Nature Podcast

Introduction

This is a transcript of the 7th June 2018 edition of the weekly *Nature Podcast*. Audio files for the current show and archive episodes can be accessed from the *Nature Podcast* index page (http://www.nature.com/nature/podcast), which also contains details on how to subscribe to the *Nature Podcast* for FREE, and has troubleshooting top-tips. Send us your feedback to podcast@nature.com.

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Interviewer: Adam Levy
Hello and welcome back to the *Nature Podcast*. This week, we're finding out how enzymes adapt to the cold and watching mice form memories.

Interviewer: Shamini Bundell
Plus, the mystery of how animals sense Earth's magnetic field. This is the *Nature Podcast* for the 7th June 2018. I'm Shamini Bundell.

Interviewer: Adam Levy
And I'm Adam Levy.

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Interviewer: Adam Levy
Crucial to every last cell on Earth are enzymes. These molecular machines are catalysts overseeing the chemical reactions in the cell. Enzymes transform molecules known as substrates into other molecules – products. But these chemical converters pose a perplexing puzzle.

Interviewer: Ashok Deniz
The problem is it's well known that chemical reactions actually slow down generally with lower temperatures.

Interviewer: Adam Levy
This is Ashok Deniz, a biophysicist at the Scripps Research Institute. So, because chemical reactions slow down at lower temperatures, if you cool a particular enzyme it works more sluggishly. But, if you look at the enzymes of organisms that are adapted to living in cold conditions, this isn't what you see.

Interviewer: Ashok Deniz
In fact, in low temperature organisms enzymes actually work at similar rates, let's say, as enzymes in room temperature. How do these enzymes do that at lower temperatures? So that's the conundrum.

Interviewer: Adam Levy

Somehow, enzymes in these organisms have adapted so that they work just as fast in the cold as normal enzymes do at physiological temperatures, around 37 °C. The obvious place to look for such tweaks to the molecule is the active site, where the substrate molecules bind and react.

Interviewer: Ashok Deniz
So, you might expect you know, just naively that changes in the enzyme that compensate for lower temperatures, they would occur right at the active site. But actually, people have found cases where the compensations actually occur pretty distant from the active site.

Interviewer: Adam Levy
But how are these distant changes compensating for the slowing effects of the cold? One clue is that these cold-adapted enzymes often have more glycines in their amino acid chains.

Interviewer: Vince Hilser
And glycine makes fluctuations much more probable, because glycine you know, glycine has a lot of ways to arrange itself.

Interviewer: Adam Levy
This is Vince Hilser, who’s been puzzling over this chilling conundrum in a paper out this week. Glycines make it easier for sections of an enzyme to unfold and wiggle around. Vince thought this might be crucial for how some enzymes are boosting their reaction rate at lower temperatures. So, he put it to the test. His team took a normal enzyme – adenylate kinase – and tried to adapt it for the cold.

Interviewer: Vince Hilser
We thought that if we put these glycines in particular parts of the molecule, at particular sites that are not near the active site, we could increase the amount of time the enzyme opens up and wiggles in these particular regions. And if we did that, then we thought that it would be possible then to mimic the actual cold adaptation.

Interviewer: Adam Levy
Now, this approach doesn’t easily fit in with the conventional view of enzymes as rigid machines, and for adenylate kinase that view involves parts of the molecule doing their jobs in a structured, mechanical way.

Interviewer: Vince Hilser
You know, the current model for how this enzyme works is that these portions of the molecule just open and close over the active site like a door, they’re actually called lids for that reason. It’s like you know, a car with the car door open, and the car door closed.

Interviewer: Adam Levy
In this picture of the enzyme’s operation, any times that parts of the molecule spend unfolded and wiggling about shouldn’t be relevant to its operation – this rigid, structured opening and closing of the car door. So, adding in glycines away from the active site to boost these wiggles shouldn’t have an impact on the enzyme’s function.

Interviewer: Vince Hilser
What that's tantamount to doing is like taking your car and removing the side-view mirror. So, if opening and closing your car door is why the enzyme works, then taking the mirror off is not affecting anything.

Interviewer: Adam Levy
But when Vince and his team took the mirror off – that is to say added glycines to different regions of the enzyme – they did affect things. They tried adding glycines to two separate sections of the molecule, neither of which were at the active site.

Interviewer: Vince Hilser
And so by making these individual mutations, we could either cold adapt the release of the product or we could cold adapt the pick-up of the substrate. In both of those cases, adding the glycines made it better for the cold.

Interviewer: Adam Levy
By adapting this molecule, Vince has demonstrated that wiggling can provide one way for enzymes to overcome the slowing effects of the cold. The study may only investigate a single enzyme but Ashok, who wasn't involved in this study, thinks there's plenty of potential for future work to extend and develop this cool research.

Interviewer: Ashok Deniz
I think there's a good chance that many other enzymes would show similar effects. So, I think the results of this work kind of open the door in a sense to studies on other enzymes and probing similar characteristics and perhaps even design of enzymes which would work at lower temperatures so, for example, in you know biotech applications etc.

Interviewer: Adam Levy
That was Ashok Deniz of the Scripps Research Institute, and before him you heard from Vince Hilser who's based at Johns Hopkins University, both in the US. Vince's paper is at nature.com/nature, where you'll also find Ashok's News and Views discussion of the research.

Interviewer: Shamini Bundell
Now, here at the *Nature Podcast* we love all science, and astronomy is absolutely no exception. We particularly like stars.

Interviewer: Adam Levy
Oh yeah? What's your favourite number of stars Shamini?

Interviewer: Shamini Bundell
Oh, good question Adam. How about maybe five… stars?

Interviewer: Adam Levy
Well if only there was a way that our listeners could give their favourite number of stars to us.

Interviewer: Shamini Bundell
Like on their favourite podcasting app or something!

Interviewer: Adam Levy
Oh, now there's an idea.

Interviewer: Shamini Bundell
Do you think that was too subtle?

Interviewer: Adam Levy
No, I think we pitched it just right. Now, do we actually have some astronomy coming up next?

Interviewer: Shamini Bundell
Ah… no. But we do have Noah Baker. He's been delving into the mouse brain to better understand memory.

Interviewer: Noah Baker
How do we remember? It's a question which has been challenging neuroscientists for decades. Now, there are lots of theories and although some of the mechanisms remain a mystery, there are some basic concepts which most scientists can agree on. For example, one of the areas of the brain crucial for memory formation is the hippocampus, this appears to be the first port of call for new memories. Here's Thomas Hainmuller from the University of Freiburg in Germany.

Interviewee: Thomas Hainmuller
So, it seems to be that indeed when you store, or try to store a new memory, initially it is represented by the hippocampus, but then it will be transferred to some other part of the brain later on.

Interviewer: Noah Baker
The hippocampus, for the most part, seems to act as a temporary or intermediate memory storage, before those memories are shipped off to other areas of the brain.

Interviewee: Thomas Hainmuller
So, in mice there is conclusive evidence that already after around 10-15 days, these memories are consolidated into other brain areas like cortical areas.

Interviewer: Noah Baker
Thomas is interested in a particular part of the mouse hippocampus.

Interviewee: Thomas Hainmuller
So, the hippocampus is actually, it's composed of several subareas and it starts with the dentate gyrus. It has a very unique cell type, the granule cell which is a neuron that first of all, it's generated throughout adulthood so there are continuously new granule cells integrated into that brain circuit, which is rarely the case in other parts of the brain. And, also these cells are very unique because they fire very little.

Interviewer: Noah Baker
To gain a better understanding of what these relatively quiet granule cells are doing, Thomas used one particular marker of memory.

Interviewee: Thomas Hainmuller
So, we we're looking for a certain manifestation of a memory, it's also called an engram. So basically, it would be a group of cells that is active during the occurring of a memory and probably it's going to be reactivated during the retrieval of that memory.

Interviewer: Noah Baker
To monitor these patterns of firing neurons, engrams, Thomas and his colleagues used a technique much-loved by neuroscientists: two-photon imaging.

Interviewee: Thomas Hainmuller
We have basically all the neurons in the hippocampus labelled with a transgenic calcium indicator that makes them pretty much light up every time that these cells fire action potential and calcium comes into the cell, and then we use the two-photon microscope to record video data from these neurons. So, therefore we are able to record simultaneously from up to several thousand neurons in one animal at each point in time.

Interviewer: Noah Baker
For this procedure to work, Thomas needed to keep the mouse's head still in relation to the microscope. But in order to study its memory, ideally it should be able to move around. The solution – put the mouse in virtual reality.

Interviewee: Thomas Hainmuller
We place it on a Styrofoam ball that floats on air, and the mouse can run on this ball and we track the motion of the ball underneath the mouse and use it to control a kind of video game, and we place monitors around the mouse that displays this video game to the mouse. So basically, when the mouse runs forward on the ball, it will move forward through the virtual world and it will see it's moving through the virtual world on the monitors.

Interviewer: Noah Baker
By letting his mice run down different virtual corridors, Thomas could monitor how neurons encode changes in the environment, things like the corridors' length or changes in its virtual decoration. Crucially, Thomas could also monitor the same neurons of the same mice on different days, to look at the engram's stability over time.

Interviewee: Thomas Hainmuller
The hippocampus per say is an intermediate memory storage so basically, we wouldn't necessarily expect any of these cells to have a permanent encoding of something that therefore they might have not, or they would probably not have stable representations of anything. On the other hand, we knew from studies using behaviour and optogenetics that even after some weeks, you could reactivate a certain group of cells in the hippocampus in the dentate gyrus specifically, and then this would still recall the same memory in the animal that it did like shortly after the animal perceived something. So therefore, we were really curious about what we were going to find and especially if there's like distinct

differences between the hippocampus sub-areas in terms of how they retrieve or how they maintain information over time.

Interviewer: Noah Baker
Sure enough, Thomas and his colleagues found that many engrams in the hippocampus are transient, not lasting long before they get remapped into a new memory. But when they looked at the granule cells in the dentate gyrus, they saw something different.

Interviewee: Thomas Hainmuller
These granule cells, even though they're not very active and they have very unique properties, they have a very unique code because this is really, very, very stable. This led us to the conclusion that the dentate gyrus, it actually has a stable reference map of a certain environment.

Interviewer: Noah Baker
Thomas described this as being a bit like a blueprint, a basic unchanging map onto which more dynamic and changeable details can be added later.

Interviewee: Thomas Hainmuller
Very likely this can be used to construct a dynamic engram in the later parts of the hippocampus, and it kind of makes sense because the exact contents or the context of some memory, it will gradually change. Like when you have a conversation at work each day the topics of the conversation will be quite different, also maybe the people involved will be, but the general setting it will be similar.

Interviewer: Noah Baker
Thomas thinks that this ability for the hippocampus to represent both broad, stable memories and dynamic, less stable memories could help scientists build a more complete picture of how memory works, and maybe even one day help better understand conditions which impact memory.

Interviewee: Thomas Hainmuller
We may have found here the outlines of a memory assembling machine, if I may call it like that. I think the next step from here will definitely be trying to understand more like how are concrete memories assembled, how do I form a representation of a certain event, and how is this assembly of memories disturbed in different conditions that affect your memories, but in order to get there we really need to try and understand what's the procedure.

Interviewer: Shamini Bundell
That was Thomas Hainmuller from the University of Freiburg in Germany, speaking with Noah Baker. You can read his study at nature.com/nature.

Interviewer: Adam Levy
Still to come in the News Chat, we're hearing about efforts to have a conversation with aliens… no, really! But before we get to that, it's our picks of the news from elsewhere. It's the Research Highlights bought to you this week by Ellie Mackay.

[Jingle]

Interviewer: Ellie Mackay
When it comes to brain size, humans are a notch above the rest, at least in comparison to other mammals of a similar body size. Now, scientists have identified a cluster of genes which may play a role in giving us our unusually heavy heads. The family of genes is known as NOTCH2NL and seems to have appeared around 3-4 million years ago, at the point when humans and modern-day apes split. In lab experiments using miniature brain models called organoids, deleting these genes made the brain smaller. Another team of scientists showed that more active NOTCH2NL boosted fetal neuron production, potentially explaining how the genes drive the growth of bulkier brains. These genes could be an important part of the evolution of big-brained humans. To read more find this top-notch paper in *Cell*.

[Jingle]

Interviewer: Ellie Mackay
Researchers in California have been proving that science isn't always glamorous. They've been digging through ancient dog poo, and what they've found is surprising. The team analysed 14 samples of fossilised faeces from an ancient relative of dogs and foxes called *Borophagus parvus*. These canids were around the size of a small Dalmatian, and weighed around 25 kilos. But within their droppings, scientists found chunks of bone from much larger animals, deer-like mammals that weighed as much as 100 kilos. This means *Borophagus parvus* must have had ferocious, muscular jaws to be able to crush the skeletons of a dinner much bigger than themselves. It also suggests that they may have hunted in packs similar to hyenas and could have coordinated and cooperated in their hunting in order to bring down such large prey. To get your teeth into more of that story, head over to *eLife*.

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Interviewer: Shamini Bundell
Next up in today's show, reporter Benjamin Thompson has been exploring how animals get from A to B using the Earth's magnetic field.

Interviewer: Benjamin Thompson
Listeners, I am pretty terrible at finding my way. Asking me to get somewhere without my smartphone is a mistake. Unlike me though, many animals are terrific at navigation, migrating sometimes thousands of miles, and all without having to stare down at a tiny map on a screen. In this week's *Nature*, Henrik Mouritsen from the University of Oldenburg in Germany has written a review looking at long-distance navigation. I gave him a call and he gave me a couple of impressive examples.

Interviewee: Henrik Mouritsen
One is these bar-tailed godwits that migrate from Alaska to New Zealand in a single fight over 8-9 days and nights with no option to land, and they can't swim so that's pretty impressive. In Australia, there is a moth called the bogong moth, and it is common in

Central Australia in the winter time, but it escapes the heat of the summer and goes to a few specific caves in the snowy mountains in South-eastern Australia, and the animals that relocate those caves over a distance of maybe 1,500 kilometres has never been there before and still locates exactly the same caves.

Interviewer: Benjamin Thompson
Now these are just two examples, and there are countless more. But exactly how these feats are done is, well it's rather debated. In his review, Henrik explores some of the different cues that animals use to find their way. Many animals are known to be able to detect the Earth's magnetic field, which offers a number of advantages when it comes to navigation.

Interviewee: Henrik Mouritsen
Well, the magnetic field of the Earth looks as if someone had placed a big bar magnet in the centre of the Earth, and the magnetic field lines now leaves the poles, curve around the Earth and come back in at the other magnetic pole. And the magnetic field has a number of characteristics which can be very useful for navigation. The magnetic field intensity is about 60,000 nanotesla at the magnetic poles, and about 30,000 nanotesla at the equator. So generally, if you measure magnetic intensity, you have a pretty good idea where you are on the north-south scale. Now the direction of the magnetic field, it would be good for a compass to give you a north-south reference, and if you now compare the direction of magnetic north compared to geographical north, you get what's called magnetic declination, and that would be a really good cue in some parts of the Earth to determine where you are east-west. There are many different aspects of the magnetic field that birds and sea turtles and a number of other animals can use to navigate on a global scale. But the bigger scientific question remains, how do these animals actually sense this magnetic information?

Interviewer: Benjamin Thompson
And this is a huge question. How do animals detect the magnetic field and the subtle differences in it to know where they are, or where they're going?

Interviewee: Henrik Mouritsen
Well there are two major hypotheses that both have support in different kinds of animals, and sometimes even in the same type of animal. So, one way you can detect magnetic fields is if you have a little iron oxide crystal – for instance magnetite – that will turn like a compass needle basically. That biological organisms can generate such particles is proven because there are so-called magnetotactic bacteria which are basically swimming compass needles.

Interviewer: Benjamin Thompson
But while some bacteria may use the magnetite method, Henrik suggests that evidence of this system in other organisms is lacking.

Interviewee: Henrik Mouritsen
Nobody has so far been able to locate magnetite assemblies at a consistent location in many individuals of the same species and connected to nerve tissue. And if you can't find these

iron oxides in the same location in every animal of a given species and it's connected to nerve tissue, it cannot function as a sensor.

Interviewer: Benjamin Thompson
Another major hypothesis for how animals could navigate using the Earth's magnetic field involves quantum mechanics, light, and a spin of electrons.

Interviewee: Henrik Mouritsen
The magnetic compass could be light-dependent, and based on radical-pair chemistry. Now, a radical pair is a molecule, or two molecules closely associated, which generates two unpaired electrons, and to do that you need energy input, and that is light. And if certain conditions are fulfilled, this radical pair is now sensitive to the direction of the magnetic field, in the sense that the magnetic field influences the way that the electrons spin. And depending on how these electrons spin, the chemical characteristic of this molecule changes, and in this way, you can generate a chemical compass.

Interviewer: Benjamin Thompson
A quantum system like this could be incredibly sensitive to variations in the Earth's magnetic field, useful for accurate navigation. There's even a potential candidate for this system, a particular class of molecules called cryptochromes that have been found in the eyes of migratory birds. As yet though, there's no proof that these molecules are involved or even that the system itself exists in nature. And even if it is a light-based system, it presumably wouldn't work in all animals.

Interviewee: Ken Lohmann
The sea turtles that we study can sense magnetic fields in complete darkness.

Interviewer: Benjamin Thompson
This is Ken Lohmann from the University of North Carolina at Chapel Hill, who researches migration in marine animals.

Interviewee: Ken Lohmann
That indicates that they don't require light to generate pairs of radicals as has been hypothesised in some other animals such as birds.

Interviewer: Benjamin Thompson
Ken suggests that maybe sea turtles use a radical pair system that doesn't rely on light – then again maybe they don't use this system at all. When it comes to sensing Earth's magnetic field, it's not necessarily either or. In his review, Henrik suggests that maybe some animals use both the radical pair and magnetite systems, and Ken thinks along the same lines.

Interviewee: Ken Lohmann
It seems likely that there is more than one mechanism, there's no reason to believe that all animals have to detect magnetic fields the same way. The Earth's magnetic field has been around as long as animals have been, and it's perhaps not surprising that different groups have evolved ways of taking advantage of the Earth's field, so it seems plausible at least to

me that there might be more than one mechanism or even that multiple mechanisms might exist in the same animal.

Interviewer: Benjamin Thompson
Getting to this final answer on the system or systems that animals use to detect Earth's magnetic field will likely require a combination of scientific fields, covering everything from quantum physics to neuroscience. And we haven't even talked about the other methods animals could use to navigate, olfaction, landmarks, temperature… the list goes on. It might take a while longer yet, but perhaps soon researchers will be able to unlock the secrets of how animals are able to achieve incredible feats of navigation.

Interviewer: Shamini Bundell
That was Benjamin Thompson. He was speaking to Henrik Mouritsen and Ken Lohmann. You can read Henrik's review over at nature.com/nature.

Interviewer: Adam Levy
Finally this week, it's time for the News Chat, and joining us in the studio for her News Chat debut is Senior Editor of the Nature Briefing, Flora Graham. Hi Flora.

Interviewee: Flora Graham
Hi.

Interviewer: Adam Levy
Now first up there's been a review of European Research Council projects. What were they assessing in this review?

Interviewee: Flora Graham
Well, this was an independent panel of experts who were looking at how successful these projects were. I mean, this is Europe's most prestigious funding body, it gave away almost €2 billion last year. So, what this panel of experts found was that nearly 1 in 5 of these projects funded by the ERC did lead to a scientific breakthrough, so they've got big impact. Another interesting point is that the ones that were most successful were also deemed to be higher-risk. So, what experts are saying is it's worth putting money into these high-risk projects because they actually are having big rewards.

Interviewer: Adam Levy
And how do you actually assess what is a higher-risk project in the first place? What does that mean?

Interviewee: Flora Graham
The way they did the assessment is the experts were given a random sample of representative projects. So, they were asked to kind of answer certain questions about these projects, how much impact did it have, how would it have changed the landscape of research in that particular field, and a whole bunch of different variables in order to come out in the end with an analysis of how that research actually resulted in real-world effects or significant changes in the field.

Interviewer: Adam Levy
You mentioned real-world effects there – what kind of impacts are these projects having on the real world, either economically or societally?

Interviewee: Flora Graham
Well the report didn't reveal specifics about which projects were the most effective for example, it was more trying to look at the overall success of the funding body. But what it did find was that because the most successful projects were also the highest risk, even if funding bodies, and funding bodies in Europe do tend to be in general a little bit more risk-averse, if they are interested in economic rewards, they don't necessarily have to stick to low-risk economic-focused projects. Even those projects that are higher risk, and maybe not directly focused on economic rewards will still do things like first of all move the needle in terms of that actual bit of science, but also have effects on broadening the technological ability of the country for example.

Interviewer: Adam Levy
Will this information actually be used? I feel like we often hear about surveys like this and it's great to have that information, but then it kind of just disappears into a void.

Interviewee: Flora Graham
Well it does come at a crucial time for research funding in Europe, because this week the European Commission is expected to release its detailed budget for the next instalment of its really big funding pot, its next big funding programme which is called Horizon Europe.

Interviewer: Adam Levy
So, this might actually be taken into consideration in some way.

Interviewee: Flora Graham
Exactly, I think people are looking to determine whether the kind of blue sky research is going to have the same kinds of effects and the same kind of value of the more practical projects.

Interviewer: Adam Levy
Well, we'll have to see if the ERC does take this new information into account when it awards future funding, but next up – a really big question. Is anyone out there?

Interviewee: Flora Graham
That is a big question. I think that people are starting to feel more and more confident that with all of the exoplanets that we're finding, some of them not that far away, some of them we can tell they're in that habitable zone, the Goldilocks zone, nice and close at the perfect distance to their star. People are starting to think that this long-held fantasy that we've had that aliens are going to be contacting us or we're going to be contacting them soon, is getting a little bit more real, and that's probably why a group of linguists last week have had their first meeting to talk about the real nitty gritty of how we can communicate with aliens.

Interviewer: Adam Levy

And this isn't just picking up messages, it's actually thinking about how we would send messages out there to aliens.

Interviewee: Flora Graham
Exactly, so this group is called METI, you might have heard of SETI, the Search for Extraterrestrial Intelligence, they were in the movie Contact, but this group is the Messaging Extraterrestrial Intelligence group and they're focus is actually sending messages out. Now, this group is really starting to think about what kind of commonalities do we have in language, these are big questions even for humanity. We don't necessarily have a firm understanding of whether language is innate in the minds of kind of any species or any creature that has logic and thought and that kind of thing, or whether it's more connected to like the shape of our bodies for example, or the environment around us. So, in the first case, we might be able to get to common ground with any thinking, logical species, but in the second case if it's really about the shape of our bodies and our planets, there might be cases where we and aliens could kind of never ever come to a point where we could communicate.

Interviewer: Adam Levy
Well it sounds very difficult even to start thinking about how to answer this question, so first, perhaps a more simple question: how physically would we get a message out there? Would we just blast radio signals into the sky?

Interviewee: Flora Graham
I think that what this group is focusing on are these exoplanets that are nearby and that are in the habitable zone, so I think the idea is rather than blast in every direction at once, let's try to focus on those planets that have a higher potential for alien life.

Interviewer: Adam Levy
And it wouldn't necessarily just be organisations like METI who are trying to do this though, right?

Interviewee: Flora Graham
Yeah, I mean in theory if you had access to the equipment needed anyone could do this, and the linguist we spoke to, Sheri Wells-Jensen, she did talk about the fact that there are apparently people out there who have radio telescopes who are sending out signals. And one of the things her group is trying to do is actually create a database of all the signals that are being sent out, because their concern is let's say at one point, one of these does hit the jackpot and an alien race does reply, and we don't have a record of which signal was sent out or when or what it said, well, we would be in a bit of a pickle.

Interviewer: Adam Levy
Now, let's say an alien life form does reply to one of our messages, we know what the message we sent was, how do we begin to unpick that? Have they thought about whether we'd even be able to recognise that it was a message in reply?

Interviewee: Flora Graham

Absolutely, I mean science fiction authors have been thinking about this for a long time and the linguist that we interviewed, Sheri Wells-Jensen, she really pointed out that there's a big crossover between science fiction authors and linguists. So, these are questions that people are exploring, of course there's kind of a common consensus that things like mathematics naturally drop out of let's say for example building radio telescopes. So, once a civilisation is at a point where they're able to build the kind of mechanisms that can do this kind of communication, hopefully we might have some common ground, whether it be mathematics or the kind of music and patterns that come out from that.

Interviewer: Adam Levy
So, we could just share equations with each other for a while.

Interviewee: Flora Graham
Sure, that's what we do now, isn't it?

Interviewer: Adam Levy
More or less, that is the nature of the *Nature Podcast*, and on that note, we should probably wrap things up. Flora, thank you for joining us.

Interviewee: Flora Graham
Thank you.

Interviewer: Adam Levy
And Flora as I mentioned is Editor of the Nature Briefing which is a daily email keeping you up to date with all the latest science news. Flora, where can they track that down if they want the latest science news?

Interviewee: Flora Graham
Oh, you should head straight to nature.com/briefing to sign up right now.

Interviewer: Shamini Bundell
That's it for this week's show, but we'll be back with all the in-depth research news at the same time next week. Until then, I'm Shamini Bundell.

Interviewer: Adam Levy
And I'm Adam Levy. Thanks for listening.

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