Brains On (APM) | Brains On! Body Bonanza: Yawns, hiccups, goosebumps and more!
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MOLLY BLOOM: Hello, Brains On listeners. Molly Bloom here. Before we get to today's episode, I want to tell you about a top secret project that we've been working on over here at Brains On headquarters. It's a brand new kids history podcast with a brand new host, my friend Joy Dolo. She's going to stop by the studio to say hi next week. But in the meantime, here's a sneak peek of our new show, Forever Ago.

JOY DOLO: Have you ever wondered who made the first sandwich?

[CHEWING]

Or what the first video game was? Or who invented shoes? I'm Joy Dolo. And I'm out to answer these questions and more with a brand new kids history podcast called Forever Ago. Every episode, we dive deep into the history of one cool thing. And along the way, we'll hear some incredible stories like how a curious teenager revolutionized skateboarding.

MAN: Gnarley.

JOY DOLO: How alarm clocks used to just be--

[KNOCKING ON DOOR]

--people. Rise and shine. And how the poop emoji almost didn't happen.

[PHONE DINGS]

Coming November 8, you can find Forever Ago on Apple Podcasts or wherever you listen.

RITIKA GURJAR: You're You're listening to Brains On where we're serious about being curious.

GIRL: Brains On is supported in part by a grant from the National Science Foundation.

MOLLY BLOOM: A few months ago, producers Marc Sanchez--

MARC SANCHEZ: Hello.

MOLLY BLOOM: --Sanden Totten--

SANDEN TOTTEN: Hi.

MOLLY BLOOM: --and I noticed that we've received a heap of questions about the human body.

MARC SANCHEZ: I'd call it a mountain.

SANDEN TOTTEN: Or even an avalanche.

MOLLY BLOOM: A lot of questions. So we set ourselves the task of answering nine of them in the course of one episode.

SANDEN TOTTEN: And that episode is today.

MARC SANCHEZ: On top of the nine questions, we wanted to give ourselves a little additional challenge.

MOLLY BLOOM: We're answering each one in a different style.

SANDEN TOTTEN: Fairy tale, poem, movie trailer, song.

MARC SANCHEZ: And to decide which question got which style--

MOLLY BLOOM: --we pulled them out of a hat. So we've been working on tracking down answers to nine of your questions and are super excited to share them with you today.

MARC AND SANDEN: Keep listening!

MOLLY BLOOM: You're listening to Brains On from American Public Media. I'm Molly Bloom. Here with me today to help us navigate this Body Bonanza is co-host Ritika gurjar from Arlington, Massachusetts. Hello, Ritika.

RITIKA GURJAR: Hello.

MOLLY BLOOM: And as you heard earlier, we also have producers MarC Sanchez and Sanden Totten.

MARC SANCHEZ: Hi there, Ritika.

SANDEN TOTTEN: Hey, Ritika!

MOLLY BLOOM: Ritika, we need you to keep us moving today and make sure we get to all nine of these questions in a timely fashion. Are you up to the task?

RITIKA GURJAR: Of course. In the spirit of efficiency, let's jump right into the first question. Marc was assigned one that a lot of you have asked.

WONG: Hi, my name is Wong.

KATE: Hi, my name is Kate.

WONG: I live in South Korea.

KATE: And I live in San Francisco.

WONG: And my question is, why do people hiccup?

KATE: What causes hiccups?

MARC SANCHEZ: I was tasked with answering this question in the form of a fairy tale. I call it Taco Tuesday.

[MUSIC PLAYING]

GIRL: Once upon a time, there was a boy named Mateo. Mateo's three favorite things in the world were trains, [TRAIN WHISTLES] tigers, [TIGER ROARS] and tacos. Mateo really loved tacos. On Tuesdays, Mateo never dilly-dallied after school like he sometimes did. In fact, he practically sprinted home. After he finished all his homework and did all his chores, Mateo grabbed a stool. And he stood next to his abuela as she added the final ingredients for the night's dinner, tacos!

ABUELA: [SPEAKING SPANISH]

MATEO: Oh, definitely. I'm always ready for Taco Tuesday.

ABUELA: [SPEAKING SPANISH]

GIRL: Mateo's younger sister, Isabela, eats two tacos. Each are sprinkled with cheese and lettuce.

ISABELA: Delicious. Gracias, Abuela.

GIRL: Mateo's mom and dad each eat three tacos. They add cilantro, onions, and a squeeze of fresh lime.

MATEO'S MOM: Mmm. You've really outdone yourself this time, mama.

MATEO'S DAD: Indeed, perfección.

GIRL: Mateo can't stop at two tacos or even three. On Taco Tuesdays, Mateo eats four tacos. Before biting into the first, he adds a few jalapeno peppers and a dash of hot sauce. But by the time he gets to the fourth taco, it is piled high with jalapenos and dripping with hot sauce. His mouth feels like it's on fire. It's so hot, he can barely finish eating it, but he does, and he loves it!

MATEO: Oh, fantástico! Muchas gracias, abuelita.

ABUELA: Ah, [SPEAKING SPANISH]

GIRL: Then as Mateo and Isabela clear the table, he makes this noise.

[HICCUPS]

Everyone laughs, including Mateo. A couple minutes later, they still haven't gone away, even after half an hour. After all the dishes have been washed and put away, after baths had been taken, after teeth had been brushed, the problem continued. Those hiccups would not stop.

[MUSIC PLAYING]

ABUELA: [SPEAKING SPANISH]

MATEO: I know I will, abuelita. Hiccups usually do go away-- [HICCUPS] --on their own, but I'm getting a little nervous.

GIRL: It's been hours. [HICCUPS] Nobody is laughing anymore. Then out of nowhere, Isabela jumps from around the corner and yells--

ISABELA: Boo!

MATEO: What was that for?

ISABELA: I heard hiccups go away if someone scares you.

[HICCUPS]

MATEO'S MOM: Here, try drinking this glass of water, dear. That usually helps me get rid of hiccups.

GIRL: Mateo drinks the entire cup without stopping. And then--

[HICCUPS]

No, that didn't work.

MATEO'S DAD: I've got it. I've got it. Here, take this paper bag and breathe into it for 60 seconds.

GIRL: The bag steadily filled and emptied aS Mateo breathed into it for a minute. But alas.

[HICCUPS]

MATEO: It's not working!

GIRL: As Mateo went to his room to get ready for bed, he was very worried his hiccups would never go away. Just before he climbed into bed, he looked in his mirror and asked.

MATEO: How am I-- [HICCUPS] --ever going to get rid-- [HICCUPS] --rid of these hiccups?

GIRL: Usually when someone looks in the mirror and asks a question like this, there is no reply. But this time--

GLADYS: You have to distract yourself, dear.

MATEO: Huh? Who-- who's there? Is that you Isabela?

GLADYS: Oh, heavens no. I'm Gladys Glottis, graduate glottal guide, great giver of voice, and guardian of the trachea.

MATEO: Gladys glue what?

GLADYS: Yep, Glottis, dear. Gladys Glottis. Call me Gigi, all my friends do.

MATEO: OK, Gigi. Who or what--

GLADYS: Yep!

MATEO: --are you?

GLADYS: I know everything there is to know about the glottis. Think of me as your fairy godmother for hiccups. The glottis is a space between your vocal cords in the back of your throat. Most parts of the body have some sort of fairy attached to them. Let's see, there's Hair Follicle Harry. I'm always losing track of what he's up to. Oh, and up Pam Pancreas. We have lunch together every Thursday.

Then there's the lung twins Lucia and Lucius. And let's see, there's Tabitha Toenail, Anna Intestine, Frankie Femur, Karina and Kim Kidney, Jaime Heart. Oh, the list goes on and on.

MATEO: But why haven't I heard of you before?

GLADYS: Oh, well, I guess you never asked for our help before. But when you looked in the mirror and asked about hiccups, I was summoned, and here I am.

MATEO: OK, Gigi, why do I have those terrible hiccups?

GLADYS: Because hiccups just happen. Our bodies involuntarily produce hiccups. But in your case, it was the tacos.

MATEO: Tacos?

GLADYS: Well, actually, it's what you put on your tacos. Spicy foods like jalapenos and hot sauce can trigger hiccups.

MATEO: Oh, OK. But why do they have to make that annoying sound?

GLADYS: Each hiccup starts with a very quick intake of air. And right after that, the glottis closes. That's where the hic sound comes from. The glottis sits atop the trachea, the passageway for air to flow in and out of our lungs. Every time you swallow, the glottis shuts so food doesn't go down the wrong pipe. Fascinating, isn't it?

MATEO: Oh, yeah. Cool, but back to the question, Gigi. How can I get rid of those hiccups?

[CHUCKLES]

GLADYS: You haven't hiccuped since we've been talking.

MATEO: You're right! My hiccups are-- they're gone!

GLADYS: Each remedy you tried had one thing in common. Getting scared, drinking water, breathing into a bag, those are all forms of distraction. Your body needs a distraction to focus on something other than hiccups. So while I told you about all the other body fairies, your body focused on something new. Hiccups gone.

MATEO: Gracias, Gigi.

GLADYS: De nada.

GIRL: Mateo went to sleep that night dreaming of trains, [TRAIN WHISTLES] tigers, [TIGER ROARS] and even tacos, but in his dream, at least this once, he skipped the hot sauce and jalapenos.

[MUSIC PLAYING]

MARC SANCHEZ: I have to admit, I love tacos too. And I often find myself with hiccups because I make them super spicy. Does that ever happen to you, Ritika?

RITIKA GURJAR: Yes, all the time. My parents always make me eat spicy food.

[CHUCKLES]

MARC SANCHEZ: And you get hiccups?

RITIKA GURJAR: Yeah.

MOLLY BLOOM: Well, now we know why.

RITIKA GURJAR: OK, one down, eight to go. Sanden, your turn.

SANDEN TOTTEN: All right.

RITIKA GURJAR: You were given this head-scratcher. Why do we get dizzy when we spin?

SANDEN TOTTEN: OK, not only did I get this question, I also got assigned to put it into a song. And it's a really cool explanation. It has to do with this fluid in your inner ear that sloshes when you move. I'd sing about it personally, but I don't want to damage those amazing ears we just talked about. So I got my pal, Gia Mora, to help me out. And I'm going to warn you, you may feel a strong urge to boogie.

[MUSIC PLAYING]

Hey, all you funky cats out there. When you boogie out on the dance floor, you ever get that dizzy feeling? Like there's a disco ball spinning round in your head, but you stop moving. Well just hang loose. Einstein's girl's going to give you the skinny.

Inside your ears there are tiny little organs. And there are covered with hair. Each hair is connected to a nerve cell in your brain, which helps you tell here from there. When you move, those hairs bend or change your brain can comprehend. Above those hairs is a liquid much like jello. Endolymph is its name. And when you spin that liquid must resist inertia, does its best to stay the same.

But when you spin, it moves, and your brain like your body grooves. At the dizzy disco, liquid's turning all night long. At the dizzy disco, you stop, the liquid still goes strong. At the dizzy disco, that's the reason for the songs, the liquid's moving while you're still.

Right on, right on, my dancing queen. Inside your inner ears, there's an organ filled with liquid. And when you start spinning, that liquid starts up moving, sloshing back and forth, back and forth, bending the tiny hairs in your inner ear that send a signal to your brain saying, hey, baby, you're doing the hustle, and don't you look fine.

But when the song ends and you stop your spinning, that liquid still keeps turning, telling your brain that you're moving, even though you're not, a dizzy disco, if you will. That's science, baby. Can you dig?

When Isaac Newton looked above and saw the apple, said what goes up must come down. Oh, must come down. He knew our brains could grasp the sense of gravity and keep us balanced all the time. And the dizziness you feel is just proof that physics is real. At the dizzy disco, you can turn yourself around. At the dizzy disco, but to nature's laws you're bound. At the dizzy disco, watch your step, don't hit the ground. You can dance the night away!

ANNOUNCER: That was Gia Mora's To Get Dizzy Disco right here on Brain On FM. Keep listening.

MOLLY BLOOM: All right, Ritika, move us along here.

[CHUCKLES]

RITIKA GURJAR: You've been asked to answer this question from Emma in Vernon, British Columbia.

EMMA: My question is, why do we yawn and why is it contagious?

MOLLY BLOOM: The style I drew from the hat for this one was a poem. And I enlisted the help of neuroscientist Robert Provine from the University of Maryland, Baltimore County. He's the author of "Curious Behavior: Yawning Laughing, Hiccupping, and Beyond." [CLEARS THROAT] Here goes. Everyone yawns from the night till the morn. We yawn when we're old and before we are born. When we were fetuses inside our mothers, all of us yawned one way or another.

You know who else yawns? Our animal associates, cats, dogs, sharks, and most other vertebrates. So why do we and so many animals yawn? We're not quite sure, but here are facts to build upon.

ROBERT PROVINE: We yawn when we're sleepy. We yawn when we're bored.

MOLLY BLOOM: And this is something that Dr. Provine has explored.

ROBERT PROVINE: Yawning occurs at points of transition. So a yawn's purpose could be a call to attention. Athletes may yawn before big events. And parachuters do it before things get intense. So a call to perk up may be its origin, but studies have found the cause is not lack of oxygen. So to the next question, why is yawning contagious? Well, it's unclear how it is advantageous. Children under five don't catch yawns from others, nor do most animals, which make scientists wonder if yawning might be a way to show empathy.

They're not quite sure, but it is a possibility. Or perhaps we're seeing something quite primal, a social behavior that's a kind of fossil. Here's something we know about this phenomenon. Catching a yawn from someone we know is more common than catching a yawn from someone like a stranger. But those more sensitive may be in danger of yawning whenever they see or hear the word. But at its root, yawning shows that we're part of a herd.

[SNAPPING FINGERS]

Thank you. Thank you. Thank you.

SANDEN TOTTEN: Dig.

RITIKA GURJAR: Now I feel like yawning.

[CHUCKLES]

Yes, right? Because even just hearing the word can make you feel like yawning. So some of the rhymes in those couplets were spot on and some were a bit of a stretch. So forgive me for that. But even though scientists aren't exactly sure why yawning is contagious, all signs point to it having social roots. Other social animals like chimps and dogs also seem to yawn contagiously.

And one other thing I want to point out before we move on is that a lot of these commonplace things that we all do, like hiccuping and yawning, we don't necessarily have answers to the why questions. Here's Robert Provine again.

ROBERT PROVINE: We tend to overlook the commonplace. So scientists always develop estimates to see new difficult to detect things, and we tend to overlook things that are constantly before us.

MOLLY BLOOM: And, Ritika, before we move on, can I talk about one more mystery?

RITIKA GURJAR: Sure.

MOLLY BLOOM: Thank you. This one is a mystery related to the body, specifically your ears. It's time for the mystery sound.

RITIKA GURJAR: Mystery sound.

MOLLY BLOOM: Here it is.

[SCRAPING]

I think we should hear that one more time since it's a short one. Any guesses? Marc and Sanden, you can guess too, but let's let Ritika guess first.

RITIKA GURJAR: Hmm. It sounds like something scraping against something else.

MOLLY BLOOM: Mm-hmm.

MARC SANCHEZ: Yeah, I definitely hear something scraping, and then there's like a-- that click which is-- sounds a little off.

SANDEN TOTTEN: It's not quite scraping.

MARC SANCHEZ: The click is what's--

MARC SANCHEZ: That's throwing me.

MARC SANCHEZ: --driving me crazy. You know what it kind of sounds like to me is like a big marker when you're drawing on paper with a marker.

RITIKA GURJAR: Yeah.

MARC SANCHEZ: Oh, right, right. Like a big felt marker.

SANDEN TOTTEN: Yeah. And the click maybe is the cap closing?

MARC SANCHEZ: Ooh.

RITIKA GURJAR: Mm.

MOLLY BLOOM: I like this mystery sound teamwork. This is good. Well--

SANDEN TOTTEN: What does this have to do with bodies?

MOLLY BLOOM: Yeah, so we will be back with the answer later in the show.

(SINGING) Ba ba ba ba ba ba ba ba ba ba ba Brains On.

OK, so far we've tackled hiccups, yawns, and getting dizzy. What is next?

RITIKA GURJAR: This time, goosebumps.

Izzy My name is Izzy, and I am from Raleigh, North Carolina. My question is, how do goosebumps happen?

RITIKA GURJAR: OK, Marc, back to you.

MARC SANCHEZ: My chosen style to explain this? A TV sitcom. Since sitcoms are usually around a half hour and we don't have that much time on the show, I decided to make up a sitcom theme song that promotes the newest episode of-- wait for it Goosebumps!

SINGERS: (SINGING) On a cold, cold night, when you have a fright, what do you get? Goosebumps. When your hairs stand on end from adrenaline, you know you got a case of goosebumps. Goosebumps! Or a stress reaction. Goosebumps! Tiny muscle contraction. Goosebumps! Our leftover trait from a long-haired cousin. You know, a primate.

ANNOUNCER: On the next episode of *Goosebumps,* Jared goes fishing.

MAN: Aw, Carl, why did we think it was going to be a good idea to go ice fishing in the dark without a jacket?

CARL: Yeah, not only am I cold, but I'm kind of scared too. That's like goosebumps on top of goosebumps, what with all the adrenaline my body is producing.

MAN: Just look at the hairs on my arm.

CARL: Whoa, they're standing on end.

MAN: Yeah. And the tiny muscle at the base of each hair is contracting to cause the skin around it to push out.

CARL: Sort of looks like chicken skin.

MAN: Or, you know--

CARL AND MAN TOGETHER: Goosebumps.

[LAUGHTER]

Goosebumps! Or a stress reaction. Goosebumps! Tiny muscle contraction. Goosebumps! Our leftover trait from our long-haired cousin. You know, a primate. Goosebumps!

Come on, Goosebump.

[LAUGHTER]

MOLLY BLOOM: Do you think *BrainsOn* would be better with a laugh track?

MARC SANCHEZ: If it means my jokes will always get a laugh, then bring it on.

SANDEN TOTTEN: Ha, you could say that again.

MARC SANCHEZ: OK, bring it on.

[LAUGH TRACK]

RITIKA GURJAR: Um, no.

LAUGHTRACK: Aw.

[MUSIC PLAYING]

MOLLY BLOOM: We're going to be back with more answers to body questions in a minute. But first, we have a question for you, our listeners. We're working on a show where we're going to talk about the invention of video games. And we want your help dreaming up the future. So tell us, if you were designing the video game of the future, what would it be like? Marc, Sanden, what's your dream video game of the future?

I think that my video game of the future would kind of be taking video games off the screen and going back into the real world. Think about Pac-Man. I would have, like-- I would set up a bunch of pancakes, maybe. And I would gobble them up and try to eat maybe ghosts that were in VR or something like that.

MOLLY BLOOM: Oh, OK. I thought it was just going to be you eating pancakes. And I was like, Marc, that's not a video game.

MARC SANCHEZ: But you would get points. [CHUCKLES]

MOLLY BLOOM: [LAUGHS]

MARC SANCHEZ: That's brunch, right? That's Sunday brunch.

MOLLY BLOOM: [CHUCKLES] That's a good plan. I like it.

SANDEN TOTTEN: Yeah, right now he doesn't get high score for eating all the pancakes.

MOLLY BLOOM: [LAUGHS]

MARC SANCHEZ: Right Yeah, maybe I could eat a cherry, or some sort of grapes, or something, you know--

MOLLY BLOOM: OK, I like it. I like it.

MARC SANCHEZ: --bonus points.

SANDEN TOTTEN: Yeah, and you'd get a superpower instead of just getting really full.

MARC SANCHEZ: Yeah.

MOLLY BLOOM: Excellent. [CHUCKLES]

OK, Sanden, what is your video game of the future?

SANDEN TOTTEN: Well, as you know, Molly, my life is already really exciting. I'm always going on adventures, and saving people, and getting treasure, and stuff.

[CHUCKLING]

So I want a video game that's the opposite of my already amazing life. I just want a video game where I sit on the beach and the only challenge is, like, getting the drink from my side table to my mouth without spilling.

MARC SANCHEZ: Cue the Hawaiian music.

SANDEN TOTTEN: That's it.

MOLLY BLOOM: Yeah, it's a good-- It's relaxing. So it's sort of-- it's a game for relaxation, maybe some meditation in there.

SANDEN TOTTEN: Yeah, chill video game, yeah.

MOLLY BLOOM: Those are both brilliant ideas. So, listeners, please send us your ideas by heading to brainson.org/contact.

MARC SANCHEZ: And if you have mystery sounds, ideas, or questions, you can send them to us at that same link, brainson.org/contact.

SANDEN TOTTEN: That's what Sky did.

SKY: My question is, why do we have two lungs?

MOLLY BLOOM: We'll be back with the answer to that at the end of the show, during our Moment of Um. And we'll read the latest listeners to be added to the Brain's Honor Roll. Stick around.

You're listening to BrainsOn's Body Bonanza. I'm Molly Bloom.

RITIKA GURJAR: I'm Ritika Gurjar.

MARC SANCHEZ: And I'm Mark Sanchez.

SANDEN TOTTEN: And I'm Sanden Totten.

MOLLY BLOOM: A full studio today.

MARC SANCHEZ: We're answering nine, count them, nine of your questions today.

RITIKA GURJAR: And we still have five to go, so let's keep moving.

SANDEN TOTTEN: OK, I'll go next.

RITIKA GURJAR: Excellent. Here's your question.

CHILD 1: Hi, my name is [? Sayla. ?]

CHILD 2: Hi, my name is [? John. ?]

CHILDREN: Our question is, why do you get pins and needles?

MOLLY BLOOM: OK, so pins and needles is that feeling when your arm, or leg, or foot falls asleep. Then you move it and it's all prickly for a while. Sanden, please tell us what's going on here.

SANDEN TOTTEN: OK, let's see, I got this one. Hold on. Let me get this list out of my pocket. Ah, here it is. My paresthesia shopping list.

RITIKA GURJAR: Paresthesia?

SANDEN TOTTEN: Uh, oh, yeah, that's the formal sciencey name for pins and needles,

MOLLY BLOOM: So what's on your list?

SANDEN TOTTEN: OK. Let's see, um, clothespins, a garden hose, ginger ale, Silly Putty, a pincushion, obviously--

MARC SANCHEZ: Obviously.

SANDEN TOTTEN: --Rice Krispies and, oh, yeah, toilet paper.

RITIKA GURJAR: OK, that's your list. Now, why those things?

SANDEN TOTTEN: Well, pins and needles has to do with your nervous system. So that's the system of nerves all over your body that feel the world and send signals to your brain. When your leg falls asleep, let's say, it's because you pinched some nerves, cutting them off from the brain. Maybe you've been sitting on your leg for a long time in, like, a weird position. So that squeezes those nerves. Basically, it's like you stuck a clothespin on them. And that makes them kind of stop sending signals to the brain.

Blood also helps to keep your nerves happy. And when you sit on your leg for a long time, that cuts the blood flow, kind of like when you put a kink in a garden hose and the water can't get through. That's why hoses are on my list.

MARC SANCHEZ: OK, how about ginger ale?

SANDEN TOTTEN: OK, so while the nerves are pinched and the blood flow is restricted, your leg starts falling asleep. That makes it feel like the fizzing of ginger ale. Once it's fully asleep, it's all numb and gooey. And to me, that always feels like Silly Putty. That's why I put that on the list.

MOLLY BLOOM: OK, and next you wrote down pin cushions, naturally.

SANDEN TOTTEN: Because that's what your leg feels like when you finally move it. And the blood flow returns full force. And those nerves are unpinched. It's like you're being poked with hundreds of tiny, little needles. That's the feeling of your nerves suddenly coming back to life. They're waking up and firing, [IMITATING GUNFIRE], at random times as they reboot. It's kind of like the random popping of Rice Krispies cereal when you pour milk on them, which is why I put that on the list too.

MOLLY BLOOM: Cool. That all makes perfect sense. So what about the toilet paper?

SANDEN TOTTEN: Oh, yeah, that had nothing to do with paresthesia. I'm almost out of toilet paper at home. I just wanted to put it on my list so I didn't forget it. Sorry, guys.

SINGER: (SINGING) *BrainsOn!* [CLEARS THROAT]

RITIKA GURJAR: Molly, what's next?

MOLLY BLOOM: Well, you know what I'd really like? I'd like to go back to that mystery sound. Let's hear it again.

[SCRAPING SOUND]

Any new guesses?

MARC AND RITIKA: Hmm. [CHUCKLING]

MOLLY BLOOM: Sticking with the marker idea?

MARC AND RITIKA: Yeah.

MARC SANCHEZ: Let's stay with marker.

RITIKA GURJAR: Yeah.

I think that's a good--

SANDEN TOTTEN: Sure.

MARC SANCHEZ: --good group effort.

MOLLY BLOOM: OK. Here with the answer is Nicole Proska, a forensic scientist from the Minnesota Bureau of Criminal Apprehension.

NICOLE PROSKA: That was the sound of me opening a jar of fingerprint powder.

MOLLY BLOOM: So that--

MARC SANCHEZ: Ah.

MOLLY BLOOM: --that scraping sound was the cap coming off. And then she put the cap down next to it.

RITIKA GURJAR: Nice.

MOLLY BLOOM: And the fingerprint powder she has is super cool. It's actually magnetic powder.

RITIKA GURJAR: Wow.

MOLLY BLOOM: So instead of a brush, she has a magnet, which she dips into this magnetic powder. And when it comes out, it looks like this spiky, crazy clump of magnetic powder on top of this rod.

MARC SANCHEZ: Oh, like a sculpture, kind of?

MOLLY BLOOM: Yeah, kind of like a sculpture.

MARC SANCHEZ: Neat.

MOLLY BLOOM: And then she brushes it very gently onto whatever surface they're trying to pick fingerprints up.

SANDEN TOTTEN: Wow.

MOLLY BLOOM: And there they are.

RITIKA GURJAR: Wow.

MARC SANCHEZ: That's cool.

SANDEN TOTTEN: That is so cool.

RITIKA GURJAR: That's cool.

MOLLY BLOOM: That's very cool. We'll post a picture of what that looks like on our Instagram, @Brains_On. Here's more from Nicole.

NICOLE PROSKA: Even identical twins, who may look alike in photographs or pictures, actually, if you look closely at their fingerprints, they will be different. So we start out by looking at the fingerprint that we picked up. And when we compare it, we will look at what we call a known print, so taken from somebody at the police station, potentially. And it'll have all 10 of their fingerprints and their palm prints. And we will look at them side by side.

We will look at the overall pattern, which is broken into three big groups, called loops, whirls, and arches. And then we will start looking at the different pathways that those patterns take, kind of like following a maze. You'll find different dead ends or endings. Or you'll see that the path will split in different places, or fork off.

The main part of fingerprints that are left behind is sweat. But there are also oils that are left behind or anything else that you may have touched throughout the day, maybe a little bit of Cheeto dust, kind of like a stamp.

MOLLY BLOOM: And then if you want to try picking up your own fingerprints, you can do it really easily just by taking tape, sort of that clearer packing tape and putting your fingers on it? You will see your fingerprint very clearly if you do that.

MARC SANCHEZ: No mess involved.

MOLLY BLOOM: And this mystery sound was inspired by another question we're answering today. This one was from Myrna in Dearborn, Michigan.

MYRNA: Why do we have fingerprints, and what do we use them for? I think fingerprints are very interesting because detectives use them a lot. And I like to pretend that I'm a detective.

MOLLY BLOOM: I was tasked with answering this question through an interview. But Ritika has very graciously agreed to help me out.

RITIKA GURJAR: We spoke with Dr. Roland Enos from the University of Hull in the UK.

ROLAND HULL: Yes, I'm Roland, hello.

RITIKA GURJAR: What in the human body makes fingerprints?

ROLAND HULL: Well, the fingerprints are made from our skin. And as you are in the womb, they gradually develop. And they are fully formed by the time you're born.

RITIKA GURJAR: This leads to the next question. Why do we have fingerprints?

ROLAND HULL: Well, I'm afraid, Ritika, the answer is that we still don't really know. For some reason, scientists haven't really studied it a great deal. But there are a few ideas. One idea is that they're there to help improve our grip. The problem with that idea is that, actually, having fingerprints reduces the area of in contact with the objects that you're dealing with. And so they should actually reduce friction. And if you're in IndyCar tires, they're as flat as possible to give the best grips. So having prints actually wouldn't be fantastic for that.

The second idea is that they actually help us to have better sensitivity. And indeed, people have put sensors and made model fingerprints. And it's been shown that they do actually magnify movements and help you detect things better. But that doesn't really explain why we've got prints on our palms of our hands and soles of our feet. So that's a puzzle.

And finally, another idea is that they act as sort of strengthening rods and lines so that it helps us to prevent getting blisters. If you've ever gone walking, you find you get blisters on the heels of your feet or the tops of your toes, not only areas where there are prints. So that's also a possibility. We don't know. What do you think?

RITIKA GURJAR: Hmm, I'm not really sure. I think it helps us sense more things.

ROLAND HULL: Yep.

RITIKA GURJAR: Do you know why everybody's fingerprint is different?

ROLAND HULL: Well, that's a very good question. They are all different. But, in fact, Ritika, every part of our bodies is different. So we've got different eyes. We've got different eyebrows, different eyelashes. The skin every else is different. The main thing about fingerprints is that they're the one part of your body pattern that criminals would leave behind at the scene of a crime. So that's why they've been so heavily used.

Every part of our body is totally unique. And of course, nowadays, we use DNA instead of fingerprints as well-- or as well as fingerprints. So that's another part of our body that we actually leave behind at the crime scene.

RITIKA GURJAR: Do our ancestor animals, such as the gorilla, have fingerprints also?

ROLAND HULL: They do. All primates have fingerprints. But not only that, if you know koala bears, which are marsupials, they're not related to us. But they do climb trees in the same way as gorillas and monkeys. They also have fingerprints.

And one final exciting thing is new world monkeys with tails, which are used to grip, prehensile tails, as we call them. On the prehensile tails, they have prints just like fingerprints. So every animal which grips in the same way as us, they all have fingerprints, or prints in those areas.

RITIKA GURJAR: I think that wraps up our questions. Thank you so much for talking with us today.

ROLAND HULL: Well, thank you very much, Ritika. It was a pleasure to talk to you.

[MUSIC PLAYING]

RITIKA GURJAR: All right, one more round of questions.

MARC SANCHEZ: Let's do this.

RITIKA GURJAR: Marc, I hear you have an old timey radio play up your sleeve to answer this question.

CLAIRE: Hi, my name is Claire. I am from Fort Worth, Texas. My question is, how do you get a brain freeze, and why do they happen?

MARC SANCHEZ: OK, Claire, to answer your question, we're going to go back to the old time days of the radio.

[MUSIC PLAYING]

MAC MACARONI: Ladies and gentlemen, boys and girls, thank you for joining us here at the WBO Radio Playhouse. I'm your host, Mac Macaroni. Dear listeners, I would like you to set your worries aside for just a moment. We're joined now by the WBO players, who have been leading us on a journey of exploration and adventure at the County Fair. Now sit back, relax, and enjoy this new installment, where our old friend Doc Parsons is on stage getting ready to judge an ice cream eating contest.

[ROOSTER SOUND]

ANNOUNCER: Last call for the ice cream eating contest. All contestants need to be on the stage and in their seats in 30 seconds.

CARL: Well, sorry, Doc, I had to race over here from a pie eating contest. Now, that's what I call a la mode.

[CRICKETS CHIRPING]

CONTEST HOST: All right then, the contestants are in place. Let's proceed. The rules are simple. First person to finish a half gallon of vanilla ice cream wins free ice cream for a year from Jackson's Piggly Wiggly market.

[APPLAUSE]

Let the ice cream eating begin. Now, as a doctor, I'm obliged to tell you to be careful not to let too much of that delicious, cold treat near the roof of your mouth. If it gets too cold there, well--

[DROPPING SILVERWARE]

CARL: Ugh, my head.

CONTEST HOST: Don't worry, Carl's to be fine. He's just proving my point. The roof of his mouth became too cold too fast. So blood vessels in his brain began to widen and try to warm it. The problem is--

[DROPPING SILVERWARE]

BILLIE JEAN: Oh, no brain freeze!

CONTEST HOST: Exactly, Billie Jean. I prefer to call it a cold stimulus headache. But to each his own. Now, where was I? Ah, yes, my warning. Now, pay attention, Carl and Billie Jean. Since each of your brains is housed in a skull, there's not much room for it to expand when it warms up. Pressure builds up in the skull and might just cause--

[DROPPED SILVERWARE]

JOLENE: Ah, my head. I think I might need a doctor for this ice cream headache.

CONTEST HOST: Well, yes, my dear Jolene, I am here if you need me. But in this case, you should be able to cure yourself. First, take smaller bites. Second, I know this is a contest. But if you don't want brain freeze, slow down. And finally, try to avoid putting the cold stuff near the roof of your mouth.

NILLIE BEAM: I'm done.

CONTEST HOST: Well, it looks like we have a winner.

[APPLAUSE]

And who are you, young miss?

NILLIE BEAM: Nillie, Nillie Beam. I'm 8 and 3/4.

CONTEST HOST: [CHUCKLES] And just how did you eat all of that ice cream so quickly?

NILLIE BEAM: Welp, I just like ice cream. I guess.

[CAROUSEL MUSIC]

MAC MACARONI: From all of us here at WBO, I'm Mac Macaroni, wishing you a wonderful tomorrow.

RITIKA GURJAR: Sanden, you're up. And here's your next question.

AMELIA: Hi, my name is Amelia.

ISAAC: Hi, my name is Isaac, and we're from Arlington, Virginia.

AMELIA: And our question is, why do your teeth chatter when you're cold?

SANDEN TOTTEN: Yeah, I got asked to answer this in the style of (ACCENTED) Shakespeare. So here we go. [CLEARS THROAT]

[MUSIC PLAYING]

When winters' breezes doth blow across your frail and fragile form, your brain reacts. It feels the chill and wishes to be warm. Your body keeps a temperature for daily operation, 98 degrees or so for thermal regulation. So when it's cold, your body knows it must take action quick. It decreases sweat and the blood vessels near your skin constrict.

Alas, alone, these things won't do. So there is more action. Your muscles, they relax a bit, followed by contraction. We call this shivering. It creates heat as muscles tense and ease. It happens to your jaws as well, which hold your precious teeth. They click, and clack, and tap, and tap. They chatter, if you may. But if it works, you'll gain some warmth. The chill will go away.

[APPLAUSE]

MOLLY BLOOM: Shakespeare would be proud. And in case people out there might need a little Shakespeare translation, what Sanden is saying is that our muscles contract in order to try to generate heat. And that's where the teeth chattering and shivers come from.

RITIKA GURJAR: Only one more question.

KYA: Hi, *BrainsOn,* this is Kya from St Mary's County, Maryland, and I am 10 years old. You know how when you hear yourself in a recording and you think it sounds funny, but when someone else here is your voice in a recording, they think it sounds perfectly normal? My theory is that when you are talking, you hear yourself differently than other people hear you. Is that true? If not, why is it that you sound different to your own ears than to other people's ears when you hear yourself in a recording? Thanks.

RITIKA GURJAR: Molly?

MOLLY BLOOM: Yes. This is a great question And, Ritika, I just want to ask you. When you're hearing your voice through your headphones right now, does it sound kind of weird to you?

RITIKA GURJAR: Yeah, it does.

MOLLY BLOOM: How does it sound different?

RITIKA GURJAR: It kind of sounds more high pitched.

MOLLY BLOOM: Very observant. Well, that's more what your voice sounds like to the rest of the world. And to tell you why, I have this coming attraction.

BOY: In a world where you think you sound like this--

BOB: (DEEPER VOICE) Hi, I'm Bob.

BOY: --but you really sound like this.

BOB: (HIGHER VOICE) Hi, I'm Bob.

BOY: Come as one man's journey to accept his own voice.

BOB: (HIGHER VOICE) That's me? That's me? That's me?

BOY: Betrayed by his own anatomy--

WOMAN: It's your jaw.

BOB: My jaw?

WOMAN: And your skull, really.

BOB: My skull?

WOMAN: When you you talk, you hear your voice in two ways at once.

BOY: --and debaffled by physics.

WOMAN: One way is that the sound from your mouth vibrates your eardrum, moves the little bones in your ear, and sends a signal to your brain for decoding. That's how everyone else hears your voice too.

BOB: That's how they hear my voice?

WOMAN: But you're also picking up vibrations that come from your voice resonating through your neck and jaw. This makes your voice sound deeper, more bass.

BOB: I like that bass.

BOY: Through a journey that takes them from behind the mic to the front page, Bob learns to love his voice.

BOB: This is how I sound. And it is great.

BOY: Coming soon to an imaginary theater near you.

BOB: Imaginary?

[MUSIC PLAYING]

RITIKA GURJAR: We did it, nine. Questions.

MOLLY BLOOM: Yay.

MARC SANCHEZ: Yeah, woo hoo.

RITIKA GURJAR: Now, sum up each one in a pithy sentence.

MARC SANCHEZ: Hiccups are caused by quick intake of breath and a sudden closure of your glottis.

SANDEN TOTTEN: We get dizzy because when we stop moving, the fluid in our inner ears that tells us what we're doing can still be sloshing.

MOLLY BLOOM: We yawn in states of transition, but aren't sure why it's contagious.

MARC SANCHEZ: Adrenaline causes tiny muscles in our skin to contract and makes goosebumps.

SANDEN TOTTEN: Pins and needles happens when our nerves get cut off from the brain, then wake back up in a dramatic fashion.

MOLLY BLOOM: We aren't quite sure why we have fingerprints, but each fingerprint is unique.

MARC SANCHEZ: If you want to avoid brain freeze, slow down when you eat cold things, take small bites, and avoid the roof of your mouth.

SANDEN TOTTEN: Your teeth chatter because your body is trying to generate heat by contracting and relaxing face muscles.

MOLLY BLOOM: And your voice sounds funny on a recording because you're used to hearing it with added base that comes through vibrations in your skull.

RITIKA GURJAR: That's it for this episode of *BrainsOn. BrainsOn.* Is produced by Marc Sanchez, Sanden Totten, and Molly Bloom.

MOLLY BLOOM: Many thanks to [LISTING HONOR ROLL].

SANDEN TOTTEN: And you can keep up with us on the Instagrams and the Twitters.

MARC SANCHEZ: We're Brains_On.

MOLLY BLOOM: And we're on Facebook too.

MARC SANCHEZ: You can listen to all our past episodes at our website.

RITIKA GURJAR: brainson.org.

MOLLY BLOOM: And now, before we go, it's time for our Moment of Um.

SEVERAL RANDOM PEOPLE: Um, um, um, um, um, um, um, um, um, um, um, um, um, um, um, um.

SKY: Hi my name is Sky, and I'm 6. And I live in Hamilton, Ontario. And my question is, why do we have two lungs?

[MUSIC PLAYING]

CHRISTY LUTTON: My name is Christy Lutton. I am an assistant professor of anatomy at the University of Southern California. And I'm an evolutionary anatomist, which means I study our bodies and why they are the way they are and how they've evolved to be the way they are.

Why do we have two lungs? Such a good question. So to answer this question, we have to go back in time a little bit. About 300 million years ago is when the first lungs evolved, in a fish. And we have inherited those lungs from our ancestors, which, if you go back far enough in time, was a fish.

And then the other question that you have to answer when you're thinking about this is why two of them in particular? And to answer that, we have to go back even further in time. So we have bodies that are symmetrical down the midline. So if you imagine drawing a line down the middle of your forehead, in the middle of your nose, down your mouth, all the way down your body, you will be divided into a right side and a left side.

So you'll have a right arm and a left arm, and a right leg and a left leg, and a right lung and a left lung. And this body plan is called bilateral symmetry, which just means we're symmetrical on two sides. And we've inherited this body plan from an ancestor that lived almost 600 million years ago, which is, like, 300 million years before even lungs existed. So the short answer of why do we have two lungs is because we've inherited this from a really ancient ancestor that lived a really long time ago. And two lungs are working fine for us.

MOLLY BLOOM: I'm going to take a deep breath and speed through this list of names. It's the Brains Honor Roll, the excellent listeners who inspire each and every episode with their ideas, questions, and mystery sounds.

[MUSIC PLAYING]

[LISTING HONOR ROLL]

ROBOTIC VOICE: Brains Honor Roll, high five.

MOLLY BLOOM: We'll be back soon with more answers to your questions.

RITIKA GURJAR: Thanks for listening.