



Science Magazine Podcast Transcript, 3 August 2012

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

Interviewer – Edward Hurme

Finally today, I’m here with online news editor, David Grimm, who’s here to give us a rundown of some of the recent stories from our daily news site, news.sciencemag.org. In the deep sea, it seems to be better to lose an arm than lose your life – that is, if you have several arms to spare.

Interviewee – David Grimm

That’s right. If you have several arms to spare, you might be a deep-sea squid, particularly if you’re a species known as *Octopoteuthis deletron* – if I’ve said that correctly. And this is a very unusual species of squid because researchers have found – as you alluded to, Edward – that it’s actually able to detach its arms when it gets into a scuffle. Now it doesn’t actually detach its entire arms, it seems to detach the tip of its arms. But this has never been seen before in a squid, and it’s actually very rare in any animal. One might think of the lizard, for example; like sometimes you pick up a lizard by its tail and the tail comes off. Something kind of similar is happening here.

Interviewer – Edward Hurme

So studying anything in the deep sea can be challenging. Is there much known about this species already?

Interviewee – David Grimm

There wasn’t a whole lot known about them, but a deep-sea biologist was studying these creatures. She was noticing that a lot of the individuals had arms of different lengths, which suggested that they were losing pieces of their arms during an attack, but she didn’t have, and her colleagues really didn’t have any evidence of this. So what they did was they used a deep-sea submersible, and they took it off the coast of California. And at first they tried just poking the squid with the arms of the submersible, and that didn’t really have much of an effect. Sometimes the creatures, they attacked the vehicle but they never really held on, and maybe it was because the vehicle was too smooth. So then the researchers tried to see if they could get something that the animal would actually sort of attack and hold on to, and they ended up using a bottle brush, which they were able to hold on the outside of the submersible. This is something they usually use to wash their laboratory glassware. And this time when the squid encountered the bottle brush, it attacked it and it left pieces of its arms behind. You can actually see a video of this on the site. These arms sort of keep on moving, and they have bioluminescent light which

they actually emit. The arms, when they detach, they actually sort of look like these little organisms squirming around.

Interviewer – Edward Hurme

So were they able to collect any of these arms, or samples of the squid?

Interviewee – David Grimm

Yeah, they did. Actually they took them back to the lab and they looked at them under the microscope. And she found that the muscle in these tips of the arms could tear at many places, which sort of suggests that the squid has sort of evolved this capability to sort of lose their arms – or the tips of their arms – in battle. The question that sort of remains is why are they doing this? And one option might be it just sort of allows them to get a quick getaway, or if these squiggling little appendages might be a distraction that allows them to, you know, maybe escape from predators. It's not always a good idea to detach your arms, especially with these squids. They actually use these arms to lure prey and to lure mates. So the idea would be if you're really getting rid of these things, you must be in dire straits, because you're really going to put yourself at a disadvantage. You're going to have a harder time mating. You're going to have a harder time finding food. But, as the researchers say, it's better to be alive and armless than dead.

Interviewer – Edward Hurme

So from fish losing appendages to fish growing more than they should, this next article kind of begs the question should fish wear sunblock?

Interviewee – David Grimm

Right. You know, when we talk about skin cancer, we often think about human beings, of course, but this new study suggests that fish can actually get skin cancer, as well, which really hadn't been documented before. This observation came about by a group of marine biologists who were studying sharks in the Australia's Great Barrier Reef. And what they noticed was that some of the fish there, specifically coral, bar-cheeked, and blue spotted trout, they had like these weird black spots on their body. And at first the researchers said, well maybe that's a fungus, or, you know, who knows what that is. And what they did was they took some of these fish back to the lab, and they analyzed these spots under the microscope. And what they noticed is that the cells in the spots didn't seem very normal. They were really tightly clustered, unlike normal cells, therefore producing pigment in areas where they shouldn't be producing pigment. And these cells were very similar to skin cancer cells that have been found on fish in the laboratory. Now researchers have actually created skin cancer in fish in the laboratory. They can breed a couple species of fish together, and actually the offspring are very susceptible to UV light and likely to develop skin cancer. And they saw that these fish that had been induced to have skin cancer, the cells looked very similar to these fish that have these black spots in the wild. So this was really the first evidence that it's not just in the laboratory, but fish can actually get skin cancer out in the open ocean.

Interviewer – Edward Hurme

So do the researchers have any ideas what might be causing this skin cancer?

Interviewee – David Grimm

Well, what's interesting about the Great Barrier Reef is it lies directly below the largest hole in the ozone layer, which means it receives a lot more UV radiation than other places on earth. And UV radiation is a big cause of cancer, especially skin cancer. It's also possible that different populations are breeding with each other in a way that's creating offspring that are more susceptible to UV light, just as has been observed in the laboratory. But the researchers don't know for certain why these fish seem to be more susceptible to skin cancer.

Interviewer – Edward Hurme

So is this something we should be concerned about? Should we be wary of eating fish that might have cancer on them?

Interviewee – David Grimm

Well, that's a good question. The researchers don't know whether these fish would be harmful to humans. One thing about the fish in these regions is these are not fish that are typically harvest for human consumption. These types of fish are actually grown commercially, so we don't really go out into the open ocean to get these particular types of fish. But what the study does suggest is if we're seeing skin cancer in these fish, maybe it's also happening in fish elsewhere on the globe. And scientists are really going to have to take a hard look at that to see if it is impacting fish that humans do eat.

Interviewer – Edward Hurme

And finally, from cancer – an often lethal disease – to a certainly lethal disease, rabies. Or at least that's what researchers thought until now.

Interviewee – David Grimm

Right. Well, the really scary thing about rabies is it's long been thought to be 100% fatal. So if you get it and it's not treated, chances are 100%, chances are you're going to die, at least that was the thinking. Although in the last decade or so, there have been a few cases where individuals seem to have gotten rabies, not gotten treatment – and the treatment is usually getting a vaccine as soon as possible – or not getting the vaccine as soon as they should have gotten it, and still surviving, suggesting that rabies isn't always 100% fatal. But the cases that have happened have sort of been isolated incidents, and researchers really haven't been clear whether they actually do prove that rabies is not 100% fatal. So what the researchers did in this new study is they went to a region in the Amazon in western Peru, and this is a region where a lot of the natives that live there actually have a lot of encounters with rabies. They live with a species of bat that can transmit rabies. This is a vampire bat. And so the people are actually getting bitten by the bats, the bats have rabies, and that's being transmitted to a number of people in these villages. What the researchers did was they interviewed a bunch of people in these villages and they took blood samples from 63 of them and took this blood back to the lab. And what they found was that 7 of the 63 blood samples tested positive for rabies. And these individuals were still alive. And only one of these individuals had been vaccinated, which means

that 6 of these 63 people had not been vaccinated for rabies, had not been treated for rabies, but had rabies and were still walking around basically.

Interviewer – Edward Hurme

So what does this tell us about the disease?

Interviewee – David Grimm

Well, what was interesting about the people that had rabies and were still alive was that they tended to be older. And what the researchers think that indicates is that it's possible that these people are actually getting maybe light exposure to rabies throughout their lifetimes. Maybe they're getting bitten but they're not getting like a full dose of rabies, and they're actually developing some sort of immunity to it – kind of as if they had had a vaccine – and that might be keeping them alive. But really the big take-home message here is that rabies is not 100% fatal. You clearly have a bunch of people in this village that have the disease and are still alive.

Interviewer – Edward Hurme

Yeah, so it seems like rabies is different when you have it in different hosts.

Interviewee – David Grimm

Well, that's true. And one of the criticisms an expert had of this study was that bat rabies may not be as strong as dog rabies. And dog rabies is a huge problem in Africa and Asia. It kills about 55,000 people every year. And it's possible that maybe that type of rabies transmitted by dogs is 100% fatal, and maybe bats carry a weaker strain of it. But regardless, the researchers say, none of this means that rabies should be taken lightly. You know, if you encounter rabies, if you get rabies, you should get that vaccination right away. Don't think you're going to be one of these lucky people that survives the disease.

Interviewer – Edward Hurme

Yes, this is a very dangerous disease. And what else have we had on the site this week?

Interviewee – David Grimm

Well, Edward, we've got a story about some very strange ice formations in Japan and what might be causing them. Also, a story about something called cancer stem cells. This is a subpopulation of cells which may help cancers avoid radiation and chemotherapy. For *ScienceInsider*, our policy blog, we've got a story about what's going to happen to the Olympic drug testing lab once the Olympics are over. Also, a story about a Russian billionaire who is giving away some very flush prizes to physicists – 2.5 times as much money as the Nobel Prize. So you can read all about that on *ScienceInsider*. And finally, for *ScienceLive*, this week's *ScienceLive* is about Mars' Curiosity rover which is about to touch down on the red planet undergoing seven minutes of terror before it does so. And we'll be chatting with experts about what the future holds for both the rover and research on Mars. And this will be our last *ScienceLive* for a few weeks. We're taking a hiatus for the rest of August, but we'll return on September 6th with a chat on the neuroscience of brain injuries, especially in soldiers and athletes. So be sure to check out all of these stories on the site.

Interviewer – Edward Hurme

David Grimm, thanks for talking with me.

Interviewee – David Grimm

Thanks, Edward.

Interviewer – Edward Hurme

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