TPWKY – Ep 215 – Earwax

[00:00:00]

EAU: "A 50-year-old woman presented to her GP following an episode of ear candling. After 15 minutes, the person performing the candling burned herself while attempting to remove the candle and spilled candle wax into the patient's right ear canal. On examination, a piece of candle wax was found in the patient's ear, and she was referred to the local ear, nose, and throat department. Under general anesthetic, a large mass of solidified yellow candle wax was removed from the deep meatus of the ear. The patient had a small perforation in her right tympanic membrane. Results of a pure tone audiogram showed a mild conductive hearing loss on the right side. At a follow-up appointment one month later, the perforation was still there, and the patient's hearing had not improved."

EW: Ooh.

EAU: An account of why not to ear candle.

EW: I mean, just one example. Just one. That sounds horrific.

EAU: I agree. Every single account of Ear Candling that I read was exactly like this. This particular account comes from an article from 2007 by Rafferty et al, um, published in the Canadian family physician that was titled Ear Candling: should general practitioners recommend it? The answer was no.

EW: No.

EAU: by the way.

EW: Firmly No. Wow. That's awful. That's

EAU: it's not great.

EW: Hi, I'm Erin Welsh.

EAU: And I'm Erin Allmann Updyke.

EW: This is, This Podcast Will Kill You.

EAU: Today we're talking about ear wax

EW: Ear wax.

EAU: Continuing our bodily fluids

EW: There's

EAU: thing,

EW: that we, I've been like mentally collecting them. There's like, saliva would be a great

EAU: Uhhuh

EW: one. Um, belly button lint. What's in there?

EAU: Ooh. I mean,

EW: Toe jam?

EAU: Dirt and skin cells. I dunno. It's probably the same thing as toe jam, Erin.

EW: Well, we'll do an episode on it.

EAU: Okay. Can't wait,

EW: we'll have to see if there's enough material there.

EAU: buh-dum-chh get it. Like, sorry.

EW: Excellently done.

EAU: Thank you.

EW: I am thrilled for this episode.

EAU: I can't wait because I have nothing to contribute, but I really wanna hear what you have to say.

EW: I'm sure that you, I mean, I wanna know what, what makes up ear wax.

EAU: Yeah, I have several pages of notes, but like it's, I'm here for you.

EW: I, I'm here for you.

EAU: I love you.

EW: I love you. I also love quarantini time.

EAU: Me too. That's what time it's,

EW: How was that done? Was

EAU: I

EW: done?

EAU: really good. Loved it.

EW: good.

EAU: What are we drinking this week, Erin?

EW: We're drinking the gold mine.

EAU: The gold mine. Really dig it out.

EW: is gold.

EAU: Mm.

EW: some of it is

EAU: So many different shades of

EW: many different shades of

EAU: grays, black, yellowish.

EW: Brown. Did you

EAU: Mm-hmm.

EW: say

EAU: I did, yeah. Lots of shades though.

EW: of shades within Mustard. Um, but we are, we're drinking. I mean, we named it goldmine because the amount of information that you can tell from Earwax is more than I ever expected,

EAU: I didn't know that Erin. So I can't.

EW: Plus Earwax is a resource, like not just informationally. Well, there's a lot to cover.

EAU: I can't wait.

EW: Oh yeah. Get

EAU: You're gonna tell me everything. Uh, what's in a, the gold mine

EW: it's um, I mean, we wanted to make it look gold-ish, you know, uh, it's got pineapple juice jalapeno simple syrup, lime club soda.

EAU: Delish,

EW: refreshing. Delicious. This episode will come out summertime? I think so. I think. Um, it's great. In

EAU: It's great in the summer,

EW: the Northern Hemisphere, summer.

EAU: you can find the full recipe on our website. This podcast will kill you.com and all of our social media channels, which you should be following us if you're not already, because we are there posting things like this quarantini recipe.

EW: Mm-hmm.

EAU: Also, um. I don't remember what else. Rate, review, and subscribe. Thank you to everyone who has left us a review. It really does help other people find this podcast and we'd like for like, I don't know everyone to listen to it.

EW: Yeah.

EAU: Um, if you are watching on YouTube, hi.

EW: Hi.

EAU: Um, and we are there that you can subscribe.

EW: Yeah.

EAU: We have called this podcast will kill you.com. You can find transcripts. You can find sources from every episode, merch, patreon, bookshop.org book mo bookmobile? Blood Mobile. Who does the music? There's a lot

EW: There's a lot, and I just, I know we always thank everyone at the end of these episodes, but I was thinking how there are, there's so much out

EAU: Uhhuh.

EW: there are so many podcasts out there, there's so much media to listen to, to watch, et cetera. And the fact that people choose to engage with ours is really, it's really surreal

EAU: Yeah.

EW: And so thank you for, for choosing to spend your time with us. [00:05:00] It means the world, truly

EAU: it really does. It really does. Like we love getting to make this podcast as like our jobs,

EW: Yeah,

EAU: um, and sharing everything that we learn with you. And I still can't believe that anyone. Listens.

EW: it's same. Same.

EAU: every time someone's like, oh I listen. I'm like, really?

EW: Really?

EAU: Thank you.

EW: of this podcast. It's what?

EAU: Why do you listen? But thank you.

EW: Thank you.

EAU: So we appreciate it.

EW: do, but enough, enough of all that it's

EAU: Moving on

EW: earwax.

EAU: earwax. Let's get into it

EW: All

EAU: right after this break

.

EAU: Ear wax! That's how I started

EW: Good.

EAU: notes. All caps, so we all know what it is. It's the junk in our ears. The official medical term for ear wax is cerumen.

EW: Junk is, you know, I'm gonna take issue with that.

EAU: Ooh, I can't wait for you to take issue with that. Uh, so cerumen is this waxy substance that our ear makes. Our ear makes this in order to stay lubricated, to clean and protect our ear canal. And really it functions a lot like

the mucus in our nose, except it's kind of also completely different. So let's get into it, shall we?

EW: ear boogers.

EAU: ear boogers. Yeah,

EW: More or less.

EAU: but different. Um, so it is a protective barrier. The same way that our nose mucus is, it is a little bit acidic. And so in being a little bit acidic, it keeps our ear canal acidic, which helps to inhibit the growth of bacteria and fungi, which would really love to be able to grow in our ear canal.

EW: Yeah.

EAU: was a 1994 paper, which I didn't read this paper, but I read a paper that quoted this paper that called the Ear Canal quote, the Greenhouse of the Human Body End Quote, because of how much fungi would love to grow in our ear canal. And I was like, wouldn't we have a lot of moist, dark places, but

EW: there's gotta be, I can think of many greenhouses

EAU: me too.

EW: Just populate throughout our bodies.

EAU: But anyways, someone thought the ear can know.

EW: potentially.

EAU: I mean every mucus membrane really

EW: every mucus membrane,

EAU: anyways, just like in our nose, in our ears, we have these glands just underneath the skin that are what produce the oily substance that ends up getting mixed with shed skin cells and debris that all together become our ear wax. There's two types of glands. There are sebaceous glands and we have sebaceous glands all over our body.

EW: right.

EAU: Sebaceous glands produce a substance called sebum, which is like this sort of oily type of substance. And then we also have in our ears these modified apocrine glands. And our apocrine glands are basically like our sweat glands are a type of apocrine gland as well. And these glands produce a variety of substances, including lipids. So like fats, wax, esters, alcohols, something called squalene, which is a kind of fatty substance and cholesterol. And all of these get together the, the secretions from our apocrine glands and the secretions from our sebum glands and mix with our dead skin cells, which I find very fascinating because the cells in our ear, like our skin cells, shed all the time, right? Like, rub your hand against your skin, and the top layer is sloughing off. Okay? Do it.

EW: it's slough.

EAU: Feel it.

EW: i've sloughed the top layer

EAU: Feel that. That's happening in our ears as well, and it moves from the inside of our ear towards the outside of our ear. Like the cells do this shedding thing in a particular way. There's a paper from 1964 that like tracked the way that our ear canal sheds its own skin.

EW: How, how is it doing? Hairs?

EAU: No. So here's what's so fascinating. It's not little hairs or little cilia. A big part of what moves the skin and all of the debris within it is our jaw movements. So when we are talking and chewing, it helps to move the ear wax and these skin cells along the ear canal itself. Ah, and this is all our, technically our outer ear, which is our ear, has three parts inner, middle, and outer, and this is all the outer parts. So from the tympanic membrane out towards the outside world. Cool.

EW: I have very cool. I have a few questions.

EAU: it to me.

EW: Where are these glands located?

EAU: Yeah.

EW: located throughout our ear

EAU: Mm-hmm.

EW: in our inner ear. Okay,

EAU: Yeah, they're throughout our ear canal. This is all outer ear canal.

EW: This is all outer

EAU: All outer ear. Yeah. Yeah. Yeah.

EW: Oh yeah, yeah.

EAU: It's the, it feels like it's inner because it's inside of like the [00:10:00] auricle or the pinna, which is like the visible part of your ear,

EW: little hole.

EAU: But it's, yeah, it's a canal that's like usually like an inch or so long. Um, it can be a little bit windy, so it sometimes feels longer when you're looking in it, but.

EW: Okay. much do we produce? And here's the other question,

EAU: I don't have answer. I don't have an answer to that question, and it bothers me so much that I didn't see that anywhere. Do you have an answer?

EW: I don't have an answer. I mean, I, I had a hard time finding, I was trying to find the origin of these glands, the

EAU: Mm

EW: ceruminous glands and like when did they evolve and blah, blah, blah. And I, I mean, maybe my search terms weren't great, but I couldn't find anything. Okay. So then the other question is, does the amount that we produce, what affects it? And I was just thinking of like, if you're grinding your teeth at night and that's an 8 solid hours of just jaw movement

EAU: Jaw movement.

EW: Are you producing more ear wax or are you moving more ear wax to, is there an impact on ear wax?

EAU: That's an excellent question. I have literally no idea. Um, I have no idea, but that's such an interesting question. So we do our, our. Ear, the glands in our ears, the cerumenus glands. So the, the sebum glands and the apocrine glands, they, uh, reduce in number as we get older. And so that's one thing that's going to affect how much earwax we make. So the older that you get, um, the less the drier your earwax tends to be because you have less of these glands. Why? Don't ask me. I don't know. Um, except that like, I mean, your skin gets drier in general as you get older, right? So you just losing sebum, producing glands everywhere. I don't, I don't actually know.

EW: Why do they fall off?

EAU: Why do they fall? I don't know if they fall off or they just kind of like dry up, you know? I get you

EW: mean physically fall off. Okay. What about ear hair?

EAU: Ear hair. Ear hair also increases in number as we get older, and so the like older people might have quite a lot of hair in their ears, especially males, and that can actually block the ear wax from coming all the way out so it can contribute to cerumen impaction, which I'll talk a little bit more about in a minute.

EW: Why do we get more ear hair when we get older?

EAU: I don't have any answer. We get hair everywhere when we get older, right? We lose hair places.

EW: We could do body hair Okay, as an episode,

EAU: listen, I'm down.

So there's two main types of ear wax. It's usually split. There's wet ear wax and there's dry ear wax. And I think you're gonna talk a little bit more about this distinction, Erin.

EW: Mm-hmm.

EAU: but it's genetically determined, which I think is. So interesting.

EW: interesting.

EAU: Um, except that obviously it does also, like I said, get drier as we age, but the drier flakier ear wax, which some people have, is usually lighter in color and it tends to be more common in people of Asian and Native American descent. And then the sticky dark ear wax, which is what I have,

EW: Mm-hmm. Same.

EAU: Very sticky wax. It's more common in people of, uh, African and European descent. And apparently the dry, flaky earwax is like a recessive trait.

EW: Correct.

EAU: You're gonna tell me more about that. That's all I got about earwax. There's not, I tried to find if there was like a, a big literature about like who's more likely to get earwax impaction or something like that. Um, and there isn't a strong association between types of ear wax. Like you can get too much of it, whether you have the dry flaky stuff or the wet sticky stuff.

EW: That's interesting.

EAU: Yeah. And so under typical or ideal conditions, our outer ear is kind of like a self-cleaning oven. Okay? So it makes this wax and then it pushes it out in order to keep our ear canals. Free of debris and bacteria and getting rid of all of these skin cells once they're dead and done. All right.

EW: Uhhuh.

EAU: The biggest complication that we see is when this mechanism, for one reason or another doesn't go as planned. And so our ear wax builds up and gets stuck inside of our ear canals. And this is called cerumen impaction.

EW: Why might that happen?

EAU: let me tell you, there's so many different reasons. Um, it's probably the biggest earwax complaint, certainly like that you see in primary care or, or things like that. There's lots of other things that you can get stuck in your ear canal. Um, bugs and Legos and other small toys, very common, but.

EW: I feel like you have an an ear invasion phobia. Am I remembering that correctly?

EAU: I do. I love that you remember that and said it on a podcast for the world. I do. It's because of the wrath of khan.

EW: Okay. Okay.

EAU: Okay. In the wrath of khan, they put a little like alien guy in. This is like the original star, uh, Trek movie.

EW: Yeah.

EAU: They put a little alien like mind control guy, and then in Animorphs that's also how they control. Yeah.

EW: what they're called?

EAU: Yeah, something like that.

EW: feel like

EAU: Did you know they're making a series, Erin?

EW: do know that I am very

EAU: I'm so excited about it.

EW: nervous because like those books were [00:15:00] very dark,

EAU: I know. So we'll see how it goes.

EW: we'll see what happens.

EAU: Uh, but anyways, so yes, I do have a phobia of

EW: Sorry.

EAU: mind control creatures being put into my ear.

EW: I just figured it was like any bug.

EAU: I mean, yeah, I don't like the idea of any, but I've taken some cockroaches out of ears and it's not like a pleasant experience for the person who has the cockroach in their ear. Sorry. It's.

EW: I regret going down this rabbit hole.

EAU: Uh, well, it's not, it's not great, okay? But anyways, ear wax much more common to get stuck in your ears than other things. Um, and the biggest issue that can happen from this is that if the ear wax completely obscures your tympanic membrane, which is the thing that separates your outer ear from your middle ear, and this is like the membrane that allows us to hear. Then not only can this be very uncomfortable, it can create this sensation of fullness. It can be very itchy, but it also can cause hearing loss, right? If you completely block the thing that we use to hear, you can have substantially diminished hearing, um, and it can really exacerbate tinnitus or that that ringing in your ear, tinnitus, some people call it.

EW: I have that, yep.

EAU: it also could set you up for an ear infection because you're obviously blocking a tube. Which anytime you do that can set you up for an infection. So this can happen for a few different reasons. Number one, if you just have very tight or very like snakey shaped ear canals,

EW: Hmm.

EAU: Then you might be more prone to getting those blocked. So we might see this in small children who have smaller ear canals that they might have be more likely to get earwax buildup, or if for whatever reason developmentally you have a different shape of ear canal. Or if you just happen to be a person who makes a lot of ear wax. And I don't have any statistics on who you are compared to anyone else,

EW: Yeah.

EAU: So the biggest modifiable risk factors are using things like cotton swabs that you stick in your ear,

EW: As in don't use them because using them will lead to impaction. Yeah.

EAU: Not only can they push the ear wax further in, which can lead to impaction, they also can create little micro abrasions in your ear canal, which

can put you at risk for infection. Also, hearing aids or all of the earbuds that we use now, they just shove stuff down into your ear.

EW: Yeah.

EAU: And then like we talked about, as we get older, our ear wax gets drier, which can make it sometimes more likely to get stuck, but also the hairs that we see in the outer, like the very outer part, can just prevent all that ear wax from leaving. So we actually see, even though your ear canals are larger when you're older, we see more impaction in older adults than we do in younger adults or children.

EW: Wow.

EAU: Yeah. Mm-hmm.

EW: Um, how do you manage impaction removal? How

EAU: Yeah,

EW: manage? You're not supposed to use cotton swabs,

EAU: don't use cotton swabs. This is not a medical advice podcast, but please.

EW: you're, yeah.

EAU: um, if it's impacted, like if you have true cerumen impaction in your ear, then usually you're gonna need a little bit of help to get it out, though, not always. So in the office we might use something that's like a spray bottle with a special hose nozzle on the end of it that we can stick just far enough, but not too far into your ear canal and spray warm, like lukewarm water sometimes with hydrogen peroxide, 'cause the bubbles can help.

EW: Mm.

EAU: and you just spray spray spraying until you can. Dislodge that thing. It's really, really satisfying. Like, so satisfying.

EW: videos exist on the internet.

EAU: Oh yes, definitely. Um, sometimes we might use like a curette or something, or there's like little vacuum aspirators that, like the ENT specialists might have to really suck it out depending on, on how it's in there. Or at home. There's actually a lot of things that people can do that are safe to not only help to soften up something that might be stuck, but also just help get rid of ear wax. If you feel like you have too much of it though, again, your ears are a self-cleaning oven that's going to do it all on their own without your help.

EW: Yep.

EAU: But over the counter remedies might be even just putting water or like saline drops in the ear, which can help to soften up dry ear wax. Hydrogen peroxide, or there's similar drops that are made of carbamide peroxide. That's like debrox brand drops in the pharmacies here. Those basically just help to soften and the bubbles can kind of help to loosen up some of that wax so that it can come out on their own. Some people might use mineral oil, which is totally safe to use. But in general, the goal is just to keep that ear wax soft enough that your ear can do its job of getting it out on its own. Ear candling is a thing I wanna mention real quick. 'cause you heard about it in our firsthand account.

EW: 'tis a thing.

EAU: The claim apparently on how it works is that it creates a negative pressure in your ear canal to draw out the [00:20:00] wax.

EW: I did not know that was the claim.

EAU: Apparently that's the claim. It also apparently is, is supposedly this negative pressure also helps to treat other non ear wax related things like allergic rhinitis or like sinus pressure in general. So not withstanding the fact that you can legitimately just be setting yourself on fire, um, as you heard in our firsthand account, you can also end up with wax that is not the ear variety, the candle variety that gets stuck in your ear,

EW: Right.

EAU: Which can potentially cause really serious damage to the tympanic membrane. And not only is there no evidence in the literature that it works, there is actually at least one study that shows that it does not work and actually creates deposits of candle wax, even if you don't have like visible candle wax. Like in our firsthand account, it was obviously like a big deal.

EW: yeah.

EAU: Chunks got stuck. But even in, in this other study, there was just like deposits of like debris from the smoke and the wax in the ear. Um. Without removing any wax whatsoever.

EW: So you're just like, adding gunk to your ear.

EAU: Adding gunk to your ear without removing any actual ear wax whatsoever. Also, no negative pressure was created in this study. They used like a fake ear canal and they put an ear candle in it and they measured the pressure, no negative pressure differential created, and they found all of this like just stuff that was deposited in the ears

EW: I mean,

EAU: without getting any ear wax out.

EW: so it seems like there's no, there. There seem to be no clear benefits

EAU: No benefits whatsoever.

EW: just a long list of cons and potentially severe outcomes.

EAU: Severe outcomes.

EW: Okay.

EAU: and that is Erin, Ear Wax.

EW: Beautiful.

EAU: Thank you. Thank you so much. I think it is my shortest episode ever. Please tell me everything I wanna know from you.

EW: God, there's so, there's so much. It's gonna be great.

EAU: I can't wait.

EW: One of the true absolute joys of doing this podcast is discovering that there's like a whole world of study out there about a topic that on the surface seems pretty mundane.

EAU: Ear wax

EW: wax. Ear wax didn't immediately strike me as a topic of fascination, despite being like, we should do ear wax next, and like pushing to do it. Classic. I, I was like, okay. I, I, I knew that it was probably important for ear health and that you shouldn't use cotton swabs to remove wax from your ears, but that was basically the limit of my knowledge. As it turns out. Ear wax is, like our quarantini suggests, a true goldmine of information. I came across papers discussing ear wax in the context of human migration, art history, forensic analysis, and anthropogenic change.

EAU: What?

EW: I am now, I'm a convert. I'm a, I'm a believer.

EAU: I love it. Okay.

EW: hopefully by the end of this history section you, you might be too, or at least you'll have a couple pieces of trivia to impress your friends with at the next party.

EAU: I can't wait. You know? I love that.

EW: Earwax has been a subject of at least minor medical interest for millennia, mostly in the context of its removal or what it signifies for total body health.

EAU: Okay.

EW: So for instance, Hippocrates apparently viewed sweet ear wax as an unfavorable symptom. While bitter ear wax meant that you were in good health.

EAU: So people were out here just tasting earwax,

EW: that is what I wrote. I was like, I don't, I, I can't think of any other way that you can judge bitter versus sweet

EAU: no

EW: besides your taste buds.

EAU: Tasting it.

EW: yeah, Hippocrates is out there going taste your patient's ear wax

EAU: I mean, they tasted a lot of urine, et cetera, so it shouldn't surprise.

EW: shouldn't surprise, but it did surprise. And my capacity for, for surprise is still, is still present

EAU: there. That's good. I think that's a good thing.

EW: It's good. You know, there's Wonder left in this world.

EAU: Exactly.

EW: Uh, and of course the typical recipes of unlikely ingredients for removal. Things like milk, cinnamon, myrrh, almond oil, saffron. These were described to cure ear ache or, or remove ear wax.

EAU: saw almond oil listed still today, so that one's interesting.

EW: Yeah, it is

EAU: Not olive oil.

EW: but not olive?

EAU: Why? I don't know.

EW: dunno.

EAU: it's what I read.

EW: As far back as the second century Celsus, who's a Greek philosopher and physician, suggested using water to flush out foreign bodies and potentially earwax impactions. So we're ahead of his time. Then the suggestion, his suggestion to use, quote, " the saliva of a hungry man", end quote, to treat a larval infestation in the ear, which is like.

EAU: So many questions there.

EW: So many [00:25:00] questions.

EAU: Saliva of a hungry man, where does one get this? How hungry do they have to be? How much saliva? Does it all have to come from the same man, or can it be from multiple hungry

EW: well it says A hungry man

EAU: So just one?

EW: Not Hungry men.

EAU: Okay. And what larva are infesting your ear?

EW: I mean, you described cockroaches.

EAU: Yeah. But, okay.

EW: dunno. I apologize for that haunting thought, but,

EAU: Mm-hmm. Keep going.

EW: I read it so now you have to read it.

EAU: Thank you.

EW: just like the the booger taste thing last week. Uh, over the centuries, physicians became more interested in ear wax In the context of ear health and, uh, and, and hearing overall. it Was recognized by the late 17 hundreds that ear wax held several important functions, including preventing dirt and insects from injuring the eardrum. They seemed particularly preoccupied by insects. , quote, "the yellow humor purged by the ears, defendeth them against fleas, little flies, and other small worms and beasts that might otherwise enter within them." End quote.

EAU: So it's not just me who has a like fear of creepy crawlies in my ears.

EW: No, I think that's a reasonable thing to fear.

EAU: Thank you.

EW: Yeah. Sorry. Sorry if I implied that it wasn't. I, I also fear the yeerk.

EAU: I appreciate that.

EW: And so you, you described how ear wax, you're producing it continuously. It's just going out of your ears continuously. And this continuous production was shown by a professor who carried out a very simple experiment, I think this is in the 17 hundreds, uh, just by wiping his ears with a piece of black velvet 100 times an hour. No matter how many times he wiped, there was always a little bit of wax on the cloth. I just loved that

EAU: Oh, that's amazing.

EW: Physicians also noted several cases where someone's hearing improved or worsened depending on ear wax compaction or removal. And so in this way. Earwax kind of helped to turn hearing into a more fluid dynamic state where it could be permanent or temporary. It could change over the course of your life, and it could be partial or complete. Earwax related deafness was apparently not uncommon. Uh, or, or other issues related to earwax compaction. So the 17th century scientist, Robert Hooke, described his months long experience with tinnitus or tinnitus and impaired hearing that was ultimately found to be caused in part by a hard, compacted stone of ear wax, which was not a rare occurrence. All sorts of remedies were employed in attempts to remove ear wax, like applying heat, plugging the ear with perfumed wool or cotton to try to stimulate the flow.

EAU: Hmm.

EW: Liquid injections with various ingredients. Hooke used warmed honey that he wriggled in his ear.

EAU: Hmm. Okay.

EW: Yeah, I feel like that would attract bugs.

EAU: honey sounds real sticky.

EW: It sounds sticky,

EAU: Yeah.

EW: The logic, but he used it warmed, uh, and that, that lo No, I'm not saying that that's any better. I'm just saying that, that that logic of, of warming something that heat, to help remove ear wax that held support in the lab actually is where it was, was found to be supported. In the late 17 hundreds. A chemist who had become interested in the topic. He had a friend with prodigious ear wax production. I think it was the same guy who did the black velvet ear wax experiment.

EAU: Ah, okay.

EW: and he supplied the chemist with heaps of ear wax and he discovered that it hardened over time, it melted with heat and it dissolved in water.

EAU: Makes sense.

EW: So yeah.

EAU: Do you know what's also interesting about warm things in your ear versus cold? This is like a separate topic entirely, but if you, if you put cold water in your ear, like if you used cold water to uh, try and z out your ear wax instead of warm water, it would make you super dizzy. It would give you really, really wild vertigo because it does a weird thing that messes with your inner ear if it's cold water versus warm water. I don't. It's a different episode

EW: new next week.

EAU: next, not next week.

EW: Next week. Next week we're doing cholesterol? Spoilers!

EAU: Oh,

EW: but when all else fails, any of your honey, whatever situations

EAU: remedies. Uhhuh.

EW: there's always physical removal.

EAU: Yeah.

EW: Ear spoons or ear scoops were popular devices. And what was appealing about these tools was that you could just own one yourself and you didn't have to seek out a doctor. If you're like, Hey, I, you know, can you clean my ear out?

EAU: Yeah.

EW: you didn't have to do

EAU: Mm-hmm.

EW: Ear scoops have been around for millennia. As evidenced by historical writings and archeological finds, similar to the way there are just so many [00:30:00] parallels between ear wax and boogers.

EAU: Uhhuh.

EW: So in, with boogers, you know, we, I talked about handkerchiefs and they became status symbols and they transcended their role as just a snot rag. A market of decorative grooming tools grew, and there are examples of these really intricately and ornately carved ear picks and ear scoops.

EAU: Really? Beautiful ear scoops.

EW: beautiful ear scoops. There's one, there's a paper. You can see an image of this. There was one that was found at Jamestown, the English colony established in what is now Virginia in 1607 and in like the first iteration of that town, they found in archeological digs, a combination, toothpick and ear scoop. It's shaped like a dolphin, and so the toothpick part comes out of its little mouth, and then there's an ear scoop coming out of its tail,

EAU: What?

EW: And then it has a little loop on its back. And so you could wear it as a necklace

EAU: what a little ear scoop in.

EW: a little ear scoop. Who knew?

EAU: Who knew? I definitely did not know that.

EW: I did not. And also I was like, dolphin, why? Why a dolphin? And apparently sea creatures were featured heavily in jewelry and decorative items at the time because maritime supremacy was blossoming in England.

EAU: Oh, that's so interesting,

EW: very, that's very interesting because there was another ear scoop found somewhere in England that was similar and they were like, we think it's a dolphin. It might be a fish. It's some sort of marine.

EAU: Marine creature.

EW: Yeah.

EAU: Wow.

EW: So, but these ear scoop tools also signify that ear wax was not solely relegated to the realm of medicine. Everyone was individually concerned with it. It was just a routine part of life to clean out your ears. And those who could afford to do so often had their ears cleaned out by a barber. Who used special tools to scoop out any crud. There's, and this is referenced in plays, so there's a play, I believe from the 17 hundreds where a soldier worries that the king has had his ears picked too much, and so he has no protection from flies, from earwigs and from flattery. So he's like, anyone has the ear of the king with his ears cleaned of ear wax.

EAU: my God, that's so funny.

EW: And there are occasionally hints at the recognition that earwax holds some value, like the situation that I just described, where it's like, well, no, we need some earwax there.

EAU: Yeah,

EW: Mostly it was considered a waste product or junk as you put it.

EAU: Junk. So sorry for calling it that.

EW: I accept, I accept your apology. and so for instance, in Shakespeare's Troilus and Cressida, Agamemnon is described as not having quote "so much brain as ear wax," end quote. Devastating,

EAU: That is devastating.

EW: Yeah. Put that in your back pocket

EAU: Yeah. Right.

EW: uh, in reality, however, earwax held far more uses than I would've guessed. At, at, so for instance, in the American Frugal Housewife, which was written by Lydia Child 1832,

EAU: Okay.

EW: holds ear wax in quite high regard.

EAU: What.

EW: "Nothing is better than ear wax to prevent the painful effects resulting from a wound by a nail skewer, et cetera. It should be put on as soon as possible. Those who are troubled with cracked lips have found this remedy successful when others have failed. It is, it is one of those sorts of cures, which are very likely to be laughed at, but I know of It's having produced very beneficial results" end quote.

EAU: So she's using it as Vaseline.

EW: Using it as chapstick. Yeah.

EAU: Taking out the earwax, put it on your cuts. Literally. I have like an Aquaphor stick that I do that with, not earwax. Okay.

EW: Yep,

EAU: Yeah. Ear wax on your lips.

EW: yep.

EAU: I dunno if I'm gonna try that one.

EW: you can,

EAU: I could.

EW: you're certainly entitled to.

EAU: Got enough ear wax, that's for sure.

EW: I feel like I'm a super producer as well.

EAU: Me too, I've always felt that way. Um, what are you gonna do about it?

EW: just, it's life.

EAU: It's life. You know, we probably make a very typical amount of ear wax. Erin,

EW: We probably do, we probably do.

EAU: We are probably not special in any way when it comes to our ear wax.

EW: We'll see.

EAU: We'll see.

EW: maybe somebody will do a paper and we'll, we'll revisit this topic and discover our, our specialness. Uh, okay. So I didn't see it mentioned in the American frugal housewife, but the author may have also been familiar with the common practice of using ear wax while stitching and sewing. It's really great at keeping the ends of cut thread from unraveling.

EAU: I could see that actually.

EW: Yeah. And so the, in fact there are some bodkins, which are these like large blunted needles with a big eye to hold ribbon. It's kind of like a tapestry needle you'd use to sew, to weave in ends.

EAU: Right. Right.

EW: but like bigger,

EAU: Yeah.

EW: some of these have ear scoops on the end of them.

EAU: So that you [00:35:00] can scoop and then use it for your, that is so interesting. Oh wow.

EW: Ear wax was also favored by many artists who used it to help bind pigment to the paper or other surfaces they were working on. So I asked you to, to find a paper for me because I couldn't find it. And, um, and this is what, this is what was inside that paper.

EAU: I didn't read it.

EW: Good. Spoilers. Yeah, so, you know, illuminated manuscripts, those beautiful books with intricate color, colorful decorations or illustrations around the side, and they were like all hand drawn and everything. The book of Kels is a famous one, if you wanna look up like a really exceptionally beautiful example. But apparently many illustrators of these manuscripts were regular users of ear wax to prevent bubbles from forming in their metallic paint mixtures.

EAU: What?

EW: And so the author of a paper that I read about this actually tried it out himself. He made a couple of bronze pigment, egg white mixtures,

EAU: Okay.

EW: one that had ear wax added to it and one without. You mix 'em together, of course, egg white's gonna create bubbles and it's, and he was like, yeah, there were fewer bubbles in the earwax one. And then he used it to like paint, think UCSF. was, it was the example. I I, it must have been, that must have been where he was.

EAU: Yeah.

EW: but one that, so he, he compared the one that had earwax and the one that didn't. And you can kind of see that the one with ear wax is smoother and the color seems more consistent. So any artists who are out there listening who've been struggling, blending ear or egg whites into paints, you know, try a dab of ear wax. Let us know. Let us know how it goes.

EAU: They probably use like artificial things now that are just, that have waxes in them or whatever

EW: might not need ear wax

EAU: is my guess. Did that guy use his own earwax or someone else's?

EW: I believe he used his own.

EAU: Interesting.

EW: Yeah.

EAU: I wonder if it depends, like if, is it gotta be wet ear wax or, or is dry ear wax okay? Like which,

EW: I mean, so he

EAU: Which type?

EW: That's a great question. I think he, I think, I mean, he, he said he had wet ear wax, but I don't know if he experimented. That could be

EAU: Maybe that'll be another paper.

EW: another paper. Someone's, someone got a master's thesis at the very least.

EAU: Right.

EW: Uh, but yeah, earwax, it's a more powerful resource than I expected.

EAU: Yeah.

EW: rich, not just in the application of this stuff itself, but also what it can tell us about ourselves.

EAU: Tell me.

EW: So Erin, you mentioned that there are basically two types of earwax in humans, dry and wet, and there might be some that fall in between, but for the most part, the distinction seems to be pretty clear.

EAU: Yeah.

EW: Like pretty night and day and is strongly associated with ancestry, like you mentioned. So people with East Asian ancestry tend to have dry earwax. Those of European and African ancestry have wet ear wax. And those, uh, who, who have Southern Asian Pacific Islands, central Asian, native North American and Inuit have intermediate proportions of wet and dry.

EAU: Okay. Interesting.

EW: Yeah, this observation first started to garner attention around the mid 20th century, and the researchers made note of a couple of things. It was also associated with armpit odor, so those who have wet ear wax have much more odiferous pits.

EAU: we have Stinkier Armpits. Agreed.

EW: Mm-hmm. And it seemed to follow a pretty straightforward pattern of inheritance

EAU: Huh?

EW: Just how straightforward was determined in 2006, and this is when researchers published their results, that the difference between dry and wet ear wax was down to one letter change in one gene of our DNA. One single nucleotide polymorphism.

EAU: That's so weird.

EW: just one nucleotide changes ear wax composition and has strong associations with armpit odor.

EAU: And the drier ear wax is, well, and that makes sense because it's all apocrine gland secretions, right? Which is like what your armpit odor is, why that is there, and your ear wax.

EW: Your ear wax and it, it follows this dominant recessive Mendelian inheritance, which is the thing that you learn about in school. And,

EAU: Right. That's like your basic genetics. Yeah.

EW: But if you, so if you have two copies of the G version, which is the, the wet earwax version,

EAU: Okay.

EW: Or one G and one A, wet ear wax.

EAU: Wet earwax.

EW: But if you have two copies of the A version, that's the, the nucleotide substitution,

EAU: Okay.

EW: then you have dry earwax.

EAU: and you're less stinky.

EW: You're less stinky. And so for context, I feel like eye color is often taught as a simple Mendelian trait. It involves

EAU: and it is not.

EW: at least 16 genes, if not more.

EAU: Yeah.

EW: Yeah. But this is very interesting and I, I didn't go down this rabbit hole, but in addition to being associated with ear wax type and armpit odor, this same letter swap might be associated with the amount of colostrum produced. With people with dry ear wax producing less [00:40:00] colostrum.

EAU: Fascinating. Also, apocrine glands.

EW: Exactly.

EAU: Yeah.

EW: what? Yeah.

EAU: How interesting.

EW: So does earwax type matter or was it just like a random mutation that spread? And it seems like it might actually matter,

EAU: Hmm.

EW: Although it's unclear why. So some researchers suggest that it could be because of the cold. As humans migrated out of Africa and spread across Eurasia, cold temperatures would've had, uh, would've been a strong selection pressure.

EAU: Okay.

EW: So the, the dry ear wax phenotype emerged around 45,000 years ago in north and east or north or East Asia, where it was colder. And it's thought that maybe the reduced sweating could have been an advantage or the reduced stinking could have? I, I don't.

EAU: Yeah.

EW: I don't know, but in, in any case, like what, what these researchers have proposed, is that because it's so widespread, it seems like there is some positive selection.

EAU: Right.

EW: it was like this is selected for not just like it happened to spread in a population

EAU: Right. Not just random because it's too, too prevalent for that.

EW: Yeah,

EAU: Right.

EW: that's, that's the idea.

EAU: How interesting.

EW: Okay. So ear wax can tell us about human migration. It can be used as a lip balm. It's great if you're illustrating a medieval illuminated manuscript and it can be analyzed to tell us about the individual that produced it.

EAU: What.

EW: So there's some interest, and I don't know how much interest, uh, in, in the forensic applications of ear wax analysis. Things like tobacco exposure, cortisol levels, et cetera, stuff like that.

EAU: In your earwax

EW: In your earwax. And so there's, there's more there. I mean, because your earwax is also like,

EAU: it's being exposed just like your nose is right to the outside world. Yes. You're getting other junk stuck in your, that's why I say junk, Erin. Defending myself, um, debris.

EW: you didn't know about Chapstick and earwax!

EAU: No idea.

EW: now that you know, you won't make that same mistake.

EAU: Won't I?

EW: But that's just the uses of human earwax.

EAU: Oh no. okay.

EW: Oh yeah. Oh yeah. Because humans are not the only producers of this glorious stuff. These cerumenus glands, The glands that produce earwax are widespread among mammals, dogs, raccoons, pigs, goats, foxes, cats. Whales.

EAU: Whales!

EW: Whales. We

EAU: do whales even have ears?

EW: Oh yeah. Okay. There are some fascinating papers on whale, cetacean hearing,

EAU: Okay.

EW: um, that I really enjoyed.

EAU: Okay,

EW: Yeah. Okay, whales.

EAU: whales.

EW: this is now, we've arrived at the last and my personal favorite chapter in the ear wax story.

EAU: Me too.

EW: All cetaceans, whales, dolphins, porpoises, evolved from a land dwelling carnivorous cat-like creature that began its aquatic journey around 50 million years ago.

EAU: Okay?

EW: Going from land to water is a heck of a transition, and so many different aspects of anatomy and physiology had to change to allow for that to happen. hearing. Which in land dwellers is done using air adapted ears. When whales evolved those ears and their hearing more generally adapted to an aquatic environment, but the canals and the wax that they produce did not simply disappear.

EAU: Mm.

EW: Instead, baleen whales keep producing ear wax that accumulates over their entire life, rather than getting continuously expelled like ours.

EAU: What?

EW: Yeah.

EAU: what does that do?

EW: Okay. Over time these waxy layers form an earplug that is centimeters long, like 25 centimeters in one adult male blue whale. A long whale earplug. You can look up pictures of these.

EAU: I will.

EW: Okay. But that's not even the coolest part. Like it just keeps getting cooler.

EAU: It just, okay.

EW: what is amazing about these layers is that they're distinct. About two formed every year. So they're predictable in their deposition

EAU: stop it.

EW: And their color corresponds to times of like feeding or migration. People have used these earplugs to estimate the age of whales, like tree rings.

EAU: Tree rings, ice cores.

EW: used this for a while, but what they're doing now is even cooler than that. Researchers are using these earplugs to detect layer specific levels of hormones, contaminants, and other compounds, and so you end up getting a more detailed picture of what a whale's entire life was like.

EAU: What?

EW: Is this where you thought this would go?

EAU: No.

EW: I know, I know. I was so excited when I was reading these papers. [00:45:00] for instance, uh, there was a blue, a male blue whale that was killed in a boat collision and was found, uh, to be around 12 years old. Based on his, ear, the, the earplug. His testosterone spiked enormously a couple years prior, which is when he reached sexual maturity

EAU: my gosh.

EW: and his cortisol increased over his lifetime. Most of the contaminants that he was exposed to occurred in the first six months of his life, which suggested transfer through gestation and lactation, which is really depressing.

EAU: wow. Okay.

EW: that's just one whale.

EAU: One whale, one earplug.

EW: One earplug. and as it turns out, people have been collecting and preserving whale earplugs for decades.

EAU: Oh, that shouldn't surprise me.

EW: know, shout out to Natural history museums, to collections, like. We can learn so much. It's been unbelievable. And so that same research group who did this study on this single male blue whale, looked at cortisol levels in 20 preserved whale earplugs collected from 1870 to 2016.

EAU: Wow.

EW: They found that cortisol was, which is, it's associated with stress.

EAU: Mm-hmm. Mm-hmm. It's one of our stress hormones.

EW: hormones, they

EAU: also essential for life functioning. Like you need cortisol to be alive. Yep.

EW: Right.

EAU: Yep.

EW: And what they found was that cortisol was pretty closely tied to whaling counts, as in, years where more whales were hunted, were more stressful for whales. So the higher the whaling count, the higher number of whales killed, the higher the cortisol level.

EAU: Wow.

EW: In the whale earplugs they collected. The exception is World War ii, when whaling counts were low, but stress was high, no doubt due to the war also being, yeah, explosions and submarines and all that.

EAU: Right.

EW: And this relationship was especially pronounced in the years following 1972 when the Marine Mammal Protection Act was passed. Just a big drop in cortisol levels.

EAU: Oh wow.

EW: And that drop remained fairly low until you get to the past few decades where cortisol increases again in certain years. Why? Abnormally warm sea surface temperatures

EAU: knew it was gonna be a global warming. Yeah.

EW: Yep. And you, the, the relationship between this is just like, it is, it's very grim,

EAU: Mm-hmm.

EW: this research is so grim, but it is vital.

EAU: Yeah.

EW: These earplugs are able to show us something that has been kind of hard to measure in certain populations or in certain situations, especially. I mean, cetaceans are incredibly difficult to study

EAU: So hard to study.

EW: long term uh, as well. And so these earplugs being able to show us the, the non-lethal human impact on organisms is incredibly important

EAU: Right, and huge

EW: Yes.

EAU: like, oh wow.

EW: Yeah. So, uh, will we do anything with that information?

EAU: It remains to be seen.

EW: seen, but uh, but that is all that I have on earwax.

EAU: Wow, Erin, I have not thought about whale ears.

EW: Okay. There are some papers and there is a researcher. I watched a video of hers on, I think it was like an old PBS video or something like that, and she was so engaging and wonderful. And I just, I really liked her. There was a, one of the papers I will shout

EAU: Okay.

EW: end as soon as I find the name of it.

EAU: I love it. Their ears are just like flat, just like holes, right?

EW: they're, they're small, but then they use a lot of like jaw fat

EAU: Mm.

EW: that absorbs, and I didn't, I, yeah, I, I, I should have spent more time learning about ear or whale hearing overall,

EAU: That's okay. This wasn't an episode about hearing. I didn't talk about hearing at all. How interesting though. Wow. I wanna know so much more. People can learn more.

EW: People can learn more. I have a bunch of sources all over the place, but I'm gonna shout out a few here. If you wanna learn more about hearing in whales. Overall, there's, uh, Darlene Ketten is the researcher that I was thinking of, and there's a paper from 1997 that I liked called Structure and Function in Whale Ears. And then if you want to check out that paper on the whale cortisol levels over time, there's a paper by Trumble et al from 2018 called Baleen Whale cortisol Levels reveal a physiological response to 20th Century whaling, and then a couple more. So there's that paper about, uh, wet versus Dry earwax and how it's just one SNP and that's by Ohashi et al from 2011. And then, earwax and art history by Petras from 2000 called Earmarks of Art History, Cerumen and Medieval Art, and a lot [00:50:00] more.

EAU: I also have a number of papers, but the two that were cited in every other paper ever that I read, um, were one from 1997 By Roser and Ballachanda. That was called physiology pathophysiology and anthropology slash epidemiology of human ear canal secretions

EW: Woo.

EAU: The Journal of the American Academy of Audiology, and then one from 1964 by Alberti, um, called Epithelial Migration on the tympanic membrane. It was actually really interesting. Um, I don't read a lot of papers from the sixties, but I always get a kick out of it when I get to.

EW: love reading papers from the sixties sometimes.

EAU: yeah, it's just, they're so different in vibe.

EW: different. They're so different. Yeah.

EAU: And then I have a bunch of papers on like impacted cerumen, and cerumen Impaction and how we deal with it. And then a few as well on the Ear Candling business. Uh, you can find all of these sources on our website. This podcast will kill you.com under the episodes tab.

EW: You certainly can. A big thank you to Blood Mobile for providing the music for this episode and to all of our episodes.

EAU: Thank you. Thank you to Lianna and Tom and Mark and Pete and Jessica and everyone. Kristina, there's like so many people to thank at exactly right network. Thank you all for making this possible.

EW: Yes. Uh, thank you also to anyone who, you know, watches this podcast, listens to this podcast. We appreciate it. Like, like we said, you have a lot of different ways you can spend your time,

EAU: Mm-hmm.

EW: appreciate you spending that time with us.

EAU: We do. It really truly does. So thank you. And a special thank you to our patrons for your support over on Patreon. It really does mean like we we're not good, I think, at using words to explain how much it means to us, but it really means a lot.

EW: it does. It

EAU: Yeah.

EW: Until next time, wash your hands.

EAU: you filthy animals.