

Podcast transcript: Eating a Healthy Diet to Protect Against Pollution

[Intro music]

Ashley Ahearn (Narrator): You're listening to Environmental Health Chat – a show from the National Institute of Environmental Health Sciences that explores the connections between our health and our world.

I'm Ashley Ahearn.

We've been told to eat our fruits and veggies since we were kids. But how many of us actually follow dietary guidelines? Be honest...

Dawn Brewer: The majority of Americans don't follow them, and the majority of Americans don't eat enough fruits and vegetables.

AA: Dawn Brewer is an associate professor in the Department of Dietetics and Human Nutrition at the University of Kentucky. She's also the head of the Community Engagement Core for the University of Kentucky Superfund Research Program Center.

She's here to remind us to eat our fruits and veggies... but not just so we can grow up big and strong. Eating whole foods – fruits, vegetables, grains, and legumes – can actually provide other benefits.

DB: One of those things could be if you happen to live in an environment that is polluted, it can help protect you from those pollutants.

AA: OK, so how can the food we eat make our bodies more resistant to pollution? The answer is phytonutrients.

DB: Phytonutrients are derived from plants – things like fruits, vegetables, legumes, grains – all of them have these phytonutrients and there's just thousands of them. And they're still being discovered.

AA: Brewer is part of an interdisciplinary team, funded by the NIEHS, that is trying to better understand how phytonutrients can help our bodies withstand the effects of some of the harmful chemicals in our environment.

DB: They can decrease inflammation, they can decrease oxidation. So, inflammation and oxidation, when there's unhealthy levels of those in the body, then we start to see a lot of cell damage, and then we start to see organ damage, then we start to see diseases crop up.

AA: The Superfund Research Center at the University of Kentucky has focused on persistent organic pollutants, such as polychlorinated biphenyls – or PCBs – as a

chemical of concern in the region. PCBs were used in coolants, lubricants, paints, and adhesives, among other products.

They were banned in the late 1970s, but chemically they're very stable so they last for a long time in the environment.

DB: So our exposure to them still continues. It's still a national concern. It's a concern in Kentucky. They've been found specifically at Superfund sites located across Kentucky, in both rural and urban areas.

AA: Exposure to PCBs can cause inflammation and oxidation at the cellular level which can later lead to chronic diseases like cancer, diabetes, and cardiovascular disease.

In the lab, Brewer's colleagues exposed cells and mice to PCBs and then introduced certain phytonutrients.

DB: And then they measure the activity or the damage caused by these pollutants and that could be in cardiovascular tissues, could be in the serum, just looking at different levels of enzymes, markers of inflammation and oxidation and how they've changed. And then they'll have a treatment group that will receive phytonutrients, different ones, different doses.

AA: Her colleagues saw a reduction in inflammation and oxidation at the cellular level as a result of exposure to certain phytonutrients.

So, how do you get those findings from the lab into communities that struggle with exposure to pollutants AND poor nutrition?

Brewer had an idea.

Her research group has worked in Appalachian Kentucky – the eastern part of the state – for years.

DB: That tends to be the area of Kentucky that experiences the greatest health disparities and challenges with being able to consume a healthy diet, and also to be physically active.

AA: It's also an area that has Superfund sites with PCB contamination.

DB: So then, if you add environmental pollution to it that just compounds everything. So it's really important to work with our Appalachian community members to help them understand the benefits of fruits and vegetables, because they are a vulnerable population, because of these health disparities.

AA: And there was one more layer to the challenge: Brewer knew that getting the right nutrition was particularly important for senior citizens.

DB: Just because their bodies are changing, and they're just not able to detoxify environmental pollutants as safely as they could as a younger adult, so they're also considered a vulnerable population. I wanted to provide these seniors with some sort of fruit or vegetable in a sustainable manner.

AA: And thus was born: the BerryCare Program.

Brewer built a relationship with a Senior Center in Boyle County through repeated visits with her students to offer nutrition lessons. Then she introduced the idea of planting some kind of phytonutrient rich plant at the Center. The director was interested.

Now, Brewer had to decide what to plant. She got in touch with John Strang, a horticulture expert at the University of Kentucky.

DB: He recommended that I start with blackberries. He said it's the state fruit of Kentucky. It grows well all over the state, not just in central Kentucky. And it's also it is a fruit that people tend to like. People tend to really like berries, but berries also tend to be very expensive. And then the other great thing about blackberries is that it is packed with phytonutrients.

AA: In fact, blackberries contain some of the phytonutrients that Brewer's colleagues had found to have antioxidant and anti-inflammatory effects in the lab.

DB: So we went with three different varieties, they're called semi-erect, so they were tall, and so seniors wouldn't have to bend over. And they were also thornless because nobody likes to get their fingers pricked when they're picking blackberries.

AA: The berries were a hit! Some of the seniors said they wouldn't be able to afford them if they hadn't been provided by the senior center. Brewer also collaborated with others at the senior center to come up with creative recipes to use the berries.

DB: So rather than just blackberry cobbler, we had a berry salsa, we put it in an omelet, put it on pizza, put it in a grilled cheese sandwich in a salad, things like that. And it was all really good, very, very good recipes.

AA: When COVID-19 hit, the Center stopped serving community meals – as seniors stayed home to stay safe. But they still managed to get their blackberries. Brewer had her trainees pick the berries so they could be incorporated into the meals on wheels program, which delivered home-cooked meals to homebound seniors in the community.

DB: So they were still being used and benefiting the seniors. So I think it's just a really fun community program that brings different stakeholders together. That is why I really enjoy the work that I do is at that ground level just for the smiling faces. Because it really does make a difference for people in being able to feed their family, being able to

make some healthy dietary changes that they may not otherwise do because they can't afford it or because they may not be motivated to do it.

AA: Brewer says that eating whole fruits and vegetables may seem out of reach from a budgetary standpoint – but it doesn't have to be that way. With some meal planning and an open mind, she said we can all fill our diets with phytonutrient rich foods.

DB: All forms fresh, frozen, canned even dried fruits and vegetables, there's a place for them in your diet. And just do what works best for your schedule and your family and use a combination – I know I personally use fresh, frozen, and canned all the time, because it's really easy to use a frozen bag of broccoli rather than me having to cut it up. So it doesn't always have to be fresh. Any form is going to be great. It all contains phytonutrients, so eat any form.

AA: So, your parents *were* right. Eat your veggies. And the phytonutrients they contain could play an important role in helping your body to be more healthy and withstand the pollutants that surround us.

DB: We're all exposed to pollutants, from water, from soil, from the air we breathe. You don't have to live next to a Superfund site to be exposed to pollutants. So with that message, we're trying to encourage people to eat fruits and vegetables for another reason, aside from saying, 'you have diabetes, and you need to eat fruits and vegetables,' it's saying, 'hey, your environment that you may not have that much control over, has pollutants in it, you're exposed to pollutants, and how about eating more fruits and vegetables to help protect yourself from these pollutants?'

AA: I'm Ashley Ahearn. Thanks for listening to Environmental Health Chat.

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