

Brains On (APM) | Brains On! Chill: The science of cooking, pt. 2 1QKRYG2844S0XTH1E7DQNGAG0M

ANNOUNCER 1: You're listening to *BrainsOn!* where we're serious about being curious.

ANNOUNCER 2: *Brains On!* Is supported in part by a grant from the National Science Foundation.

MOLLY BLOOM: All right, Nantin. Are you ready to do this?

NANTIN: So ready, Molly.

BOB: And I'm ready too.

[SCRATCH EFFECT]

MOLLY BLOOM: Bob, what are you doing here? Aren't you supposed to be at work?

BOB: I took the day off. I heard you were doing a show about chilli. I love chili. Beef chili, and three-bean chili. I eat it all, even if it makes me a tad gassy.

MOLLY BLOOM: Um, Bob--

BOB: OK, fine, a lot gassy. But who cares? [CHUCKLES] We'll all be gassy together, right? Now let's get some chili.

NANTIN: I think you misheard that. We're doing a show about chill. You know, cold stuff. Not chili the food.

MOLLY BLOOM: Sorry, Bob.

BOB: So-- so no beans, no onions, and no paprika?

MOLLY BLOOM: No. But you know what is perfect for an episode on chill? Popsicles.

NANTIN: Yeah. I think we have some in the freezer.

BOB: Oh, I do love getting fresh popsicle sticks for my collection. You wouldn't happen to have any chili flavored ones, would you? With a little frozen beans and beef in them?

MOLLY BLOOM: No, because no one wants that. But we do have grape.

BOB: Grape! Let me add it. You don't mind if I take the whole package, do you? OK, great. Thanks. Bye!

[FOOTSTEPS]

NANTIN: Well, I'm happy that worked out.

MOLLY BLOOM: Me too. But now I'm craving chili. Let's do the show. And hopefully, that'll take my mind off it.

NANTIN: You got it. Time to chill out.

SINGERS: Chill, chop, mix, heat. Reverse the order. Then repeat. Heat, mix, chop, chill. The recipe for every meal.

[CRUNCHING]

[LIQUID POURING]

Chill, chop, mix, heat. Reverse the order. Then repeat. Heat, mix, chop, chill. The recipe for every meal.

[ICE CUBES CLINKING]

MOLLY BLOOM: This is *Brains On!* From American Public Media I'm Molly Bloom, and my sous chef for this culinary crash course is Nantin Ba from New York City. Hi, Nantin.

NANTIN: Hi.

MOLLY BLOOM: So Nantin, what is your favorite cold food?

NANTIN: ICs like Italian ICs.

MOLLY BLOOM: What flavor?

NANTIN: I don't know. I think this is a New York thing, like New York City. So during the summer and winter, there will be a cart. And like the four basic flavors is coco, like coconut, mango, cherry, and rainbow.

Rainbow, I guess, it's like a mix of fruits. But yeah, so I get usually coco on the bottom and the rainbow on top.

MOLLY BLOOM: That sounds really, really delicious. Well, after last episode's heat wave, we are ready for the temperatures to drop. Time to chill out.

[MUSIC PLAYING]

NANTIN: This is the second in our five-part series on the science of cooking.

MOLLY BLOOM: And we've partnered with our friends at *America's Test Kitchen* to answer your many, many kitchen related questions. Last episode, we talked about the role that heat plays in cooking, and how heating up our food helped humans become humans.

NANTIN: It's a big deal.

MOLLY BLOOM: And today, we're talking about the coolest side of cooking, literally.

NANTIN: And we're starting with this pair of questions.

BETH: Hi, Molly. My name is Beth.

MAX: And my name is Max. We're from Los Gatos, California.

BETH: And we were wondering--

MAX: How do refrigerators work?

VALENTINA: Hi. My name is Valentina. And I live in Fort Worth, Texas. And my question is why does food need to be refrigerated?

MOLLY BLOOM: To help us answer this, I asked producer Sanden Totten to do some research. And he should be here now. Sanden.

SANDEN Hey, guys. Sorry I'm late. Can you move those chairs out of the way?

TOTTEN:

NANTIN: You brought a whole refrigerator with you?

SANDEN Well, he's my friend, first, and a refrigerator, second. Let me just set him down. There. Guys, meet Toby.

TOTTEN:

MOLLY BLOOM: You named your refrigerator?

SANDEN Doesn't everyone? I mean, how else are you going to personally thank them for keeping your food cold? Wait.

TOTTEN: You guys do thank your appliances, right?

BOTH: Um.

SANDEN Seriously? Geez, so rude. And they think I'm the weirdo. Am I right, Toby? Anyway, we're here to answer your

TOTTEN: questions.

MOLLY BLOOM: OK. Well, first is how does this refrigerator--

SANDEN You mean Toby?

TOTTEN:

MOLLY BLOOM: Oh, sure. Sorry. How does Toby work?

SANDEN Great question. The magic of Toby has to do with his tubes.

TOTTEN:

NANTIN: His tubes?

SANDEN Yeah. He has a loop of tubes that run both inside him and outside him. Right, Tobs? Exactly. He says his tubes

TOTTEN: are kind of like our blood vessels that carry blood around our body, except his tubes carry something called a refrigerant through him.

MOLLY BLOOM: Right. A refrigerant. That's a special substance that's good at absorbing heat from the environment.

SANDEN Exactly. Inside Toby, there's a machine that pumps this refrigerant through the tubes. As the refrigerant enters

TOTTEN: the inside section, the cold part, it goes through a special device called an expansion valve.

Now, this device drops the pressure around the refrigerant. So like when a substance is in a very low pressure situation, like this, it can actually boil with way less heat than it would need at normal air pressure.

MOLLY BLOOM: So if this refrigerant inside the-- I mean, inside Toby, is now in a low pressure state, does it boil too?

SANDEN Precisely, Molly. So it leaves this expansion valve and it boils, turning into a gas inside those tubes in the cold

TOTTEN: part of the refrigerator. So it goes through the tubes in the cold part. And along the way, it kind of sucks up the heat from inside the refrigerator, leaving coolness in its wake.

It's kind of how if you have water in your skin on a hot day and it evaporates, it kind of makes your skin feel a little cool. Has that ever happened to you?

NANTIN: Yeah.

SANDEN It's sort of like that. Oh, right. Forgot about that. Toby says there's also a fan inside him that kind of blows on these cool tubes to spread the chill around.

TOTTEN:

NANTIN: Very cool. I mean, literally, very cool. But all that heat the refrigerator absorbs has to go somewhere, right? Otherwise, Toby would eventually get super toasty.

SANDEN That is an excellent point. So after this gas passes through the cold part of the refrigerator, it reaches a compressor that squishes it back into a hot liquid. Then it runs through these tubes outside of Toby on his back.

TOTTEN: And there, all that heat is radiated out into the world. Then the refrigerant is ready to be pumped back through the cold part and do it all over again. It's an endless loop.

MOLLY BLOOM: So that's why it can sometimes be warmer than usual around a refrigerator even if it's still cold inside.

SANDEN Yep. Toby runs both hot and cold. That's why he's got thick walls with insulation to keep the cold parts inside from being heated by the heat from outside. Am I right, my dude?

TOTTEN:

NANTIN: Thanks, Sanden and Toby. Now can you answer part two-- why foods need to be refrigerated in the first place?

SANDEN Yeah, of course. You see, food, naturally, has bacteria or molds or yeast on it. And normally, these are in small amounts, totally safe to eat. But given enough time, they multiply, and turn your food into a soggy, moldy, lumpy mess-- a gross. That's where Toby steps in.

TOTTEN: Toby keeps it chill. And when those microorganisms are cold, they take longer to spread, giving you more time to eat the food before it turns nasty. Also, Toby's super cooling power helps slow the natural enzymes that decay the food too.

So basically, your food won't get dicey because Toby keeps it icy. And that is why you should thank your refrigerator.

MOLLY BLOOM: Wow. I am sorry, I never thought of it like that. Thank you, Toby.

NANTIN: Yeah. Thanks for doing all that.

SANDEN He says you're welcome. And if you excuse us, we actually got to get going back home. It's Sarah, my blender's birthday today. And we're kind of throwing her a surprise party.

TOTTEN:

MOLLY BLOOM: OK. Later you, two.

NANTIN: Bye.

SANDEN OK. Bye. What's that, Toby? Of course, I bought a gift. No, you can't say it's from both of us. Get your own. Well, you should have thought of that before we left the house. I don't know. Make a card or something.

TOTTEN:

NANTIN: Should we be concerned that he talked to his appliances?

MOLLY BLOOM: I'm sure it's fine.

SPEAKER: (SINGING) Brains on.

MOLLY BLOOM: Now, here's a cool experiment you can try on the next hot day.

NANTIN: Or any day, for that matter. To play along, you need a frozen stick of butter in an ice cube.

MOLLY BLOOM: Editor Molly Birnbaum invited brother and sister Zela and John Kim to *America's Test Kitchen* to try this experiment.

MOLLY BIRNBAUM: So I'm going to have each of you take this frozen stick of butter. So this stick of butter has been in the freezer. It's totally frozen, in one hand. And now take a piece of ice in your other hand. Which one is colder?

JOHN: Ice.

MOLLY BIRNBAUM: Ice? How much colder is it?

ZELA: Way Colder.

MOLLY BIRNBAUM: Way Colder.

MOLLY BLOOM: Wait. Did you catch that? John and Zela are holding frozen butter and frozen water. And which one was colder?

JOHN: Ice.

MOLLY BIRNBAUM: Ice.

MOLLY BLOOM: But they're both straight from the freezer. They are the same temperature. Try it for yourself. It's super weird. So why does the ice feel so much more frozen?

MOLLY BIRNBAUM: There are two different materials. And each material conducts heat differently. And that's what it comes down to. Some things are really good conductors of heat. That means that they move heat energy quickly. Some things are really poor conductors of heat. That means they move heat slowly.

MOLLY BLOOM: So in our butter-ice bonanza, ice is a great conductor. It moves the heat from your hand fast, sucking that warmth right out of you. But butter is full of fat. And fat is a lousy conductor of heat. It takes much longer to drain the warmth from your palm. So it feels less chilly.

MOLLY BIRNBAUM: And so the same thing happens with fluid in your mouth. So if you take a bite of ice cream, which has a lot of fat in it, it's not going to feel really, really cold in your mouth. But if you take a bite of sorbet, have you guys had sorbet, before?

JOHN: Yes. Raspberry sorbet.

ZELA: Yeah.

MOLLY BIRNBAUM: It's delicious, right?

ZELA: Yeah. Like a slushy, almost.

MOLLY BIRNBAUM: It's like a slushy. It doesn't have any fat in it. So that means that it takes the heat goodbye to your tongue much more quickly.

JOHN: It's a lot more cold.

MOLLY BIRNBAUM: Exactly.

MOLLY BLOOM: So next hot day challenge your friends to an ice or frozen butter holding contest. And remember, you better bet on butter, buddy.

SPEAKER: Ba ba ba ba ba ba ba ba ba ba brains on.

MOLLY BLOOM: Before we move on I have one more experiment I want you to try. And the only piece of equipment you need is your ears. That's right. It's time for the mystery sound.

SPEAKER: Mystery sound.

MOLLY BLOOM: Here it is.

[MYSTERY SOUND]

OK. Any guesses?

NANTIN: At first, I was going to say a blender, but I heard the dinging at the end. So a meat grinder?

MOLLY BLOOM: Excellent guess. But we are going to be back with the answer in just a bit. [MUSIC PLAYING]

NANTIN: Do you have a mystery sound you'd like to share with us?

MOLLY BLOOM: A question you'd like answered on the show?

NANTIN: Or maybe you have an idea about what dish you'd share with an alien.

MOLLY BLOOM: Right. We want to hear from you. If aliens landed on our planet, and you could only serve them one dish to represent the food of the Earth what would it, be and why? So Nantin, what dish would you serve the aliens?

NANTIN: I would personally serve the aliens a turkey sandwich. It's like no. Yeah, actually a turkey sandwich.

MOLLY BLOOM: Why a turkey sandwich?

NANTIN: It's the first thing I could think of. It's not bad. Like it tastes good.

MOLLY BLOOM: Something that pleases a lot of different kinds of people. Well, share the menu for your alien encounter by heading to brains.org/contact.

NANTIN: And if you share your ideas, questions, mystery science or drawings with us, you'll be added to the brains honor roll.

MOLLY BLOOM: Like this curious crew.

HENRY: Hi. This is Henry,

NATHAN: Nathan.

PATRICK: Patrick.

STELLA: And Stella

NATHAN: From Round Lake Illinois.

PATRICK: And our question is--

HENRY: What makes mint taste cold?

MOLLY BLOOM: We'll be back with an answer to that question during our Moment of Um at the end of the show.

NANTIN: Plus the latest group to be added to the brains honor roll. Keep listening.

[MUSIC PLAYING]

MOLLY BLOOM: Got your parka ready because it's time an icy blast from the past. Thanks to this question from Eli.

ELI: My question is, how do people keep food cold and fresh before refrigeration?

MOLLY BLOOM: Here to help answer that is producer, Matt Frassica. Hi Matt.

MATT FRASSICA: Hey, Molly. Hey, Nantin. So I recently went up to the small town of South Bristol, Maine. It's a place that gets very cold in the wintertime. And I went to see how they make ice that lasts all year long. Let me take you there.

Hey, I'm Matt.

KEN LINCOLN: Ken Lincoln.

MATT FRASSICA: Nice to meet you.

KEN LINCOLN: You too.

MATT FRASSICA: I met Ken Lincoln at the Thompson Ice House. It looks like an old barn, sandwiched between the road and a pond.

We stepped inside the barn.

KEN LINCOLN: And then we're going to open the door that goes straight into the actual storage of the ice.

MATT FRASSICA: Oh, wow. The whole inside of the barn is filled with ice.

KEN LINCOLN: And we have about 100 tons of ice in there.

MATT FRASSICA: So the ice is in these big blocks.

KEN LINCOLN: Yeah.

MATT It's right up to the edge of the door. So you open the door, and it almost looks like we've been snowed in, but it's
FRASSICA: just ice blocks.

KEN LINCOLN: That's right. Yeah.

MATT And it's cold in there.

FRASSICA:

KEN LINCOLN: Oh, yeah.

MATT This ice once covered the pond that's beside the ice house. Every February, a crowd of grownups and kids

FRASSICA: gathers on the pond to cut the ice into perfect blocks and stack them in the ice house.

And they use the same tools they've been using to harvest ice on this pond for almost 200 years. The thing about ice, though, it melts. But this ice--

KEN LINCOLN: They'll still be ice in here in October.

MATT So having gone through the whole heat of the summer.

FRASSICA:

KEN LINCOLN: Yeah.

MATT How can ice sit in a wooden barn with no electricity and no air conditioning and stay frozen for eight months?

FRASSICA: Turns out, it's all about the insulation.

KEN LINCOLN: These walls are 2 by 10s, they're 10 inches thick. And they are full of sawdust.

MATT Sawdust-- the stuff is magic. It can insulate well enough to keep ice frozen all summer. It used to be that only

FRASSICA: people who lived out in the countryside could get ice from an ice house like this one. People who lived in cities or in warmer places, where ponds and Rivers never froze over, they didn't have a good way to keep their food cold in the summertime. Until--

KEN LINCOLN: They call them the Ice King. His name was Frederic Tudor.

SPEAKER: His Majesty, Frederic Tudor, the Ice King. Ice to meet you.

MATT In the early 1800s, Frederic Tudor wasn't the king of anything yet. He was just a young guy from Boston with an

FRASSICA: idea. An idea so crazy, no one thought it would work. He wanted to sell ice on islands in the Caribbean.

FREDERIC I'll put the cool in piña coladas. Just imagine, ice drinks on a sunny beach. It'll blow people's minds.

TUDOR:

MATT Of course, there were doubters, haters, dream smashers, who laughed at his idea. But he got 130 tons of ice

FRASSICA: anyway, loaded it up on a boat in Boston, and sent it down to the island of Martinique.

KEN LINCOLN: His first load nearly all melted.

FREDERIC Anyone wants some nice fresh water?

TUDOR:

KEN LINCOLN: He covered it with hay, which hay works, but then they figured out that sawdust was a much better insulator. His second trip, they used sawdust. And over half of it was still good when he got there.

FREDERIC Bingo. What's nice? My ice. Come and get it, people.

TUDOR:

MATT He built ice houses on islands in the Caribbean and in the Southern United States so he could sell ice year round.

FRASSICA: Still, Tudor wasn't satisfied. He wanted to extend his ice empire even further.

FREDERIC Ice will conquer the world. I'll bring the joy of a good brain freeze to every man, woman, and child living today. Or

TUDOR: my name isn't the Ice King.

MATT Tudor packed up a ship full of ice and sailed it to India, where it was a huge hit. So he kept going, shipping ice as

FRASSICA: far as Singapore and Hong Kong.

FREDERIC My people, we're entering a new Ice Age.

TUDOR:

MATT Meanwhile, the commercial ice business had taken off back in the US. Every family had an ice box. Basically, a

FRASSICA: cooler that could hold a block of ice and keep things like butter and chicken cold.

Cities like New York and Chicago became the biggest markets for ice. And deliverymen would come around every morning to sell blocks of it. And all of that added up to huge profits for Frederick Tudor.

KEN LINCOLN: He ended up dying by the standards of that time, a millionaire.

MATT Of course, no one has an icebox anymore. Electric refrigerators put an end to the ice trade. But some people still

FRASSICA: like to use natural ice if they're going on long sailing trips or hunting out in the wilderness, any time you're far from electricity and need to keep things cold for a long time.

KEN LINCOLN: This ice will last four times longer than the ice you buy at the store.

MATT Why is that?

FRASSICA:

KEN LINCOLN: There's less air in it, and it is frozen at sub zero temperatures.

MATT And there's another side advantage to getting your ice from nature instead of artificial refrigeration.

FRASSICA:

KEN LINCOLN: It doesn't cost any energy to create it. I mean, I call it carbon free ice.

MATT Mother nature is just making it.

FRASSICA:

KEN LINCOLN: Mother nature makes it, and makes it better than we can.

[MUSIC PLAYING]

NANTIN: Those ice harvesters knew what was up.

MOLLY BLOOM: Can't beat mother nature.

NANTIN: Although, did mother nature invent the popsicle? Nope.

MOLLY BLOOM: Fair point. Katie Laird, another editor from *America's Test Kitchen Kids*, brought us into her kitchen to tell us who did invent that frozen treat, and how to make a really delicious one.

KATIE LAIRD: Ice pops were actually invented in 1905 by an 11-year-old kid. How cool is that? So this boy named Frank Epperson, in the San Francisco Bay Area, was just kind of playing around and mixing things up.

And he mixed together the sugary soda powder and water, and he stirred it with a wooden stirrer. And he got a little distracted and he left this cup outside. It was a chilly night. He forgot all about it. Came back in the morning, and it was partially frozen.

So he just picked it up by the wooden stick that had frozen in there, tasted it, loved it. And he ended up selling them around his neighborhood as like a child entrepreneur.

**FRANK
EPPERSON:** Icy treats here. Get your icy treats here.

KATIE LAIRD: Kept growing up, kept developing it, ended up selling it at an amusement park, got a patent for his idea. And his kids convinced him to name it Pops-sicle. And that's how we got popsicle.

MOLLY BLOOM: I love that. It's the pop like a soda pop reference?

KATIE LAIRD: No, to like pop like dad. Because he had originally named his creation after himself. After his last name, Epperson. So it's eppicles. And then his kids convinced him like oh, these are pop's things, you know. So popsicle. Yeah.

MOLLY BLOOM: Popsicle does have a better ring to it than eppsicle.

KATIE LAIRD: I think so too. Yeah.

MOLLY BLOOM: Sounds like a weird body part or like disease or something.

KATIE LAIRD: Totally.

MOLLY BLOOM: And what are we going to talk about today?

KATIE LAIRD: Today, we're talking about paletas, a Mexican-style frozen treat. Usually, it has a base of fresh fruit juice. So we did a strawberry cream version. So ours involves heavy cream as well. But it could be just straight up fruit.

And then the trick is that you also want some chunks of fruit in the popsicle of sorts. So we make our paletas test by pureeing a base of strawberries and honey and lemon, a little bit of salt to bring out all those flavors.

And then we add in some more strawberry towards the end of the process, and just give it like a coarse chop. So the final product has this base that's full of fruit and flavor, and then also these pieces kind of suspended in there.

MOLLY BLOOM: Nantin, what is your favorite popsicle flavor? If you could dream any flavor up, any taste combination, what would it be? A waffle-sicle, a soda-sicle, a KitKat-sicle?

NANTIN: It would probably be like a Dr. Pepper popsicle because that's my favorite soda. Or I mean, I'm pretty sure, yeah, this combination was invented but like Sprite and gummy bears.

MOLLY BLOOM: Whoa. You are an innovator. I really like these ideas. Well, if you want more recipes like the paleta recipe, the *America's Test Kitchen Kids* newsletter brings recipes and hands on activities for kids straight to your inbox. Go to americastestkitchen.com/kids to sign up and learn more about their upcoming cookbook for young chefs.

NANTIN: This fall, ATK is launching *America's Test Kitchen Kids*. It will feature books and hands on activities, designed to excite the next generation of curious cooks and engaged eaters.

MOLLY BLOOM: OK. Time to shift your focus from your taste to another sense. It's time to go back to that mystery sound. Here it is again.

[MYSTERY SOUND]

All right. Any new guesses?

NANTIN: A toaster oven.

MOLLY BLOOM: Toaster oven. Yeah, that dinging did kind of feel like a toaster. Well, here is ATK editor, Molly Birnbaum with the answer.

MOLLY BIRNBAUM: I am Molly Birnbaum, and I am the Editor in Chief of *America's Test Kitchen Kids*. And that was the sound of ice cream being churned.

MOLLY BLOOM: Speaking of ice cream, that reminds me of a question we recently got from Caleb.

CALEB: I'm from North Carolina. I'm seven years old. And my question is why is ice cream make people thirsty?

MOLLY BLOOM: Excellent question, Caleb. I get super thirsty when I eat ice cream. Here's the other Molly again with the answer.

MOLLY BIRNBAUM: Most ice cream shops have a water cooler in them, so you can drink water as you eat ice cream. So it's common. People get really thirsty. And the reason is that sweet foods like ice cream behave in a similar way to salty foods.

So when you eat a big quantity, and who does not eat a lot of ice cream in a go, you start to digest the ice cream and the sugar is rapidly absorbed into your blood, making the concentration of sugar in the blood higher than the concentration of sugar in your body's other cells.

So nature does not like imbalance, so the body forces water out of the cells into the blood. Your body and your brain notices that the water is leaving your cells. And that is a cue for thirst. So therefore, you get really thirsty when you eat really sweet foods like ice cream in this way.

MOLLY BLOOM: Isn't that crazy? We all think about salt making us thirsty, but sugar does the same thing. That may be related to why you crave a glass of milk with cookies or cake. Good thing we have these nice glasses of ice water here.

NANTIN: Cheers.

MOLLY BLOOM: Refrigerators use a substance called refrigerant to help stay cold.

NANTIN: And chilling or freezing food helps they last longer because bacteria and other bad stuff can't grow on it. Plus, it shuts down the enzymes that cause foods to deteriorate.

MOLLY BLOOM: Before refrigerators, ice harvesters sold ice around the world. And it was a big business.

NANTIN: And there's still nothing better at keeping your food cool than ice.

MOLLY BLOOM: That's it for this episode of *Brains On*.

NANTIN: *Brains On* is produced by Marc Sanchez, Sanden Totten, and Molly Bloom.

MOLLY BLOOM: We had engineering help from Eric Stromstad, Veronica Rodriguez, and Sara Brigger. And we could not have made this science of cooking series without the help of our friends at *America's Test Kitchen*, Molly Birnbaum, Caitlin Keleher, Sasha Marks, Katie Laird, and Lisa McManus.

NANTIN: Again, you can check out the cool stuff they have in the works for kids by heading to americastestkitchen.com/kids.

MOLLY BLOOM: And if you're looking for that recipe for those amazing paletas, head to our website, brainson.org.

NANTIN: Now, before we go, it's time for our Moment of Um.

SPEAKER: Um. Um. Um. Um. Um. Um. Um. Um. Um.

HENRY: What makes mint taste cold?

[MUSIC PLAYING]

SARAH REISMAN: My name is Sarah Reisman. And I am a professor of chemistry at Caltech. So mints are candy. And that means that there's some sweetener. And then the flavor that makes something taste minty comes from a chemical that's added called menthol.

Before we can answer why menthol makes things feel cold, we have to think about how we feel cold. The reason is that in our bodies, we have these cells that are called neurons. And neurons are really what's responsible for sensing things like temperature or pressure or chemicals.

And so these neurons, basically, have a bundle of proteins. They're called the TRPM8 receptor. So it's a complicated name. And that's not really important. But these TRPM receptors, when there's a change in temperature, they change shape. And when they change shape, then they can allow ions to go across the cell membrane.

And this change in ion flow across the cell membrane tells us that there's been a change in temperature. And menthol can actually interact with these TRPM8 receptors. It's similar when you eat something that's spicy, when you eat a chili pepper. It has a molecule in the chili pepper called capsaicin. And this tricks our brain into sensing something hot.

And so lots of the foods that we eat have these molecules that not only are they flavor components, but they have these other functions as well.

SPEAKER: Um. Um. Um.

MOLLY BLOOM: Well, I'm feeling refreshed and ready. So here's the latest group of chill creative kids joining the Brain's honor roll. They send us drawings, mystery sounds, questions, and more. And we send them a virtual high five. Let's do it.

[LISTING HONOR ROLL]

We'll be back next week with more science from the kitchen. See you then.

NANTIN: Thanks for listening.