



## Science Magazine Podcast

Transcript, 19 October 2012

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### **Promo**

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### **Music**

#### **Interviewer – Kerry Klein**

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. So Dave, let’s start with the bad news. In our first story, we’re talking about dangerous complications to a clinical drug.

#### **Interviewee – David Grimm**

Right, Kerry. This has to do with what’s called an antishock drug known as hydroxyethyl starch, or HES. And HES is a synthetic derivative of regular starch. It’s a large molecule that binds liquid. It’s commonly given to patients who have lost a lot of blood. It’s not really a blood substitute, but it keeps up the blood volume. And the idea was that it would prevent the circulatory system from collapsing, because you would have enough volume in, you know, your veins and arteries to keep circulation going.

#### **Interviewer – Kerry Klein**

And this is not the first time that we’ve heard about this drug. There have been other clinical trials and other studies going back to the early 2000s. So tell me a little bit about the history of clinical trials of this drug.

#### **Interviewee – David Grimm**

Well, ever since 2001, there’s been some concern that HES might be doing actually more harm than good. There was a 2001 study in *The Lancet* that suggests it could potentially be harmful to patients. And in June of this year, there was a clinical trial conducted in Denmark that was published in the *New England Journal of Medicine* which actually found that septic patients – these are patients with really severe infections – when they were treated with HES, they were significantly more likely to die within 90 days of getting the treatment. And also a lot of them needed kidney replacement therapy than those that were treated with an alternative, which is called Ringer’s acetate.

#### **Interviewer – Kerry Klein**

Wow! These are some serious complications, and this can’t be good news. How has the medical community responded to this series of studies?

#### **Interviewee – David Grimm**

Well, what happened was after this study was published in June, a company that makes one of the HES compounds that's called Voluven complained that the study that came out in June didn't include its HES compound, and therefore its HES compound was unfairly lumped in with all these other HES compounds that were thought to do harm. So actually this new study, which was just published this week also in the *New England Journal of Medicine*, involved data from more than 6,000 patients. And this time, they did use Voluven. And what they found was that of the patients treated with the HES, 18% died versus 17% of those treated with the saline solution. So there was really no difference between the drug and the control. And what's more, kidney replacement therapy was more often needed, and there were higher rates of bleeding and itching in the HES group than in the control group. So this trial really kind of puts the nail in the coffin, that it seems like most, if not all, of these HES compounds are really problematic, and really sort of suggest that doctors might want to think twice before they use this, or at least realize that these compounds have a lot more dangers than were previously thought.

**Interviewer – Kerry Klein**

And onto a more positive study, we've got more on the possible advantages of reading.

**Interviewee – David Grimm**

Right. And this is specifically reading that's done with children early in life – and not just reading, but any sort of educational stimulation. You know, it makes intuitive sense that the more we try to teach our children when they're young, and the more time we spend with them, and the more time we spend reading with them or sort of engaging them in, you know, intellectual activities, the hope is that they're going to be smarter growing up. And there's a lot of evidence for this. What this new study really adds is that these activities can actually change the very structure of the brain.

**Interviewer – Kerry Klein**

Right. So as you said, Dave, there have already been a lot of studies relating reading and education to, you know, the development of our early brain. What did they do in this study to show something new here?

**Interviewee – David Grimm**

Well, what they did was they looked at 64 children from a low-income background. And the researchers visited the children a couple times at home when they were both 4 and 8 years of age. And they were looking for things like, you know, the number of books the kids were reading, the number of educational toys in their houses, even how much warmth and support they were getting from their parents. And then 10 years after that visit at 8 years old, the researchers used an MRI machine to really look at detailed images of the children's brains. Well, they weren't so much children anymore, they were sort of young adults at this point. And what they found was that the level of mental stimulation the children received had a strong correlation with the thickness of two regions of the cortex – and this is sort of the main region of the brain. Actually what was interesting, they found that more stimulation was associated with a thinner cortex.

**Interviewer – Kerry Klein**

And we want a thinner cortex?

**Interviewee – David Grimm**

Surprisingly, we actually do. It turns out that when the brain develops, it produces more synapses – these are the neural connections between cells – than are needed. And typically what happens is these underused connections are later eliminated. And this elimination process, which is actually called synaptic pruning, is actually really important. It actually makes our brain more efficient. You can sort of think of it as a highway, and maybe if you've only got one straight shot to where you need to go, you're going to get there a lot faster versus if the highway gives you five different ways to get to the same place, it can get confusing; things can sort of slow down. And sort of the same thing happens in our brain. So we actually really do want a thinner cortex, and actually what we really want is a more efficient cortex. And what this study is really showing is that these early educational experiences really do help make the brain a lot more efficient.

**Interviewer – Kerry Klein**

Well, it sounds like when the researchers were observing these kids when they were very young, that there were a lot of variables – not just books but also toys in their home environment. I mean, is this a fail-safe link between cortex development and books specifically?

**Interviewee – David Grimm**

That's a good question. The researchers actually looked at other factors, like the intelligence of the mother and the degree and the quality of her care. And they found that these things didn't have an effect on the thickness of the cortex. It was really this educational stimulation – these books and the educational toys – that really seemed to have the most impact.

**Interviewer – Kerry Klein**

Very exciting. Alright, and from early infancy to early humans, this last story is one that we can really sink our teeth into.

**Interviewee – David Grimm**

That's right. Kerry, this story concerns some fossilized ribs that were found in a very ancient site known as the BK site in Tanzania's Olduvai Gorge, which is a very famous fossil bed. And a lot of the fossils here are more than a million years old, and a lot of them belong to our human ancestors. So this is a really sort of important place in the world to sort of figure out what our ancient ancestors – how they were living and what they looked like. And researchers sort of scouring this site, they found these ribs from prehistoric antelopes. And what was really interesting about the ribs is they bore marks from stone tools. And this suggests that early humans had dined on them. Now that's not really that surprising. Obviously we had to eat back then, and we were developing tools, so we would have been using our tools to get meat off bones. What was interesting about this particular find is that the researchers found that some of the fossil ribs, they had been peeled back.

**Interviewer – Kerry Klein**

Peeled back. So what's the significance of that?

**Interviewee – David Grimm**

Well, if you can sort of think of yourself eating ribs. When we eat ribs, it's a bit of a violent activity. We're sort of snapping the ribs, and we're really sort of gnawing at them to get, you know, as much of the meat as possible. And early humans would have even been more violent. They would have been really just peeling the ribs back as much as possible to get at the marrow to get, you know, sort of the best parts of the rib. And why that's interesting is in order to do that, you can imagine an animal being killed. The ribs are really sort of the most delicious parts, and so any animal that kills another animal is probably going to go after the ribs first. And so there's been some competing hypotheses about how our early ancestors got food. You know, were they hunters? Did they actually go out and kill these animals themselves? Or were they mainly scavengers? Did they wait for another animal to kill the prey that they were after, and then came in afterwards and sort of dined on the leftovers? Well, if they're really getting to these ribs, you have to sort of assume – or at least these researchers say you really have to assume – that our ancestors were actually getting to these animals first. And if they got to them first, what that really indicates is that we were hunting these animals and not just scavenging them.

**Interviewer – Kerry Klein**

Is it possible that there could be, you know, alternative explanations for this? Maybe did other animals didn't value the ribs so much, or that there was some other order of events that could have happened?

**Interviewee – David Grimm**

Well, one possibility is that there was what's called aggressive scavenging going on. And this would still imply that our ancestors weren't hunting and killing these animals, that we were actually waiting for something else to hunt and kill them. But when that something else did hunt and kill them, we would scare that whatever that something else was away. And what's interesting about that is that's sort of seen as a, almost like a precursor of hunting. We weren't actually killing the animals themselves, but we were getting sort of bold and aggressive enough that we could sort of scare away another animal and sort of get to this food first. And that could be what happened here.

**Interviewer – Kerry Klein**

How interesting. And what else have we had on the site this week, Dave?

**Interviewee – David Grimm**

Well, Kerry, for *ScienceNOW*, we've got a story about monitoring volcanic activity on Jupiter's moon IO from millions of miles away. Also, a story about why we return, or don't return, the smiles of other people. And it has a lot to do with how we rank in the social hierarchy. For *ScienceInsider*, our policy blog, we've got a story about the strange case of a Japanese stem cell researcher who's been enveloped in a big scandal over the last week or so that seems to involve some fabrication, some faked associations with powerful universities, and a bunch of other intriguing things. So check that out. We

have also a story about a brand new weather and climate center in the United States. For *ScienceLive*, this week's *ScienceLive* is about the Nobel Prize – whether or not it's actually good for science. And next week's *ScienceLive* is about Neandertals – whether they actually were a lot smarter than we've been giving them credit for. And finally, this week on the site, we announce the winner of the Dance Your Ph.D. contest. This is our yearly contest where scientists try to interpret their Ph.D. theses in dance form. So be sure to check out all these stories on the site.

**Interviewer – Kerry Klein**

Yeah, I saw this one. It was a new spin on a burlesque, that's for sure.

**Interviewee – David Grimm**

Yes, exactly.

**Interviewer – Kerry Klein**

Alright, well 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](http://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.