

TPWKY – Ep 214 – Boogers

[00:00:00]

EW: "During the late dry season, we noticed that a flu-like illness had become increasingly prevalent in the group. The symptoms of flu consisted of a hacking cough, frequent sneezing, a running nose, or a blocked nasal passage. Some affected individuals lay on their stomachs for prolonged periods while coughing and breathing through the mouth. By mid-September, at least 52 of the 82 chimpanzees in the group were suffering from this illness.

An adult male, Kalunde, aged approximately 29 years, displayed the above flu-like symptoms between September 14th and October 3rd. During this period, he was observed on four occasions using a toothpick-like tool 10-18 centimeters long. On one additional occasion, he was also seen to make a tool, apparently without using it.

He inserted the tool deeply into one of his nostrils, which often immediately stimulated him to sneeze. When he sneezed, a large amount of nasal mucus was discharged onto his upper lip. The mucus was then picked off and quickly ingested.

On one occasion, he recovered a dry twig from the ground and removed the leaves from it. He tried to elicit sneezing by pushing the modified stem into one nostril, but in the course of 29 seconds, he failed to do so. He then discarded the tool, picked up a large dry leaf, removed the leaf blade with his teeth, and pushed the modified mid-rib into one nostril. Within five seconds, he sneezed and his nasal passage was successfully cleared.

Kalunde was one of several chimpanzees which, because of a badly blocked nasal passage, were breathing with difficulty only through the mouth, because the normal air passage was blocked. The stimulus afforded by the use of this tool forced the accumulated nasal mucus out of his nose. Kalunde ceased to display this type of behavior after October 3rd, and by October 9th he had recovered."

EAU: I love literally everything about that description.

EW: Isn't that glorious?

EAU: so good. It's every toddler.

EW: It's every toddler, toddlers stick tools up their nose to induce sneezing.

EAU: stick their own fingers up their nose

EW: Of course, of course. I, I love it.

EAU: stick things up

EW: Things up their nose. But what I love about this is that there, there seems to be like, because this happened repeatedly, because he tried different tools, different approaches, it seems like it was an intention, like there was an intention behind this

EAU: Very much. It sounds

EW: very much. And what's really interesting is that none of the other chimpanzees in the group copied him, although there was one that was like really intent and like really studying his behavior.

EAU: Interesting.

EW: But I, I loved it. He was the only one. So that was from a paper, uh, by Nishida and Nakamura from 1993 called Chimpanzee Tool Use to Clear at Blocked Nasal Passage. Uh, I love it. Hi, I'm Erin Welsh

EAU: and I'm Erin Allmann Updyke,

EW: this is, This Podcast Will Kill You.

EAU: Welcome to Boogers.

EW: Welcome to Boogers. I'm so excited for this.

EAU: me too

EW: I, I think we chose it 'cause we were like, what sounds

EAU: fun. Yeah.

EW: Yeah. And like

EAU: of dark on this

EW: we do, we do. We need a little, we need a little bit of levity from time to time.

EAU: Yeah.

EW: This provides that, I think. Yeah. Yeah.

EAU: there's some, uh, you could get into some real darkness about mucus,

EW: of course you could.

EAU: We won't today

EW: I'm, I'm certainly not,

EAU: for the most part.

EW: Uh, it's gonna be a really fun episode. There's, I, I have no idea what you're gonna be talking about. I'm sure you have no idea what I'm gonna be talking about.

EAU: Not a clue.

EW: Great, because I had no idea when I was like, wait, what? Why, what are we doing here? The history of boogers. It's gonna be great. Uh, but first before we get into all of the greatness of boogers, it's it's quarantini quarantini time. What are we drinking this week? I

EAU: We're the snot rocket.

EW: The snot rocket. So I absolutely love this. I was like, I was thinking, okay, we could do like jello, something like that.

EAU: Like chia seeds something.

EW: Chia seeds, uh, psyllium husk. Just sitting in water for a while. But, uh, but there are recipes out there for how to make your own snot at home. That's like. I mean, like, we can all make our, we're making our own snot currently.

EAU: sure are. Yep.

EW: But yeah, so the British Society for Immunology has a recipe, A PDF, you can find it on their website called the Gruesome snot recipe. We're, we're calling it the snot rocket, but [00:05:00] it basically follows the same, uh, the same principle. You can find this recipe anywhere if you look up homemade snot and it's gelatin powder and corn syrup and food coloring to make it whatever stage of the process you want. Do you want green? Do you want more yellow? Uh,

EAU: Could probably add some like lemon or lime juice or like some other juice to

EW: sure.

EAU: flavorful. 'cause otherwise it's gonna be pretty bland.

EW: Oh yeah. It's gonna be pretty, you could do, because it calls for hot water too, so you could do a little bit less hot water and a just a little bit of flavor of something, so, yeah,

EAU: like, you know, the jellos you used to make in college, for example.

EW: exactly. Exactly. Uh, but you can find the recipe for this on our website. This podcast will kill you.com, our social media channels. And then there's also on the British Society for Immunology.

EAU: Shout out.

EW: Shout out. Thank you for your service. Uh, but website, yeah,

EAU: We have one. It's called This podcast Will Kill you.com. You've heard us talk about it literally. So there's no way this is the first episode that you've ever listened to, boogers?

EW: If it is. Wow. Thank you. Welcome. This is exciting.

EAU: But we do have a website

EW: We do

EAU: And on it you can find transcripts. You can find sources for all of our episodes. You can find a goodreads list, a bookshop.org affiliate account. You can find merch. You can find our Patreon. You can find Blood Mobile, who does our music, and much more

EW: much more

EAU: the end.

EW: the end rate review, subscribe. We're on YouTube. You can see the, we chose shirts that were either fun. It's Erin's a lovely striped shirt. Love it. And then I tried to get the, the S knottiest in the spirit of boogers green and yellow and orange. It's, it's, yeah.

EAU: have called it a snotty shirt

EW: Oh, I will now. Yeah. No,

EAU: forever

EW: forever more.

EAU: Okay.

EW: Okay.

EAU: we?

EW: Let's do it

EAU: Okay.

EW: After this break.

EAU: I started off this section with the question, what are boogers?

EW: Okay.

EAU: and I do, I kind of wanna know where the term boogers comes from and I didn't, are you gonna tell me that later?

EW: I am,

EAU: Yes, I was hoping so. I do not know. What I do know. And I think what we all actually know is what a booger is. It's one of those, you know it when you see it relationships, right?

EW: I mean, dried nasal mucus. I was like,

EAU: nasal

EW: is the medical term for booger? Dried nasal mucus.

EAU: like a good medical term,

EW: Yeah.

EAU: But Yeah. They are dried or sticky bits of our snot, our nasal mucus. So to talk about boogers, we first have to talk about our snot and to talk about our snot, we have to talk about mucus. Now on this podcast, I have used the term mucus membranes a lot of times because so many infections that we have covered on this podcast we can get infected by contact with our mucus membranes, but I don't think I've ever really defined the term. usually just say something like mucus membranes, for example. Our nose, our eyes, our mouth. So let's talk about our mucus membranes, shall we? Our whole entire body has to protect itself from pathogens all the time. And we do this in a whole bunch of different ways, but we really, our bodies rely very heavily on barrier methods. our skin is this thick, relatively hard protective layer made up of keratin. It's not actually very thick, but in the scheme of things, it is compared to a bacteria. And our stomach, which also contacts the outside world, is full of acid to kill things that might get in there. And then we have our mucosal surfaces. These are areas of our body that are protected via, you guessed it, Mucus. So our mucosal membranes, or our mucosal surfaces are these wet epithelial cells that rely, at least in very large part on mucus to protect us against infections. our nose and really our entire respiratory system, which connects between our nose, our mouth, and then down into our lungs one of these mucosal surfaces

EW: Wait, hold on. Wet epithelial cells.

EAU: epithelial cells?

EW: tell me more about what wet, what that means?

EAU: no, like our skin is an epithelial barrier, but it's not wet

EW: Yeah, but where, where's the wetness coming from

EAU: the mucus.

EW: and where's the mucus coming from?

EAU: let me tell you!

EW: Okay,

so it's the moisture that make these cells wet,

EAU: It's the moisture.

EW: but the cells are making the, the moisture,

EAU: the,

EW: the, the,

EAU: the moisture and the moisture is the mucus and the mucus makes them wet.

EW: so chicken and egg.

EAU: Yeah. I don't know. Don't ask me which came [00:10:00] first,

EW: Okay. Okay. I'm just trying to under, so it's, it's wet. Okay. Okay.

EAU: I'm just saying that's part of how we define like a mucus membrane is a wet surface that has mucus on it.

EW: Oh, okay. Okay.

EAU: all that

EW: I got it. I got it.

EAU: Okay. Okay.

EW: I was really thinking it was deep.

EAU: It's

EW: Just not that deep.

EAU: It's surface layer,

EW: I,

EAU: just kidding. Ah,

EW: oh yeah.

EAU: Okay. Anyways, that was

EW: That was a very dry epithelial cell.

EAU: We're going too far. Erin.

EW: We gotta read it back.

EAU: Okay. I wanna talk a little bit more about our nose, since that's what we're focusing on today. Our nose mucus. All right. We know that we use our nose to breathe. We use our nose to smell. I'm not talking about those two aspects of the function of our nose today. I'm focusing on the layer of protection that our nose affords the rest of our lower respiratory system, from pathogens, from toxins, and from other stuff that would harm our lungs. Snot our mucus is the thing that allows our nose to protect us. If we could take a short detour into the anatomy of our nose.

EW: I would love that. I would love nothing more.

EAU: Okay, good. So our nose, obviously we have a septum that divides the middle of our nose into these two nasal passages. you've never seen a cross-sectional like cut open view of our face, then you might not know that our nasal passages connect posteriorly, so like towards the back of our face, um, and open up into this relatively large nasal cavity. And our nasal cavity has these like grooves, these kind of like projections in the walls of them that further serve to increase surface area. That's the same thing that our septum does, right? Instead of just one hole, we have two. So we have more surface area for epithelial cells

to be on. And then that nasal cavity connects even more posterior, like almost towards our neck, with a chamber called the nasopharynx. And that lies just above our oral cavity or our mouth. The walls of this entire cavity are lined with specialized cells and these cells, a lot of them have teeny tiny projections that are kind of hair-like, um, that are called cilia. Now, this is not the same as the actual hair that we have in the very first part of our nose, which is very normal and also a layer of protection. But these are teeny tiny little hair-like projections. We also have interspersed these specialized types of cells called goblet cells. Our goblet cells job is to make mucus, so that is the vast majority of where our mucus is coming from, is from these goblet cells. And then also below the first layer of epithelial cells, there's another layer of submucosal cells. That's also where our blood vessels, our nerves, and all of the other good stuff in our nose exists. But we also have a whole bunch of glands, specialized cells that form these nasal glands. They also make a bunch of different types of secretions, including types of mucus. All right,

EW: Why are goblet cells called goblet cells and are goblet cells the same? Like these are mucus producers everywhere where we make mucus.

EAU: Correct.

EW: Okay.

EAU: Goblet cells are the cells that make mucus everywhere. They're all over our guts. They're all over all of our mucus membranes. I think, and I could be misremembering this, but I think they're called goblet cells, just 'cause they kind of look like a goblet, like you know,

EW: Oh, okay.

EAU: A chalice. They kind of look like that. They're

EW: Okay.

EAU: robust,

EW: yeah. Fancy cells.

EAU: and they hold fluid. I dunno. That's my best remembrance. Alright, so.

EW: Erin's etymology. Done.

EAU: So let us get more into detail on this mucus blanket as I saw it described in one paper

EW: lovely. Really beautiful.

EAU: it's so good. So inside of our nose covering all of the cells and covering those teeny tiny hair-like projections is a wet cushiony. Two layered, actually blanket that is made of mucus. Mucus is mostly water.

EW: Mm-hmm.

EAU: 97% water. also a bunch of salts in there, ions. But the thing that makes mucus mucousy are these things called glycoproteins. And these are molecules that are made up of sugar and proteins all stuck together. And we call these type of glycoproteins mucins. That's how we got the name mucus. And what mucins do is the same thing that chia seeds do. If you put them into liquid, they hold onto that water and turn it into a gelatinous substance. So they are the things that make our snot snotty

EW: Okay. Yeah.[00:15:00]

EAU: Uhhuh. Now, the other thing that we have a lot of in our mucus is immune cells, immune particles, antibodies, especially IgA which is the main antibody that helps to block pathogens from entering our nasal cells and our respiratory tract. This is in super high concentrations in our nasal mucus,

EW: What is, yeah, what does IGA do? Like where does it stand in the, in the other, among the other igs?

EAU: it's basically, it is the highest concentration antibody in our, uh, the mucus membrane areas. So it is, it is like an associated with mucus membranes, especially in the respiratory tract antibody. just like IGG or IGM, the other major antibodies. There's other ones as well too. Um, it is highly specific to like a particular part of a particular pathogen.

EW: Okay.

EAU: and you can have memory with your IGA, like you can with IgG, which is like a main memory type. And all of the other ones are present too in our nose. But that's just like, it's that really high concentration. So it's usually the first line of defense in our mucus membranes.

EW: Hmm. Okay.

EAU: So for people who have like IGA deficiencies for example, then they might be at more susceptible to certain types of, especially respiratory pathogens 'cause they're not gonna block those as easily before it even gets into your lungs. Oh.

EW: Amazing.

EAU: So interesting. So that's what our mucus is made out of. I said already that we have these little hair-like projections, these

EW: cilia. Mm-hmm.

EAU: De de, that kind of line most all of our respiratory tract, especially our nasal passages and our uh, our nasal cavity back there and these things wave like grass in the wind or really like, um, sea grass in the ocean

EW: Yeah. Beautiful.

EAU: It's so beautiful. And in doing so, they serve along with the mucus to propel all the stuff in our mucus back to where it needs to go. So in the very front part of our nasal passage that might be propelling it out towards our nose holes or

EW: Uh.

EAU: but most of our mucus and the cilia is propelling stuff backwards towards our nasopharynx and our oropharynx so that we can swallow it.

EW: Right. It, it is upsetting, but it is the truth and Okay, but why you said that sometimes it will propel forward and sometimes backwards. Why? Why, what?

EAU: just anatomically.

EW: Oh, okay. Okay.

EAU: of the time it's going back, but it, the very front ones might sometimes go forwards. Just yeah. Anatomically

EW: that's where the motion

EAU: output.

EW: Yeah. Okay.

EAU: so our mucus blanket does three major things in our nose. Number one, it filters the air that we breathe, literally because it is sticky. A lot of the larger particles, including bacteria, but also allergens, toxins, et cetera, get stuck in the stickiness of our mucus. That's the first thing it does. two, it serves as the first line of defense against pathogens. Both because we have so much immune system stuff in our mucus immunoglobulins, but also, you know, white blood cells and other inflammatory markers. also because when these pathogens get stuck to and interact with the mucin proteins in our mucus, it actually stimulates our immune response.

EW: Right, which is why you can have some vaccines that are through your nose.

EAU: good through your

EW: Yeah.

EAU: uh, especially if you need an IGA response. Ugh. And number three, this one's really important. Our mucus helps to humidify the air that we breathe and

EW: Yeah.

EAU: our cells moist as well.

EW: It's a big one.

EAU: It's a huge one because if we were sucking dry air into our lungs, we would get super sick, but our. The air that we breathe is completely like, it reaches 100% humidity by the time it hits our nasopharynx.

EW: Beautiful.

EAU: Isn't that beautiful? Even when

EW: Yeah,

EAU: in Colorado and it's like 2% humidity

EW: it's too, you've got the, the crusties boogs on the planet. You're just like, my nose hurts

EAU: Right?

EW: Yep.

EAU: so interesting too, is that it does the opposite on the way out. So as we are breathing out through our nose, we are taking back that water and we're really, really good at it. We lose 42% more water if you're mouth breathing compared to nose breathing.

EW: That's fascinating. Okay. This is why I, I remember being, learning that you're s, when you run, you're supposed to breathe in through your nose and out through your mouth.

EAU: Oh, That's interesting.

EW: That's what I always remember being, hearing. I can't do it. I have to mouth breathe the whole time.

EAU: the whole time. That makes sense.

EW: And so I'm just wondering how dehydrated, how more dehydrated I am.

EAU: 42% according to one paper I read.

EW: That's a lot.

EAU: I [00:20:00] know,

EW: That is. Okay, so your nose is both humidifying and dehumidifying, depending on the context. It's recovering a lot.

EAU: and exhale it d it

EW: Reclaims that water. And, okay. So tell me, so now we're, we're still talking about mucus as a wet thing,

EAU: wet thing.

EW: but then what makes it boogers? What dries it out?

EAU: What dries it out? Honestly, I don't have a great explanation for that.

EW: Okay.

EAU: Uh, that's the short answer. I'm sure I could keep talking 'cause that's kind of what I do. Really. I think a lot of it comes down to how dehydrated we are to begin with.

EW: Okay.

EAU: if you are dehydrated, then it is more likely that your boogers or your nasal mucus is going to become more dehydrated.

EW: Mm-hmm.

EAU: There's a lot of different ways that we can have trouble with our nasal mucus, right? When we get sick, a lot of us are like, I'm making way more boogers. I'm making way more snot

EW: Yeah,

EAU: We make like two liters of snot a day.

EW: it's, it's why we all need to be hydrated.

EAU: It is why we all need to be hy. There's a lot of reasons, see our poop episode for more. But yes, it is one reason that we need to be hydrated. And a lot of times it can feel like we're constantly blowing our nose. We must be making way more mucus. I actually have no data. There is no data in the literature that I found to suggest that we actually produce any more mucus when we're sick. But what does happen is that the blood vessels in our nose are swelling.

EW: Uhhuh.

EAU: more blood flow, so could potentially have more water component to that mucus because of plasma extravasation basically.

EW: Okay.

EAU: we also have more inflammatory markers which can contribute to water because it's inflammation which brings ions, which brings water. But also what we know is that common cold viruses really mess with that muco ciliary transport. So our cilia are not doing a good job bringing that mucus back towards our throat where it's supposed to go so that we can swallow it. And this can last for weeks after exposure. And so that might be part of why it feels like we're blowing our nose so much. 'Cause our

EW: It is just

EAU: how it

EW: shooting down.

EAU: Right,

EW: about like post-nasal drip though? 'cause that always increases a lot. I feel like during colds, respiratory infections.

EAU: that also just because it's not transporting it all the way back the way that it should, 'cause that still aligns the entirety of our tract

EW: Oh. So it's just,

EAU: just kind of hanging out there and drip dropping rather than moving along the, you know, seagrass the way that it ought to.

EW: okay.

EAU: Okay. But that was the the opposite question of you asked me, Erin, which is what about boogers?

EW: have more snot questions if you're so willing, but if we wanna get to the boogers stage we can. Okay. Okay.

EAU: if you have, if I

EW: It's about color. You'll, you'll get there. Yeah. Yeah. Okay.

EAU: to. Mm-hmm.

EW: Okay.

EAU: So we also can have trouble in the opposite direction where instead of having too much mucus, we have the really gross boogery hard mucus. And there's several different ways that this can end up happening. Dehydration, I already mentioned, is a really big one, but there also might be some reasons, be they genetic or be they just, I don't know, changes in how our body is responding. That if we start secreting more of these mucins of our cells, these mucins, the proteins that make our mucus mucus, they are stored as solids, but they are secreted and then hydrated by the water lining our cells but in any case, that could be one reason, right? If you're either secreting more of these, or

EW: Mm-hmm.

EAU: said, if we just don't have enough water, then all of these mucins are forming this thick, goopy, sticky, rubbery mucus rather than a nice slippery one.

EW: Mm-hmm.

EAU: The other way that this can happen is if we have issues with ion balance, so we can have a huge throwback for like OG listeners. If you remember all the way back to our cystic fibrosis episode. People with cystic fibrosis have a defect in an ion channel, which means that they are not transporting sodium, chloride, and bicarbonate across our cell membranes in your mucus membrane cells in a way that leads to less water on those cells and thus thicker mucus in your airways.

EW: Mm-hmm.

EAU: That's another way that you can have thicker, thicker, stickier mucus. And then also if we are sick, then our mucus also has a bunch of inflammatory cells. There's increased permeability of our blood vessels and there's just more junk in our mucus. So sometimes we get that thick, hard to clear mucus because it's just so full of other junk, including bacteria or viruses, but also our own immune system stuff. And that gets in, Erin, to the question that you didn't quite ask 'cause I didn't let you, which is What's up with the color of our mucus?

EW: What's up [00:25:00] with the color?

EAU: Everyone wants to know. because there's this like idea that, oh, green or, or yellow means that you have a bacterial infection. And that's not really the case. Green or dark yellow mucus means that you have a bunch of white blood

cells and inflammation going on. So yes, that's probably often associated with some type of infection, but not necessarily a bacterial infection. You can get plenty gross mucus with just a viral infection.

EW: I feel like I want to know where this notion came from. Maybe we'll explore it on a health myths in the future

EAU: I love that idea.

EW: because like I, I have definitely heard this over the years and times when I'm like, I know for certain that this is not a bacterial infection

EAU: and you have grody mucus.

EW: And I have absolutely appalling. Yeah.

EAU: And you can have a, a viral or a bacterial infection and have totally com clear snot as well too.

EW: Yep. Yeah.

EAU: The other color that you might see is brown or red, kind of bloody mucus. And sometimes that might be concerning, but it also might just mean that you've been blowing your nose so hard for so long that you've got some capillaries leaking. So there's a little bit of blood mixed in there. It runs the gamut really.

EW: It's a rainbow of mucus.

EAU: it really is.

EW: Maybe not blue, but

EAU: not blue.

EW: I could imagine almost any other color.

EAU: Yeah, pretty much. I mean, red, yellow, brown, uh,

EW: Green, orange,

EAU: for

EW: maybe not purple either.

EAU: If you had a lot of blood in there, It could potentially

EW: could be. I guess you're right. Yeah.

EAU: maybe.

EW: Okay.

EAU: so that's our boogers, Erin, and our mucus. Do you have other questions?
I feel like you probably do.

EW: I do. Um, nose picking.

EAU: Nose picking.

EW: Yep. And, uh, children pick their nose constantly.

EAU: Children pick their nose.

EW: Children get lots of nosebleeds.

EAU: They do. Yeah. Those two things are in fact associated. Mm-hmm.

EW: Okay.

EAU: So, um, uh, I tried to get an an understanding of like how many people
really pick their nose. a lot of people pick their nose,

EW: Yeah. I have a, a paper.

EAU: Oh, good. Okay. I found a few. There was a survey of adolescents, um,
and only 3% of them reported never picking their nose, they probably lied.

EW: 3% were liars. Yeah.

EAU: were liars because, or they just didn't remember that. Like they definitely
picked their nose as a kid.

EW: Yeah.

EAU: Um, in surveys of adults, anywhere from like nine to 15% report never picking their nose again. just means never recently. Right. Uh, because pretty much all kids are going to pick their nose at some point. And really, like, I, I get it. I have two small kids who. We tried from very young age to teach them to blow their nose

EW: Yeah.

EAU: And they, bless them. Still just kind of suck at it, you know? Well, and sometimes you're, they're just too sticky and dried out to actually get those boogers out with just blowing your nose like

EW: Yeah.

EAU: gotta do something else. There are some risks associated with nose picking. There is an increased risk of infection, like if you have small abrasions, then you can get bacteria or viruses that get into your nose that can cause either a local infection or can put people at higher risk for other respiratory infections. Right? Since again, your nasal mucus is there to protect you against infections. Also, there's been studies that show that people who do pick their nose more regularly are more likely to carry staph aureus in the nose.

EW: Hmm. That makes sense.

EAU: that's something. of course nose picking puts you definitely at higher risk of nosebleeds and things like that. I didn't see a ton of data that said that, like picking your nose puts you at risk of getting other people infected, but theoretically it's possible because you're gonna have stuff on your fingers from picking

EW: Yeah,

EAU: if you don't wash your dang hands afterwards.

EW: a hard study to carry out.

EAU: Like I, I don't you, I don't even know,

EW: Do do our boogers change as we get older.

EAU: I mean certainly 'cause everything about our immune system changes as we get older. But I don't have great data to say like, your boogers get X, Y, and Z way versus when you're younger. So that's boogers. Erin,

EW: Boogers.

EAU: what you got for me?

EW: Uh, okay. Before I tell you all about boogers and what I could find, the medications that we use to dry up

EAU: Yeah. Mm-hmm.

EW: snot

EAU: Okay.

EW: What works, what doesn't work. I know that there's some that are don't, that don't work at all. yeah,

EAU: There's a lot that don't work at all. Um, especially most of the over the counter stuff.

EW: yeah.

EAU: doesn't work at all. One that does is pseudoephedrine.

EW: Yep.

EAU: Okay. That's not the same thing as the other. It's the one that you have to get behind the pharmacy counter

EW: Right.

EAU: Okay. You have to have an ID for it. What that does is causes blood vessel constriction

EW: Okay.

EAU: and so that's going to reduce blood [00:30:00] flow. It's gonna reduce inflammatory response, and so that's gonna also help to clear things up. That's

the same thing too, that like a nasal steroid or something is gonna do is just reduce overall inflammation rather than directly affecting the cilia or mucus production itself. Hypertonic saline or even just isotonic saline, so like saline nasal sprays or saline nasal washes also help to stimulate our cilia

they're providing hydration, which can help double if you're dealing with that really thick or hyper concentrated mucus. One that people use a lot, even though the data is meh at best, is guaifenesin. That's what's in like a Mucinex or whatever.

EW: Right.

EAU: Uh, no affiliation here that claims to thin the mucus. It's what's called an expectorant. So people usually use it if they have like a lot of chest congestion to try and help cough out. We didn't even talk about the cough reflex. Um, but to try and cough out that mucus by making it thinner.

EW: Yeah.

EAU: The, there is some data that shows that it does help. Most of that data is like based on surveys of, did you feel like you were coughing out more stuff versus looking at the actual like mucus layers

EW: Yeah. Yeah.

EAU: eh,

EW: Okay.

EAU: Erin.

EW: Fascinating.

EAU: too, but that's, those are the main functions.

EW: Those are the ones that actually, great. Okay. Cool.

EAU: So now tell me everything you know about boogers.

EW: There's so much. I can't wait.

You may or may not be surprised that the history of boogers is not the most robust area of study.

EAU: Is it not one of the four humors? Erin,

EW: I mean, yeah, it is, but like, I didn't wanna go down another humoral theory of disease pathway, but I really, 'cause I was trying to find like boogers, like references to boogers. I, I don't know what I expected to find. But yeah, the literature was kind of sparse on like the story of dried nasal mucus slash phlegm slash snot slash bogies over the ages goobers.

EAU: people call them goobers.

EW: just think of the chocolate covered peanuts

EAU: yeah. Mm-hmm.

EW: I used. That was by my movie theater snack for a while. Goobers, yeah, for a period of time. And then I went back to like sweethearts or something.

EAU: Okay.

EW: Anyway, I tried a bunch of different search terms for this, for this episode, and I did find a few fun snippets on like the etymology of boogers or bogies. So it turns out that booger, which is what we in the US often called dried nasal mucus, uh, probably originated from bogey, which is often what is used in the UK to refer to what we call boogers and goblin or hob, goblin or boogeyman.

EAU: Oh

EW: So something meant to frighten, especially little children.

EAU: Hmm.

EW: So I don't know if it was like, oh, and then also.

EAU: scary stuff. That's so weird,

EW: Yeah. Also it was, it was used, booger has been used in the US and the southern us especially to, to mean ghost or spirit.

EAU: huh?

EW: And so how it got from like scary bogey, uh ha, goblin whatever to booger in your nose. Maybe it's like, oh, there's a little bit of a, there's a goblin up there or something.

EAU: Oh, interesting. It's a cave

EW: It's a ca Yeah. Like you have a little goblin in your nose. I, yeah. Uh, but in addition to bogey, to refer to dried nasal mucus, it's also a golf term, meaning one shot over par. So it was named after an imaginary golfer named Colonel Boogie Bogey in 1890, who was very good. So you were like, trying to beat him. I like, couldn't quite get my head around where Colonel Bogey came from. Uh, I guess it's like another, he was like the, the bogey man. Like this imaginary thing you were trying to beat. Um,

EAU: That's so random, Erin.

EW: Also bogey is referred to, or is used to refer to an unidentified aircraft sometimes. So like Top Gun, think of that. Mm-hmm. And in Australia, bogey, there you go. In Australia, apparently bogey can mean swim or bathe or like swimming hole. Maybe

EAU: Like we're going to the bogey or like, oh my God, all of our Australian listeners. I'm so sorry.

EW: I, I don't know. Okay. I don't know.

EAU: Can you

EW: yeah, please send us an example of bogey in a sentence.

EAU: How do you use the word bogey in a sentence?

EW: Uh, but yeah, this little, this little exercise in etymology was basically how the entire research for this episode went for me, where I was just like, rabbit hole. Let's dig down here. Rabbit hole. Try to understand this. Oh gosh. Is that where we're going now? Like, so, so instead of doing one like comprehensive history of boogers, I decided to do three stories related to boogers.

EAU: love it.

EW: Number one, mucus in evolution.

EAU: Okay.

EW: Number two, nose picking, and number three, handkerchiefs and facial tissue.

EAU: Ooh,

EW: So it's basically just like a booger grab bag.

EAU: I love it.

EW: There we [00:35:00] go. Okay. Number one, why mucus is great. One of the many fascinating booger facts you shared with us, Erin, is that our mucus that we produce in our nose helps to protect us from infection by acting as this little barrier to trap pathogens or other irritants that we might breathe in. Not just bacteria and viruses, but also put like pollutants and just like junk

EAU: Junk.

EW: in your like, you know.

EAU: it's all the junk that you're breathing in.

EW: You know, when you, uh, blow your nose after you're gardening or you are driving down a dirt road with the windows open, like I, I've done that. And then what comes out is like, you're like, there's mud in my nose. Otherwise that would be in your lungs. So that's pretty great. Thank you mucus for that. Our nasal passages are just one place that mucus resides. Like you said, Erin, we have all these mucus membranes. You can find it in our intestinal tract, our lungs, our genital tracts, and humans are far from the only species to produce mucus. In fact, mucus is widespread in the animal kingdom. I mean, it's like close to universal,

EAU: Yeah.

EW: Produced by vertebrates and invertebrates alike. From dogs to fishes to corals and comb jellies. The most distant animal relatives of humans produce mucus,

EAU: course.

EW: And it serves far more purposes than just keeping our noses moisturized and infection free. It helps with transport of substances, so corals produce a kind of mucus that traps food like zooplankton, that's then conveyed to their mouths to be digested and then excreted through that same mouth after digestion.

EAU: I love that.

EW: It helps with gas and ion exchange. So this is crucial for fish to maintain how much water and sautees are in their bodies. So when salmon travel from the ocean, salt water to their breeding grounds up river, which is fresh water, their mucus composition changes, like, does that help to protect against different pathogens that they're exposed to? Does it help with that ion exchange?

EAU: Wow.

EW: Mucus also helps with communication. So land snails might use mucus as a cue to like where to go. They're like, oh, there are studies done that's like, uh, snails of the same species will follow the tracks of the, the same species of snails,

EAU: Okay.

EW: then they'll maybe avoid the mucus tracks of non-related.

EAU: I love that.

EW: Uh, fish also use mucus. There's a lot about fish and mucus. Uh, I've downloaded a few review papers in case you're interested. Fish use mucus to communicate in a bunch of different ways, like from signaling alarm, reproduction, to repel predators. There's even like mucus traces up waterfalls or like upstreams to be like, this is where to go.

EAU: Oh wow.

EW: Uh, hagfish in particular are well known for the absolutely ridiculous amounts of slime that they produce. There's, I have a whole paper on this too.

EAU: is it gonna be like hagfish mucins instead of snail mucins that they're putting in skincare? I just can't wait for that.

EW: Also. well hagfish also produce these, like these fibers that like help the mucus be more coagulated? I don't, it's really.

EAU: love

EW: It's cool stuff. Yeah. Uh, mucus helps with adhesion. So for instance, there are some types of birds like swallows and Phoebe's that build nests made out of mud, mixed with their saliva, which contains mucin that basically acts as glue to cement the nest.

EAU: Wow.

EW: cool.

EAU: really cool.

EW: I love to like, how did that evolve? Um, yeah.

EAU: we have so many questions.

EW: It helps with lubrication.

EAU: Of course.

EW: Earthworms use mucus to move through the earth. We use it, uh, to help our digestion move smoothly. It's critical in reducing friction injuries, and of course, mucus helps to prevent infection. Not just as a barrier, but mucus itself contains many different antimicrobial compounds even within corals, jellyfish, fish, the quantity and overall composition of these compounds as well as the mucus microbiome might change along with changing environments. Again, think of those salmon going from salt water to freshwater. Saliva contains mucus that helps to fight pathogens that cause cavities doesn't always do a great job. Um, the see our fluoride episodes. These antimicrobial properties of mucus have garnered a lot of attention as a potential in like non-toxic protective coating agents for implants, for example. 'Cause it's like, well these are things that are naturally found. Um, but then there's also a.

EAU: already making them.

EW: Yeah. And, uh, but there are other avenues for antimicrobial applications of this. Uh, there's snail mucin. Maybe we'll go down that pathway sometime.

EAU: I have a bottle.

EW: Do you really?

EAU: bit embarrassed to say. Yeah. I don't, it's, it's like just any other lotion, let's be honest.

EW: I mean...

EAU: Just a little stickier.

EW: Yeah, yeah. Unfortunately, I think skincare mostly comes down to genetics, but, and sun exposure.

EAU: Sun exposure. Yep.

EW: Yeah. Clearly mucus is a [00:40:00] vital substance for most of animal life on this planet. And that's also evidenced by how often it has evolved independently. Like one recent paper found 15 cases of parallel evolution. So like mucin genes keep evolving because it's so important.

EAU: Yeah.

EW: It's crucial.

EAU: Wow.

EW: Yeah. Mucus is pretty rad. Um, okay, you ready for number two?

EAU: I love it. I just, can we sit with that Mucus

EW: Mucus is rad.

EAU: Yeah. So our boogers are pretty rad.

EW: A hundred percent.

EAU: A hundred percent. People just try and get rid of 'em all the time. It's like, thank you.

EW: Well,

EAU: Okay.

EW: try to get, speaking of trying to get rid of boogers. No nose picking. Alright, a 1995 survey of 254 adult residents of Dane County, Wisconsin, I'm sure you read this one. Mm-hmm.

EAU: Yep. Yep.

EW: Revealed that 91% were nose pickers, although only 75% thought that everyone else picked their nose. This would come, these findings would come as a great though, probably not entirely unsurprising upset to Albert Seltzer, MD. Whose author of a 1963 paper titled Nose Picking In, in which he says, quote, "the average person would consider it insulting to be advised not to pick his nose. Nose picking is not done in polite society. It is in a class with nail biting, ear picking, sniffing, and other mannerisms that simply are not done by the well-bred person. Perhaps it would be more correct to state that people, even the most well-bred, ought not to pick their noses, but do far too often. If you do not believe it, look around you the next time you are at a public gathering, at a ball game, or a lecture or at church. This matter deserves the attention of all people who wish to be in good taste and to remain in good health." End quote.

EAU: So he's saying, everyone is out there picking their nose, but none of you should be doing this.

EW: No one is doing, everyone's doing it in private. No one, you, no one should be doing it at all. But everyone does it. And it's so like, it's so funny. It's when I, when I read that thing about like, just go to a ball game or whatever, and it is amazing. Airports

EAU: Oh, yeah.

EW: driving around and you look around at the intersection and there's just like constant, I feel like nose picking is, is on display all the time.

EAU: really is. If you

EW: It really is. It's there.

EAU: Not just the toddlers.

EW: Not, it's really not. It's really not. Uh, yeah. So nose picking is not a thriving area of research as far as I could find,

EAU: No.

EW: Unfortunately. I guess most articles seem to focus either on how common it is, which is exceedingly common. Uh, extreme cases, so like compulsive nose picking, rhino, rhinotillexomania, which is, I think you mentioned that, uh, sometimes leading to injury and blood loss and like a septum deviation, perforation. That's what it is.

EAU: Yeah,

EW: And some, some papers have looked at the health effects, like nose picking and infection rate or other things like that, but not so much about the history of nose picking or cultural variations.

EAU: yeah.

EW: Nose picking might be widespread even among adults, but it's not seen as culturally acceptable in many places around the world. And why that is might come down to the same reasons that we see other bodily excretions or fluids, as you know, like unacceptable or like the disgust there. They can harbor pathogens. So if someone with a case of flu or a cold or COVID picks their nose and wipes their runny snot on their hand and then touches a shopping cart, a door handle or God forbid, shakes your hand, that makes transmission of that pathogen more likely.

EAU: Yeah.

EW: And so it's possible that our feeling of disgust regarding nose picking and booger eating, which I could not find statistics on

EAU: Mm-hmm.

EW: that helps prevent the spread of certain diseases. And it certainly seems like this disgust is something we have to learn, like spend any time with a child under five, 10 years of age and you'll see that right away.

EAU: Yeah.

EW: I read a frankly bizarre chapter of a book. That asked the question, the chapter specifically asked the question, why is eating snot socially unacceptable? Yeah.

EAU: What was their conclusion?

EW: Mostly the chapter seemed to be a defense of the practice, like defending it or at least kind of took this stance of like, this is no different than swallowing snot, which we do all day every day, and also we exchange bodily fluids all the time with other people. So why would you not want to consume somebody else's snot? I did not particularly enjoy this chapter made me uncomfortable and there was a quote that sought to [00:45:00] explain why admitted booger eaters did what they did.

EAU: Mm-hmm.

EW: It haunts me and said, I'm passing, passing along this curse.

EAU: Okay.

EW: God, help me. Okay. Quote. "It should not be forgotten that among human preferences concerning food texture, crunchiness is highly significant. And as regards flavors, salty and sweet tastes are the favorite ones. It so happens that dry nasal exudations possess both characteristics as well as proteins and trace of lipids." End quote. Yeah.

EAU: I

EW: I wanna go back to the person I was before I read that. I think

EAU: I have two things that I wanna say about that, Erin.

EW: Please.

EAU: Number one, I, you know, that I tried to, uh, record my kids to see if they had any stories about boogers that we could use for our firsthand account. And they're too into poop jokes right now. So their stories just devolved into poop. And,

EW: Understandable. Understandable.

EAU: they said multiple times that they eat their boogers because they do both of

EW: Yeah. Yeah.

EAU: Um, 20 years from now, they're gonna hate me for this, but. They, they said that they eat them because they're delicious.

EW: Oh,

EAU: like, I don't believe you.

EW: crunchiness, salty, sweet flavors. This is,

EAU: I don't know, man. It's, you know. You're right. We do, we do swallow, you know, over a liter of our own mucus, a liter and a half of our own mucus every day.

EW: I,

EAU: does somehow feel different to like take it out and then eat it intentionally feels different. It feels different to me.

EW: I just, yeah, like there's, is the disgust learned? Is it

EAU: Right?

EW: Right?

EAU: Is it warranted? I don't know.

EW: Ugh. I, I can't help but feel that it is warranted. But, but this, this disgust that we feel is not universal. It's not universal across the globe. It's not universal across our lifespan. It's not universal in other primate species as evidenced by our firsthand account.

EAU: Ugh.

EW: So I read a review of nose picking in primates that revealed that at least 11 species not only pick their nose, but also eat what comes out, eat the mucus. This spans from chimpanzees like our firsthand to capuchins, from macaques to aye ayes, all of which have pretty good dexterity. So it seems like the species that have good dexterity, that have been observed are nose pickers and nose and booger eaters.

EAU: you're telling me that our fingers evolved so that we could pick our nose and eat our boogers?

EW: so is that, is that the case? Yeah. Uh, some, but some, some don't use their fingers directly. They'll use sticks, uh, or twigs. Like our, like our firsthand. Um, but some do use fingers. So aye ayes.

EAU: aye-ayes

EW: Do you know how aye ayes have that super long middle finger that they used to dig out grubs and trees? They also used that finger to pick their nose and eat their boogers. So the scientists who observed this were like, where the fingers totally, it's disappeared. It's all the way up there. Where the heck did it go? It's like a very, very long finger. A CT scan revealed that it goes all the way up the nose until it reaches the throat. Your pharynx. Their pharynx. Yeah. And then they lick.

EAU: Pull it out.

EW: put in, just Yep. Consume

EAU: they're just moving it from one place to another.

EW: Yeah. Yep. Whew.

EAU: Fascinating. Erin, I love this.

EW: given the widespread nature of nose picking in those species who have the dexterity in the fingers to do so in primates, the authors suggest that maybe nose picking and booger ingestion is an adaptive grooming or cleaning behavior rather than a harmful one.

EAU: okay. Okay.

EW: The jury is out, jury is out. I also wanna know if other species that have fingers like raccoons, for instance, pick their noses.

EAU: do they pick their nose?

EW: I dunno.

EAU: I feel like raccoons have little claws, you know. Ouch.

EW: I mean, oh, so like, it's too sharp. Like if they had blunted,

EAU: Yeah.

EW: I don't know if, if an aye aye can pick its nose to its throat?

EAU: To its throat

EW: I, I dunno. And there's one last nose picking fact that I wanna share with you. You already know this, but maybe it's just a reminder. I wanna give a shout out to the tick species that crawls up the nostrils of chimpanzees as well as the occasional human potentially to avoid being groomed or being removed during grooming, which chimpanzees frequently engage in. Um, I'm not sure if they're able to get the tick out with their fingers, but there have been, you can see pictures of chimpanzees with the ticks

EAU: In their nose.

EW: In there, and humans discovered it in theirs. Like researchers have discovered it over the years and they're like, there's something in my nose that I can't get out. So, [00:50:00] just wanted to leave you with that

EAU: Maybe that's

EW: cursed knowledge. Sure.

EAU: or,

EW: There you go. It's right. Ah,

EAU: No judgment here.

EW: oh, number three.

EAU: three,

EW: Blowing your nose.

EAU: blowing your Nose

EW: Nose picking is just one strategy to rid yourself of the pesky nasal mucus. Or you can use a twig if you want to be the chimpanzee in our firsthand account. Uh, you can also use pressure to evacuate your nostrils, perhaps into the air, the aptly named snot rocket. Mm-hmm. Or into a receptacle such as a handkerchief or a tissue.

EAU: tissue.

EW: But people have been emptying their nose into handkerchiefs and tissue for quite some time. Well, handkerchiefs ask when the handkerchief was invented, and you'll get a hundred different answers. Like maybe it was when cloth was invented. Maybe it was in ancient China, ancient Rome, maybe it was invented by King Richard, who reigned from 1377 to 1399. He requested, apparently, small pieces of linen made to be given to the Lord King for blowing and covering his nose.

EAU: okay.

EW: Quote, uh, and this, this might be a case of like a difference in when a thing was invented and then when a name for it was. Like everyone had a little small piece of cloth who thought to be like, this is the specific name for it. Right. And so people long before King Richard II were likely blowing their noses and wiping their brows with small pieces of cloth, wiping their hands, you know, before eating food. But it seems that at the time of his request, there wasn't a specific word for it in English. And handkerchief didn't show up until the early 16th century,

EAU: Hmm.

EW: Though kerchief is earlier. So I just, yeah,

EAU: interesting.

EW: interesting. The handkerchief holds this. Interesting position where on the one hand it's an object of practicality, but it's also one of powerful symbolism and a sign of like, it's a communication device, but also a sign of, of like a status symbol almost.

EAU: Huh? Okay.

EW: So Renaissance studies scholar, Dr. Bella Mirabella uses these two quotes in this chapter I read about handkerchiefs to show this like strange juxtaposition of handkerchiefs. So from a 1558 book on manners quote, "and when you have blown your nose, you should not open your handkerchief and look inside as if pearls or rubies might have descended from your brain."

EAU: Okay. Wait, wait, wait. One of my, I don't have a lot of memories from childhood, but one of my clearest is watching an episode of one of the Mary Kate Nash Olson shows they were like in middle school

EW: okay.

EAU: talking about a kid that they got like assigned to be in a project with, and they were like, yeah, you know that kid who blows his nose and then spends too much time looking at the boogers.

EW: That's amazing.

EAU: that description has always stuck with me, especially every time that I'm like showing my kid his boogers after he blew his nose.

EW: You're like Mary Kate, Ashley Olson booger episode.

EAU: Long

EW: spend too long looking as if pearls or rubies have descended from your brain.

EAU: funny, Erin.

EW: Uh, um. So that's one, right? Like you, you use a handkerchief to

EAU: it

EW: you're, it's not something, it's not pretty in there. It's not something to admire. But then also from a 1580 book, quote, " maids and gentle women gave their favorites as tokens of their love. Little handkerchiefs of about three to four inches square wrought roundabout with a tassel. At each corner, men put the handkerchiefs in their hatbands" end quote. So these snot rags could also be indications of love or flirtation or like devotion. In Shakespeare's Othello, the plot hinges kind of around a handkerchief. So basically Iago is the bad guy. Also the parrot in Aladdin, which is the bad guy. Mm-hmm. Manipulates Othello by telling him that he saw another man with the handkerchief of Othello's wife Desdemona. So Othello then murders Desdemona. Totally normal reaction to something like that, to a handkerchief.

EAU: Yeah.

EW: He was lying. It was a mess. Classic.

EAU: One of his tragedies.

EW: might that, that one might be a tragedy. The handkerchiefs were used to signify not only love but status. They were sprayed with perfume. They were decorated ornately, they were printed with historical scenes. In Dickens' Oliver Twist handkerchief or some variation of that word is used 50 times,

EAU: Wow.

EW: which is,

EAU: it's a lot.

EW: It's a lot. And so the handkerchief over time transcended its original use as like a booger receptacle. It was embroidered with gold and silver threads made from [00:55:00] silk or decorated with lace. I mean, who would blow their nose into that? And so I think people probably, and I don't know this for sure, but I, I would guess that people carried two versions of handkerchiefs. Right? One practical and one decorative. But if your hanky was the practical one, it had better be stark white. Otherwise that was considered gross.

EAU: Interesting.

EW: But, oh. Which makes sense though, 'cause like,

EAU: Otherwise it looks like it's been used.

EW: And it looks like it's been used. Yeah. Over time, handkerchiefs fell out of style and lost much of their significance with, with one notable exception being the hanky code, where different colored bandanas or handkerchiefs represent interest in different sexual activities.

EAU: Hmm.

EW: Um, but once. Exactly. Yeah. And um, and I think also handkerchiefs were just sort of like not, it was not seen as hygienic, which is funny because they were for a while and then it, they weren't anymore. And then once disposable tissues came on the scene, they took a further hit. So the first disposable facial tissue was made by Kleenex in 1924. The story according to the Kleenex website, 'cause that's the only real source I could find on this. So just caveat, grain of salt.

EAU: They wrote this

EW: They wrote the story. It goes that the parent company, Kimberly Clark, adapted gas mask paper filters from World War, I first into menstrual pads, Kotex, and then into thinner sheets called Kleenex. And they were intended to be used to remove cold, cold cream initially.

EAU: Oh, interesting.

EW: And then a few years later, allegedly after people wrote in saying, I love Kleenex to blow my nose into, during colds, they begin marketing it as absorbent kerchiefs, and the rest is history. Yeah, but for real, that's basically all I have on the history of boogers.

EAU: I love it. I learned so much. I'm really curious to hear from listeners, anyone who wants to actually tell us about your experience with nose picking

EW: Yeah.

EAU: or booger eating or like really like how are boogers seen? I do think that there's a probably a lot of cultural differences in

EW: cultural differences.

EAU: how nose picking is like around the world. If it's cool, if it's frowned upon, if it's everywhere, if

EW: cool. All the hip cats are picking their nose

EAU: you know those nose pickers over there?

EW: leather jackets and nose picking.

EAU: Oh, oh, oh. It's like one of

EW: Oh my God. Yeah. It's natural. Yeah. Can't believe we both.

EAU: I can't,

EW: Okay. For, for the audio listeners, we're doing that thing where it's like your hair color, was that what it was?

EAU: It was? What color? Your color. And you say it's natural. It's natural. And then

EW: And you wipe your nose and it's, yeah.

EAU: it's natural.

EW: We're quite skilled at

EAU: you can tell that we grew up in the 90s

EW: Descriptions. It's true. Oh.

EAU: Anyways,

EW: there's,

EAU: you wanna

EW: a lot there and there's more to learn. If you are not tired of hearing about boogers or mucus or nose picking, handkerchiefs, there's more out there. Uh, okay. I have a bunch of of sources. I'm gonna shout out one from each kind of story.

So, by Miles Taylor from 1974, the origin and functions of nasal mucus plus those sweet fish mucus review papers I found. Then by fabre et al from 2023, a

review of nose picking in primates with new evidence of its occurrence in *Daubetonia madagascariensis* Toughy, I'm guessing that's aye-aye

EAU: Yep. Yep. Yep.

EW: Um, and then by Bella Mirabella from 2011. It's a chapter in, uh, the book, *Orna Mentalism, the Art of Renaissance Accessories*. And the chapter is called *embellishing herself with a cloth, the contradictory life of the handkerchief*.

EAU: I love that. I have a few papers for this episode, um, one by Fahe and Dickie from 2010 in the *New England Journal of Medicine* called *Airway mucus Function, and Dysfunction*. If you wanna really, really, really Deep dive, uh, on mucus

EW: how deep Erin?

EAU: 81 pages deep

EW: Good God.

EAU: by Hill et al from 2022 called *Physiology and Pathophysiology of Human Airway, mucus* in *Physiological Reviews*. It's like there's too much there. Um, I really enjoyed a paper from the proceedings of the American Thoracic Society from 2011 called *Anatomy and Physiology of the Upper Airway*. There's like, it's quite a lot of fun stuff about your nose. Um, and then there's a few more about medicines that we use about nose picking and things like that. You can find them all on our website. This podcast will kill you.com under the episodes tab.

EW: You certainly can. 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 [01:00:00] Mark and Pete and everyone else at Exactly right for everything that you do to make this podcast possible.

EW: Thank you. Thank you. And thank you to you listeners. Let us know what you think of this.

EAU: Did you like it?

EW: Did you like it?

EAU: us

EW: Did you learn something new? Yeah,

EAU: We don't judge. We've all picked our notes, literally everyone.

EW: it's true. It is true.

EAU: and thank you as always to our patrons for all of your support over on Patreon. It really, really does. mean the world to us.

EW: It does. Until next time, wash your hands please.

EAU: you filthy animals.