



Science Magazine Podcast Transcript, 14 December 2012

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Promo

The following is an excerpt from the *Science* Podcast. To hear the whole show, visit www.sciencemag.org and click on “*Science* Podcast.”

Music

Interviewer – Sarah Crespi

Finally today, David Grimm, online news editor for *Science* is here to give us a rundown of some of the recent stories from our daily news site. So David, first up we have a new mechanism for a longstanding treatment. It’s one of those things where we know it works, but we don’t know how.

Interviewee – David Grimm

That longstanding treatment is maggots. Maggots have actually been used for centuries. Napoleon actually used them in his army to clean wounds. And the reason maggots have been so popular for so long is because they tend to eat rotting flesh and leave healthy tissue alone; meaning that if you want to clean out a wound, especially in the age before antibiotics, maggots were a great way to do that. And in fact, they have become popular again recently, because there’s so much antibiotic resistance out there. In fact, in 2004, the U.S. Food and Drug Administration actually approved maggot therapy as a prescription treatment.

Interviewer – Sarah Crespi

So we know it works, but we don’t know how it works.

Interviewee – David Grimm

We don’t know how it works, right. So that’s what this new study is about. And what the researchers did was actually took maggot secretions from disinfected maggots, and they prepared these in the lab and they added them to donated blood samples from four healthy adults. And the researchers measured the level of so-called complement proteins – and these are proteins that are involved in the body’s inflammatory response which would happen when you got injured, causes swelling. And what the researchers found was that every blood sample that was treated with the maggot secretions showed lower levels of complement proteins.

Interviewer – Sarah Crespi

So the maggot juice was suppressing the immune molecules in the blood?

Interviewee – David Grimm

Exactly and it was suppressing them by up to 99.9% in some cases, so it was a very powerful response. What was even more surprising was that these maggot secretions were really long lasting; even if the scientists treated the blood samples a day, a week, or

a month afterwards, they saw the same effect. They also even boiled some of these maggot secretions, and they still didn't lose any of their potency. So these are really effective secretions at suppressing the immune system.

Interviewer – Sarah Crespi

It sounds like it's a good candidate for a pill too, instead of a maggot format.

Interviewee – David Grimm

Right, and well, that's the idea that the researchers hope that maybe the research could lead to a clinical drug that would feature maggot secretions, although that's probably several years away. Although if you don't want to wait for the pill, you can get those maggots right now, because they are FDA approved and you can get them via prescription.

Interviewer – Sarah Crespi

Wow, alright. Next up, we have a story about why homosexuality may still be around despite the fact that it might have some evolutionary disadvantages.

Interviewee – David Grimm

Right, well that's one of the big mysteries about homosexuality, because most homosexual people don't procreate. The question is why and how has homosexuality, sort of, persisted in our population. We usually think, at least from a Darwinian sense, that the genes that we pass on, the traits that we pass on are adaptive. They help us become fitter; they help us produce more offspring. And homosexuality would seem to go against that, because, again, people that are homosexual tend not to have children. These researchers think they have come up with one viable explanation.

Interviewer – Sarah Crespi

Right, and this isn't something that they've just seen in people, right? This exists in other organisms.

Interviewee – David Grimm

Right, this isn't a mystery just for humans. Homosexuality has been seen in swans, in sheep, and actually a variety of other animals. One thing researchers do know in humans is that homosexuality tends to run in families. If one of a set of identical twins is gay, there's a 20% chance that the other twin will be gay as well.

Interviewer – Sarah Crespi

So what did the researchers look at? Did they look at the genes of the people?

Interviewee – David Grimm

Well, that's something that had been done in the past. You know, researchers have been looking for, you know, what they call a "gay gene" or "gay genes" that would help, sort of, explain the mystery. Because if there were gay genes, that could explain how it was passed down from generation to generation, and why it seemed to run more in families. But in this study, the researchers didn't look at the genes themselves. They looked at

modifications to the genes, something known as epigenetic changes, and these are chemical modifications that actually can turn certain genes on or off or modify how much of the gene is expressed in the cell, how much of the protein from that gene is made. And the researchers focused on a time when a lot of epigenetic changes are being made, namely during development in the womb, and they also looked at the interplay between hormones. Fetuses are exposed to a lot of hormones in the womb, and how that might interplay with epigenetic changes. So, in the womb, both male and female fetuses are exposed to testosterone, but female fetuses have a way of, sort of, blunting the effects of testosterone which otherwise would turn them male. It leads to the development of testes and ostensibly, the development of male sexuality. What the researchers proposed is that there is epigenetic changes in the female and the male fetuses that sometimes make the female fetus much more sensitive to testosterone, for example, which would make this fetus have a much more male-type sexuality when this child was born. And that could explain what's happening in the womb. It could also explain why homosexuality could be passed down from generation to generation, because epigenetic changes can actually stick around on the DNA. They help, sort of, bind together the long strands of DNA, and that actually could mean that so-called epi-marks could be passed from parents to offspring. It could be a way, even if there isn't a gay gene or gay genes, there may be these gay epi-marks that are passed down through the generations.

Interviewer – Sarah Crespi

And so do they know anything about how these marks might actually affect sexuality?

Interviewee – David Grimm

And Sarah, that's really the question here is exactly how this is working. Right now, researchers are sort of still at the hypothesis stage. They are sort of trying to come up with an explanation for why homosexuality has been evolutionarily conserved. They think they got it, but now they've actually got to show that that's what's happening and that's going to be the next step.

Interviewer – Sarah Crespi

Alright. Next up, we have a story about elephants on the rampage.

Interviewee – David Grimm

Sarah, this story is about elephants, particularly Asian elephants, in Sri Lanka. Sri Lanka only has about 6,000 elephants left, and elephants, especially Asian elephants, are a very endangered species. They are extinct in 78% of their historic range. And what's making matters worse is that even when researchers try to protect elephants by keeping them in national parks, the elephants often escape where they hurt themselves, and they actually also hurt other people. Each year, more than 70 people and 200 elephants die as the result of human/elephant conflict. So it's not just that the elephants are disappearing, but there's just a really big problem with elephants living in such close proximity to humans and vice versa.

Interviewer – Sarah Crespi

So, it's really hard for a population to share a space with elephants. What kinds of things have researchers done to tackle that?

Interviewee – David Grimm

You know, what they used to do – it wasn't researchers necessarily – but when elephants used to escape, they used to get shot. And more recently, conservationists have argued that - don't shoot the elephants, just put them back where they came from, and that will solve the problem. And this new study set out to figure out does it actually solve the problem, and what they actually found is it actually can make the problem worse.

Interviewer – Sarah Crespi

So we know - not all elephants like to stay put. What did the researchers do to track things more closely?

Interviewee – David Grimm

Well, what a team of researchers did was they took 12 elephants; these were all elephants that were captured outside of their protective area. They darted the elephants with tranquilizers and fitted them with GPS collars so they could track their movements. And they tracked the movements of these 12 elephants over a period of up to three years, and what they found is only three of these elephants that had been returned to their protective areas actually stayed. The rest of them escaped again. Some of them tried to get back to where they were originally. Some of them tried to get back to where they had been found. Others just sort of really wandered far afield. For example, there was one elephant named Brigadier who left the very next day after he had been relocated, travelled almost 96 kilometers before reaching the sea. He then continued his journey swimming another five kilometers but was reported by the Navy and returned to shore. He settled in another region, continued to cause problems, and eventually fell into a well and died. And there was another elephant named Homey who set off for home three times after being relocated, and died 15 months after his first move from multiple gunshot wounds. And these were pretty typical situations. The elephants that were being relocated really did not want to stay put, really did not want to be in their protected area, wanted to go somewhere else. And the problem is, when they went somewhere else they often entered major towns, caused a lot of destruction, and actually killed five people. And five of the elephants were themselves killed over the course of the study. So if anything, relocating the elephants actually made the problem worse.

Interviewer – Sarah Crespi

So, what conclusions can researchers and policy makers draw from this study?

Interviewee – David Grimm

Well, what the study shows is that relocation of elephants doesn't really work. Unfortunately, what that means is that conservationists have to come up with another strategy that's going to be both beneficial to humans and beneficial to elephants as well. And I'm sure that's something they are working on now.

Interviewer – Sarah Crespi

Okay, well, what else is on the site this week, David?

Interviewee – David Grimm

Well, Sarah, for *ScienceNOW*, we've got a story about how a blood pressure drug may help treat autism. Also, a story about the Hubble Space Telescope revealing new findings about the early universe. For *ScienceInsider*, our policy blog, we've got a story about a UK plan to sequence the entire genomes of 100,000 people. Also, a story about one scientist's failed crusade to boost the amount of money the NIH has available to fund scientists. And finally, for *ScienceLive*, our weekly chat on the hottest topics in science, we've got our last *ScienceLive* of the year this week. It's about efforts to develop a male contraceptive – a male version of the pill. And *ScienceLive* will be taking a bit of a hiatus after that and returning on January 10th. Be sure to check out all these stories on the site.

Interviewer – Sarah Crespi

Thanks, Dave.

Interviewee – David Grimm

Thanks, Sarah.

Interviewer – Sarah Crespi

David Grimm is the editor for *Science's* online daily news site. You can check out the latest news and the policy blog, *ScienceInsider*, at news.sciencemag.org. Or you can also join a live chat, *ScienceLive*, on the hottest science topics.