But Why: A Podcast for Curious Kids

Why do people have allergies?

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Jane 00:21
This is But Why: A Podcast for Curious Kids, from Vermont Public. I'm Jane Lindholm, and I'm the--achoo!! Excuse me, I'm the host of this--achoo! Excuse me, I'm the host of this show. Sorry, I think there must be something in the air that's irritating me. My eyes are watering and itchy and my skin is all itchy, too. Wait, I know what this is! It's an allergy. An allergy is when your body reacts to something that doesn't bother most people. Could be something in the environment, like pollen from a tree or a plant, or the dry skin falling off a pet cat or dog. Or it could be something you've eaten, like a peanut, or a shrimp or some milk. For most people, those things are harmless. But for some people, when they encounter that thing they're allergic to, their body's immune system thinks it's a threat, and starts putting up all kinds of defenses against what it sees as a danger. And you feel that immune response as itchy bumpy hives on your skin, or that feeling like you need to sneeze or wipe your eyes. Or if you're having a severe reaction, like your throat is really tight and you might be having trouble breathing. You should definitely find an adult if you think you're having an allergic reaction. You might need some medicine to help reverse the reaction. And the sooner you get help the better. But what's the deal with allergies anyway? Why do some people's immune systems think cat dander, or skin cells, are a problem when other people can cuddle and hug and kiss a cat to their heart's content with no reaction at all? So many of you want to know why.

Boden 02:02
Hello, my name is Boden and I live in Essex, Vermont and I'm six and a half. And why do we have allergies?

Avalin 02:10
Hi, I'm Avalin, and I live in Indianapolis. I'm eight.

Neil 02:15
Hello, my name is Neil and I live in Tempe, Arizona.

Maya 02:18
My name is Maya and I am eight years old. I live in Atlanta, Georgia.

Kemen 02:24
My name is Kemen. I live in Hamilton, Ontario, Canada.

Aoife 02:29

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My name is Aoife. I'm eight years old. I live in Manchester in England. And my question is, why do people have allergies?

Alex 02:36
My name is Alex. I'm a four-year-old. I live in Anchorage, Alaska.

Mia 02:41
Hi, But Why. My name is Mia and I am seven years old. I live in Columbus, Ohio.

Abigail 02:48
Hi, my name is Abigail. I'm four years old and I live in Toronto.

Miles 02:52
Hi, my name is Miles. I'm nine years old. I live in Kansas City, Missouri.

Neo 02:58
My first name is Neo. And I live in Germany. And my question is why do allergies exist? And I'm five and a half years old.

Jane 03:10
When we saw how many allergy questions you had sent us, we knew we had to get an expert in to help us.

Ruchi Gupta 03:15
I'm Ruchi Gupta. I am a pediatrician. I'm also a researcher, or a scientist. So my whole job in life is to answer the question, why? And I'm also a mom and I have two kids. And they both have allergies. So I live this every day.

Jane 03:36
A pediatrician, as you probably know, is a doctor who helps kids. Dr. Gupta works at Northwestern University and the Lurie Children's Hospital in Chicago. She also founded a center that does all kinds of research on asthma and allergies. And she loves helping to explain to kids what's happening inside your body. So we're excited that she was willing to answer that question of why some people get allergies.

Ruchi Gupta 03:59
We are working really hard to answer that question, the big "why." Why is your body fighting food? Or why is it fighting the environment? And for some reason, your immune system recognizes it as an invader, and wants to attack it. And that's what we're trying to understand is why does your immune system think, you know, that peanut is a invader? Or milk is an invader? These are common things in our worlds. But why would your body think a cat is an invader? Or why would it think this tree is invading you, for some reason, right? So understanding why your immune system goes down this pathway is something a lot of researchers are trying to do. And also we're trying to stop it. Can we stop

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that cascade, that reaction, from happening and can we teach the immune system that these things are okay and safe?

Jane 04:51
That's not very satisfying, is it? But it's the truth. There are a lot of things about how our bodies work or why we have certain illnesses or reactions that are really just not fully understood. Allergies are one of those mysteries. And they're currently on the rise. These days, Dr. Gupta says about one out of every 13 kids has a food allergy. So scientists like her are working really hard to figure out what's going on, and how they can help keep kids and adults with allergies safe and healthy. Here are some of the things they're investigating as causes of allergies.

05:24
A lot of it has to do with genetics. You get traits from your parents, and that is why you know, you were born to look a certain way, oftentimes, but then a lot of these conditions that we have are partially genetic. So partially, you know, if your parents had it, or if they had, you know, not allergies, but they had something related like asthma, you know, then you have a little bit of a higher chance of having it. But then we're all really curious, what is it in the environment? You know, what is it around us that may be also contributing to, you know, getting allergies? And that's, that's a really good question. And we're trying to find the answers, some of the things we're thinking about is--are, there's a really cool word, it's called microbiome. And you may not have heard of it, but what the microbiome is, and this is really fun, because it's a lot of bugs all over your body, and in your gut and on your skin, we call them bacteria. But there's good ones, and there's not good ones, and there's actually trillions of them. So, lots of them. And what we're thinking now is sometimes if we mess with them, then it can lead to developing certain conditions like allergies. So for example, if you get antibiotics, which you need, you know, say you have an ear infection, you know, that's really common kid thing, or strep throat, which many of you have probably experienced, and you have to take some medicine, right, every day, a couple times a day. Well, that's, you know, taking care of that bad bacteria that's causing you to have this infection. But it's also, you know, maybe messing with your good bacteria, you know, and so those are things we're learning. And then you know, a lot of people talk about this theory about your skin. So if you have eczema, you know, then you have a higher chance of getting allergies and--

Jane 07:16
And some kids know know what eczema is because they have it. But for kids who don't, it's your skin gets kind of blotchy and rashy and can be really itchy and a little bit flaky. And so there's some questions about whether that skin barrier could be breaking down a little bit and letting some bad things in that you could be allergic to, right?

Ruchi Gupta 07:34
That's exactly right. Exactly. So and you know, eczema, what we just talked about, you know, that kind of broken red skin that is very related to allergies.

Jane 07:46
Given what we just heard from Dr. Gupta, you might be able to guess what the answer is to this question a lot of you have also been sending us:

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Maisie 07:54
My name is Maisie. I'm seven years old. And I live in Edinburgh. And my question is, why do some people have allergies and some people don't?

Bailey 08:05
Hi, my name is Bailey. I am nine years old, and I live in Birmingham, Alabama. Almost everybody in my family is allergic to something, except my little brother, who isn't allergic to anything, almost. So my question is, why are some people allergic to some things while others aren't?

Winston 08:25
My name is Winston. I am eight years old. I live in Madison, Wisconsin. And my question is, why do some people have have allergies? And some don't?

Jane 08:35
It's confusing, isn't it? Like? Why doesn't Bailey's brother have any allergies, especially when the other family members do? And why do different family members have allergies to different things? Scientists are still trying to figure all of that out and what might trigger an allergy in one person but not their brother. Remember how Dr. Gupta said one factor is genetics, the traits your biological parents passed down to you? But just like you might have brown eyes and your brother might have green eyes, or your skin color might be a slightly different shade from your sister, one of you could have an allergy that the other doesn't. And even if you share the same environment, there can be different triggers. This is something that really needs to be understood better. And Dr. Gupta is among the many researchers hoping some of you will find the answers by becoming researchers and scientists yourselves.

Dahlia 09:25
Hello, my name is Dahlia, and I live in Virginia, and about seven and a half years old. And my question is, why do you why do people have allergies and why are they allergic to pollen?

Sophia 09:41
Hi, I'm Sophia and I five years old. And I live in Virginia. And my question is, Why does pollen make your eyes itch?

09:53
I can't wait till you all grow up and solve some of these why's that you're asking. Doing research in being a scientist, I love it because I get to do it. But there's so many whys in the world that we need all of you. So, pollen is one of the most common environmental allergens and the why, again, some reason your body considers it an invader. And that is something we're trying to figure out. Why does it make your eyes itchy? It is because when your body sees that pollen coming into your body, it kind of starts releasing this, all these chemicals in your body, and they're meant to go fight this invader, but they also cause symptoms in your body. So that is something called histamine. And it gets released. And that is what causes usually the common symptoms, you know, your eyes are itchy and sometimes red and you want to rub them you know, you're congested. Some people sneeze a lot. Some people have itchiness around their mouth and throat during that time. You're just uncomfortable. It's no fun.

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Eva 10:58
Hi, my name is Eva. I am seven and a half years old. I live in Huntington Beach, California. And my question is, why does grass make you itchy?

Jane 11:07
Is that an allergy when you roll around in the grass and your body gets a little red? Or is that something that happens to everybody?

11:14
No, that is an allergy. That's exactly right. Some people don't have any issues rolling around in the grass. And some people do get itchy. And again, get all those symptoms that we just talked about. You know, the the good thing is, the exciting thing is, that even though we don't completely know why, we do have medications you can take to feel better. They're antihistamines. So we talked about histamine being the the chemical that's released in your body that causes those symptoms. And then you take an anti, you know, against the histamine, that stops it. And then we have treatments. Now we have allergy shots. And then we have another medicine that's like a drop you can put under your tongue. It's called sublingual immunotherapy. And all of these, what they're trying to do is teach your body that this thing is safe, right? So you put little bits of it into your body, and your immune system sees it on a regular basis and starts noticing, "Okay, I don't need to attack this. This is not hurting me." And over time, your immune system starts saying, "Okay, you can, we can live together and be okay."

Claire 12:21
Hi, I'm from [Unclear], Michigan. And I'm Claire and I'm six years old. And my question is, why are people allergic to dogs and cats?

Jane 12:32
What is it in a dog in a cat that you're actually allergic to?

Ruchi Gupta 12:36
It's dander, we call it dander.

Jane 12:38
Dander is the dead skin cells that fall off the body of dogs and cats and all other mammals, including you and me. Birds have dander too. And dander isn't something you can see. These are microscopic skin cells, and they fall off of all of us because our body is constantly getting rid of old skin and making new skin. It's pretty amazing, really. But some people have an allergy to the dander that gets stuck in their pets fur or falls on their carpets or lands on their couches. People can also be allergic to their pet's saliva and urine (less politely known as spit and pee).

13:14
Those types of things are where you find that allergenic protein that, when you inhale it or touch it on your skin, then you start having those symptoms.

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Jane 13:24
Maybe you've heard of dogs and cats that no one is allergic to, sometimes called hypoallergenic pets. The truth is, there's no such thing as a completely hypoallergenic cat or dog because all mammals shed skin cells. But since a lot of dander gets caught in their fur, sometimes a pet that doesn't shed as much fur is a good choice. Or a pet that doesn't have as much of the specific protein that's causing your allergy. But no way to have a pet that doesn't have any dander.

Adeline 13:53
Hi, my name is Adeline. I live in Pelham, Alabama. I'm seven years old. And my question is can people be allergic to water?

Hassini 14:01
Hi, my name is Haasini. I am six years old, I live in London. My question is, why are no people allergic to water?

Jane 14:12
Could people be allergic to anything and everything? Or are there some things that no one is allergic to?

14:18
Wow, that's a great question. I would say, you know, people can be allergic to almost anything. But if it is a true food allergy, then they're allergic to the protein that's in that food, you know, so there's a lot of components that make up any item, any food or any drink, and it's that protein that they're allergic to. I have never seen anyone who's allergic to water and water is a part, a very, very essential part, of our lives. So my answer would be not that I know of, but there's always something that stumps you but I have never seen a water allergy. And I really, really hope no one ever has one.

Jane 15:04
Coming up, we're going to talk about allergies to food. A lot of you have them. So we'll go over some of the questions you've sent us about food allergies and why, if your school or camp or youth center asks you not to bring in anything with peanuts or whatever, it's important to follow the guidelines to keep everyone safe.

BREAK 15:20
BREAK

Jane 15:21
This is But Why. I'm Jane Lindholm and today we're talking with allergy researcher and pediatrician Dr. Ruchi Gupta. Dr. Gupta runs the Center for Food Allergy and Asthma Research. And she works hard to better understand why some of us are allergic to things that are totally fine for other people. We've been talking about some environmental allergens, things you find in your environment, like pollen, or pet dander. Reactions to dust mites, mold and cockroaches are also common environmental allergies. But food allergies are also a big area of research. And while you can get some of the same symptoms from a food allergy as you can from an environmental allergy, there are some cases where food

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allergies can be really severe, which is why there might be rules about what foods you can bring to school or camp, especially if someone who goes there has a food allergy. And maybe that person is you. As I mentioned before, Dr. Gupta told us a lot of people are allergic to different foods.

16:19
32 million people in the United States have a food allergy. People can be allergic to anything, but there are top nine foods. And I'll just tell you what those are because many of you may have them. So it's peanut and then other tree nuts, like cashews, walnuts are real common ones, pistachios, almonds, you know, these ring a bell for any of you all. So tree nuts. Then there's milk and eggs, which are really, really common when you're younger. And a lot of people grow out of those. And then there's wheat and soy. So those are two of the other categories. And then shellfish/finfish are big ones. And actually, shellfish is the most common one in adults and the third most common in kids. So shellfish/finfish. And shellfish, you know, those are, you know, crabs. And finish is more like salmon or something like that. And then sesame is the number nine.

Jane 17:14
But again, there's that pesky question of why.

Max 17:17
Hi, my name is Max. I'm from Sharon, Massachusetts. I'm six years old. And my question is, why do people have food allergies? And what makes them have them?

17:29
My name is EC, and I'm eight years old. And I live in Oceanside. And my question is, why do some people have allergies to food? Bye, I love your show!

Jane 17:41
Why is it really dangerous for some people to eat one peanut when someone else could scarf down two or three peanut butter and jelly sandwiches no problem (except maybe a tummy ache)?

17:51
This is really, really important. Because a lot of times your friends may not understand. Like, "Oh, why can't you eat that food? I can eat it." You know, so people are different. And the reason we think people are developing those food allergies are a lot of what I talked about earlier, you know, so something changing in the environment, partially genetic, you know, so if your parents have any of that, but then you know, environmental changes, the microbiome, we talked about the skin changes, and then potentially how we're eating, you know, and what we eat. And that's a whole different thing. Because the way we eat and the where our food comes from has changed dramatically, you know, in those couple generations. So we don't have an absolute answer yet. But I promise you so many of us are trying to find out.

Annabelle 18:42

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My name is Annabelle. I'm from Owings Mills, Maryland. I'm nine years old, and I have a very severe dairy allergy. My question is, why do some people have allergies and others don't? And why are some more severe than others?

18:59
Thank you, Annabelle, for that question. There's different things that can cause your reaction to be more severe. One is, maybe you ate more of the food, right? So the quantity that you're eating. If you just had a tiny, tiny amount, maybe it didn't hit you, because everybody has different thresholds of how much until your body says, "Oh, no." You know? So if, if you've had a higher quantity, it can cause a more severe reaction. But some people get a severe reaction with just a small amount. So we don't know exactly, but there are some things that we do know and, and the amount is one, and if you're sick during a reaction or have other immune compromise, that can also make your reaction more severe. And then, you know, other smaller things like if you've exercised a lot and then eat, we know that that could also cause it. So we're learning more and more about that. When you have a food allergy it can cause a lot of different symptoms. So those of you with food allergies have probably experienced some of these but it can cause skin symptoms. So you can get hives, we talk about, leaves red bumps all over your skin. It can cause mouth and throat symptoms. It can cause breathing problems, especially if you also have asthma. You can feel, you know, difficulty breathing or tightness in your chest. And another big one is vomiting, right? A lot of people who have food allergies, you can get GI symptoms. So, vomiting is really common with allergies. It can even get worse and cause like a drop in blood pressure. And you can feel faint. And so food allergies can be very severe. And that is why it's so so important to carry your epinephrine. Because if you're feeling that severe reaction, it's important to take it because that can reverse it. But it is hard, because since it's so different than environmental allergies, people get confused by it. So that's very, very important to know.

Jane 20:54
You mentioned epinephrine. And for kids and adults who know they have an allergy, where they get a really big reaction, or maybe they have trouble breathing, and they know that it's dangerous, they often carry something called an EpiPen that has that drug that you mentioned, epinephrine, that can help reverse the symptoms. And Luke wants to know, how does an EpiPen work?

Luke 21:17
I live in Kyoto, Japan. And I'm three years old. How does an EpiPen work?

21:24
My name is Brynn. I live in Japan. I am six years old. My question is why do we need EpiPens? (I'm, I'm the sister of Luke.)

21:35
Great question. So epinephrine is the same thing your body makes if you've heard of adrenaline. That's what epinephrine is. So a lot of times you say, oh, you know, like, you've got adrenaline in your body. When you get nervous your adrenaline kind of kicks in. That's exactly what epinephrine is. So what it does for you is it, when you have that immune cascade, you know, when you eat something and thinks it's an invader, what happens usually, and why you have some of these symptoms is it causes your

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lungs to get tight, right, and your blood vessels to get loose. And what epinephrine does is it comes in and reverses that. So it tightens your blood vessels and it relaxes your lungs so you can breathe better and it's easier and it decreases the swelling there. And it it tightens your blood vessels, so you don't get like faint and hypotensive we call it. So that's what it does it pretty much is your own adrenaline. And if you've had a reaction, sometimes you'll feel your own body kicking in. And that's your own adrenaline, but epinephrine helps just speed that up. Let's get it going faster and get rid of these symptoms.

Jane 22:43
So an EpiPen is a really efficient way to get that epinephrine into your body fast when you're having an allergic reaction. It's a shot and usually you jam it into your leg or have someone else do it and release the medicine into your body. If your doctor has told you you need an EpiPen, it's important to carry it with you if you're in an environment where you might come in contact with the thing you're allergic to. In my family, my husband is allergic to bee stings. But we're beekeepers. So when we're working in our beehives, he always keeps his EpiPen right in his bee suit, so he could grab it fast if he ever needed to use it. Maybe some of you carry EpiPens too. But if you don't know you're allergic to something, you wouldn't carry an epi pen or even know to avoid that thing. So I asked Dr. Gupta, when you should tell an adult if you start to feel kind of funny after eating a new food or petting a new animal or something?

23:37
immediately, immediately. If you feel funny at all, please please tell an adult. If it's because of something you ate, it's even more important because like I said, those reactions can become severe.

Jane 23:52
Right. And some of the things that you might want to be on the lookout for: you know, if you've eaten something, maybe your lips feel kind of tingly or your throat feels scratchy or it feels like kind of like it's just a little bit harder to breathe. Or if you get really itchy in places like your armpits or your crotch all of a sudden, those might be signs that you're having an allergic reaction. Anything else that you might want to be on the lookout for?

24:14
Yeah. No. If you feel sick to your stomach. You know, for food allergies, that's a big one. You know, you feel like throwing up. And then your skin, exactly like, also,if you start seeing red bumps, you know, or increased itching or swelling. Those are all very common in kids.

Jane 24:32
Okay, so what about treating allergies?

Ezra 24:35
Hi, my name is Ezra. And I live in in Sheffield, England, and I am six and three quarters years old. My question is how do people get allergies and how do they grow out of it And why did they all have allergies and why did they grow out? And I was inspired by this because I have allergies to nuts and se--nuts and sesame. And I've grown out of egg and dairy and peanut.

25:03

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Wow, that's great, I'm so happy to hear that. So, about 30% or more kids will develop tolerance or grow out of their milk and egg allergy. The hard ones are those peanuts and tree nuts, only about 15 to 20% grow out of those naturally. Same with shellfish and finfish. Those are harder to grow out of.

Jane 25:26
if you know you have an allergy to a certain food, even eggs and dairy, you should work with your adults and your doctor to come up with a plan of action. Like, you might be able to eat certain foods with cooked eggs or milk. And over time, some people's bodies develop a tolerance for the food and don't get the same reaction. But as Dr. Gupta said, some foods are harder to grow out of than others. And you should always make sure you're talking about this with the help of your adults and your doctor.

Chelsea 25:55
My name is Chelsea. I am seven years old. I live in Pittsburg, Kansas. And my question is, is there a way for you to get rid of your allergies? And I love your show.

Jane 26:11
Growing out of an allergy isn't the only way to help your body learn to figure out that it doesn't need to react so strongly to the things you're allergic to.

26:18
The other thing that we're learning now is something called oral immunotherapy. So it's the same as we talked about with the shots are under your tongue. It's little bits, eating little bits of the food slowly over time. So your immune system says, "Okay, that's alright, we can we can deal with you." And you keep doing that with the allergist, always with your allergist. And and then slowly over time, you'll be able to eat a certain amount of that food. The other ones which I'm so excited about, in the next five or 10 years, kids, you're going to have a lot of choices. So there's new biologics, we call them. They're shots. But you don't have to take it often. Like once a month. But what it does is it cuts off that cascade I talked about. So your immune system releases, you know, certain, certain chemicals we talked about, but it stops it so that it won't be able to release them. And then you're somewhat protected, you know. And then you take it again. Once it wears off, you take it again. So some of those biologics are coming out, the oral immunotherapy and then the under the tongue thing I talked about, and then even a patch that you get, we call it epicutaneous. So it's the same idea. All of these are the same idea, you know, getting small amounts over time. But this one is through your skin. So lots of exciting treatments coming up.

Jane 27:39
Can I ask you about the difference between those treatments? Because it sounds like one of them is a treatment that trains your body over time to not see these things as the invaders. So it's almost like, you know, if you ate a bunch of peanuts all at once your body is like, "Whoa, what is this? Oh my gosh, I've gotta, I've got to fight this." But if you're at your doctor's, at your allergist, and your allergist is giving you a teeny tiny bit of peanut, your body might say, "What? Oh, I think that's a peanut. Nope. Okay, that's okay." And then over time, it can recognize the peanuts and be like, "No, no, that's okay. Peanuts are not bad for me." Is is that kind of what that treatment is like?

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Ruchi Gupta 28:18
Yeah.

Jane 28:19
And then it sounded like you were talking about another kind of treatment that's a little bit different, that it's not that your body starts to say, "Oh, that thing I used to be allergic to is okay now." Your body is still saying, "Oh, no, I don't want you in my body." But there's a medicine that kind of basically holds your immune system back. It's like if you were running to chase something out, and there's somebody else who came in and said, "Hold on, buddy, you're fine. Let that thing be in your body. It's fine." So it's not that you think it's not an invader, but there's kind of like a blocker there saying, "Nope, you can't go attack it. We're not going to let you." Does that sound right, too?

28:54
Yeah, that's really cool. I love that. That's exactly right. Yeah.

Jane 28:59
Okay, so now we know a little bit about how allergies are treated. But we still don't entirely know all the answers to all the questions you sent us about why we get allergies. Dr. Gupta says she works with a lot of high school students, and she's really excited that some of you might help figure out all the mysteries surrounding allergies someday. Ruchi Gupta is a professor of pediatrics at Northwestern University and Lurie Children's Hospital and the founding director of the Center for Food Allergy and Asthma Research and we're so glad she could join us today. That's it for this episode. If you have a question about anything you think But Why should tackle, send it our way. Ask an adult to record you asking your question. You should also tell us your first name, where you live and how old you are. Our show is produced at Vermont Public and distributed by PRX. Our team includes senior editor Melody Bodette, as well as Kianna Haskin and Kaylee Mumford and me, Jane Lindholm. I'm the host and executive producer of the show. Our theme music is by my friend Luke Reynolds and even after all these years, I never get tired of hearing him whistle that tune at the beginning. If you feel the same way, maybe you'll send us a video of you whistling it yourself or playing it on an instrument, and we'll post it on Instagram. We'll be back in two weeks with an all new episode. Until then, stay curious!

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