

Brains On (APM) | Brains On! How do you catch a cold? (Encore) 1QDE6E8RY8X5KFDRG83EC26F3R

DELIA GRIMES: You're listening to *BrainsOn*, where we get curious about the science of everything.

[MUSIC PLAYING]

MARK: Hello there, *Brains On* listeners. Producer Mark here. And I have some exciting news for you. Our dear, dear host Molly is almost back. Believe me. I know how you've missed her. And truth be told, we've all missed her. But she's coming back, and we couldn't be more happy.

We're digging into the archives again for this episode. And this time, the focus is on how we catch a cold. Your runny nose questions will be answered next. And I'll be back in the middle of the show to read off the latest Brains Honor Roll. So stay tuned for that.

Until then, you guys brought your sneeze guards, right? Well, if you did, it's time to hold them up. And if not, well, you might want to stand back a second.

MOLLY BLOOM: [SNEEZES]

DELIA GRIMES: Gesundheit.

MOLLY BLOOM: Oh, thank you.

DELIA GRIMES: Are you getting sick?

MOLLY BLOOM: I don't know. Maybe. I have allergies. So maybe that's it. I really don't want to get sick right now.

DELIA GRIMES: I just got over a cold. It stinks.

MOLLY BLOOM: Yeah, I hate colds.

DELIA GRIMES: Yeah. I mean, I always wonder, though, how do we catch colds anyway?

MOLLY BLOOM: Yeah, that's a good question. Let's find out. Oh no, wait. I'm going to sneeze.

[SNEEZES]

[MUSIC PLAYING]

CHILDREN: *Brains On!*

MOLLY BLOOM: You're listening to *Brains On* from Minnesota Public Radio news and Southern California Public Radio. I'm Molly Bloom. And my co-host today is 14-year-old Delia Grimes. Welcome, Delia.

DELIA GRIMES: Thank you.

MOLLY BLOOM: Delia and I are answering this question today.

DELIA GRIMES: How do you catch a cold?

MOLLY BLOOM: And we don't have to go very far for the answer. Scientists know how and why we catch colds.

DELIA GRIMES: It hasn't always been this way. People have been catching colds for millennia. But it wasn't until very recently that we actually knew why.

MOLLY BLOOM: And this was very frustrating for one little virus who was desperate for some attention.

VIRUS: It's tough being small. Nobody ever notices you, especially when you're a cold virus, like me. I'm a rhinovirus which means I'm really small. I'm just 20 nanometers wide.

SPEAKER 1: How small is that?

VIRUS: OK. If you lined up 100,000 of me in a row, we'd still only be as long as the head of a pin.

SPEAKER 1: Whoa. That's small.

VIRUS: So yeah, no one ever knows I'm around. Like back in ancient China around 500 BC, I was hanging out with this couple.

SPEAKER 2: Honey, are you feeling any better?

SPEAKER 3: No. My head is so stuffed up. And my nose is running like the Yangtze River.

VIRUS: It's me. I'm doing that.

SPEAKER 2: Ah, well, you must have caught a cold.

VIRUS: Me, you caught me.

SPEAKER 3: Yeah, all that cold blew into my skin through by pores, and now my body is out of whack. I can feel the wind inside me making me sick.

VIRUS: It's not wind. It's a virus. Come on.

SPEAKER 2: That's what causes a cold, all right. Wind, definitely wind. Best way to deal with it is to give you some spicy herbs to open up your pores, so that the wind can get out again.

SPEAKER 3: Sounds good. [SNEEZES]

SPEAKER 2: There, there. We'll get you feeling better.

VIRUS: See? See what I mean? And it wasn't just that one time. For centuries, people didn't know I was here, like in ancient Greece. They thought colds were caused by something called the four humors. Basically, they thought the body was made up of four fluids, and you'd get sick if they were out of balance.

Great story. But wrong. I was making them sick the whole time, and I got no respect for it. Then there was this one guy in the Middle Ages named Maimonides. He was real smart about a lot of stuff but not when it came to me.

MAIMONIDES: [COUGHS]

Oh, have I got a whopper of a cold? Oh. But it's summer. It couldn't be the cold air that gave me this chill.

VIRUS: Duh, it's me, the cold virus. Hello.

MAIMONIDES: Something else must be making my nose run.

VIRUS: Yeah, yeah, like a virus.

MAIMONIDES: Let me think. What could it be? Ah, I know. It's a v--

VIRUS: Virus. Say it. Virus.

MAIMONIDES: Very hot sun. That's it. The very hot sun.

VIRUS: Oh geez.

MAIMONIDES: The sun must be melting the hard excretions found in my brain making them run out of my nose. Ha-ha, It makes so much sense. I must write this down.

VIRUS: Seriously, melting brains, come on. I'm right under your nose, or in your nose, whatever. Doesn't it make more sense that something is being passed from person to person. Why else would cold spread in schools and workplaces?

BEN FRANKLIN: Quite right I must say.

VIRUS: Ben Franklin, America's 18th century ACE inventor.

BEN FRANKLIN: I mean, if cold air or wet weather or sun was making people sick, then why wouldn't sailors be sick all the time. They spend every day in the sun. They often get wet and travel through cold places, yet sailors can go months without so much as a sniffle.

VIRUS: Exactly. If I'm not on that ship, I can't make them sick.

BEN FRANKLIN: It's when they return to shore that they suddenly catch colds. Colds must pass from person to person.

VIRUS: Yeah, viruses need humans to spread us around. We don't just magically appear out of nowhere.

BEN FRANKLIN: Yes, it's not weather. Something else must be making us sick, but what could be so small, so hard to see? Stale air. That must be it. Let me open the windows, get this tainted air out of here.

Ah.

VIRUS: Good grief. Enough with the fear theories. Ben Franklin was on the right track, but even he couldn't figure out that it was me making people sick. Will anyone ever see me for what I really am?

WALTER CRUZ: I see you. You are wee little virus. You cause colds.

VIRUS: Uh? You see me? You know what I am?

WALTER CRUZ: Oh yeah. I am Walter Cruz. Nice to meet you little virus. I am a microbiologist from Germany. And in 1914, I decided to take a sample from the nose of one of my students. He had a real mean cold. I ran that sample through a filter so fine, it could beat out the nose hair, the boogers, even the bacteria.

VIRUS: Uh-huh.

WALTER CRUZ: Then I took what was left and stuck it up a different student's nose. And he got sick too. I thought, this is good. That means whatever is making them sick is so small it passed through my filter, which even rocks bacteria. So this cold germ must be tinier than bacteria, which means it must be a virus.

VIRUS: Yeah, you got it. Woo. I'm a virus. You don't know how long I've waited for someone to finally get it. You're my hero, Dr. Cruz. Come here. Give me a hug.

WALTER CRUZ: I'd rather not. I might catch something.

[MUSIC PLAYING]

MOLLY BLOOM: Delia, would you hug a virus?

DELIA GRIMES: I don't think I would unless I wanted to catch a cold.

MOLLY BLOOM: Good call.

SINGERS: (SINGING) Ba, ba, ba, ba, ba, ba, ba, ba, ba, ba, *Brains On*.

MOLLY BLOOM: Hey, Delia.

DELIA GRIMES: Yes.

MOLLY BLOOM: Guess what?

DELIA GRIMES: What?

MOLLY BLOOM: It's time for the mystery sound.

[WEIRD SOUND]

CHILD: Mystery sound.

MOLLY BLOOM: Here it is.

[RUNNING WATER]

Do you have a guess?

DELIA GRIMES: I think I do.

MOLLY BLOOM: OK, keep it to yourself. And everyone else out there, keep your guests in mind. We'll come back to it later in the show. But first, we're going to find out how that cute little rhinovirus makes us sick. Come to think of it, maybe it's not so cute after all.

DELIA GRIMES: We talked to Dr. Mark Schleiss.

MOLLY BLOOM: He's a pediatrician and infectious disease specialist at the University of Minnesota. He explained that the way we catch the cold or a rhinovirus as it's called, is that it goes through one of our mucous membranes, which is our mouth, our eyes, our nose.

That virus goes inside of our body, attaches to a cell. That virus that injects the DNA inside of it where it replicates, which means it makes more copy of the virus. And then the virus breaks out of the cell and does that to more cells inside the body. And that's how you get sick.

DELIA GRIMES: When I talked to Dr. Schleiss, I asked him why the cells inside our body when they're fighting the virus makes our noses run.

MARK SCHLEISS: Like any viral infection as soon as the host or person encounters the infection, the immune system compensates and tries to fight it off. And so some of the symptoms that you get from viral infections are driven by molecules that are made by our white blood cells. They're called interferons. And as the name implies, they interfere with the viral infection.

Unfortunately, the interferons also have side effects in their own way. They make you feel feverish, muscle aches, and runny nose and cough. So that's just the body's immune system trying to fight back.

DELIA GRIMES: How many viruses are there that we know of?

MARK SCHLEISS: I don't know the number. But it's probably in the hundreds of thousands, believe it or not. It turns out that most of the viruses in nature don't even infect people. Viruses are all over the world in every life form we've ever studied, in the oceans, in the mountains, in plants. Plants have virus infections too. So only a tiny slice of viruses actually cause disease in people.

One of the interesting things about rhinoviruses is that there are many different subtypes of rhinovirus. That's why you catch a cold and you're not immune to colds for the rest of your life. You can get it over and over and over and over. And there are more than 50 different subtypes of rhinovirus infections.

DELIA GRIMES: What myths about the common cold are true? Like is it true that you can go outside in the cold and maybe catch a cold?

MARK SCHLEISS: So somebody did an experiment where they got some students together and said, we'll take half of you and infect you in the nose at room temperature. We'll take the other half of you and stick you in a refrigerated room on purpose where it's really, really cold. And we'll infect you with the same dose of virus.

And it turned out that there weren't any differences at all between the two groups. Whether you were infected with the cold virus in a really, really warm temperature or whether or not you were infected with the virus at a really cold temperature, you were just as likely to get a cold, and it lasted just as long.

DELIA GRIMES: What cures are true and what are kind of just myths?

MARK SCHLEISS: Yeah, that's a great question too. The one that I think is most interesting is zinc. It turns out that if you take a high enough dose of zinc, especially early in the course of your cold, you can shorten the duration of the cold by-- oh, I don't know-- 20% or 30%. So you do get a little bit better faster.

It turns out that one is true. There actually is some scientific evidence to support that. On the other hand, another treatment that a lot of people talk about and a lot of people do is vitamin C. And actually it turns out that it's been proven that vitamin C has no impact on the cold at all.

CHILDREN: *Brains On* colds.

MARK There's no cure for the common cold. But that doesn't stop us from trying.

SCHLEISS:

MOLLY BLOOM: We ask kids what remedies they try to help themselves feel better when they have a cold.

CHILD 1: Soup, water, juice.

CHILD 2: I take medicine or lie in bed.

CHILD 3: Take stuffy nose medicine.

CHILD 4: I snuggle in my parent's bed and have and have healthy snacks.

CHILD 5: Lay down, watch TV, and have a washcloth on my head.

CHILD 6: Yeah, you have to drink things and eat and rest and sleep.

[MUSIC PLAYING]

SUNNY SMITH: (SINGING) When you have a cold, you don't have to worry. All you need is to rest and take it easy. There is only one cure for the cold that we know. It is rest and love for your cold. Don't you know? Don't you know?

Na, na, na, na, na. La, la, la. Na, na, na, na, na, na. Na, na, na, na. Na.

DELIA GRIMES: That was Sunny Smith from Sunny and the Sunsets.

MOLLY BLOOM: With the song the "Cold and It's Cure."

[MUSIC PLAYING]

MARK: So what do you look like when you're sick? Are you green-faced? Is all your hair messed up? Do you stink? I know sometimes I'm all three of those things. Well, why not draw a picture of what you think you look like and send it in to us. You can go to brainson.org and click on the contact link to find our mailing address or send us an email. brainson@mpr.org. That's brainson@m-- like Minnesota-- pr.org.

We love hearing from you. Thanks for sending in your fantastic questions, amazing mystery sounds, and stupendous drawings. As a matter of fact, I have a freshly printed list of kids who sent in questions, sounds, and drawings, and high fives. Here it is. The latest installment of the Brains Honor Roll.

[MUSIC PLAYING]

Matthew from San Carlos, California, Nathaniel from Auckland, New Zealand, Josephine from South Los Angeles, Sophia and Nate from Incline Village, Nevada, Frankie from Portland, Oregon, Theory from Marin, California, Matthew and Stuart from Calgary, Canada. Rory from Charlotte, North Carolina, Charles from Fort Worth, Texas, Ariana from Washington DC. Molly from Los Angeles, Kennedy from San Diego, Eloise and Milo from Belmont, California, Kiley from McFarland, Wisconsin, Elias from Albany, New York.

Isaac from Layton, Utah, Ben from Kansas City, James and Ryder from Valley Center, California, Joel and Bridget from Edina, Minnesota. Justin from Cerrito, California, Elijah and Judah from Chicago, Lillian from Hillsboro, Oregon, and Piper, Asher, Wren, and Leif from Melbourne, Australia.

[MUSIC PLAYING]

[ROBOT]

[MUSIC PLAYING]

Remember, if you want to be included on a future Brain Honor Roll, let us know. Find us on Instagram, Twitter, and Facebook, or send an email to brainson@mpr.org.

OK. Time to get back to the show. We're just about to reveal the mystery sound. But first, let's take one more listen. Here it is.

[RUNNING WATER]

MOLLY BLOOM: Any guesses?

DELIA GRIMES: I think it might be someone washing their hands.

MOLLY BLOOM: Very good guess. To find out the answer, we have 11th grader Tim Ranier from Duluth, Minnesota.

TIM RANIER: That's the sound of somebody washing their hands.

DELIA GRIMES: Yay.

MOLLY BLOOM: You were right. Tim has been researching hand hygiene, which is keeping your hands clean since he was in seventh grade.

DELIA GRIMES: Here he is explaining why something as quick and easy as washing your hands is such a big deal.

TIM RANIER: Say, for example, that you touch an object that's contaminated by someone who didn't wash their hands, so you have that on your hands. And then say you go to lunch at school. It's probably pretty quick getting lunch. You might get to the beginning of line, something like that. You end up-- so you haven't washed your hands.

Your hands are contaminated. And then you get a sandwich per se. You touch that sandwich. The viruses and bacteria that are on your hands from that contaminated object go to the sandwich. And then you eat it. And that's what makes you get sick. So if you wash your hands before you're going to that-- or before you go to lunch or if you take just a couple of seconds to use the hand sanitizer maybe that's even provided at a lunch line or something like that, it can keep you from getting sick.

You wouldn't get you wouldn't be essentially eating those germs from someone else-- on a contaminated object. All right, so the correct hand-washing technique is to first of all rinse your hands under the water, then apply soap to your hands. Scrub your hands with the soap for about 20 to 30 seconds. And then rinse your hands off under the water when you're done doing that, making sure to-- during that scrubbing process, get all the areas of your hands, including the fingertips, which are most often missed between the fingers, and also the backs of your hands. If you can, you should even wash your wrist when you're washing your hands.

So one of the biggest myths about hand hygiene is that hand sanitizer kills what's on your hands basically viruses and bacteria instantly. Hand sanitizer just like hand washing often needs to be left on your hands for about 15 to 20 seconds. So it actually requires time to be able to kill the bacteria and the viruses. Some things would be killed immediately, but other more dangerous things take longer times.

It's quite impressive about how such a small change in behavior-- you think, it's-- I mean, it's something that maybe 20 to 30 seconds extra in your day before eating for example. And it can make a tremendous difference in your health.

MARK: Washing hands can help prevent you from catching a cold. But if you do catch one, it's not all bad. Maybe something good can come out of it besides what comes out your nose.

MOLLY BLOOM: Producer Mark Sanchez is joining us now. Hi, Mark.

MARK: Hello.

MOLLY BLOOM: So there's a benefit besides getting to eat unlimited amounts of chicken noodle soup?

MARK: Actually, yes. The good part comes in the way we can study rhinoviruses.

DELIA GRIMES: How so?

MARK: Well, these things are mutating so fast that virologists like John West at the University of Nebraska, he can watch them change as they move from person to person. And within each person, they can study how our immune systems react and evolve with each new strain. Humans and these rhinoviruses are evolving together. They're actually co evolving.

MOLLY BLOOM: Whoa.

MARK: I know, right? It's those relationships between disease-causing agents like rhinoviruses and later problems like allergies and asthma that prompted the hygiene hypothesis.

MOLLY BLOOM: What's that?

MARK: Well, the basics behind the hygiene hypothesis are that some exposure to viruses and other germs at a young age may be better for you in the long run. Your body's immune system learns to react and not overreact to viruses when you get older.

Think of a kid on a farm. And that kid helps feed the animals, plays in the hay, and runs around in the dirt. All those things are filthy and filled with viruses. But that kid's immune system is learning how to react to all those viruses when he or she is young.

So when they get older, their bodies are like, oh no problem, I've seen this before. I've got this under control. The other cool thing is this. If we can figure out how these viruses work, predict how they change and mutate, if we can do that, some scientists think this might be a way to use viruses as tools against much bigger diseases like cancer.

DELIA GRIMES: The common cold could fight cancer?

MARK: That's the theory. You see, some viruses, including rhinoviruses are what are called lytic.

MOLLY BLOOM: What does that mean?

MARK: Well, viruses actually make their homes in cells and kill them in order to reproduce.

DELIA GRIMES: Kill them?

MARK: Yep. Cell murderers. And that process of killing a cell, that process is called lysis. And if you think about that in terms of cancer, that could be huge. What if we could tame and train an army of viruses to march into your body and head straight for a patch of cancer cells? Their only job would be to invade the cancer cells and go through lysis.

MOLLY BLOOM: Cancer murder.

MARK: That's what the researchers hope anyway.

MOLLY BLOOM: OK. So colds are probably never going to be fun.

MARK: Probably not. But if you could think of yourself as an evolving experiment that could, who knows, cure cancer someday, then maybe a little runny nose isn't so bad.

[MUSIC PLAYING]

DELIA GRIMES: We have our answer. The cold virus spreads through our mucous membranes.

MOLLY BLOOM: Like in your eyes, nose, and mouth.

DELIA GRIMES: The viruses attack cells, but we fight them off.

MOLLY BLOOM: Which makes us feel terrible in the short run.

DELIA GRIMES: But builds up an immunity to that particular cold virus in the long run.

MOLLY BLOOM: But there are lots of different types of cold viruses, so you're going to keep catching colds anyway.

DELIA GRIMES: And vitamin C won't help prevent or shorten your cold but zinc can.

MOLLY BLOOM: [COUGHS]

This human experiment is going to get some chicken soup. But first, we need some help from our listeners. Send us a recording of your sneeze. We'll take the sneezes we get and make a sneeze super mix.

DELIA GRIMES: Or a sneezer mix, if you will.

MOLLY BLOOM: Visit our website brainson.org for instructions on how to send us your sneeze.

DELIA GRIMES: While you're there, you can listen to past episodes, or you can find *Brains On* in the iTunes store or your other favorite podcast apps. This episode was produced by Marc Sanchez, Sanden Totten, and Molly Bloom.

MOLLY BLOOM: Many thanks to Bob Brekke, Kathryn Grimes, Ian McKim, Val Kaylor, Tom Reid, Stuart Bloom, Eric Wrangham, Mike Mulcahy, John West, and Aidan Arnold.

DELIA GRIMES: Thank you for listening.

[MUSIC PLAYING]