

Erin Welsh

Hi, I'm Erin Welsh and this is This Podcast Will Kill You. Welcome to the very first episode in this season's miniseries of bonus episodes. If you tuned in to any of our bonus episodes from last season, you may remember that in each of those episodes I had an expert guest come on the podcast to help us dive more deeply into an aspect of the topic that we had covered in our previous week's regular episode. We got up close and personal with koalas and chlamydia, explored the true origins of epidemiology, dug into fossilized poop, and those were just a few of the episodes.

This season though I'm doing something a little different. We'll still be deep diving into a topic with an expert guest but that topic will be a book and that expert guest will be the author. In each bonus episode this season, I'll be interviewing authors all about their popular science books on topics ranging from smallpox inoculation during the American Revolutionary War to menstrual periods, the history of eugenics to why sweat matters and so, so much more. I guess you could think of it kind of like This Podcast Will Kill You book club in any case it's gonna be super fun and I can't wait to see where these discussions take us.

I am so thrilled to be kicking off this miniseries with an interview with one of the all time greatest science writers out there, David Quammen. Over the course of his career, Quammen has published over a dozen books and has contributed to countless magazines and journals including National Geographic, the New Yorker, Outside Magazine, and more. His books have explored topics such as island biogeography, the history of evolutionary theory, and the spillover of pathogens from domestic and wild animals to humans. That last book, 'Spillover: Animal Infections and the Next Human Pandemic' is actually one of my favorites as well as one of the most terrifying books I've ever read. I suspect many of you have already read it but if you haven't, make sure you check it out.

Quammen's latest book, 'Breathless: The Scientific Race to Defeat a Deadly Virus' picks up in a way from where 'Spillover' left off by examining not pathogens that could cause a pandemic but a virus that did indeed cause a pandemic. Of course I'm talking about SARS-CoV-2 and the COVID pandemic. While there may be some quibbling over the finer aspects of the virus' pathophysiology or epidemiology, there's at least one thing that the scientific community can agree on when it comes to SARS-CoV-2. We saw it coming for decades. Epidemiologists, disease ecologists, virologists, science journalists like David Quammen. So very many people have warned that a pandemic was on the horizon, that a virus or other pathogen jumping into humans from animals and then being efficiently transmitted human to human was not just possible but likely, especially given the increasing frequency of interactions among humans, wildlife, and domestic animals.

But knowing something is likely to happen is very different than watching your prediction come true before your very eyes. And the resolution provided by that crystal ball may not be high enough to allow us to turn prediction into prevention. Which is part of the reason why three years after the COVID pandemic began, we're still struggling to find answers to questions like what animal does SARS-CoV-2 naturally reside in? What was the sequence of events that led to the spillover event? Was there more than one spillover event? That these questions have yet to be fully answered does not mean that no progress has been made. On the contrary, we may know more about SARS-CoV-2 at this point than we do about any other virus on this planet. But in particular the lack of clarity on this virus' origins has led to a fierce, controversial, and highly politicized debate that reveals a great deal about attitudes towards science and the disconnect between how science is conducted and how it is presented in popular media.

This question of where SARS-CoV-2 came from is just one of many explored by Quammen in his book 'Breathless'. In this riveting, fast paced, and slightly terrifying book, Quammen takes a big picture view of the COVID pandemic as seen by those were Working most closely on the disease, the scientists. How did our scientific understanding of this virus, the disease it cause, and the pandemic it's responsible for evolve since those reports of a pneumonia of unknown cause began circulating in early January 2020? Tracking down the origins of the COVID pandemic means looking beyond where and when SARS-CoV-2 first emerged, it means examining the influence that past epidemics and pandemics have had on the public health policies shaping this one. It means asking ourselves why prediction and surveillance weren't enough for complete pandemic prevention. It means confronting the growing mistrust in science and spread of misinformation and disinformation that added fuel to the pandemic fire.

Addressing these elements of COVID is important not just for understanding how we got to where we are today but also to help us be better prepared if or when this happens again. In 'Breathless', Quammen expertly weaves an account of scientific discovery as it relates to SARS-CoV-2 and also stresses that what we haven't yet learned about this virus, where the gaps in our knowledge lie, is just as crucial to the COVID pandemic story as what we have. But before I get too lost in singing the praises of 'Breathless', let's get into the interview itself right after this break.

TPWKY

(transition theme)

Erin Welsh

David Quammen, what an honor. Thank you so very much for joining me today.

David Quammen

I don't know if it's an honor or not but it's nice to be invited.

Erin Welsh

Well I am such a longtime fan of your work and I suspect many of our listeners are as well. So it's just wonderful to have you here. Your latest book 'Breathless' is a fascinating and terrifying exploration of the COVID-19 pandemic as scientists sought to understand the inner workings and origin of SARS-CoV-2, which is of course the virus that causes COVID. When did you first decide that you wanted to write a book about SARS-CoV-2 and how did you land on this particular focus?

David Quammen

Actually my publisher decided that I wanted to write a book about COVID-19. And then I did, after they did. I was in Tasmania for the month of February 2020 as this thing exploded. January this thing got started. I got a call in mid January from an op editor at the New York Times saying hey Quammen, it's about time for you to write another op ed on something for us, so why don't you do that? Like for instance, I don't know on this virus in Wuhan. And I said yes, I do want to write a op ed about this virus in Wuhan because this could be serious. And we can loop back to how I was confident it could be serious at that point, mid January. And so I wrote an op ed for this editor, she was based in Hong Kong but working for the New York Times and it ran on January 28th, saying people, this could be it, this could be the next pandemic, this virus, it's a coronavirus, etc, etc. Here's why it could be really a pandemic threat.

And then I got on a plane and flew to Tasmania to do research on a book that I was working on for Simon and Schuster about cancer as an evolutionary phenomenon. And Tasmania was important because the Tasmanian devil, that little marsupial omnivore that's unique to Tasmania, is dying off from an epidemic of genuinely transmissible cancer. A transmissible tumor, it's supposed to be impossible but it's not impossible. And it says a lot about how cancer can evolve. So I spent my time there crashing around in the bush with Tasmanian devil biologists. I had met them before, I had written about it before, but now I was back for a book. Except that my email lit up with requests to flap my jaw about the virus in Wuhan. And so I spent half my time doing that, talking about this virus while I was in Tasmania. Flew back from Tasmania on March 2, 2020, then did not leave the state of Montana for two years. Did not leave my town here, Boseman, essentially for two years.

And in late April or so, or maybe it was soon after I got back, I heard through my agent that Simon and Schuster wanted a pandemic book and would David be interested in writing it? Because they knew I had already published 'Spillover' in 2012. So they said we want a pandemic book, would you write it for us? And I thought very carefully about this for four or five seconds and then said yes. But then was faced with the difficulty of figuring out how do I write a uniquely useful book about something that a lot of other people are gonna be writing books about? And how do I research it without being able to travel, which is usually part of my operating principle? Go there, if you're gonna write about Ebola killing gorillas in the Congo forest, go there. Gonna write about viruses in bats and caves in Southern China, go there. Couldn't go there. So I spent the rest of 2020 trying to figure out how to do this book. But I had committed to it to Simon and Schuster and committed to it on a deadline of delivery by December 31st of 2021. So I had to figure it out fast. So that was the beginning of this.

Erin Welsh

You are certainly no stranger to pathogens of pandemic potential. As you mentioned, your excellent 2012 book 'Spillover' explores this topic in great depth. Do you remember what went through your head when you first heard about these cases of pneumonia of unknown cause in early 2020? When did the alarm bells start really ringing for you?

David Quammen

Well I subscribe and have for almost 20 years I suppose to ProMED-mail. And you I'm sure know what ProMED is but in case any of your listeners don't, ProMED is a subscriber list alert service on infectious disease. So I belong to that and that means that I and 80,000 other subscribers get numerous emails virtually every day alerting us to a child has died of a suspicious respiratory disease in Ho Chi Minh City or water buffaloes have shown up with lumpy skin disease in Malaysia or people are sneezing in Adelaide, Australia. Whatever. So we get emails as you know, we get emails, bing, bing, bing. So you get all these emails about all these different kinds of diseases and most of them you're not interested in. So you delete them, delete, delete, delete. Some of them you read and then delete them, some of them you don't delete.

So I went back to January of 2020 to see which ProMED emails I had not deleted on this subject. And the earliest one I found was one on January 13, 2020. And for the first time it used the word coronavirus, at least the first time that I noticed. And I'm sure that that's the reason I didn't delete it was because I looked at ProMED on the Wuhan virus and I saw the word coronavirus and that's when I said boom, this could be the one because the scientists 10 years earlier had told me the next one is gonna be caused by an RNA virus, an RNA virus with a history of spilling over from animals into humans. So maybe an influenza, maybe a paramyxovirus, or maybe a coronavirus.

Erin Welsh

Many people saw this pandemic coming or saw a pandemic of this kind coming, as you mentioned. Yet we were more or less unprepared when it did arrive. What do you think are some of the sources for that disconnect between prediction and prevention or prediction and response? In other words, I guess what didn't we see coming about this pandemic?

David Quammen

Right. One of the things we didn't see coming was obdurate, stupid national leaders. Actually we saw them coming too but there was nothing we could do about it. People have asked me what surprised you most about this pandemic? And what surprised me most was how bad the responses were. Not the nature of the virus, not the potential of the virus, not the origin of the virus. Nothing surprised me at all except how badly we responded. I said I was in Tasmania, when I flew there on February 6th I took masks with me, shoved them in my briefcase, I shoved in some in N95s thinking I may need these to get on an airplane by the time I come back. But I didn't. I thought they will have real time airport diagnostic testing by the time I come back if this thing goes big. But we did not, not because it's technologically impossible but just because nobody was willing to pay for it, nobody was willing to spend either the financial or the political capital to be ready.

I asked the same question you just asked me, I asked Ali Khan. Ali Khan is a great disease scientist I've known for a long time, he's now dean of the School of Public Health at the University of Nebraska, formerly he was in Special Pathogens at the CDC. I asked him Ali, what happened? Why were we so poorly prepared? And he said failure of imagination. It wasn't a failure of science, wasn't a failure of public health, it was a failure of imagination. And I'm pretty sure what he meant was failure of political leadership to realize A) that although the scientists can predict a pandemic, they can't tell you whether it's going to happen between now and the November 2020 election. And they can tell you that it would cost tens of billions of dollars to be adequately prepared and also political capital, instituting measures that would be unpopular and would hurt economies. And then it takes the imagination of the political leader to say okay, well they can't guarantee but it could happen between now and the next election and although it would cost tens of billions of dollars to be adequately prepared, it will cost tens of trillions of dollars not to be adequately prepared. And that's what happened. And I think Ali was right about that.

Erin Welsh

This is not our first experience with a coronavirus of pandemic potential. We humans have been infected with coronaviruses for a very long time. And then of course there was SARS in 2003 which it's often said that we here in the US dodged a bullet with SARS. And in your book you discuss how one consequence of that dodge is that we were potentially less prepared both mentally and practically perhaps for this current pandemic. Can you talk a bit more about that?

David Quammen

Yes. SARS-1 as we call it loosely now, SARS in 2003, was a very specific warning and the disease scientists took it very seriously. I mentioned Ali Khan, he was at the CDC in those days, he responded to SARS-1 in Singapore, he was part of the response team there. When I met him in 2006, I was interviewing scientists all up and down the Special Pathogens corridor at the CDC for a piece that I was writing about zoonotic diseases for National Geographic. So I spent two days going up and down the corridor talking to people about Ebola and rabies and Marburg and Nipah and Hendra and avian influenzas and all all sorts of things.

And then Ali took me to lunch and he's a very serious man and he has been in all of the difficult outbreak situations and he has great empathy for the human victims. But he's also kind of a jaunty guy with a very candid sense of humor. So we sit down at lunch and and he says to me all right Quammen, so you've interviewed all my people about these emerging diseases, which one of them is your favorite? I gave the entry level answer. I said Ebola. Ebola is pretty dramatic. Ebola is a very dramatic disease. And Ali said meh, I like Ebola as much as the next person but for me it was SARS. And he likes Ebola, gallows humor. He was at the Kikwit Ebola outbreak, I think. He was risking his life to save lives during that. So that's the way Ali talks.

But for me it was SARS. I said really, SARS? Really SARS? He said yeah. And then he told me why SARS. It's a coronavirus, single stranded RNA virus, respiratory transmission, high case fatality rate, did not burn out, we stopped it because of good public health measures and the luck that it spread to cities with strong governance and strong healthcare systems who stopped 8000 cases, 800 fatalities, 10% case fatality rate. And Ali said to me literally we dodged a bullet. Next time it could be a lot worse. How could it be a lot worse? Well for instance a coronavirus with that kind of case fatality rate plus transmission from asymptomatic cases. Boom.

Erin Welsh

Right. Or presymptomatic as we saw with COVID as well.

David Quammen

Yeah.

Erin Welsh

And in your book you talked about how because SARS never really reached the US that may be part of our public health infrastructure or preparedness wasn't quite as up to speed as maybe some other countries that did have firsthand experience with SARS.

David Quammen

Right, right. Absolutely. You know Ali and his colleagues had learned the lesson of SARS, absorbed it. He was in Singapore as I say. But there were few if any cases in the US and I think no fatalities in the US. So the lesson of SARS did not register nearly strongly enough on American public health and political preparedness for public health emergencies, just didn't register the way it registered in Singapore, in South Korea, in a few other places who were far better prepared and who took this virus very seriously in consequence and who did not have big first waves, Singapore, South Korea. Although eventually they got hit, they got their waves because this is a virus that's so enterprising, you can't keep it out forever.

Erin Welsh

Other countries besides the US also dodged the SARS bullet. But it could be argued that many of them had a more robust response at least initially to the COVID pandemic compared to the US. What do you think could account for these different responses? Why did we stumble where others did not?

David Quammen

You know Erin, that's still one of the big mysteries to me is the difference in the geographical patterns in who got hit badly and who didn't. Some of them were fairly easily explained. Singapore and South Korea and Japan and New Zealand did not get hit bad. I mean if you're New Zealand or if you're Iceland, if you're an island, you have a big advantage, especially if you're an island that is not an important entrepot of global trade. So there was an advantage. If you were the smart prime minister of New Zealand, you had an advantage, she had an advantage. And she put her advantage to good use and protected her country. So those things are relatively easy to explain. And as I said, Singapore eventually and South Korea eventually got their turns to be hard hit.

But then there are other mysteries like most of Sub Saharan Africa, Central Africa. And yet apart from South Africa, Africa has not been very hard hit at all. The Democratic Republic of the Congo last time I checked has not been very hard hit at all and it's been a mystery that people have tried to explain. One of the possible explanations is that the demographics is different. The population is much younger than other places. That could be part of it. People speculate that maybe a coronavirus burned its way through Africa within the memory frame of immune systems. But nobody knows. I would love to know. I would love to know why South Africa got hit badly and Democratic Republic of the Congo has been relatively spared.

Italy, Italy got hit so badly, especially the north of Italy at the beginning. I think that was bad luck, I think they got heavily seeded very early on because there are three international airports around Milan and there are travelers coming in for business from Wuhan, among other places. And the population is older and they're multi generation households and there's air pollution and there's smoking, all those things. And then New York City got hammered and a few other places got hammered. We still don't know how much of that was determined by differences in public health response, how much was determined by differences in the nature of the population, and how much was determined by bad luck.

Erin Welsh

It's really interesting to think about the COVID-19 pandemic in comparison to the 1918 influenza pandemic, as many people have done. But I think what's incredible is that despite our many advancements in scientific technology and our understanding of viruses and our greater public health infrastructure, it's still going to take years to untangle some of the mysteries of SARS-CoV-2 as well as the COVID pandemic. We certainly did not dodge a bullet with COVID. In what ways do you think we might be better off with the next pandemic because of our initial mishandling of COVID?

David Quammen

Well we've learned how to make an mRNA vaccine quickly, that's a big thing. And we've learned how to make some other vaccines. I don't want to omit Sarah Gilbert and the Oxford Astrazeneca vaccine, I didn't get as much as I wish into my book on that. So we have the capacity now to create a new vaccine or adaptive vaccine quickly to a new coronavirus within the coronavirus family, whatever. That's been really important. We've got a lot of work to do on the rest of it. I mean science denial has just gotten worse and more toxically obdurate in the last 2.5 years. We've got to fix that. I don't know how you fix that but we've got to fix that. We've got to get the general public back on the side of science so that they trust it, they accept its guidance, and they readily pay for it.

Education of kids is a really important part of that. I don't know if we can afford to say that it starts with educating kids because we've got to do it now, we've got to do it fast. We can't wait for the 5th grader who's got a great science teacher to grow up and become an epidemiologist. We can't wait that long. But that has to happen. And we need more surveillance. We need more what some people call smart surveillance so that we're not waiting for outbreaks to hit us and then try to respond to outbreaks where suddenly 41 people are sick from a new virus in a city or in a village somewhere.

We gotta get there before we've got those 41 cases of people with human transmission. We gotta get there when it's one or two cases or maybe nobody is symptomatic at all but a virus that looks like a dangerous virus is detected in a poultry worker in Arkansas who feels fine but the poultry worker is routinely screened for new viruses because he or she is working with 200,000 chickens and twice a day some wild ducks land in the pond where they get their water. So danger of avian flu, among other things. Or some other version of that. We need to screen the person who is driving a truck that delivers farm raised raccoon dogs and bamboo rats from Southern China to the city of Wuhan, to the markets in the city of Wuhan. We need to be screening that truck driver. And the results of that screening have to be flowing at the speed of electricity around the world to labs all over who are connected, who are coordinated to help interpret and respond. We need a lot of that, among other things.

Erin Welsh

Absolutely. All right, we are going to take a quick break here and when we get back we'll get into more of the COVID prediction and response side of things with maybe a question or two about origins. So stay tuned.

TPWKY

(transition theme)

Erin Welsh

Welcome back everyone. Let's dive back in. In your book you talk about two main strategies when it comes to dealing with pandemics, prediction and prevention vs surveillance and response. We'll always need both of course but funds are finite which creates conflict between the two. Can you talk a bit about the different sides of this conflict and how you think the COVID pandemic has affected the discussion of where funding should be concentrated?

David Quammen

Yes. And there is a discussion. I'm not going to call it an argument but there is a discussion among scientists about these two different kinds of strategy. And you said prediction and prevention, I sometimes and they sometimes phrase it as discovery and prediction vs surveillance and response. So discovery and prediction implies sampling animals all over the world, all kinds of animals looking for viruses, new viruses that might potentially be zoonotic, be transmissible to humans. In particular looking at mammals and birds because the viruses that take hold in us generally almost without exception come from mammals and birds. By one estimate there's maybe 1.7 million unknown viruses in mammals and birds capable of infecting humans. These are at best orders of magnitude estimates.

There was a program that was funded for years through USAID called the PREDICT program, it was an acronym, PREDICT. They gave away \$200 million over the course of 10 years for this kind of work, sampling, looking for new viruses, characterizing new viruses, looking at them to see which ones look the most dangerous that we could predict might spillover into humans. So discovery and prediction. And Dennis Carroll, who has been the lead initiator of what is now the Global Virome Project is I think it's fair to say a spokesperson for this point of view, discovery and prediction. And that's the idea of the Global Virome Project, let's really learn about all the viruses that are out there that have any potential to be human pathogens and try and predict. But there is overlap between these views.

On the other side is surveillance and response which says let's not worry about every virus in every mammal and every bird, let's worry about the viruses that exist in animals at the points where there is ecological disruption and human-animal interaction. The interfaces, let's look at the interfaces rather than going into the deep forests and finding really really really wild animals that nobody ever messes with and see what viruses they carry. So let's look at the interfaces in the ways that I was just describing. Let's do serological sampling for antibodies in people who work with wildlife but who still feel fine. And let's see what viruses are turning up in their bodies, viruses therefore that have already showed the capacity to infect a human whether or not they make that human sick and whether or not they transmit. That's the warning bell to this school of thought.

Surveillance and then response when we find, like there are three poultry workers in Arkansas who have PCR positive tests for a new coronavirus that we haven't seen, not this one and not SARS-1 but a different one. And it's in three people but they feel fine. Then let's flood that situation with resources to contain that situation, find out where it's coming from, how it's getting into those people, whether they are showing any symptoms whatsoever even if they're not reporting them, what their viral loads are, whether the virus is replicating within them or maybe they've just gotten a big nose full but it hasn't been replicating. Let's find that out. So that's surveillance and response. The idea being that catch the tiny fires, catch the tiny spot fires before they grow, and do that in the areas where there's a lot of dry tinder rather than walking through the entire rainforest to make sure that there are no fires.

Erin Welsh

I love that analogy. Thinking about this in terms of COVID-19, if there had been more funds toward the discovery side of things vs more funds towards the containment side of things or initial response/surveillance, which of those approaches do you think could have had more of an effect on the emergence of this pandemic?

David Quammen

Well I think they both could have but certainly surveillance and response. It's most easy to see how that could have made a difference. I mean if we were doing surveillance of the commercial trade in wildlife species for food, both caught from the wild and farm raised, if they were sampling those truck drivers and sampling those raccoon dogs that were coming up out of Yunnan province and sampling those bamboo rats, they might have spotted this virus before it got into 41 people reporting to hospitals in the city of Wuhan. And at the same time you can argue that EcoHealth Alliance, the organization based in New York, I don't know whether they at this point would say we're in the business of discovery and prediction or whether they'd say well no, we're more targeted than that, we're more in this business of surveillance and response. But they were doing this kind of work at one scale, not at the scale that we need, they were supporting Zhengli Shi and her laboratory at the Wuhan Institute of Virology.

Zhengli Shi and EcoHealth Alliance and a number of other colleagues for 15 years have been publishing papers saying hey, there are dangerous coronaviruses in bats in the caves of Yunnan province and in botanical gardens, flying around in botanical gardens, people are in their vicinity, this is dangerous. They've been publishing papers on that for 15 years. And now it's sort of a blame the messenger situation because they've done that work, they're being accused of having had this virus in a lab and let it leak. Despite the fact that there is no evidence whatsoever that they ever had this virus and there is counter evidence to suggest that if they had had this virus, first thing they would have done would have been published a paper in Nature or Science saying hey, here's a really, really dangerous coronavirus, we found it, we're getting the publication in Nature. That's what we do for a living, that helps our career. And you need to be aware of it. Didn't happen.

Erin Welsh

That actually brings me to my next question which is about the origin of SARS-CoV-2. Pandemic prevention efforts are limited in part by how general our predictions are. For instance, we know the circumstances under which spillover of a zoonotic pathogen is likely to happen and we can predict which groups of viruses might be the likeliest to cause a pandemic, but making predictions specific enough to enact prevention measures seems extremely difficult, if not impossible. And I think the ongoing struggle to understand the emergence of SARS-CoV-2 reflects this. Can you bring us up to speed on what is currently known about the origin of this virus?

David Quammen

I can scratch that surface, I carve it deeper in 'Breathless', in the book. First of all why is it important? Why is it important for us to know what is the origin or origins of this virus? And I think there are two answers to that. I'll frame this by saying I think of there being two primary schools of thought on the origins. One is the natural origins school of thought, this is a natural spillover of a wild virus from a bat possibly by way of an intermediate animal and possibly with recombination, creating a hybrid genome when two coronaviruses were replicating inside the same animal, inside the same cell. That's the natural origins hypothesis school of thought.

And then there is what I call the nefarious origins school of thought. And the nefarious origins school of thought is a basket that contains a couple of different hypotheses. One, this is an engineered virus that was specifically designed in a laboratory by evil scientists trying to create a virus and succeeding, to be released intentionally to cause harm to people. That's the most extreme form of nefariousness. Second gradation on this spectrum is well this is a virus that was manipulated in a laboratory, maybe originated as a wild virus, was manipulated in a laboratory with gain of function research of some sort for supposedly good scientific purposes but that was reckless and should never have been done. And this was made more dangerous and more adaptable to humans and then somehow it leaked from a laboratory.

And the third version is sort of the mild lab leak hypothesis which is this is a virus one way or another was taken into a laboratory, was cultured, not just a genomic sequence in a sample but it was grown live. And a lot of people don't appreciate the huge difference there that the importance of that distinction. Lots of sequences are messed around with in laboratories and that doesn't mean you have live virus. So this was a virus that was in a laboratory, a wild virus but a dangerous virus and it was allowed to leak. So those are the nefarious origins hypotheses. And I don't consider myself an advocate really for any of those or at least I didn't start out as an advocate for any of those different hypotheses.

I don't consider myself a prosecutor. Some people seem to perceive their roles as prosecutors in this discussion, particularly on the lab leak side because they have made a lot of prosecutorial accusations based on circumstantial evidence, coincidence, and absence of evidence. A lot of accusations against Peter Daszak of EcoHealth Alliance, against Zhengli Shi at the Wuhan Institute. Accusations, whether they're right or not, they are assuming a prosecutorial role it seems to me. I view my role as a juror. I'm listening to all this and I'm saying what's persuasive? What's convincing to me? And after 2.5 years, what is very convincing to me is the natural origins hypothesis as supported by a lot of very specific work and evidence gathered and assembled by people like Eddie Holmes and Michael Warby and Marion Koopmans in the Netherlands and other people that I respect, disease scientists of various different sorts, molecular evolutionary virologists, veterinary virologists, epidemiologists, professionals.

More professionals on that side, and more amateurs on the other side. Because a lot of people have decided that they are full time researchers on the internet, therefore they are knowledgeable about molecular evolutionary virology. I've been following this stuff for 20 years and I know I'm still an amateur and I will always be an amateur. So anyway, so I perceive myself as a juror. But the preponderance of the actual evidence is strongly, strongly, strongly on the side of natural origins and peer reviewed scientific papers by Michael Warby and Christian Anderson and Eddie Holmes and Marion Koopmans and Angela Rasmus and a number of others.

Is a lab leak still a theoretical possibility? Yeah, it's hard to prove a negative. Should we still think about, talk about, and in some way investigate the lab leak hypothesis? Yeah, yep. Does that mean equal time, equal resources, equal probability? No, I think natural origins is much more probable but it's still important not to close our minds to the possibility that this other thing might have happened. But we need to see some evidence, we need to see some data if it happened. And this virus, SARS-CoV-2, cannot have leaked out of a laboratory unless it was in a laboratory and we have zero evidence that this virus was ever in a laboratory.

Erin Welsh

Yeah. I won't ask you to go in depth about the origins of the lab leak hypothesis, how it started or how it grew. It's all in the book everyone, go check it out. But I do want to ask why you think it has persisted for so long or why it holds such appeal to people. Is it a matter of finding a scapegoat or an easy solution to future pandemics or a further reason to mistrust scientists?

David Quammen

Yes, I think that's part of it. For instance, I started to say why is it important for us to know the origins, to learn or keep trying to learn the origins of this virus? First of all because if this virus has natural origins then it means we need more science. We need more surveillance. We need more genomic sequencing. We need more of all that. We need more sampling of wild animals, especially in the chain of supply. If you think that this virus came from gain of function work or just growing it in a laboratory and that's crazy and dangerous, then what you're essentially saying is we need less science. So more science or less science.

And the other difference is that it's the difference between did we do this or did they do this? If it's natural origins, then it leads to an understanding that all of the things that all of us do as humans, consumers on this planet, put pressure on highly diverse natural ecosystems and lead to the contact between humans and wild animals and their viruses and cause spillovers. If it's a lab leak, then it's easy. We say they did it, those idiots, those reckless idiots over there. They did it. So that's a big difference. There are stakes in figuring this out. And so why do those people embrace the lab leak hypothesis with such passion? And they do. It's partly that, it's partly being able to say they did it, those idiots over there. And it's partly that conspiracies and dark movements of evil activity are more dramatic and they've always been more dramatic.

Erin Welsh

Yeah. It's something that I really appreciate about your book, how you went into such great detail about the origins of this idea and where it has gone from the very beginning and the range of nefariousness, as you put it.

David Quammen

And I want to be clear that I try very hard in the book to be fair to those people because there's some very smart people including at least one friend of mine on that side of of the discussion. There's some smart people and the fact that they might believe in a conspiracy doesn't make them dumb but they're sensitive about it. I respect them, I think they have good motivations, I think they're intelligent. I just think they're wrong and that they don't have any positive evidence on their side. They could be right but so far there's no evidence that they are right.

Erin Welsh

Yeah. Given your background researching pathogens of pandemic potential and zoonotic pathogens that are likely to spillover, do you think that pandemics are preventable or are they inevitable? What do we have control over in a pandemic and what don't we?

David Quammen

Okay, I'm gonna be an optimist which is not natural for me and I'm going to say that pandemics are preventable. Spillovers are probably not preventable. Given the fact that we have 8 billion people, 8 billion hungry people on this planet and the number is still going up, people are still having babies, people are still eating meat, I'm still eating meat a little bit. People are still riding around on airplanes. And all of that squashes viruses out of the natural world, into our ambit, to use another metaphor. And as long as that keeps happening, there will be viruses infecting a human here or there and a couple of people here and there, there will be spillovers. Michael Warby I think has said spillovers are common but pandemics are rare and we have to keep it that way. And we have to make it even more true, we have to make pandemics more rare.

We've had three pandemics, three million, million, million killing pandemics in the last 100 years. A little bit more than 100. The 1918 influenza, AIDS, and COVID. And they are all almost certainly zoonotic events. So we need to do that surveillance and response that I was talking about. It needs to be one of the highest geopolitical scientific priorities on the planet, surveillance and response, so that we catch the next spillovers before they become outbreaks of two dozen, three dozen people dying horrible deaths in an African village or in a city in Central China or in a town in the American Southwest. We have to catch those early, early, early. And if we do, if we really saddle up and invest, I think we can prevent pandemics.

Erin Welsh

I appreciate the optimism because I have not been feeling as optimistic as of late.

David Quammen

And I should say, Erin, that I think I say that a little bit differently at the end of the book. I say that there are more pandemics coming. Probably what I should have said in that particular sense is there's certainly more pandemic threats coming, there is the threat of more pandemics coming, there is the chance of more pandemics coming. Absolutely. But we can meet that challenge if we do a lot differently from what we're doing right now.

TPWKY

(transition theme)

Erin Welsh

Wow. How much fun was that? Thank you so very much, David, for taking the time to chat with me today. I still can't get over the fact that I got to speak with one of my SciComm role models. If you enjoyed the interview and are looking to dig a bit deeper into the book we chatted about today, check out our website thispodcastwillkillyou.com where I'll post a link to where you can find 'Breathless'. And don't forget you can check out our website for all sorts of other cool things including but not limited to transcripts, quarantini and placebo recipes, show notes and references for all of our episodes, links to merch, our bookshop.org affiliate account, our Goodreads list, a firsthand account form, and music by Bloodmobile. Speaking of which, thank you to Bloodmobile for providing the music for this episode and all of our episodes. Thank you to Lianna Squillace for our audio mixing. And thanks to you, listeners, for listening. I hope you liked this bonus episode and are now psyched to become part of the TPWKY book club. A special thank you as always to our fantastic patrons, we appreciate your support so very much. Well until next time, keep washing those hands.