

But Why: A Podcast for Curious Kids

[How Does Your Heart Work?](#)

April 13, 2018

[00:00:20] [JANE LINDHOLM] This is “But Why: a Podcast for Curious Kids” from Vermont Public Radio. On this show we take questions from interesting kids like you and we find answers.

[00:00:31] Would you like to see us live?

[00:00:33] We're going to be part of the mega awesome super huge wicked fun podcast playdate in Boston at the end of April. We're going to be exploring the world of owls. I'll tell you how to get tickets at the end of the episode. But I want to get right into today's topic. We're going to be talking about a very special muscle. It keeps us alive and it has its own rhythm. [heartbeat]

[00:01:01] Today we are answering questions about hearts.

[Child1] How do hearts keep you alive?

[00:01:06] [Child2] How does the heart pump blood?

[00:01:08] [child3] Why do children have heart surgeries?

[00:01:12] [JANE LINDHOLM] We'll have answers to all those questions and more. And we're going to get help from an expert.

[00:01:17] [DR. CROSSEN] My name is Jane Crossen and I'm a doctor who takes care of kids who have heart problems.

[00:01:22] [JANE LINDHOLM] Why was that something that you wanted to do?

[00:01:24] [DR. CROSSEN] Kids have the most interesting hearts and they're the coolest anyway. [laughter]

[00:01:32] [JANE LINDHOLM] Kids or kid hearts?

[DR. CROSSEN] Both.

[JANE LINDHOLM] The official words for someone who takes care of kids' hearts is a pediatric cardiologist. “Pediatric” means a doctor who works with kids and “cardiology” is the study of the heart. The kids who see Dr. Crossen were often born with something unusual about their hearts that needs correcting. And sometimes kids come to see her because their hearts either beat too fast or too slow or with not quite the right rhythm. Now you can't talk about a heart without talking about blood. So, let's start with questions from Clara and Luke.

[00:02:07] [Luke] Hi my name is Luke. I'm 6 years old. I live in Roswell Georgia. My question is how is blood made?

[00:02:16] [Clara] Hi my name is Clara. I am four years old and I'm from Baltimore City. And I also want to know how and why does the heart make blood.

[00:02:27] [JANE LINDHOLM] How does your heart keep you alive and how does your heart--and why does your heart--make blood?

[00:02:31] [DR. CROSSEN] OK those are great questions. Your heart, interestingly, does not make the blood. The blood is made in your bones, which is kind of crazy.

[JANE LINDHOLM] Yeah that's wild.

[DR. CROSSEN] Yeah, but that's where the blood is made. And then once the blood is made, the heart's job is to pump it around all through your body because the blood is there to give all of the food and the oxygen, which keeps your body alive, to deliver all that stuff to all the parts of your body all the way down to your toes and your fingers and into your stomach and into your brain and everywhere else.

[JANE LINDHOLM] When I think about my bones, I think they're pretty hard.

[00:03:13] How does the blood get out of your bones and move around your body or does it only move around in your bones?

[00:03:19] [DR. CROSSEN] No it comes out of the bones, Sometimes, when you're eating a chicken, have your mom crack open a leg bone for you and you can see that the inside of the bone looks different than the outside. It's very-- kind of it looks like it has blood in it. And that's where the blood is made and then it manages to get out of the bones and into the bloodstream to help us, you know, keep that oxygen and food moving around.

[00:03:47] [JANE LINDHOLM] So the heart's job is to pump the blood around your body, but what's the point of that? Julian wants to know the role that blood plays here...

[00:04:01] [Julian] I'm four and I am in Massachusetts. And my question is why is blood so important?

[00:04:07] [JANE LINDHOLM] Remember how Dr. Crossen just said that your heart moves all that blood around. Your heart is a pump. It keeps that blood flowing to all the different parts of your body from your head all the way to your toes. Without blood, your body doesn't get the oxygen and nutrients it needs to function. And without your heart, your blood wouldn't get where it needs to go. That's why your heart is so important and you can't live without a heart.

[00:04:35] [Isabelle] Hello my name is Isabelle. I'm from California and I'm five years old. My question is how do hearts keep you alive?

[Ray] My name is Ray, I'm five and a half years old. I live in Bismarck, North Dakota. My question is how does the heart pump blood?

[00:04:51] [DR. CROSSEN] The idea of it being a pump is pretty easy to understand if you just take your own hand and squeeze it. If you like had something in it like a water balloon that had a hole in it, you'd find that when you squeeze the balloon with your hand, the water shoots out, right? And then when you relax it doesn't squirt anymore. So, the heart

squeezes, pushes the blood out of itself and then it relaxes to let the blood come back in. And then, and then it squeezes again just like opening and closing your fist. And that's how the pump works. It's a muscle.

[00:05:27] [JANE LINDHOLM] So it's a muscle and it's squeezing this blood around. Can you talk a little bit about what happens when your blood has circulated through your body, what happens to it then?

[00:05:37] [DR. CROSSEN] Yeah. So, all the blood, you know, gets squirted out into your, into the big blood vessels that carry the blood around to your body, and it goes into these tiny little blood vessels that you can't even see any more, they're so small. Those are the ones that when you, like, scrape your knee, blood just kind of loses out a little bit because it's coming out of these tiny little blood vessels. And then when it goes all the way through those little tiny blood vessels, it starts coming back into veins. Veins carry the blood back to the heart. And, as they come together, just like rivers coming together, or like two streams coming together, they get bigger and bigger until they get back to your heart. And by then they're a really big, big blood vessel that's over--it's bigger than the size of your thumb.

[00:06:22] [JANE LINDHOLM] Are the veins carrying blood that has different stuff in it than the vessels?

[00:06:29] [DR. CROSSEN] No, they're carrying the same stuff except that they don't have as much oxygen in them because the oxygen is being sucked up by all the parts of your body that need oxygen which is all the parts of your body. So that's the main difference and it doesn't have as much food in it because the food gets taken up too.

[00:06:47] [JANE LINDHOLM] So, if we think about it kind of like a train, and this train is moving through your body carrying this oxygen, the blood is the train moving around and carrying the oxygen and it sends this oxygen out to all the different parts of your body, and then it kind of moves back to your heart to pick up that oxygen again?

[00:07:03] [DR. CROSSEN] Yeah, the train cars aren't completely empty but they don't have as much in them as they did when they were heading out to deliver their food and oxygen.

[00:07:12] [JANE LINDHOLM] Coming up we'll learn about why you can sometimes hear your own heartbeat when you're lying still. And we'll talk about why some children have heart surgeries.

[00:07:21] But first a message for the adults listening.

[00:08:42] [heart beat] [JANE LINDHOLM] This is "But why: a Podcast for Curious Kids". I'm Jane Lindholm and that's the sound of a human heartbeat pumping away. That heartbeat is what an adult heart sounds like. But [whooshing sound] this is what your heart beat sounded like before you were born.

[Child] Hi, my name is Arwen?. I'm from Los Angeles California and I'm five years old. And my question is, "why is a baby's heartbeat fast *the way it is* and why is it slower after it's born?"

[00:09:17] [JANE LINDHOLM] So Arwen wants to know why a baby's heart rate is faster when it's still in the uterus and slows down after the baby is born. Well, Arwen, it's not just before you were born but even now you, at the age of four, you have a faster heartbeat, at least most of the time, than the adults in your life. And there are a couple of reasons for that. One is that before they're born, babies are growing and developing really fast. So, all that blood needs to move around to help them grow bigger fast. You still grow fast once you're born when you're a kid. So, your heart is working hard to move the oxygen and carbon dioxide around your body to help you grow bigger, But it also has to do with size, and it's a little complicated so we don't need to get too far into it, but smaller animals tend to have faster heart rates than bigger animals. So, your hamster has a faster heart rate than your dog, and it's that way with people too. Children tend to be smaller than adults and they have faster heartbeats than adults. Now Evie has a question about heartbeats too.

[Evie] I'm Evie and I'm 9 years old. I'm from Melbourne Australia. My question is why when you're upside down does all the blood rush to your head. But when you're standing up straight, the blood doesn't all rush to your feet?

[00:10:36] [JANE LINDHOLM] All right. So Evie asked, "how come when you're hanging upside down all the blood rushes to your head, but when you're standing up straight it doesn't just all rush to your feet.

[00:10:46] [DR. CROSSEN] That's a very interesting question. It does actually go to your feet. You just don't notice it as much for some reason. But if you stand up long enough, a lot of the blood will go into your legs and into your feet just because of gravity. You know that's the lowest part. Just like water runs downhill, the blood will go to the lowest part of your body. But not all of it. Obviously, a lot of it stays up in the other parts to keep your body running.

[00:11:11] [JANE LINDHOLM] So sometimes, if you're feeling a little bit dizzy or faint, somebody might tell you to lie down or to put your head between your legs. Is that to get the blood to more flow more easily to that part of your body.

[00:11:24] [DR. CROSSEN] Yes, exactly. That means sometimes too much blood is in your legs and you've got to get it to go back up to the brain to make you feel normal again.

[00:11:33] [JANE LINDHOLM] So, is my heart working harder when I'm standing up than it is when I'm lying down and my whole body is basically at the same level?

[DR. CROSSEN] A little bit. Not too much difference really.

[JANE LINDHOLM] All right, here's another question from Jim.

[00:11:47] [Jim] Hi my name is Jim. I'm six and three quarters. And I'm from Melbourne Australia. And my question is why when you're underwater, upside down, or lying still can you hear your heart in your head?.

[JANE LINDHOLM] Ooh, why do you sometimes hear your heartbeat in your head?

[00:12:06] [DR. CROSSEN] Ah hah. Well, that's usually because if you've got your head kind of squished up against something, the blood vessels are a little bit squished on the side of your head, and it makes a noise. Sometimes, you can hear it in different places, and you've just got to be in a very quiet location, like in bed at night or, like I said, leaning up against something. And I know what you mean. I can I can hear that sometimes, too, and that's okay. That just means the blood is doing its job moving around.

[00:12:37] [JANE LINDHOLM] Yeah, or Jim says sometimes he can hear it when he's underwater.

[00:12:40] [DR. CROSSEN] Yes that's true.

[00:12:42] [JANE LINDHOLM] So our last question comes from Zane and this is a good one for you, Dr. Crossen, because you work with kids whose hearts aren't quite doing what they're supposed to do. So, here's Zane

[00:12:50] [Zane] My name is Zane. I'm seven years old. I live in Still Water. My question is, why do children have heart surgeries?

[00:13:02] [JANE LINDHOLM] Yeah, so Zane wants to know why do children have to have heart surgeries?

[00:13:02] [DR. CROSSEN] Heart surgeries are needed when there are holes in your heart that are letting the blood go into the wrong places, or if there is a narrowing so the blood can't get out of the heart easily. Those are the two main reasons. The heart is a series of rooms, basically, that collect the blood and then, pump them out to the body and also out to the lungs. And if those rooms aren't put together quite right or there's holes between them, then that can be a problem because the blood that's got the oxygen can mix together with the blood that doesn't have the oxygen and send the wrong stuff to the body.

[00:13:48] [JANE LINDHOLM] When you're doing heart surgery on a small child, do doctors have to use different kinds of instruments and different kinds of procedures on children than they do on adults?

[DR. CROSSEN] Oh yes. They have to wear magnifying glasses to see into the hearts of little tiny babies just almost like looking through a microscope.

[JANE LINDHOLM] I think the idea of heart surgery, or the heart not working quite right, can be scary to kids and certainly it must be for your patients. For the children who you talk to, how do you talk to them about fear and what's unknown and the kinds of medical procedures they're going to have to have?

[00:14:28] [DR. CROSSEN] That can be hard for kids or for grownups even, obviously. It's kind of scary. The main thing we tell them is that their parents are going to be with them while they're going to sleep to have their surgery, and that they'll be asleep during the surgery completely, so they won't be feeling any pain or having any problems. And then when they wake up their parents will be there with them again. And we also talk about how much better it's going to be that their hearts are going to be fixed and they can run and play better after they have their surgery.

[00:14:56] [JANE LINDHOLM] Your heart, as you said, is a muscle. It's something that works in your body to keep you alive. Why do you think we always think of our heart as something that has to do with love and how we love people or how we feel about things?

[00:15:10] [DR. CROSSEN] Yeah that's a good question. I think it's because it's so important. And people realized that, even a long time ago before they even knew how the heart worked, that it was very important, and because love is so important they put the two together.

[JANE LINDHOLM] But, really, they have nothing to do with each other?

[DR. CROSSEN] Really, they have nothing to do with each other. And your real heart isn't shaped like a Valentine either.

[JANE LINDHOLM] What is it shaped like?

[DR. CROSSEN] It's more squared off than that. It's more like, well part of it looks like an ice cream cone and part of it is more just square.

[00:15:48] [JANE LINDHOLM] And is it really about the size of your fist if you make a fist? That's about the size of your heart?

[00:15:52] [DR. CROSSEN] Yes that's right because your heart grows as you get bigger, just like your fist grows. A normal sized heart is about the size of any body's own fist.

[00:16:02] [JANE LINDHOLM] So before we let you go what should we know about the best ways to keep our hearts healthy and safe?

[00:16:09] [DR. CROSSEN] That's a great question. So, you know, kids that are born with their hearts, that have problems, you know that wasn't their fault. It wasn't anything they did. But as people get older and they don't take care of themselves right, then they can have heart problems that are caused by those kinds of things. So, the most important ways that you can keep your heart healthy are to exercise and eat right--meaning lots of fruits and vegetables, and not so many sodas that can make you fat. Stay healthy by doing those things and, of course, not smoking cigarettes.

[00:16:44] [JANE LINDHOLM] Thank you very much to Dr. Jane Crossen at Johns Hopkins Hospital in Baltimore, Maryland. Now if you have a question about anything, have an adult record it and send it to Questions@Butwhykids.org. We will do our best to get an answer for you. And we love hearing your voices so much. We wish we could answer all of your questions, but just hearing all of your curiosity is really inspiring to us adults who get to hear them. So, thank you. And before we go, I promised to tell you more about this exciting event in Boston at the end of April.

[00:17:17] "But Why" is doing a live show all about owls and other birds with our friend Bridget Butler who's known around these parts as the bird diva.

[00:17:26] It's on Sunday April 29 in Boston and it's part of WBUR's mega awesome super huge wicked fun podcast playdate on that weekend, April 28 and 29 at the Coolidge Corner Theatre in Boston. We will be joining five other kids podcasts in doing live shows. You can find more information at whykids.org. And we would love to see you there.

"But Why" is produced by Melody Bodette and me, Jane Lindholm, at Vermont Public Radio. Our theme music is by Luke Reynolds. We had additional music today from Blue Dot Sessions. We'll be back in two weeks with an all new episode. Until then, stay curious.