



Origin Stories Episode 9: Did Cooking Make Us Human?

Meredith Johnson

0:00:16

This is Origin Stories, the Leakey Foundation podcast. I'm Meredith Johnson.

We modern humans have evolved in ways that are clearly different from the other living great apes. We have these big, complex brains, small teeth and jaws and much smaller guts. Some evolutionary biologists think the key to these differences might be found in something that we all do every day. Reporter Briana Breen takes a look at the origins of cooking.

Rachel Carmody

(Whispering) Mr. Theo. Did you have a good nap? Did you? I know, it's almost time for you to eat.

Briana Breen

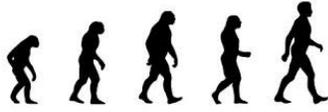
This is Rachel Carmody and her son Theo. Rachel spends a lot of time thinking about food, but not in the way you and I probably do.

Rachel Carmody

I'm currently a postdoctoral fellow at UCSF in microbiology, but I'm also a visiting Fellow in the Department of Human Evolutionary Biology at Harvard. Aww, I think you're making sad sounds because you're hungry. This is my son, Theo. He is twelve weeks old and he will be weaned on to cooked food because of all the benefits that it provides in terms of softening the food and it being easily digestible, but right now, you don't have any teeth at all, so you're just getting breast milk. He's fussy because he's hungry.

Briana Breen

Can you tell me what you had for breakfast?



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Rachel Carmody

I had bacon and coffee and that's it. With a newborn, you don't get a lot of time to make a complex breakfast. Nutritionally, it's probably not the best choice, but it tastes so good.

Briana Breen

Rachel looks at how nutrition relates to human evolution. The reason she's focused on this area is because of one person.

Richard Wrangham

My name is Richard Wrangham. I'm a Professor of Biological Anthropology at Harvard University and I wrote a book called, "Catching Fire: How Cooking Made Us Human."

Briana Breen

Richard was Rachel's advisor at Harvard and they work together on a lot of projects. They're interested in cooking because the change from a raw food diet to one that included cooked food probably impacted every part of our ancient relative's lives.

Richard Wrangham

As soon as it was possible for our ancestors to be able to eat their food cooked on a regular basis, what that meant was, those individuals born with slightly smaller teeth and smaller mouths and smaller guts would be the ones that use their food even more efficiently and as a result they would be the ones that survive better, had more babies. In other words, the ones that were favored by the process of evolution.

Briana Breen

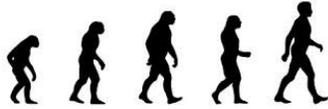
And it turns out that humans are the only species that appreciate the difference. Researchers at Harvard found that chimps, when given a piece of food that's raw will actually hand it back to a researcher and wait to have it cooked.

Rachel Carmody

And if you have ever seen a chimpanzee behave you know that waiting to eat is not something that comes easily for them. So, the fact that they will withhold consuming an item, give it up actually, and the chimpanzee will make this exchange willingly suggests that not only do they appreciate that the cooked is better, but they will ascribe a value to it. A deferred benefit.

Briana Breen

All animals, when given the choice show a clear preference for food that's been cooked. Cats, dogs, even insects.



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Richard Wrangham

So if you are rearing caterpillars, if for some reason you want to get as much productivity out of your cockroaches as possible, then it's better to feed them cooked food than raw food.

Briana Breen

But back to humans. We have some very specific adaptations that according to Richard and Rachel seem to have come directly from this change in diet.

Rachel Carmody

So two million years ago body size gets larger, brain size gets larger, but interestingly, we also had adaptations that suggest that we were able to chew less well. If we think back to our closest living relatives and look at chimpanzees, chimpanzees spend an enormous amount of time every day just chewing. Forget about even procuring the food; there's a lot of time invested in that, but just looking at the amount of time it takes them to break down the foods, it's been estimated that they chewed four to six hours per day.

Briana Breen

Humans today chew food for less than one hour and looking back to those physical changes from two million years ago, when our jaws, teeth and GI system all got smaller, we wouldn't have been able to eat as much raw food. Earlier species would've been way better equipped for a raw food diet. In the 1990s Richard was teaching at Harvard. He was trying to figure out what could've caused this set of adaptations to happen all at once. He realized he might have a piece to this puzzle in his own history.

Richard Wrangham

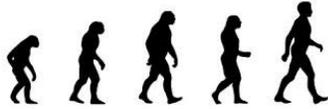
I started thinking about how possible would it be for any human to live on raw food anywhere in the wild and the reason I did so was because of an experience many years ago when for some days at a time, while following chimpanzees throughout Gombe National Park and studying their feeding behavior, I tried to feed like a chimpanzee.

Briana Breen

This was the early 1970s. Richard was a research student at Gombe National Park in Tanzania with Jane Goodall.

Richard Wrangham

This began when I simply forgot to pack sandwiches or was too late to organize my food supply for the day and I would simply survive all day on the chimp foods. I did go to Jane Goodall at one point and say to her that I would like to really do an experiment of seeing how like a



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chimpanzee a human could live their life and survive and what I suggested was that for days at a time I would eat the chimpanzee diet and live like them. So go naked in the forest like them and Jane said, “Well okay, you can do this except you’ve got to wear a loincloth,” and I said, “Well, if you’re not going to take the idea seriously, then I’m giving up.”

Briana Breen

Okay, so hold on. Did you actually go out completely naked for a time period?

Richard Wrangham

No, I never did.

Briana Breen

Okay.

Richard Wrangham

It was kind of a joke at the time, but if Jane had said yes I would've felt obliged to try it.

Briana Breen

Got it. But Richard didn't give up on trying a chimp diet. He took it very seriously. He ate everything they ate; the leaves, stems, and fruits from trees, as well as the occasional monkey. Rachel Carmody again.

Rachel Carmody

I've known him long enough to know that he's willing to try anything in the name of science. I believe he even tried to eat ants the way that chimpanzees do by fishing them out of their ant nest and of course he ended up with bites all over his face and generally concluded that humans were not meant to eat a chimpanzee diet.

Briana Breen

The experiment didn't go so well.

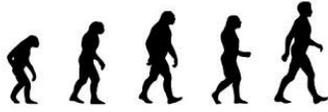
Richard Wrangham

There was hardly any food that they eat that you can fill your stomach with. You'd get incredibly hungry. It's simply impossible.

Briana Breen

But was Richard just not used to this diet? Could other humans do better on a raw food diet?

Rachel Carmody



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So humans today can in theory survive on raw food, but they don't thrive and we know this because a study was done Germany of five hundred and seventy two raw foodists, and these are people who have followed a raw food diet for a period of at least three years and what these researchers found is that body mass index decreased with the amount of time someone had been a raw foodist, but importantly, what the researchers found was that fifty percent of women of reproductive age were not undergoing ovarian cycling. They were not reproductive if they were following a one hundred percent raw food diet. So, yes people can survive on a raw food diet, but they cannot thrive and as a human evolutionary biologist when you are so energy limited as to impair reproduction, that is not a sustainable strategy.

Briana Breen

If fifty percent of early human females hadn't been able to reproduce we wouldn't be here today. So who's the ancestor we need to thank for cooked food?

Richard Wrangham

I read the fossil record saying that *Homo erectus* was the first species that was adapted to cooking.

Briana Breen

Homo erectus lived about a million and a half years before the first modern humans.

Richard Wrangham

They really needed cooked food and the reason for saying that is that they were the first species that had relatively small teeth and small guts and if that is right then the first species that sat around a fire and started learning to cook, would be the predecessor.

Briana Breen

A species called *Homo habilis*.

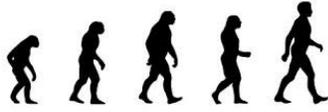
Richard Wrangham

So that intermediate in my view would have been the one that started using fire and then eventually got to the point where they discovered that fire was so valuable for cooking food and they were able to cook their food so regularly that they became adapted to cooked food.

Briana Breen

But these ancestors probably didn't go straight from eating raw foods in their original forms to grilling over an open fire.

Rachel Carmody



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I think the first step in that transition might have been to use very simple tools of hammer stone, for example, or a slicing tool, but the big benefits are not going to come until ancestral hominids began to apply heat to the food.

Briana Breen

When food is cooked you immediately get more energy, more calories.

Richard Wrangham

And there are two reasons for that. One is that what cooking does is to increase the proportion of the nutrient that actually gets digested in the small intestine. The second reason is that if you cook the food, the food gets digested more quickly and it demands less of the body.

Briana Breen

But to begin cooking someone had to be the first to experiment with putting food in a fire and to eat that very first warm, charred piece of food.

Rachel Carmody

I think probably what occurred is that ancestral humans came upon foods that had been cooked naturally by bushfires or by volcanic activity or by lightning strikes and these ancestral humans as they walked through the savanna and encountered something that had been cooked naturally might have ate it and enjoyed it and benefited from it. They realized they could walk further that day, or if they encountered these foods regularly, they could produce more babies than they had in the past.

Briana Breen

Richard and Rachel see other clues that our species probably had control of fire from very early on.

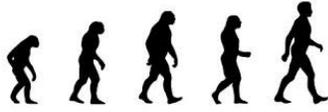
Richard Wrangham

When we emerged as the first *Homo erectus* then we could no longer climb nearly as well in trees as we had before and what that means is that they almost certainly slept on the ground.

Briana Breen

And having access to fire would have given them a way to keep safe from predators while they slept, but archaeological proof of fire and especially proof human ancestors had control of fire has been hard to find.

Richard Wrangham



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We remain very puzzled by the fact that you will find archaeological sites even as recently as forty thousand years ago that have no trace of fire and for which the archaeologists involved say, “Look, we've looked so carefully here that we think these people were living without fire.”

Rachel Carmody

We've got pretty strong evidence of the control of fire going back one million years ago and this goes to Wonderwerk Cave in South Africa where we see deep in a cave, evidence of controlled fires happening over a period of time that can't be explained by environmental disturbance because they are so deep in the cave. We can't say for certain whether the burned bones that were found were burned for the purpose of cooking or perhaps they were burned as fuel.

Briana Breen

But in that cave, our ancestors were able to use fire when and how they wanted and even without lots of evidence of ancient fires there's still many other signs of the influence cooking had on us.

Richard Wrangham

The process of developing into *Homo sapiens* clearly depended on having a big brain and so much of what we do is dependent on our intelligence. Something like a quarter of the food we eat goes to simply fuel our brain. It's only possible if we have a rate of food supply that is made possible by cooked food.

Briana Breen

Thanks to the early ancestors that learned to cook, today we have larger brains and unlimited options for what and how we eat. We've also added an infinite number of techniques for producing and preparing foods.

Rachel Carmody

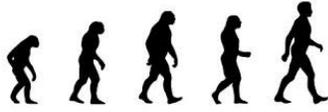
Fundamentally, the foods that we see in a supermarket today bear quite little resemblance to their ancestors. We've made fruits sweeter. We reduced their tannins and their bitter qualities. We've made them easier to peel. We've made them brighter in color and this has changed the nutritional value of these items.

Briana Breen

And what we need in our diet today may also be evolving. The BBC tried out its own experiment similar to Richard Wrangham's chimp diet.

Male Speaker 1

Good night's sleep?



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Male Speaker 2

Well, quite lousy. Some strange sounds during the night (unintelligible, animal noises). Not bad at all.

Female Speaker 1

You can hear the baboons going and the birds going and something roaring down there.

Briana Breen

A group of British volunteers lived in a zoo for twelve days and ate what they called an evolutionary diet. They stayed in tents next to the zoo's primate area and ate a raw diet made of vegetables, fruits, nuts, and honey.

Female Speaker 1

Oh, we've got delicious food for you today.

Male Speaker 3

John is still struggling with the vegetables.

Female Speaker 2

Have you ever eaten a piece of cauliflower before?

John

Never.

Female Speaker 2

So this is your cauliflower—

John

This is my very first time.

Female Speaker 2

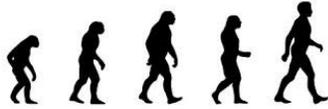
Go on then.

John

Actually, I'm shaking.

Male Speaker 3

Go on John, you can do it.



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Female Speaker 3

Don't smell it, just eat it.

Briana Breen

When they started the program the participants were all overweight and on the verge of developing serious health problems. At the end of their stay the zoo's temporary residents emerged with a dramatic drop in cholesterol, their blood pressure was lower and they all lost a significant amount of weight. Most of us probably don't want to try living in a zoo or experimenting with a chimp diet ourselves, but today the modern highly processed diet is one that humans around the world aren't doing great on. Examining what our ancestors ate and why they ate it could help us make better choices for the future.

Rachel Carmody

It's really only been in the last hundred years where we have the problem of excess calories. This is not a problem that exists for most species and it's certainly not a problem that existed for us back in human evolution and the problem then was always getting enough and so now when we think about human health and a raw food diet some people could reasonably expect health benefits because they're starting out in an obese diabetic state where it actually benefits them to extract fewer calories out of the diet.

Richard Wrangham

If the important thing is to get as much energy as possible, which is the way that animals in general are responding to the opportunities, then cooked food is always going to be best but, if for some reason you are short of vitamins then it is better to eat your food raw because the process of cooking tends to reduce the concentration of vitamins by somewhere from twenty-five to seventy-five percent sometimes and of course the other thing is that if you actually want to lose weight then it's better to eat your food raw because you will get less energy.

Briana Breen

Back at Rachel's Theo doesn't realize it yet but he's already benefiting from cooked food.

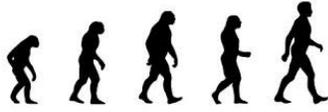
Rachel Carmody

You almost ready for lunch?

Briana Breen

You're getting bacon?

Rachel Carmody



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You're getting bacon indirectly, because mommy ate bacon. Yes, you are. I bet the milk is going to taste like bacon. I love bacon. It's good.

Briana Breen

For Origin Stories, I'm Briana Breen.

Rachel Carmody

Yes on bacon. Yeah.

Meredith Johnson

Thanks to Richard Wrangham, Rachel Carmody and baby Theo. We'll have links to more information about Richard Wrangham and Rachel Carmody's work in the show notes along with a link to Wrangham's book, "[Catching Fire: How Cooking Made Us Human.](#)"

Today's episode was produced by Briana Breen. Our editor is Audrey Quinn. Music and scoring by Henry Nagel.

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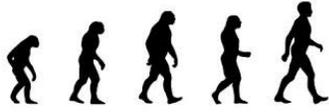
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