uh, it in Stephen King's, it is a spider.

EAU: Oh.

EW: Uh, they're also women, like

EAU: Yes, Uhhuh.

EW: feminine, they are evoked in stories of femme fatales. These treacherous and deceitful women who

EAU: With their venom.

EW: Mm-hmm. Spiders are also recognized for their creative talent and their hardworking nature. They've given us phrases like web and network spinning a tale, and spiders teach us resilience like in the nursery rhyme of the itsy bitsy spider and crawled up the spout again.

EAU: And then every single time.

EW: Every single time. You just gotta keep doing it. E.B. White, the author of Charlotte's Web wrote quote, once you begin watching spiders, you haven't time for much else. The world is really loaded with them. Isn't that cute?

EAU: That was really cute.

EW: Of, of how he got the idea for Spider, for Charlotte, spider's web for Charlotte's Web is, um, he had a, like, he found a spider in a barn, brought her in a shoebox to his apartment in New York. She hatched a ton of spiders and he just let them like chill.

EAU: Just go.

EW: wanting to see them. And he was enthralled and

EAU: How interesting.

EW: Yeah. And even I think Darwin at one point on the, the voyage of the beagle became infatuated with spiders. He said something like, I am red hot with spiders. Like, he was like, loved watching them and loved watching them balloon across the, the ship.

EAU: That is kind of cool.

EW: true. The world is loaded with spiders. [00:50:00] I, I used to do this a lot, especially in Panama, but I, I highly recommend next time you're somewhere in nature at night. Could even just be a backyard, take out a flashlight, a headlamp, shine it on the ground,

EAU: Yeah.

EW: Those glittering sparkles that you see scattered throughout the grass, throughout the trees, through the bushes. Many of those are spider eyes and it

kind of is like, maybe that's scary at first and maybe it's comforting because how often do you actually see them? How often do you interact with them?

EAU: Right.

EW: These things are doing so much work for us. We don't have to roll out the welcome mats for the brown recluse, the black widows of the world.

EAU: Take them out of your house if you don't want them inside.

EW: Doing this episode, I think, I've never had an issue with spiders, but it did make me kind of take a step back and go, oh, there is a lot of work that these spiders do for us. And they are cute and they are wonderful. And so, um, that's all I've got about brown recluse bites do we have, and spiders in general. I don't know what I'm gonna do for other Spider Venom episodes.

EAU: we'll have more. Don't you worry.

EW: We'll figure it out. But do you have any for me about the epi of spider bites

EAU: no. Erin Uhuh. I think what's interesting is that unlike almost every other disease we've ever covered, we probably overestimate rather than underestimate how often we're bit by spiders in general.

EW: Funny. That is the first, is that the first time?

EAU: I can't remember another time that we, maybe someone who knows our podcast better than we do can tell us, but especially when it comes to spiders like brown recluses. Like most of the time, if you think it is that it probably isn't, which is so interesting. There was a paper from 2006 that went through all of the case reports that they could find of supposed brown recluse bites in the US and of 908 case reports, only 8% of those were actually confirmed with a spider and like confirmation that that spider was a brown recluse.

EW: Yeah.

EAU: So it's really hard to say how often people are actually being bitten and how often those bites are bad enough to really need medical care.

EW: Well, and it's also interesting, it's probably both underdiagnosed and overdiagnosed 'cause how many people get bitten and never realize it.

EAU: even realize it. Exactly. Although there was that paper that you said where they found 2000 spiders over the course of six months in a house.

EW: No one was

EAU: No one was ever bitten.

EW: Yeah.

EAU: Can you imagine

EW: mention that. That is a pretty cool.

EAU: 2000 spiders all around your house? Although that was a big house, you said 2,900 square feet. But

EW: it's a

EAU: that's a big house.

EW: It's, it is reassuring

EAU: It is very reassuring, right? They're just living among thousands of brown recluses and never having any issues with it.

EW: Yeah.

EAU: Being said, I read that in Brazil where there's a different species of Ellis that's most important there. There's about 3000 annual reports of Ellis Bites. Are those all for sure confirmed? I don't know, but that's the data that I have.

EW: Hmm.

EAU: Like you said, it is not unlikely that the distribution of these spiders could change due to future climate scenarios. Not necessarily expand, but who knows? It just makes it more important that people who work in the medical profession know where these spiders live, if they live near you, or have

somebody on staff who's able to help identify spider bites, which I think we don't have enough of. So here's, shout out to your local ologist

EW: Right.

EAU: entomologist.

EW: control do spider bites?

EAU: I imagine that they, but like they're not, you're not gonna be able to like send them your specimens necessarily. Um, as far as I know. So take a picture, but I don't, I don't know. It's, it's great question. But that's, that's all I have, Erin for Brown recluse

EW: Brown recluse

EAU: Brown recluse.

EW: bit of Yeah. PR uplift of

EAU: Pr.

EW: species.

EAU: Don't seek them out. Just leave them be

EW: And that's, and that's our,

EAU: the end.

EW: Should we tell the people where to learn more

EAU: We definitely should.

EW: Okay. I have a bunch of different, kind of an assorted collection of papers by Sandage at all. From 20 2005 Brown Spiders, A review of biology, life history and pest management was, um, an interesting one, just an overview of them by Lua from 2022, the biology and evolution of spider venoms. If you wanna know more about venoms broadly, and then by Davy from 1994, the disgusting spider, the role of disease and illness in the perpetuation of fear of spiders.

EAU: Love that. I also loved that biology and evolution of spider venoms paper. That was my first one on my list. There's also a [00:55:00] chapter in the Handbook of Clinical Toxicology of Animal Venoms and Poisons, um, from 2017 that was on the biology and distribution of spiders and medical importance. There's also a paper that was really interesting, super recent 2026 in the Journal of Medical Entomology that was reclus spiders contesting myths on distribution by behavior and medical risk in Florida.

EW: saw that one.

EAU: So

EW: I have that

EAU: They only have invasive Mediterranean recluse species in Florida, and even those are very low abundance and they did super interesting, like trying to force these things to bite and they just didn't, they just wouldn't.

EW: They're like, don't why this

EAU: Median.

EW: cost me to

EAU: I want to keep it Anyways. That was great. Um, there was a New England Journal of Medicine paper from 2005 bites of brown recluse spiders and suspected necrotic arachnidism. Listen, there's so many more. Check 'em out on our website. This podcast will kill you.com under the episodes tab.

EW: Yes. Uh, thank you to Blood Mobile for providing the music for this episode and all of our episodes.

EAU: you so much. Thank you to Lianna and Tom and Mark and Pete and everyone at exactly right for everything that you do to make this podcast and our YouTube hello possible.

EW: Yes, thank you. Thank you. And thank you to listeners for listening, watchers, for watching whatever people who do stuff with this podcast, I need to find a better way to say this. Thank

EAU: Thank you.

EW: for you and we hope you like it, and it means everything.

EAU: It does I, we will do more spiders by the way. So tell us the spiders that you want to hear next, and a special shout out to our patrons. Thank you so much for your support over on Patreon. It really does mean more than we have good words to tell you.

EW: Truth, truth. Until next time, wash your hands.

EAU: You filthy animals.