

But Why: A Podcast For Curious Kids

Why do our fingers and toes turn wrinkly in the bath?

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[Jane] This is *But Why: A Podcast for Curious Kids*. I'm Jane Lindholm. We take your questions and we find interesting people to answer them on this show. This week we're talking all about our weird and wonderful body.

[Kid] Why are people ticklish?

[Kid] Why do our ears and nose keep growing when we don't?

[Kid] How do you get freckles?

[Jane] Those are just a few of the questions we'll be tackling in this episode.

So many of you are curious about bodies and I don't blame you, our bodies are kind of amazing. So we went to the University of Vermont Medical Center to find some answers.

[Lori] My name is Lori Racha, pediatrician at the University of Vermont Children's Hospital, pediatric primary care.

[Jane] A pediatrician is a doctor who specializes in kids and babies. You probably have a doctor you see at least once every year. Well, that's your pediatrician.

Our first question comes from Natalie. She's 5 and she lives in Phoenix, Arizona.

[Natalie] Are humans are animals. It doesn't make sense.

[Mom] Why?

[Natalie] Cause we don't look like an animals.

[Lori] Thanks, Natalie! I love your question because it's something that I think we often times we wonder about we just don't ask. Yes, humans are animals. Scientists divide everything that's alive into two basic categories, either animals or plants. And it's almost easier to say that because we're not plants, then we must be animals.

We can also be broken down into a little more of a classification, into something we call vertebrates. And those are animals that have backbones. We can also be considered mammals and that means that we feed our babies milk that the mom makes for them.

[Jane] You're right, Natalie, we don't look much like a lot of other animals but think about how different some animals look from one another: a huge blue whale and a tiny mouse are both animals but they don't look very much alike. And a parrot could hardly be said to resemble a walrus. It's amazing how much diversity or difference there is in the animal kingdom and we're a part of it too.

Our next question comes from 8 year old Avery in Middlebury, Vermont.

[Avery] Why don't people have tails?

[Lori] Avery, I'm excited to tell you that people actually do have tails very early in our development, when we're developing babies. We have a tail and that's when we're about four weeks along in what's called "gestation," that's the process of our babies growing inside us. And that tail is there for a week or two and then starts to get smaller and smaller and the tail that we have left is just a tiny little, thing kind of the base of our bodies when we're sitting down. It's called the tail bone or coccyx and we are really aware of that if we fall down and we land on it because it can get really sore.

So we do have a tail. It's just not there for very long.

[Jane] Did we used to have tails in earlier evolutionary stages and we've lost them?

[Lori] It's not really known for sure. I think as scientists look and see more examples of earlier humans maybe they'll will see that. But at least at some point in our lives we do have tails. Sometimes I think it's maybe that we don't need a tail anymore. I mean if we think about what animals do with their tails and why they have them, we're pretty good at balancing on our own two feet. So we don't need a tail, like monkeys to go from branch to branch and we can use our hands with fly swatters so we don't need our tails like cows do to swat the flies away.

[Jane] Although we might wish we still had tails to swing from branch to branch.

[Lori] And when you don't have a flyswatter and an annoying fly is around you would be nice to have a tail too.

[Lili] My name is Lili. I'm ten years old. I live in South Burlington, Vermont. I want to know how come we need food and water to survive?

[Lori] I think of it more as energy and helping your body work like it's needed to. We need food to give us energy to make our muscles move and for our brain to think thoughts. We need water to help us with digestion and also to keep all of our body what's called hydrated. So the human body is mostly water, which is hard to think about that where you know walking around with mostly water, but all of our body is made up of little cells and those cells are primarily water so if we're not replacing that water and

we're sweating and letting off air. And the breathing, the air that we're breathing out has moisture in it too, then we would get very dry, we'd turn into little raisins so it's basically just to keep our bodies, giving them what they need to be able to operate. Kind of like your car you need to make sure it has gasoline which the kind of energy and also that it has water in its radiator so it doesn't get too hot.

[Bailey] Hi, I'm Bailey. I am nine years old. I live in Hebron, Kentucky. And my question is why do some people have birthmarks that some people don't and why everybody everybody's different?

[Lori] First of all, Bailey, one of the things I'd like to say is that we are, everyone is different, but we're also really the same. Our very basic building blocks of what makes us who we are, is something called DNA. Ninety nine out of 100, so ninety nine percent of all people have the same DNA.

So there's only one percent that actually makes us different. And I think that's really interesting when you think of how different we all are. So birthmarks are just one other little aspect that can make someone have something more unique. And so there are some birthmarks that kind of run in families that if your parents or grandparents had birthmarks you might be more likely to have birthmarks. And some people don't have anyone in their family who has a birthmark and then they will have one. So it's all determined based on that genetic material that makes us all who we are. The DNA and how it's expressed in our own bodies.

And the birthmarks really can vary. You know there's two basic types of birthmarks that we talk about: there's pigmented, and those are things that tend to be brown or a little bit darker light and dark brown; and then there's something called vascular birthmarks and those mean that they have blood vessels that are kind of making them oftentimes a little bit more red. And so those can vary. Some birthmarks, you're born with and they go away and some birthmarks stay forever and one of the common vascular birthmarks that we see are called "salmon patches" and they're called salmon patches because they're pink in color kind of like the food salmon. And when you have a little salmon patch on your face, we call those and we see this commonly in babies, we call that Angel kisses and when it's at the back of your neck we call that "stork bites." Those are little vascular marks. About half of those will go away and some will stay.

What I often talk to kids about is if you have something on your skin and it's concerning you or it's something that bothers or worries you that there are special doctors that can take care of those things and can give you information. And those are called dermatologists. And so that's something that you can talk to your parents or caregivers about if that's something you'd like to have looked at and see if there's something that could be done differently.

But I think birthmarks are really interesting and kind of give you a way of telling yourself different from other people. And so they can be special things too.

[Jane] Dr. Racha, while we're talking about things that look different on your skin, here are two questions about freckles.

[Jack] Hi my name is Jack. I live in Maplewood, New Jersey and I'm six years old and my question is how do you get freckles?

[Rachel] Hi my name's Rachel. I live in Kensington, Maryland. I'm in second grade. My question is why is there a freckle on my belly button?

[Lori] Freckles are one of my favorite things. One of my four kids has freckles and so I've heard this question a few times. Freckles are just pigmented areas of your skin and so pigment means contains color and most of the time freckles are kind of a tan or brown color and you may notice that if you have freckles that they get darker when you see more sun. So usually in the summer people will say their freckles are darker and then they get lighter during the winter and then also over time. Younger kids tend to have more freckles than you do when you are older. So for some kids if you're bothered by your freckles you may find that they become less over time.

Everyone has a certain amount of what's called melanin in their skin and that's the chemicals that kind of determines the pigment, or color, of the skin and that changes when it's exposed to sunlight. And so when you get more sunlight the melanin starts to produce a darker pigment. In individuals, especially folks who have light-skin, blond hair, red hair and very light skin, they tend to be more prone to freckles than people of darker skinned and darker hair. And so those people will tend to get more sunburns too. And so we always say it's important to protect your skin when you're outside and use some sunscreen and avoid those times of day when it's most, the sun is most strong which is usually early afternoon.

One of my favorite books childhood books, and I hope many of you get a chance to read it, is called *Freckleface Strawberry* and it talks about a little girl who has red hair and is very pale in her skin and has freckles everywhere and her experience with it. And the book is written by a very famous actress named Julianne Moore. And in the beginning of the book is one of my favorite statements. Her advice with freckles is to live with them because after all the things that make you different also make you you. And I have to agree. I think freckles a really fun thing for kids and again another way of making you who you are.

[Jane] A freckle in your belly button is just luck of the draw, because it just happened to be there.

[Lori] So it's kind of luck of the draw that you have a freckle there because the skin is everywhere and that's where these freckles form. And so you have skin in your bellybutton so you could have a freckle there. Or it could be a different type of skin. It might not be a freckle it might be something called a mole.

[Jane] Which is not the animal.

[Lori] Not the animal, not at all but just another flat brown skin condition that we see.

[Eve] Hello, my name is Eve. I lived in Evanston, Illinois. And my question is when you go in the tub why does only your hands and feet get wrinkly? And I am six years old.

[Brady] Hi I'm Brady from Hinesburg, Vermont. And I want to know why my hands turn wrinkly after they are in water?

[Gwenivere] Hi my name is Gwenivere. I am seven years old. I have a question. Why do your fingers and toes get pruny when you stay in the bath too long?

[Jane] Gwenivere lives in Fairlee, Vermont. And here's seven year old Greta from East Middlebury, Vermont.

[Greta] Why do your feet and hands get wrinkly after being in the bath tub?

[Lori] This is such a fun question I have to say. I admit, I didn't know this answer when I got this question so I had to do a little research and then I found out there is no general agreement of why this occurs. There are a couple of different theories and theories are just ideas of why this happens.

And so let's talk a little bit about how the skin is made up and then we'll talk about what these two theories are. So the first is that the skin again is made up of two kind of layers an outer layer called the epidermis and a deeper layer called the dermis and it's the outer layer the epidermis that's involved with getting wrinkly in the tub. And this doesn't happen immediately and mean as we all know you go swimming or you go in the bathtub and it's usually you've been in there for 20 minutes or so when you start to notice it.

So in this outer layer of the epidermis is something called keratin and so keratin is, its job is to keep your skin kind of strong and together and to also keep it moist. Now keratin gets you know old with time too. And so it can kind of die and it's in your skin. It's just kind of sitting there as these dead cells. And when those dead cells get subjected to water, one theory is that they kind of absorb water again almost like a sponge. And as that starts to swell it forms some wrinkles.

And so my next question was will if we have skin everywhere and we have keratin and this layer of our skin everywhere, why is it just our hands and feet? And so looking at

that a little bit more closely, I found out that our hands and feet are the part of our body that do the most work. And so they have the thickest layer of keratin. And so it has the greatest opportunity to swell when it's in the water so that made a lot of sense to me.

And then I was reading a different theory which said that when we have wrinkly skin our ability to pick up objects especially when our hands are wet is much improved. It's kind of like having good tread on your tires on a rainy day that you don't slip and slide as much and that this could be something that our autonomic nervous system does. And so how you explain the autonomic nervous system is it's all of the things that are being done in your body that you don't have to tell it to do. So you don't have to tell your heart to start you know to keep beating. You don't have to tell your body to breathe. These are all things that your body can do on its own. And so the autonomic nervous system made just sense you're in a slippery environment, it would be better for you to have better tread and may cause the skin to wrinkle just of its own.

So I don't know what the real answer is. I think we'll have to wait and see if there's some more information that comes along. But I think it's a really neat thing that happens and we don't have to worry about those wrinkles staying because those go away when we get out of the water and in our hands dry again and it usually takes just you know 10 or 15 minutes to go away. So that's a fun question.

[Manuel] Hi, I'm Manuel. I live in England. And I would like to know how do hands feel things?

[Lori] The hands feel kind of how all of our body feels actually. So again in that skin we're talking a lot about skin today. But in the skin, in a deeper layer the dermis, are lots of nerve cells. And so the nerve cells you can think of those little areas where they take messages from the body and so they have different types too. So there's some nerve cells that can identify pressure. So when something's pushing on something there's different nerve cells that determine how if something's hot or cold, so temperature. There's others that determine something's painful or sharp. And so all of those little nerve cells are kind of collecting information from what's happening to our skin or our hands in this case. And then they send chemical messages, or electrical messages through these nerve cells to eventually our spinal cord and brain and then those areas interpret what those things mean. So you may feel something that's hot and sharp at the same time and our response is to quickly move away.

And so the spinal cord is what does those really quick decisions, like this is really hot. I have to move right now, in your brain may get a sensation of you're at the beach and you're feeling sand and you feel sort of the granules of the sand but it feels like a pleasant warm temperature and you're not pulling your hand away from that situation but you're kind of interpreting again how that feels. So we have little areas of the skin

that are collecting information sending him to the parts of our brain and spinal cord that can help us interpret those and make a good decision on what to do with that.

[Jane] There are parts of your body that are more sensitive to touch than others like your lips.

[Lori] Yes.

[Jane] And your hands probably have a lot of those sensors.

[Lori] Yes. And so that's thought to be a higher density, so more of those little areas collecting information than other areas of your body. And it's really something that you noticed if you lose that sensation. And that's something that you know temporarily, if you're having some work done on your mouth and you have some anesthetic or analgesics something that's kind of preventing you from feeling those, it feels very strange to rub your cheek or something and not feel it but you can see that your hand is touching your skin. So it's something that we kind of take for granted but then really notice if it's not there.

[Jane] OK, action break! We've been answering a lot of questions about our bodies and if you're feeling a little fidgety, like I am, it's time to get up and move around. Wiggle your body, do some jumping jacks. Even if you're strapped in the car or have mobility issues, move whatever part of your body or mind you can. Get that blood flowing.

OK. Now that we've worked out some of that energy you can do a little experiment: if you want to explore some of what Dr. Racha was saying about feeling things. Gather three different objects, something rough, something smooth, something cold. Now grab a friend, or a parent, or a sibling and tell them to close their eyes then put each object and any others you found in their hands and have them describe it. Or swap roles and have someone blindfold you and put things in your hands. See what you can feel without having to see them and see how different textures feel different in your hands. It's pretty amazing how much we can tell about something just by touching it.

OK. Here's another question.

[Miles] My name is Miles. I'm from Kansas City and I'm 7. My question is why are people ticklish?

[Lori] Miles, I love this question because as a pediatrician and examining kids I have kids giggling all day. And I say I have the best job on the planet because I get paid to tickle kids. It's part of my job and it's an expectation that I will be checking their bellies. But it's a really interesting reason why we are ticklish. And I think the best way to explain it is to think about what's actually happening with a tickle. So you're activating two different parts of your brain when you're getting tickled. So again we've been talking

about the skin and these nerve cells collecting information. And so you have one part of the brain that's receiving information about a touch. There's another part of the brain that is kind of interpreting. How do I feel about this touch? And so the two parts of the brain that are collecting this information have really fancy names. And I don't and I don't want you to be worried about the fancy names. I'm just going to say them just so you've heard them because they're kind of an interesting sounding name. So the part of the brain that recognizes the touch or pressure is called the "somatosensory cortex" and so it has sort of a map of the body in the brain. So it's saying if I'm tickling you in your belly it's saying I'm receiving pressure, or this tickling feeling in that area. And then the other part of the brain that's interpreting how I feel about it, about this pleasant sort of feeling is called the "anterior cingulate cortex." So when those two areas are activated at the same time, they're both getting messages, you feel a buildup of pleasant feelings which results in giggling. Now if you try to tickle yourself this doesn't work. And so I use this practically all the time so I have a patient and they're very ticklish. I ask them to put their hand on top of my hand and then I put my other hands on top of theirs. So I'm kind of making a little hand sandwich.

[Jane] Hand sandwich.

[Lori] Yes. Exactly. Not a ham, but a hand sandwich. And so I have them press with me. Now that is including it another area of the brain. So when you are touching your own body and telling your hand to touch my belly you are activating a part of the brain called the "cerebellum." And so when the cerebellum is active with the other two areas active it kind of cancels out one of them and it doesn't, you don't have that builds up a feeling of a ticklish feeling any longer. So if your doctor is tickling you, you need to tell them to let you tickle yourself too because then the tickling feeling will go away.

Now another thing really interesting about tickling is that your personality plays a role. So if you are a very bubbly kid, you giggle at everything. You are more likely to have more laughter with the same amount of tickling than a child who's more shy or reserved. And the other part of it is that it really depends on your relationship to the person who's tickling you. So if you have a positive association with that person you know this person you feel very comfortable with this person, you will giggle more. If a stranger came up to you and tried to tickle, that would give you more of a warning signal and it would not be would not be a ticklish feeling at all.

So again back to my office when I'm examining kids I'm always highly complimented if a child giggles when I feel their belly because it means that they have at least at that moment a positive association or a positive feeling about our working together and so that's always kind of a nice thing for me.

[Jane] I know people though who will laugh if you tickle them but they don't want to be tickled. And it's a confusing thing if you're the tickler because you think that your friend is enjoying this because they're laughing and laughing, it sounds so fun. But then when you finally stop they say I didn't like that I don't like you tickled like that. Why do you still laugh even if you don't like it?

[Lori] Yes. I think it's because it's still this built up of feeling. And so it's kind of you're wired to giggle even though you might be yelling stop at the same time, right? So it is a confusing feeling. And I was really interested in sort of the way that the personality plays a role because I can certainly see even within my, the folks that I tickle, that you do if you are just, you know everything is a funny thing, you do seem to enjoy the tickling more than someone who's a little bit more shy. And so I always say maybe a good thing to do is a test tickle, you know just a little tickle and not have it be too long and then see how your friend reacts before tickling more, because it can be a bit overwhelming.

[Jane] And stop if they say stop.

[Lori] Stop if they stop, even if they're laughing. Yes. Yes.

[Jane] And here's a question about our ears and noses.

[Allegra] Hi my name is Allegra. I'm eight years old. I live in Orange County California. And my question is why do our ears and nose keep growing when our bones don't?

[Jane] Isn't that weird and fascinating, Allegra? Well, it turns out that as we get older it's not really true necessarily that our ears and noses keep growing bigger and bigger. It's more that they start to sag and droop. There are two reasons for this. The first is that as we get older our skin starts to lose its elasticity. Think of elasticity like this, an old rubber band or the elastic in your pants. It snaps back in but when it gets really old and worn out the band stops snapping back in. So it just kind of stretches out and sags and hangs there. That's sort of how our skin works as it gets older.

And then the other factor is gravity. That's a force that's always pushing on us. It's why things fall to the ground when we drop them. And it's also pushing on our body keeping us on the earth. As we get older our noses will droop a little bit and our ear lobes will get longer because gravity is forcing them down and they don't really have any bones in them to keep them in one place. Pretty amazing, huh.

All right. Here's another question and this one is about bones.

[Steve] My name is Steve, from Dallas, Texas. I'm five years old and I want to know how do bones connect together?

[Jane] Steve, your body has bones and muscles that help you move. But there's something else in there too: tendons. Tendons are like long cords that connect the muscle to the bone and the tendons are what pull on the bones and actually make them move when your muscles are firing. The easiest place to see your tendons moving is the back of your hands. Try wiggling your fingers. You see those little lines on the back of your hand. Well, those are tendons and they're helping your fingers move.

[Jane] Thanks so much to Dr. Lori Racha for answering all of our body questions. Believe it or not we have so many questions you've sent us about bodies that we're going to have to do a whole other episode with Dr. Racha to answer more of your questions. So we'll be back in two weeks with Dr. Racha for another bodies episode, including answers to the questions why do we hiccup and are yawns really contagious?

I bet you just yawned there.

As always, if you have a question about bodies or balloons or biscuits or Bingo whatever is on your mind, doesn't have to start with a B, have an adult record your question and send the file questions@butwhykids.org. It's easy to do on a smartphone. We'll do our best to find an answer. By the way if there's a reason that talking is difficult for you, you can have an adult send us an e-mailed question and we can answer it that way too. We just love hearing your voices whenever possible.

Check out the But Why Kids Facebook page to see some photos and learn a little bit more about your fellow listeners from around the world.

But Why is produced by Melody Bodette and me, Jane Lindholm, at Vermont Public Radio and our theme music is composed by Luke Reynolds. He's the one doing that whistling at the beginning of the episode. All right we'll be back in a couple of weeks. Stay curious!