



Science Magazine Podcast Transcript, 29 March 2013

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Promo

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Music

Interviewer – Kerry Klein

Finally today, I’m Kerry Klein, and I’m here with online news editor, David Grimm, who’s going to give us a rundown of some of the recent stories from our online daily news site. So Dave, in our first story, we’ve got more on the gut microbiota.

Interviewee – David Grimm

Right, and this is a really interesting story, probably one of the most interesting stories I’ve seen with the gut microbiome, as we call it. This is the, sort of, population of bacteria that live in our gut. A lot of people are familiar with something called gastric bypass surgery. This is where people, usually people that are quite obese, go in, and they basically have a piece of their stomach rerouted to, basically, the middle of their small intestine. And what this does is, is it really limits the amount of food people can eat. And the results can be very drastic. People can lose a lot of weight fairly quickly after this surgery. But one really interesting thing that happens after the surgery that researchers have noticed is that people with type 2 diabetes, the disease vanishes almost immediately after the surgery, which shouldn’t happen. It should take a while for the impact of the fewer calories and diet to really kick in. And also the feces of the people that have the surgery, the microbes in their feces tend to be dramatically altered from what it was before.

Interviewer – Kerry Klein

So this clues scientists in that there’s a little bit more going on here than just making the stomach smaller.

Interviewee – David Grimm

Right. It really suggests, or at least the hypothesis that the researchers started out with in this study was that maybe something about the surgery actually changes the population of the microbes in our gut, and maybe it’s the microbes themselves that are making a big contribution to our weight loss, not just the surgery.

Interviewer – Kerry Klein

Right. So how did they investigate that question?

Interviewee – David Grimm

Well, the researchers actually tested this in mice. They gave mice the equivalent of gastric bypass, which one of the experts in the study says was probably a Herculean task

to do this very, sort of, nuanced surgery on mice. But the researchers did it, and what they found was that as with humans, the balance of the microbes in the guts of mice that had got the surgery was a lot different than those of mice who didn't get the surgery. It was also a lot different than mice that had just dieted, which suggested that it wasn't just the reduction in calories that causes microbes to be different in the guts of people with this surgery.

Interviewer – Kerry Klein

So how did scientists then nail down cause and effect here with these bacterial populations?

Interviewee – David Grimm

What they did was they actually took bacteria out of mice that had gotten the gastric bypass surgery, and they put the bacteria into mice that hadn't gotten the surgery. And when they did this, the recipient mice lost about 5% of their body weight in two weeks, so it was a pretty dramatic weight reduction in a pretty quick amount of time. And this is really powerful evidence that the microbes themselves seem to be dramatically contributing to the weight loss both in the mice and probably in humans as well.

Interviewer – Kerry Klein

Okay. And in our next story, the dangers of too much alone time.

Interviewee – David Grimm

Kerry, this is another story about human health, but it's not about obesity. It's about how much time we spend alone and whether the social isolation of being alone or whether the loneliness itself is actually bad for our health. Both have been shown to be bad for our health, but nobody's really been able to tease out what is a bigger contributor to early mortality. Is it the fact that we're physically alone and separated from other people even though we might be happy being alone? Or is it the feeling of loneliness? Is that what makes some people die earlier than others?

Interviewer – Kerry Klein

Right. So which is it?

Interviewee – David Grimm

Well, that's what this study was trying to figure out. The researchers looked at about 6,000 British people age 50 and up, some of whom lived alone, some of whom were just very lonely, and they looked at these people over a 7-year period. And basically, they looked at how many people died. And they found that the people that were socially isolated, so the ones that were physically separated from others, from friends, from family, from acquaintances, had a 27% greater risk of dying. And this held even when the researchers controlled for things like sex, age, and other factors that are related to survival.

Interviewer – Kerry Klein

How did the scientists actually quantify loneliness versus social isolation?

Interviewee – David Grimm

Well, they gave the participants a survey asking questions, sort of, like, you know, how lonely do you feel – really trying to get at their emotional state. And what was interesting was that when the researchers looked at these survey results and they said, okay, now we know which people are physically alone, but what about the people that just feel very lonely. They are emotionally very alone. At first it seemed like the result was the same – 26% had a greater risk of dying. But when the researchers controlled for other factors, that percentage went away, and they found that loneliness really didn't seem to have any impact on whether somebody was going to die early or not. And that showed that it was the physical isolation itself that causes people to die earlier, not the, sort of, mental isolation or the mental loneliness.

Interviewer – Kerry Klein

But there have been other studies in the past that do link the emotion of loneliness to mortality and health. How can we reconcile those studies here?

Interviewee – David Grimm

Well, one of the authors of one of those studies actually chimes in on this story and says it could be a cultural issue. Perhaps the British subjects have what's known as the culture of a stiff upper lip. Maybe they were just answering their survey questions differently than Americans do, and maybe that's causing differences in what the British would consider lonely versus what Americans would consider lonely.

Interviewer – Kerry Klein

So if social isolation actually is a cause of a higher mortality here, why would that be?

Interviewee – David Grimm

Well, it could be as simple as people that are alone are just not getting the care that they need. Maybe they don't have somebody to be able to help them if something goes wrong. Maybe they don't have that spouse that's telling them to, you know, eat your fruits and vegetables and don't eat so much red meat. So the explanations could be fairly straightforward. What's really interesting about this study is really just, sort of, teasing apart what it is that seems to kill us earlier. Is it that social isolation or that mental isolation?

Interviewer – Kerry Klein

Right. Well, very interesting. And our third story may help explain Washington, D.C.'s mysterious exploding manholes.

Interviewee – David Grimm

That is right. Believe it or not, Washington, D.C. has an exploding manhole problem. There have actually been 38 “manhole incidents” per year in the U.S. nation's capital. And this new study may have solved the mystery.

Interviewer – Kerry Klein

Okay. Here's my guess – real-life teenage mutant ninja turtles.

Interviewee – David Grimm

That was my first guess, too, but it turns out it's something a little bit more banal. It seems to be, at least according to this new study, very high levels of methane seeping up from the city streets. What researchers did in this study was they actually drove every single street. They actually say they did this – maybe they had their grad students do it – every single street in the District of Columbia and sampled the air. And what they found were that there were thousands of places in Washington, D.C. with air concentrations of methane that were significantly above normal background concentrations of the gas – sometimes as high as 50 times higher than background.

Interviewer – Kerry Klein

Well, the city was allegedly built on a swamp. Is it just the natural background of the area?

Interviewee – David Grimm

And that was one suspicion they had. Things like landfills and swamps release natural methane, but the methane they were finding was a particular isotope that's found in the pipes of cities. You know, most of the natural gas we use to burn on our stove tops, for example, is methane and actually that has a different signature than the methane that comes from more natural sources. And that's the kind of methane that the researchers were picking up, so they really suspect that there's a lot of leaky pipes out there. A lot of the city's infrastructure is a lot older. You've got these rusty pipes, these cracked pipes, and a lot of the methane is coming from that. And what was really interesting was when the researchers looked at the amount of this methane in manholes, it was found at levels thousands of times higher than background. And they say that probably explains why D.C. manholes have a tendency to blow up.

Interviewer – Kerry Klein

Well, other than the potential dangers of these occasional explosions, is this actually dangerous?

Interviewee – David Grimm

The methane itself is not dangerous to human health, although it can promote the formation of ground level ozone which can irritate the lungs at high levels – makes it dangerous for people with respiratory problems. But it's not so much the gas itself; it's sort of what the gas can do when it explodes.

Interviewer – Kerry Klein

Alright. And what else have we had on the site this week?

Interviewee – David Grimm

Well, Kerry, for *ScienceNOW*, we've got a story about bees emitting electric fields and how they may use that for communication. Also a story about building robotic ants and why you'd want to do that. For *ScienceInsider*, we've got a story about HeLa cells.

These are cells that have been made famous recently. They belong to a woman that lived a few decades ago, and they've outlived her. They are a very popular model in scientific laboratories around the world. A group has just released most of the DNA from these cells, the sequence of the DNA, and that's sparking a lot of privacy concerns. Also, a story about the future of nuclear research in the United Kingdom. For *ScienceLive*, our weekly chat on the hottest topics in science, this week's *ScienceLive* is about conservation strategies – are they really working or are we failing at conservation? And next week's *ScienceLive* is about *Jurassic Park* on the 20th anniversary of the movie. How much of our conceptions of dinosaurs have changed since the movie came out? So be sure to check out all of our stories on the site.

Interviewer – Kerry Klein

Thanks, Dave.

Interviewee – David Grimm

Thanks, Kerry.

Interviewer – Kerry Klein

David Grimm is the online news editor of *Science*. You can check out all of our news at news.sciencemag.org including daily stories from *ScienceNOW*, science policy from *ScienceInsider*, and *ScienceLive*, a live chat on the hottest science topics every Thursday at 3 p.m. U.S. Eastern time.