Bret and Heather 80th DarkHorse Podcast Livestream\_ What Cov...

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**SPEAKERS**

Bret, Heather

**Bret** 00:09

Hey folks, welcome to the Dark Horse podcast live stream number 80. Oh my god number 80. Is that possible?

**Heather** 00:16

It's possible. Here we are.

**Bret** 00:18

Here we are. I am Dr. Brett Weinstein. This is Dr. Heather Hyang. And I am going to emphasize those degrees because today we are going to be using them both in terms of critically analyzing important concepts and as a defense against those who will make accusations of us. So, Dr. Heather Hein, we

**Heather** 00:36

are not We are not trying to hide behind any false credentials that we both have PhDs in biology.

**Bret** 00:41

That is right.

**Heather** 00:42

That's right. So today, we are going to talk about some new developments in the lab like hypothesis. We are going to talk about ivermectin and we are going to talk about cicadas. And what combined what links all of those. I'm not sure I'm not sure of that. But but but I'm sure we'll discover a glorious

**Bret** 01:02

umbrella of evolutionary biology there it it lets us talk about pretty much anything we want so long as it moves or develops or adapts. It's pretty cool.

**Heather** 01:13

Yeah, indeed. So we do encourage you always at the top of the hour to to subscribe to the channel, go to the clips channel, subscribe to that, like the videos, share with your friends, consider going to our Patreon and joining us there. We very much appreciate all the support this week, for the first time in a few weeks, we also have an ad to go to so should we do that? To do that next? Yeah, let's pay the rent. Okay. All right. You want to start? No, I

**Bret** 01:43

think you should start you have a prop for one thing?

**Heather** 01:45

Well, I'm not no I don't. Okay, so this week we're going to talk to you a little bit about public goods. public goods is a company that is a basically a one stop shop for many of your needs. A little bit like some other giant vendors online that you might imagine but they make all of their products themselves. And the packaging is simple and elegant. And the products are terrific. We've tried their avocado oil, and their chocolate covered almonds and both of those are are delicious. And also shampoo and counter cleaner. And it all seems pretty good.

**Bret** 02:23

Yeah, the stuff is high quality. And the packaging does not drive you crazy as you're looking at somebodies idea of how to get your attention in a market right? These are tasteful, understated, they look nice, they don't, they don't cause a disruption of your thought as you run into them in your life. That's

**Heather** 02:39

exactly right. They are they're understated as you say and beautiful and functional. And you know, really everything we haven't tried the whole gamut of what they offer but they sell coffee, they sell pet food. They sell like we said shampoo, conditioner. So so many things. They also have a focus on organic ingredients when when that's possible. And I guess maybe we should just finish off by saying that we can bring you an awesome deal from for our listeners, you receive $15 off of your first public goods order with no minimum purchase. That's that means obviously that you could find something for $15 and get it for free. They look good to so confident that you will love their products and come back again and again that they are going to give you $15 to spend on your first purchase. So you have nothing to lose just go to public goods.com forward slash dark horse or use code Dark Horse at checkout once again that is p UB li si g o d s.com. forward slash Darkhorse to receive $15 off your first order.

**Bret** 03:45

And we thank them for sponsoring the Dark Horse podcast. Alright. Alright, so we start with Do we have announcements that we have not covered? We already did it. Okay, so let's start then with our first topic, which has to do with the lab leak hypothesis. And of course, longtime fans of the Dark Horse podcast will know that we have long discussed the evidence for the lab leak hypothesis and compared it to the evidence for what is treated as the null hypothesis that this emerged from nature, possibly through an intermediate species, but ultimately from bats. Now, there have been developments in the last couple of weeks in this story, but they are not scientific developments. Interestingly enough, what they are is social developments amongst scientists and those who report on them. So maybe we should put up the letter that emerged. This Week in Science Magazine.

**Heather** 04:41

It's on my screen, Zack rice. Actually, there's just one paragraph that I think we can share to indicate what what is said here. It's called investigate the origins of COVID-19. It has 18 signatories in including a number of notable people, one of them One of whom you will speak you have speak to. Quote, as scientists with relevant expertise, we agree with the who Director General, the United States and 13 other countries and the European Union. That greater clarity about the origins of this pandemic is necessary and feasible to achieve. We must make hypotheses about both natural and laboratory spill overs seriously until we have sufficient data. A proper investigation should be transparent, objective, data driven, inclusive of broad expertise subject to independent oversight, and responsibly managed to minimize the impact of conflicts of interest. Public health agencies and research laboratories alike need to open their records to the public, investigators should document the veracity and provenance of data from which analyses are conducted and conclusions drawn. So that analyses are reproducible by independent experts.

**Bret** 05:45

Yeah, my only wish the letter ended with the single word sentence, obviously, right? It is so clear that this is a viable hypothesis. And it should have been investigated seriously from the beginning rather than dismissed as it has been. But what I want to do is put it in context. So first thing to say is that the most important thing about this letter is the third author. The third author is Ralph barrack. And Ralph barrack is the lead investigator of the pie in the UNC lab that does gainer function research on bat borne Corona viruses. It's one of the two leading labs in the world for this kind of work. The other one being at the Wuhan Institute of virology, there's Eugene Lee lab. And so to have one of two people at the very forefront of this technology come forward. And author a letter that says this is a viable hypothesis and should be fully investigated, is to say, we have been right all along. This was a plausible hypothesis from the beginning deserving of scientific respect, which is the opposite of what it got, what it got was ridicule. In fact, in the leading journal, the Lancet, those who medical journals, the leading medical journal,

**Heather** 07:08

I think Jama is probably I don't know, the lowlands is the leading medical journal,

**Bret** 07:11

a leading medical journal, one of two prominent early publications dismissed explicitly as a conspiracy theory and those who talked about it as conspiracy theorists, those who were interested in looking into the lab leak hypothesis. So to have Ralph Barrett come forward and say, in fact, this is a viable hypothesis, and it deserves investigation is a rare triumph where those who were portrayed as cranks at the outskirts who were actually correct, and had the evidence with them have been, in some sense, vindicated. Now, I do think there's,

**Heather** 07:52

as I've said before, I don't like the word vindicated here, because what we all need to be doing all the time, especially when we wear the mantle of science, is looking for all possible explanations and keeping all the possible explanations alive, so long as they are not falsified.

**Bret** 08:06

Well, I agree. But when I save indicated, so this letter if it is taken seriously, and if we don't see funny business downstream of it, which is a possibility, you're already seeing a little bit, but if this letter is taken as the ground floor, and now we proceed from it, as the letter suggests that we should do, then the point is, okay, now we can begin to compare the evidence fairly. What has been vindicated is those who said the lively hypothesis is clearly viable, and those who say otherwise are incorrect.

**Heather** 08:36

Yeah, it's a vindication for the scientific method. And it's reveal once again, that those people who were saying you cannot consider that we're actually acting in an anti scientific way. Absolutely. And if I may, there was an MIT Technology Technology Review article, if you would show this sack that came out in the wake of that science letter. And I just want to read one. one paragraph from it from it, the chief scientist for emerging disease at the Wuhan Institute of neurology, she is and she Zhang Li said in an email that the letter suspicions were misplaced, and would damage the world's ability to respond to pandemics, quote, it's definitely not acceptable. She said at the group's call to see her labs records, who can provide an evidence that does not exist.

**Bret** 09:23

It's a very interesting statement. But I would point out that one of the really important things about this letter, and you know, it isn't just Ralph barrack, but the fact that he shows up there is the jaw dropping fact of it, the fact that it has a lot of top people, including quite a number of people whose specialty is evolutionary, which I think is actually also an indication that you and I have been on the right track here that the evidence that compels people to get out in front here is is largely evolutionary. But the where was I headed? Damn, I don't know. Get it back in Second, okay. So Oh, I know what it is. The fact of Ralph barrack showing up in mid May saying loudly hypothesis is viable, covers all of the various things that were already on the table. That means it is viable in spite of denials from Zhang Li lab. This is a colleague of Zhang Zhang Li, this is a sometimes collaborator who is saying, not only he is implying, by showing up here he is implying that not only is SARS COVID to as we find it consistent at a technical at a molecular level with techniques that might have been used to enhance it in the lab. Right. He is saying that the denials that he has heard are not compelling to him as a leading expert in the field, one of two top labs in a position to know what is and isn't possible what might or might not have been done. So this is absolutely stunning to have him emerge. And I will say he has said before he is indicated, one cannot rule out loudly, but he has done it. When pressed here he is coming out in front. And that's really important. And although I do think it's very late, and he should have done it much earlier, I'm glad to see him there. Also worth noting, he is co author here. In fact, the second author on this paper paper is Alina Chen, who is in my opinion, a great hero of the story because she is inside the Academy has correct expertise to speak about molecular evidence and fees early career which means this is dangerous to her at a level that it wouldn't be or would be much less so if she were more advanced. So to have them co authors on this paper is significant. That's really good news. It is really good. And I think she deserves our gratitude and congratulations to her on getting this letter published at this level. And that's the other most important thing here is not only do you have people have unimpeachable credibility saying that the lab leak hypothesis is viable and deserves investigation. But you have them saying it in the journal Science right now. The journal Science has yes

**Heather** 12:15

so unlike the Lancet about which I'm just not assure science and nature are understood to be you know, whether or not these reputations are still founded, but are understood to be the two most important and prestigious science journals in the world.

**Bret** 12:29

Yes, and important because science exists as the sort of other side of the, the duality that is science and nature, right? So science nature journals, the journal Science and the journal Nature, right? The journal Nature is a British Journal that is the other top journal and you might add cell if we were talking about molecular biology, but for general science, you've got science and nature and nature was the place where the Christian Anderson letter was published at the beginning of the pandemic, pandemic claiming, I don't know where that cantique I don't think pandemic is a thing, and I'm pretty sure it has nothing to do with pandemics. But yeah, anyways, Christian Anderson published a letter early on claiming molecular expertise that actually ruled out the possibility that this was a lab leak, which is obvious nonsense, and has been obvious nonsense to everyone who has looked at it carefully without a bias. But in any case now,

**Heather** 13:32

so to the degree that there were wagons being circled, it seems that Ralph Eric, at least was either not inside the circle or has left the circle.

**Bret** 13:39

Well, you know, I also, I don't think we're likely to ever know exactly why we won this one. But we did win this one, when in

**Heather** 13:51

this case means keeping the hypothesis alive until it's actually been assessed.

**Bret** 13:55

Yep. I am not claiming that we know the answer here, though. I think one answer is much more likely than the other as I've said repeatedly, but

**Heather** 14:02

there aren't just two hypotheses on the table. It's there's not a one or the other. There are multiple possibilities. There are

**Bret** 14:08

two broad classes. And so the particular details will be interesting either way, but But in any case, I don't think we will ever fully know why this went so differently than other cases where whistleblowers and analysts try to force recognition of an obvious truth in general, that's a failure. Yeah, the powers that be when they have a desire to advance one story and hide another typically very successful at doing it, especially when they have all of the important properties. I mean, think about who it is who's lined up against investigating the lag, leveling hypothesis, all the major tech platforms, its major mainstream newspapers, it's the Academy, right? It's, you know, up until now, the major science journals, right, that's an incredible Arsenal, and to have, you know, The Outsiders the dark horses, right? Actually successfully force recognition of something that actually puts all of those forces back on their heels is amazing why it happens a little hard to say. But part of the answer is, those who were on the other side were very careful, right? Many were highly qualified. And there was a lot of courage. And because of that, I think somebody like Ralph Barrick, he's a smart guy. And I think he is sure to recognize this isn't going away. And so anyway, he you know, I, I'm glad he has arrived at the conclusion he's apparently arrived at, and I'm glad that the journal Nature, I mean, science, was willing to publish this. I will say I have a couple of concerns based on what I've seen so far. One concern is that there's an emphasis in both the letter that science published and the blog post that the editor who made the decision apparently posted about it, which is there's an emphasis on the hazard that the lab leak hypothesis might pose to people of Asian descent. In other words, there's an emphasis on that concern, which I think, frankly, is not impossible, that there would be such a thing. But I wonder if this is not an indication of how this was rationalized on the inside, and affect people who knew better? Were saying less than they understood because they were attempting to protect colleagues and others who might legitimately fear backlash.

**Heather** 16:43

That's I guess that's possible. I don't I don't see this, as emphasized in the letter there is no, the very last very short paragraph of a admittedly short letter mentions that this should be in no way an excuse to further anti Asian sentiment, which should be obvious to every reasonable human being. But I don't I don't know that that qualifies as an emphasis. But perhaps

**Bret** 17:05

Well, it does in such a short letter it does when it shows up also in the blog commentary on the letter. And then there's the fact of what the New York Times you know, still,

**Heather** 17:14

but I guess I would say that the you know, the scientists, the 18 scientists who read the letter have no control at all over the blog commentary on their research, right? Like they don't like we have to be very careful about ascribing any intention to the people writing the letter for, you know, the, you know, what goes on downstream, because that's part of that's part of what we've been talking about, right? Well, for 14 months now is like, you know, to the degree that scientists are trying to get the word out the media, you know, there's some there's there seems to be some concerted effort that may or may not be coordinated on the part of BDM on the part of tech companies on the part of, you know, academia on the part of the who various places to to stop discussion. And so you know, what happens on a separately written post about a letter, the authors of the original letter cannot be held responsible?

**Bret** 18:01

No, I'm not holding them responsible. What I'm saying is, I think, given what in a very short pivot is included, and then mentioned, again, in a commentary on the pivot, I'm wondering if this is not an indication of the internal something allowed lots of people who should have known better to say things that didn't make any sense for more than a year. So what is it that they were saying to themselves is a question that is very important if we're to ever face such a thing again, and prevent it from happening? Right. So what was the internal excuse? That's a good question. And this may or may not be it, or it may or may not be part of it. But the other thing is, well, I mean,

**Heather** 18:39

that's actually it's it's huge. If that is, if that is the case. And I, you know, I, I'm not, I wouldn't put the possibility of that very high myself. But what that suggests is that fear of racism has created an anti scientific movement that has clouded the waters effectively for an entire year during which the world has been in unprecedented territories across every domain, right? And, you know, to to which then I will point my finger at, yes, there are some actual racists out there who are assholes and need to stop it, right. But what we have for almost exactly that same time period, and of course, starting well, but before that, is a focus on how racist everyone is, right? You know, this, this talk about how everyone has to admit their own racism, no doubt encourages the sense that what we really need to do, one of the priorities we need to engage in is making sure that no racism ever happens and we do need to make sure of that. But if there is a basically a false Boogeyman, wherein racism is misunderstood to be far more widespread than it actually is, which we have talked about extensively on this podcast. We understand that to be the case, then if that is partially to blame for This misdirect this, this, this just this terrible policy and apparent, you know, scientific backing of bad policy to not engage what was obviously a possible hypothesis from the beginning, then that's one more thing on the list of harms that critical race theory and intersectionality. And welcome somehow brought to the world probably

**Bret** 20:22

agreed. Now the question though is how does it fit with respect to a pivot that has another frightening feature to it? Okay, so on the one hand, you've got this emphasis on preventing a backlash against Asians, which, of course, makes sense. But

**Heather** 20:37

if this did come from the web, it wasn't the Chinese people. Well, but

**Bret** 20:41

that's that's been my point, which is, in fact, those of us who have been pushing for a responsible investigation of the lab leak have been saying, This isn't a Chinese failure. This is a failure of the international scientific community, if that's where this came from us. So we've been careful about that. And to now have a sort of, well, we need to investigate this. But when it's like, well, actually, we were ahead on that too, right? Not the Chinese, this is not a Chinese failure. Now, it may well, the cover up is a failure of the Chinese Communist Party, and the government of China. But that's not the same thing as the responsibility of Asians. Right,

**Heather** 21:15

of course. And, you know, as you began this, this commentary by saying, The Wuhan Institute of virology and the barrack lab in North Carolina are actually the, you know, by many measures, the two most premier labs in the world doing exactly the kind of gain of function research that would have allowed such a virus potentially, to be created. such that, you know, this, this kind of research needs to needs to be regardless of whether or not this particular virus emerged from a lab, that this type of research needs to be reassessed as it was, as I don't remember the days we've talked about it before it was halted. I think, something like 2014 under the Obama administration, and reinstated in 2018, with the help of Dr. Fauci Yes, in during the Trump administration, but with the help of Dr. Fauci this type of research was reinstated.

**Bret** 22:03

Yep. And you know, getting to the bottom of this is central, because either this thing jumped from nature, and the people who were screaming that we needed to do gain of function research in order to get ahead of the next pandemic, you know, have been vindicated themselves, in a sense, right? I don't think gain of function research is sensible. But if this pandemic really leaped from nature without going through a lab, then it tells one story and if it came from the lab, it tells the opposite story that it was exactly the panic response to the possibility of something jumping from nature that caused us to put ourselves in such a serious situation. So just want to go to the last thing on this is the new york times article in which it attempts to contextualize this letter in science. Right? So exactly, you have that letter, can you put it in that article. So the New York Times basically does a report on the the letter that includes beric. And unfortunately, I can't read it at that size. But in any case, it does a number of things. And effectively, it reads like in it. So it's Carl Zimmer is one of the authors, it reads as an attempt to reposition the elite so that they don't lose all credibility having been on the wrong side of this issue for so long, with so much at stake. And so one of the things it does, can you scroll down a little bit more? So first of all it embarrassingly conflates theory and hypothesis again, for no particularly good reason. Okay. Well, I can't, I'm not gonna be able to find it with Zack scrolling. But what it says in the center of this article, is the problem in large measure is that those who have been pushing to consider the lab hypothesis have been expressing too much certainty, and that the problem is people who have been too certain, right? And it puts the default. Yeah, exactly. It's our fault, even though we haven't been certain. We haven't been certain at all. In fact, I've been saying it's a pivot right there. It's a clever pivot. Right. And my point has been stopped saying theory it's not a theory. It's a hypothesis as is the other we're not certain here the you know, when you say it's a hypothesis, you're saying, here are the exact rules of engagement. What's

**Heather** 24:23

going to come back at you is that you made a flowchart and you said, you know, here and also on Bill Maher, something like I think there's a greater than 95% chance well, and that is read, apparently as certainty. Well,

**Bret** 24:36

I don't know. I think the point is, those who are making this want to make a general explanation of why they were on the wrong side, right? And to portray you basically to straw man anyone who is on the other side, even though I think the strength of those you know, in the drastic group of Alina Chan of us has been that we've been very, very careful to Weber's isn't certain, but there is an impressive amount of evidence that points in this direction. And if Well,

**Heather** 25:06

I mean it's, it's, it's typical now, right? Like there there is there is no and of attempts to further divide us. And you know, their every kind of argument seems to be rather than scientific and us versus them argument. And the us versus them arguments. Of course, they sometimes clothed in pseudoscience sometimes come cloaked in pseudo scientific rhetoric, as if, as if by going forward with that, you know, yummy dopamine hit feeling of I don't like the people who look like that. I don't like the people who aren't wearing masks outside. I don't like the people who think that the lab that this was a lab leak, as if that is has anything to do with the scientific assessment of any of these things. that's a that's a pure raw, emotional like amygdala response that is not in any way scientific,

**Bret** 25:55

right. And at some level, here, we have the hazard that as the elites often do, when they are unable to control the story, they are going to do everything in their power to not allow the implications of it to be understood. The implications are something is wrong with our institutional structure, that it got this one, so very wrong. And that forces us to ask the question, what else might it be getting wrong? So we can leave it at that. But I very much want people to keep an eye on what was actually said, and what this pivot is going to do in terms of portraying what was being said.

**Heather** 26:36

Okay, so not sure what to do, I thought we were all going to spend like two minutes on that story. And it took half of our time. So maybe we should drop some of what we're going to talk about with regard to ivermectin, I have a lot prepared here. And I just don't think we really have time to get through it all. Well, so let's just let's just start. And so

**Bret** 26:55

we can just start we have we have to talk about the predicament that we are in on YouTube with respect to ivermectin, which is mentioned specifically in their community guidelines. YouTube has community guidelines.

**Heather** 27:08

You really want to start before you even say what the thing is. Yeah,

**Bret** 27:11

I do, because we are scientists who are about to talk about scientific evidence that scientific evidence may have implications for what we collectively ought to be doing and what you individually might think, we are not going to make any recommendations as to what you should do. And we are not going to say anything conclusive about what the data say, because the data are not themselves conclusive. However, it doesn't mean the data don't imply things. And, you know, I think YouTube ought to think very carefully about whether it wants to confront to people who have the proper credentials have demonstrated a willingness to be responsible about evaluating heterodox scientific processes. And in this case, our have just been through a circumstance where a hypothesis that they were suggesting needed to be investigated is now understood to be necessary to be investigated, you know, in science, etc. So, that's the context.

**Heather** 28:14

Okay. So we have we've mentioned ivermectin before ivermectin became somewhat prominent as something that people were talking about early in the pandemic, probably April, May of last year, people were beginning to talk about it. We spent considerable time actually in Episode 61, January 2 of this year of 2021, in which we provide a bit of background as to what it is. It was discovered by scientists in 1975. In a patch of Japanese soil, Satoshi Amora, more I called it astonishingly safe, and a wonder drug akin to penicillin and aspirin. And a review in the Journal of drugs and dermatology concluded after more than 25 years of use, ivermectin continues to provide a higher margin of safety. Now, that was obviously, you know, that had nothing to do with efficacy against COVID. And in fact, the quote doesn't have anything to say about efficacy. But But safety. So this is this is a drug that has been widespread in use for various various pathogens in both human and non human populations and veterinary applications for four decades at this point, almost, you know, coming up on are actually maybe at this point 50 years? No, not quite, I think it's over 40 over 40 years. And there have been a few people sounding the gong during the pandemic about whether or not ivermectin might be effective, we know it to be safe in humans from all of these studies that have been done already, because it's such a widespread drug in such widespread use, whether it might not be effective, either as treatment or as prophylaxis against SARS. kobie. To prophylaxis I'm never sure people know exactly what that means. If they are only associating Word with condoms. So prophylaxis just means a preventative. So for instance, we don't have a malaria vaccine yet. So when you travel to malarial areas, you have to take prophylaxis of one or the other, depending on what species of malaria is there if you got 5x or Plasmodium. Anyway, sorry. There are

**Bret** 30:14

a couple things I want to add to that. Yep. First of all, so Toshi Amara shared the Nobel Prize with William Campbell for the discovery of, of this drug, and it has been in use, preventing river blindness and treating river blindness for all of these decades. Now, when we say it is safe. What we are saying is it is comparatively safe. All drugs have downsides. Yes, this one has some downsides. In terms of what has been observed, the downsides are short lived in general and minor, and largely a result of the death of the parasites that this is used to fight. In other words, if you are infected with a worm, a parasitic worm, and then that worm dies, your immune system actually has to take it apart at a molecular level, which may cause you to itch and other things. But that is part and parcel of being cured of the disease. So all drugs have downsides. The downsides on this one are very, very low.

**Heather** 31:17

Yes, absolutely. When we first talked at some length about ivermectin back in early January of this year, there were at that moment, only three studies on ivermectin proceeding in the US, none of them funded by NIH or any other US Agency which is which is at the very least negligent when when I go to the site now the clinical trials.gov we find that there are seven two of which are not yet recruiting so there are a few more than there were before but still really not that many especially when you compare that to Zack, please May I see my notes Thank you, especially when you compare that to what we what we can now see in the published literature, what is going on in the rest of the world there are so many studies, but without the full force of the American government behind them I just to say that they you know, without NIH backing without you know, without without the incredible scientific establishment that the US can bring to bear on problems. Why is the US government not? Not? I'm sorry, you're trying to tell me something and I'm not sure what it is because I can't read your writing. I'm sorry. Okay, so there is a review car at all. 2021 Oh, no, actually, first, we wanted to say that a new paper by Saha at all Zack, if you will publish this year, submitted this year in fact and published this year, March 2021, the binding mechanism ivermectin and level salbutamol with spike protein of SARS, COVID. Two. So that's all we need to show of that. We're not going to go into depth in any of these papers. But basically what this paper finds is the mechanism of action, by which ivermectin might work against SARS KB two, which is by binding to the spike protein, which, you know, sure turns out to be so prevalent in so many stories around SARS COBie two is the spike

**Bret** 33:28

protein. Yeah, because the spike protein is essential to getting into the cells in order to do the bidding of the virus blocking the cell protein is an obvious go to move, which is why the vaccines look the way they do. The distinction here, though I would point out is that ivermectin is a mode of action is loosely analogous with innate immunity. In other words, ivermectin was not constructed in order to target the spike protein of SARS, it generally has an effect that gets in between the spike protein and the cells that it might invade preventing the the mode of action. Yeah, which implies that the chances of SARS Coby to evolving around it are much reduced, right? Because this is not a specific thing that can be undone by slight changes. It's a generalized activity, right? So you've got a comparatively safe drug, we've got a known mechanism of action, which frankly, you don't even need, but there is one that's fascinating, blocks the activity of the spike protein, and it appears to do so but in a way that is unlikely to be subject to small evolutionary changes disrupting it.

**Heather** 34:36

And I guess that's also a fit for how many applications we already know that are you know, FDA approved for ivermectin there's so many different pathogens, that ivermectin seems to be effective against. That it working as a as a is kind of a broad spectrum. And even it's, you know, antiviral in this case, but anti pathogen anti pathogen Yeah, and I don't know, I don't think broad spectrum anti pathogen is a term of our category right? But it you know, it seems to be that so there's also a review this is car at all don't show my screen yet sec. ivermectin is a potential drug for treatment of COVID-19 and insync review with clinical and computational attributes. This is also published the third of January this year. And a couple of you know, they basically are just these these guys are reviewing other people's research. And most of the studies are small, you know, the N is small in almost all of these studies. There are no giant clinical trials that I have seen yet. They say another study by lamet all reported that ivermectin and doxycycline is combination is very efficacious and saris, Coby to clearance in patients with mild to moderate disease. Later they say, according to the results of another paper, which will link to all of these ivermectin combined with doxycycline, was safe and efficacious in early viral clearance and patients and took less time than in this other paper. They were comparing it to hydroxychloroquine and azithromycin combination for viral clearance. And actually, you can, Zack just show Nope, not yet. Where is it? And oh, here it is. So they just I'm not going to walk through this whole table. But they, they run through the summary of the papers that were available to them that they reviewed. And in all all of the cases where they there was a ivermectin being compared to some other treatment ivermectin was doing as well, but usually much better. So.

**Bret** 36:46

So let me cause us there. So you will see frequently in the discussion of why we mustn't think about talk about ivermectin, you will see the claim that there are no large scale studies that would give us the evidence, what there is, is meta analysis that actually looks at many studies, as you just described, and that is, in fact, a better kind of evidence, right? So it would be nice if we had a really large long standing study, but a meta analysis that gives you a consistent indication is the equivalent or more of a large study, a large study can be biased, a meta analysis, the biases of various different researchers will tend to be canceled by the fact that they won't be consistent between these things. The other thing to say is, large studies are great, because they reveal very small effects, when you have a very large effect, you do not require a very large study to see it. And so the the compilation of all of these things, is very strongly suggestive that ivermectin does work. And what we know about it from the context in which it has been used as an anti parasitic suggests it's very safe, which then we would have to put in to juxtapose it to the alternatives here.

**Heather** 38:08

Well, I'm not sure I totally agree with all of that. I think, you know, I would point my finger at NIH, and some of the, you know, the governmental agencies within the US who are normally the ones who would help make happen would help facilitate the large scale studies, you know, it's exactly these organizations who are in part, and they are their representatives who are saying, well, we can't assess this because there are no large scale studies. Exactly. While I think we are seeing evidence that they may be helping make sure that there are no large scale studies. So that, you know, that's, that's a problem right there. And then we do also have some evidence from Africa, of different kinds, you know, it's not a large, it's not a large scale clinical study. But basically going back in afterwards and looking at results, having been having done a without imagine that's what they were doing, they effectively pulled an experiment on several populations within Africa. But before we go there, with regard to this car at all review, I did want to just spend a moment talking about the fact that many of the studies that they were reviewing, were combining ivermectin with doxy with doxycycline, which is an antibiotic, and sometimes the the so called control group, the other group was hydroxychloroquine, with azithromycin zithromax, which is another antibiotic. And this struck me as surprising are you I'm not I'm not sure why we are expecting these these drugs that are understood to be antibacterials. To be effective against a virus and this seems to go against a you know, one of the few things that we learn in sort of basic biology, about about drug efficacy and you know how you know, doctors should never be prescribing antibiotics when what you've got is a virus We all want what do you got as a cold, right? So there's this again, just like we're in complex system space. And somehow ivermectin in combination with doxy with doxycycline, might actually be even more effective. I'm worried about widespread use of doxycycline. And it's also effective as an anti malarial actually. And it but it is, it has known effects with regard to sun exposure. And so when you're on doxycycline, you're really not supposed to be spending time in the sun because you're much more prone to burning. And of course, we also know that spending time in the sun is good for you with regard to defending yourself defend your body defending itself against stereoscopy, too. So there are a lot of things to juggle here.

**Bret** 40:46

So let's, let's sort that a little bit. Okay. One, it is interesting that in the case of things that are not bacteriological, or fungal that we see, increasingly, that antibiotics, which we have been told are should be limited to the use against fungi and bacteria turned out to be useful. So this is a welcome to complex systems phenomenon, hey, you're getting surprised by something that you didn't think to predict? B. That's not to say that it makes any sense at all, for a doctor to prescribe an antibiotic when you do come in with a virus, who's to say what affects what and see, we also learned back, you know, decades ago, about how safe these antibiotics tended to be. And that turns out to be wrong, right? These things have downsides because, of course, welcome to complex systems. So you know, what landscape are we in pretty hard to know, whether the NIH is integral to why the big studies don't exist? Maybe. But I think the point is, you somehow at the root of all of this is some weird license with no limit to a double standard, right? So if some, if the powers that be decide they don't like something like ivermectin, they can establish any standard up to a ridiculous degree that nothing can overcome, right? When it comes to the thing that they favor? There's almost no standard at all right? There's no level of danger that could be sufficient to call it into question. And so we don't know what that looks like on the inside. But what you can see is the hallmark of it is a double standard that is glaring, if you know how to analyze what's being said,

**Heather** 42:25

Absolutely. So when we began to really be thinking a lot about ivermectin again, a week ago or so, I said to you, I wonder if given how widespread and give given how many decades ivermectin has been used to, to decrease pathogens. In Africa in particular, if that may not be playing a role in why we why many African nations seem to be doing much better than you might otherwise expect. And that, you know, there are other reasons, too. There are other possibilities, of course. But we actually we found two papers this week. And I imagine there might be more but we found two papers. One of which is this one, Zachary says helwig and Maya, titled it published in the International Journal of antimicrobial agents, titled The COVID-19 prophylaxis question mark lower incidence associated with prophylactic administration of ivermectin. So, in that paper, they have probably would it be useful if I had? I can't, I can't do it. So their methods. The methods in this paper are we collected data from countries that routinely deploy prophylactic chemotherapy, that's PCT. Using countries that I'm going to start again, their methods are as follows. And I'm quoting them we collected data from countries that routinely deploy prophylactic chemotherapy using various drugs, including ivermectin based on the various varying MDA designs, we grouped these countries into two different categories, those that include ivermectin in their prophylactic chemotherapy, and those that do not, we then proceed to compare COVID-19 proliferation between these two groups, and further contrasts with them against a third group of countries that do not use prophylactic chemotherapy at all. So they've got three groups, they're comparing groups that simply use prophylactic chemotherapy because of all of the other things that are in that are endemic in these countries river one like river blindness. And of those countries in Africa that use prophylactic chemotherapy there there are two sets, one of which has ivermectin in the prophylaxis and one of which doesn't. And then there are countries that don't use prophylactic chemotherapy at all. And here, Zack is figure three from this paper which shows for those just listening on the y axis we have incidence cases per 100,000 people and the three categories on On the left, we have prophylactic chemotherapy. That includes ivermectin, a short, squat image, because there are a lot of countries. And there, they have very low incidence rates. In the middle, we have countries that use prophylactic chemotherapy. But those don't include ivermectin. And then we have a lot of, and there aren't very many countries in that group. Most of the countries in Africa that use prophylactic chemotherapy include ivermectin in their chemotherapy treatment, and then we have a number of countries in Africa on the right, that use no prophylactic chemotherapy at all. And so the authors go to great lengths to say, look, we know that the sample sizes are way different. And, and, and this is coming in after the fact and all of this, but look at these numbers. The countries that were already deploying ivermectin at the population level have far lower case, case counts, case rates than the countries that are either deploying chemotherapy. Again, chemotherapy, meaning something, or chemical therapy. Yeah. Without ivermectin or none at all. Right. So that's, that is a very interesting piece of data. Thank you.

**Bret** 46:14

So I'll just say this is this is effectively a natural experiment, right? So things vary between islands. This is countries vary in what they've been doing. And we can now look at the difference between those countries. And it is a profound difference, which we can't say for certain comes from this. But

**Heather** 46:29

and here's just the other study that does very much the same thing. Okay. This is Guerrero at all published again this year. And this is a Colombian medical journal COVID-19, the ivermectin, African and nigma and is called. So I'm going to take my screen back, please. Thank you. So that we can show you this, this is the paper just in PDF format. They, under their remarks, they have three What do these results contribute? Our data suggests that a mass public health preventive campaign against COVID-19 may have taken place inadvertently in some African countries have massive community ivermectin use, additional studies are needed to confirm it. So that they come to the same conclusion as that first study. But there's two of them not working together who looked at very similar data, probably basically the same data, they came up with the same answer.

**Bret** 47:29

So our viewers ought to be considering this question in light of conspicuous patterns like that. And in light of the fact that the drug in question has a very long, extreme safety record, why wouldn't you test it? Right? Why wouldn't you do that large scale study? Why wouldn't you deploy it somewhere to see whether it had the effect? And then discover whether or not this was, you know, I mean, no, I don't think we've said this time. But this appears to be effective in controlling COVID from people who've already contracted it and preventing contraction, right. And prophylactic treatment and prophylaxis have imagined the thing blocks to spike protein that's integral to how it gets between people. It's also integral to how it gets between cells, right? So this is highly effective. In both cases, it would appear. So what on earth is the excuse for not testing?

**Heather** 48:27

Well, unfortunately, I think I may have at least part of an answer. But but one more thing before we go to that. So if you can pose that question, once more, in just a minute. Let us just point out this is a paper from pre COVID. Remember those days? I do? Yeah, I do. what's called an observational study. Published in 2019. In the British Journal of Dermatology, it looks like I think that's what that's gonna stand for called ivermectin, safety and infants and children under 15 kilograms treated for scabies, a multicentric. observational study. So this has nothing to do with COVID at all. This is simply and it's nothing to do with efficacy actually, even like I think from from what I can infer from this paper, efficacy in ivermectin against scabies had already been established, but now they were looking at look, can we actually give it to really tiny kids? Can we give it to infants and kids under 15 kilograms, which is like 13 pounds? 13, about 33 pounds? And what they find is that is is yes, they've you know, obviously there are always risks, but this is a remarkably a remarkably safe drug for something that has such broad scale efficacy. And remarkably

**Bret** 49:39

safe in this case means short term, and as far as we can tell, long term because it's been in use so long.

**Heather** 49:46

Exactly. Okay, so what was the question you just asked?

**Bret** 49:50

The question is given all of the evidence circumstantial inadvertent experiment, as it may be from all of the evidence that this appears to have a mechanism For action and appears efficacious in preventing both the spread between people and the spread within a person. Why on earth? Would you not run a very large study that would tell you for sure how good this was? And how best to use it?

**Heather** 50:17

Yeah, why wouldn't you? Why wouldn't you? And wouldn't it? Wouldn't it be a legitimate word to use that it would be criminal if you didn't, if you knew that it would be a good idea to do so? Well, as it turns out, if ivermectin were an effective treatment, the vaccines never would have gotten emergency use authorization in the US. And we know that because even though even my computer would like me not to be talking about this, here is and we'll link will link to the URL for this. But here, here is just a downloaded version of the document from the FDA emergency use authorization of medical products and related authorities guidance for industry in our state and other stakeholders. So I'm gonna scroll down this is from January 2017, expires in 2022. This is still the the guiding document, and you go down not very far. Although it may seem like it's going fairly far and find emergency use authorizations are to go I swear it's here. Here we go. criteria for issuance under emergency use authorization medical products. One criteria for issuance, there are a few it needs to be a serious or life threatening disease or condition. That needs to be evidence of effectiveness. There needs to be a risk benefit analysis and D there need to be no alternatives. I quote, for the FDA to issue an emergency use authorization there must be no adequate approved and available alternative to the candidate product for diagnosing, preventing or treating the disease or condition. A potential alternative product may be considered unavailable if there are insufficient supplies with the approved alternative to fully meet the emergency need. That is not a problem for ivermectin by not doing the relevant, large scale clinical studies on ivermectin. And thus it not being approved by the FDA for use in COVID. That opens the door for you as for emergency use authorization for the vaccines that we are now all living with and among

**Bret** 52:34

this is stunning. If that is the explanation, then we are talking about something for which I'm not even sure we have a proper term

**Heather** 52:43

because anger inducing.

**Bret** 52:47

It is that but let's just say this would have elements of malpractice, this would be gross negligence. I think it verges on depraved indifference, given that we're talking about a life or death situation for vulnerable people who get this disease in addition to effectively the crippling of the world economy. And who knows how much harm we'll never be able to measure all the harm that came from this pandemic and the way it has forced us to alter our behavior, all the businesses that have closed all the people who've been rendered homeless, who's to say what all of the costs actually are, and if there is an effective if this is effective, and you know, we can't say that it is. But we can say, look, evidence works a certain way. This certainly seems like a whole lot of evidence that points in a direction. And if it were just simply good at treating people with COVID. That would be immense. The fact that it appears comparable in preventing people from contracting the disease to get a prophylactic dose at a prophylactic dose to vaccines, that we happen to have a long standing administration of this thing to people and in parts of the world where there are things like river blindness. People do take this regularly, in fact, I think is referred to as Sunday Sunday because people remember to take it on as a weekly or bi weekly basis. The point is, we have a lot of information on how people tolerate this drug. So if it was a great drug for this, that would be immensely good news for planet Earth. What's more, this stuff is readily mapable. Right? You can make this stuff all over the world and in fact it is readily available probably too readily makeable. Now what do you mean by that?

**Heather** 54:43

Well, it's been around for a very long time and it's no longer under patent

**Bret** 54:47

no longer under patents so anybody can make it and not violate

**Heather** 54:51

and yet and yeah, check out me you actually sent me this. So you know this, but check out Mark's response. So Merck does Merck does not like ivermectin, that All

**Bret** 55:00

right, I want to point out the the history here so well, Santos reason Okay. Oh Maura Yep, discovers this compound. He sends it to William Campbell, who I think is a friend of his who is a Merck scientist. Right. ivermectin, is the drug that emerges it gets a Nobel Prize, right?

**Heather** 55:21

So those two are those two those Well,

**Bret** 55:24

those two got a Nobel Prize for their discovery of that drug. And they shared that Nobel Prize with a woman who was being heralded for discoveries in fighting malaria, I believe, but in any case, a Nobel Prize was awarded for the discovery of the compound that became ivermectin, which is a Merck drug. Okay. What does Mark say?

**Heather** 55:46

Mark says, here actually, maybe, let's see if I can show the relevant here we go. Okay, so this. This is a quote from an article that I will link to Mark's patent on ivermectin expired in 1996. And they produce less than 5% of global supply. In 2020. They were asked to assist Nigerian and Japanese trials but declined both. In 2021, Merck released a statement claiming that ivermectin was not an effective treatment against COVID-19 and bizarrely claimed, quote, It concerning lack of safety data and the majority of studies of a drug they donated to be distributed in mass rollouts by primary care workers and mass campaigns to millions developing countries. The media reported the Merck statement as a blinding truth without looking at the conflict of interest when days later, Merck received $356 million from the US government to develop an investigational therapeutic, the who even quoted mark as evidence that it didn't work and their recommendation against the use of ivermectin. It's a dangerous world and corporate marketing determines public health policy, global vaccine rollout to everyone is the policy. So

**Bret** 56:51

is there a polite way of saying what the fuck is going on? Right? Yeah, like, we're talking about a situation in which life and limb is on the line. at a scale that's almost impossible to comprehend. We're talking about millions of deaths worldwide. This is an immense number of people who stand to benefit, not to mention all of the suffering that comes to people who have lost a family member, right? That is an immense, immense amount of harm, before you ever get to the massive disruption of planet Earth, right. And it appears that there's something just on the shelf, cheap to make safe to distribute long longitudinal safety data that comes from the fact that millions of people take this thing. In fact, I believe 4 billion doses of this thing have been administered already on planet Earth. It was plenty

**Heather** 57:47

safe for Merck to distribute widely when it was still under patent but now they're claiming the safety record isn't sufficient.

**Bret** 57:53

Right? That doesn't even make sense that now it's inconsistent before you get to the end of the sentence you've already contradicted yourself somehow so yeah, this is just something ungodly is going on and the idea that not only does it show up in weird contortions of merch and the who, but it shows up in the YouTube community guidelines Thou shalt not right what is going on this is insane

**Heather** 58:20

what what indeed what indeed. So I will also post the this mark statement on ivermectin use the whole thing on our show notes. It's not It's not easy reading. It's not It's not fun. But I mean, I guess we've already talked about this, but media is all crickets on this on ivermectin. Yeah, when they are actually saying that there's no there's no possibility of efficacy at all. So we mentioned I believe in Episode 61. The AP having fact checked ivermectin. And they concluded without basis that quote, there's no evidence that ivermectin has been proven a safe or effective treatment against COVID-19. And indeed, that same fact checking article has about safety and innocence. Actually, I think I think I can get there. Yeah. Okay. So this this article, no evidence ivermectin is a miracle drug against COVID-19.

**Bret** 59:15

We I have to stop you right there. Yeah. This The more you read this article,

**Heather** 59:20

I have a quote from

**Bret** 59:21

it. crazier it is, but I just want to point out the title, no evidence that ivermectin is a miracle drug, right when you're hyperbolic. And the second part of the sentence the fact that you don't have any evidence that this thing is beyond. Yep. You know, this is

**Heather** 59:37

fact checking. Right? 2021 this is fact

**Bret** 59:39

this is the hyperbole. Garbage is what this is

**Heather** 59:43

absolutely. So the quote is this I will not be able to find it by scrolling down. I'm just going to read it here. In March and Arizona couple attempted to self medicate and took chloroquine phosphate, an additive used to clean fish tanks that is also an ingredient hydroxychloroquine the woman became grave The URL and the man died. What Pray tell does that have to do with ivermectin that isn't a fact checking off article by the Associated Press, right which is then going to be referred to by other media. So the article supposedly about ivermectin and its failure to be a miracle drug. Iver Mecca as a couple of Yahoo's and drink fish cleaner. Which is not in any way related to ivermectin like

**Bret** 1:00:27

that's, that's a fact check. Check so many steps removed, right that the fact check is about ivermectin. ivermectin exists in context of another drug that people think by at work. And then some people bought some stuff that they thought was the the second drug and that somehow implies the first drug isn't any good? Yeah,

**Heather** 1:00:47

it's not. I mean, we've talked about this before. It's not even guilt by association for drugs. It's like guilt by association for drugs. And I don't even know what actually, I think when we talked about this before it was two episodes ago, Episode 78. I quoted from Washington Post article on April 8, and I'm just gonna read this quote again and again, I'll put the link again in the show notes. With regard to ivermectin quote, it's like the new hydroxychloroquine said Angela Rasmussen virologist at Georgetown University Center for Global Health, science and security, referring to the malaria drug published, pushed by President Donald Trump that proved ineffective against COVID-19. Quote, it would be great if ivermectin did work, it's been around for years, and it's cheap. But to my knowledge, there was no data that suggests it's good for COVID-19. And of course, that's just thinly veiled code for this thing smells like Trump. And if it smells like Trump, it must be bad. So good people not just can but indeed should must safely ignore this thing. It's probably better if you mock and deride anyone who takes this seriously as well. Yeah, right. Like just like, just sort of wave your arm the general direction of like an orange Halo over there. And imagine it's Trump and put anything you don't like next to it, and boom, your problems gone.

**Bret** 1:01:57

Right? But the problem is that this stuff carries, like, the weight of law, right? If we can't talk about it on YouTube, right, because it violates the who guidelines, but of course, the who is out of control for reasons that we can speculate on, but I have no way of knowing. And you know, that fact checking article I remember, there's also a sentence in the middle of it that actually says what the thing means, like the actual fact. And the critique, like the the actual critique is something like, the studies that suggest that ivermectin is effective, are not the gold standard, blah, blah, blah, blah, blah. And the point is, well, that's not an argument at all. Yes, it is an argument that you might want a, you know, a study that didn't have the defects of the ones that exist, but that's hardly the same thing. As there's no evidence for it. There is evidence for it, even if every effort has been made to leave the impression that it hasn't, so that people who have the power to shut up those who would talk about the evidence will do that. Right? And in whose interest might they be doing that? It's hard to come up with another candidate. Right? Right, then the people who stand to make a profit from other treatments, whether it's remdesivir, or vaccines, and the really appalling thing here is, if the world is to get over COVID-19, having botched the response to this point, right, our best hope is some kind of composite herd immunity, where there are not enough people susceptible to this disease for the disease to continue to propagate. And then it goes extinct over time. How are you going to get there? Well, who's not susceptible? People who have had COVID have at least some immunity for some time, right? And it may be a lot of immunity. And it may be for a very long time. We can say the same thing about people who've had the vaccine,

**Heather** 1:03:56

it looks to be a very comparable, you know, if we're if if the vaccines are going to require you annual boosters, then the amount of time that you're naturally achieved immunity from exposure to actual SARS COVID to and the amount of immunity that you receive that you get from being vaccinated, might well be comparable and are appear. Really, unfortunately not to be permanent.

**Bret** 1:04:16

Right? Yeah. Okay, so you've got those two categories, right. And then you might have another category, if ivermectin works and you administer it widely, which you could do very, very quickly, because of course, it can be produced by anybody and is already being produced around the world for other reasons, right? You ratchet up that campaign, you give it to people that provides a third group that would be very, would have a high degree of immunity to contracting the disease. If you can get that.

**Heather** 1:04:45

Have you run into anything Sorry to interrupt but um, have you run into anything? I just have not seen this and I think the question hasn't been asked, but whether or not if you're on a prophylactic dose of ivermectin, it would do anything to reduce if you're exposed to SARS COVID To you are better able to defeat evidence suggests that you are better able to defend yourself against it. But are you able to spread it yourself? Do you do you remain contagious yourself? This is a big issue with the vaccines right there seem, you know, because you can be asymptomatic with a vaccine, you might be more likely to spread it. Because you might be being less careful because you think you're immune to it. And I don't know, I have not seen any evidence of this with regard to ivermectin.

**Bret** 1:05:25

Well, I would point people to, to Pierre corys group, they have a lot of information on the web. I recall, there's a very interesting study, I believe it was Argentina, in which a lot of frontline workers It was like 1200 frontline workers, were part of a study, 800 of them got ivermectin 400 of them didn't Not a single one in the 800 contracted the disease. And a quite a number did in the other group,

**Heather** 1:05:54

more than 50% did in the in the other group. But what that doesn't say is if any of those 800 who were treated with ivermectin prophylactically. Still were able to, you know, if they were exposed, spread the disease to anyone else. Right? I would, I would like to know that I

**Bret** 1:06:11

would like to know it too. But let's just say if, loosely speaking, based on what we've seen, if the numbers or anything like they appear to be, then the composite of people who have a prophylactic relationship with ivermectin, people who've had COVID, and therefore have immunity for some time, most of them people who've had the vaccine and therefore have immunity for some time, most of them. That composite group could well be quickly above the number that creates herd immunity, where COVID starts becoming less common because it can't find a willing victim.

**Heather** 1:06:44

Yeah. So

**Bret** 1:06:47

what would it take? If you knew that that wouldn't case to block that effort?

**Heather** 1:06:52

Wouldn't it be much more likely to get to 80% of any given population compliant with one of those three things one of those three categories? Right, rather than saying, there is one and only one road to being a good person in this game in this era? where, you know, the, the vaccines seem to be effective. They simply cannot have the safety record that ivermectin does. ivermectin without giant scale clinical studies seems to be effective and does have decades long safety record.

**Bret** 1:07:28

It does. And, you know, I feel weird about this, because, you know, we are oddly at the epicenter for various reasons, I think primarily because we are in a position to have fears that are backed by scientific training, right, our concerns about the vaccines are founded the hazard of vaccines for which we have no long term data, that interact with the immune system in a novel way, right? those hazards are real, whatever the long term harms actually turned out to be the fact that we don't know what they are at this point, is a legitimate reason for us not to want to be vaccinated. Right? In light of that, in light of the fact that anybody who follows that same trail of logic might reasonably end up in that same category, not because they're anti vaccine, as we have said many times, whereas vaccinated as anyone, we are highly pro vaccine. In this case, we are concerned about we don't what we don't know about these vaccines. And that is not a wild guess that is on the basis of our best understanding and the huge unknowns that exists surrounding this technology. So why wouldn't you want to investigate whether or not people who are concerned about the hazard of these vaccines for themselves and their families might have an alternative that is approximately as effective at fending off COVID? Right? If your real interest in wagging your finger at everybody about masks and vaccines is to get us to a position where COVID can't spread any more than food, and we want to provide the maximum diversity of useful technologies that people can deploy. So the sum total of us really are immune to this disease at a level that It then goes extinct. And we can stop living this way. I do. I mean, what reasonable person wouldn't?

**Heather** 1:09:14

Yeah, what reasonable person wouldn't if they were actually, if they actually cared about the things they say they care about, if they're actually interested in the health of humanity and the societies that we live in. I guess the other thing, just to connect two of the dots here, that maybe should be obvious, is we potentially have a problem with schools, as these, some of the new variants seem to be more willing to infect children. And I don't know if it's the FDA or whoever just approved ones, the Pfizer vaccine for 12 to 15 year olds. But there's a lot of people who are adults and are willing to take one of the mRNA vaccines are not willing to let their kids anywhere near it. And certainly, we want to To our children from from them as well, because the risks are higher for younger people for two broad reasons they are still developing. And so there are often often drugs that are safe and adults are not safe for children. This is part of why you don't drink when you're pregnant, you don't give alcohol to three year olds, right? Everyone knows this. And of course, more of their life is ahead of them yet, so they have more time to experience any long term effects that might result. So for those two reasons alone, you want to be much more cautious about giving things to children that are not vetted by long term research. But ivermectin appear appears to be have a have a very long term safety record, even in very tiny children. We still don't have the giant clinical trials with regard to efficacy against COVID. But maybe, especially given the problem in schools, and especially given the variants may be now figuring out how to leap into kids because more and more of the adult population is vaccinated there's less reservoir on the adult population. Maybe ivermectin to you know, 18 year olds and under would be a legitimate way to start rolling this out. And you know, maybe if you really have to play your damn games, you can do it in such a way that you know, the the vaccines are only for over 18 year olds and the kids are for the ivermectin is for younger people. But you know, really why why do you need to play those games with all of our lives like that? That's that's the big question.

**Bret** 1:11:28

Yeah, that is the big question. And, you know, the contrast to me between getting us little folks to go after each other over moral failings for being frightened of novel vaccines and things while the big people are apparently playing business as usual, with you know, not only the lives of strangers, but the normal business of planet Earth. Right. The fact is, ivermectin isn't new, we could have been investigating this all along. If there needed to be a campaign to ratchet up its production, it could be underway. And if it turns out that it's disappointing, I mean, frankly, if it was half as good as it appears to be, it would be tremendous. So, you know, if it's as good as it appears to be, then how much did we lose, dragging our heels and on whose behalf and how many people participated in shutting down this discussion and why? Right, it's just, it's, it's mind boggling to me, it really looks like crime of the century stuff. You know, hopefully,

**Heather** 1:12:29

somebody century is still young, but it seems like a good contender,

**Bret** 1:12:32

it does seem like it's in the early lead, right? And, you know, it ought to, among other things, the fact of you know, the long slow road to the acknowledgement, that lab leak is a viable answer to where this thing came from. And therefore, we have to wonder about gain of function research. We should also then be wondering about the people who pushed it, you know, Fauci, Peter datsik. Right, all of the things that got that in motion, we should now be questioning all of the newspapers that signed up for the standard line, frankly,

**Heather** 1:13:07

that this week in virology podcast this week, in virology, were very instrumental in making sure that no one who took loudly seriously was taken seriously early

**Bret** 1:13:16

on, right. And, you know, we've got entire fields of biology, the fields that we most need, which are apparently compromised by some political willingness to shut down discussions they find inconvenient or threatening to their future prospects or whatever. So we have to look at this. Now as you know, I sometimes say certain stories diagnose the system, right? You do what happened to us at evergreen diagnose the system because the mainstream press couldn't figure out what to do with a story in which you had people advocating for for blacks who were behaving in a bigoted way towards whites, it's not a natural story. So they either didn't report it or they reported it upside down. Right. So that diagnosed the press. This story seems to diagnose a much larger phenomenon diagnosis, a tech sector at diagnosis, the press a diagnosis, the scientific establishment, it diagnosis, the governmental regulatory apparatus, all of those things, and we have to take a good long look at what happened because oh my god, the cost could hardly be bigger.

**Heather** 1:14:18

Yeah. And I guess it also diagnosis you already mentioned, Pierre Corey, who you know, if you've been paying any attention to the ivermectin story at all, you'll be familiar with his name. He's an MD, who's a lung specialist who's treated a lot of codes, patients and he testified before the Senate in I guess it was late last year, I think. And that was taken down by by YouTube, by YouTube senate testimony by a doctor who's treating COVID patients who's found that this drug ivermectin appears to be helping and asking for authorization to use it on label instead of off label. YouTube takes it down on

**Bret** 1:14:59

a That we're talking about not just a doctor, we're talking about a highly decorated doctor who had already improved our treatment of COVID-19 by discovering the use of corticosteroids against against the pathology, okay. This is somebody who had already earned the right to say heterodox things many times over. Right? And yet YouTube takes it down testimony, even if he was a crank testifying to Congress. People have a right to see that. But the fact is, this wasn't the crank,

**Heather** 1:15:28

if the Senate has decided to invite someone to testify. Where does YouTube get off? Where do they get off?

**Bret** 1:15:36

They took that down. And yet Dr. Fauci claiming that we didn't support gain of function research is somehow you know, normal. Like that's an obvious lie. It obviously involves defining things in some secret way that nobody's going to tell us, right? That's nonsense. Yeah, right.

**Heather** 1:15:54

So we'll post this, but you can just briefly put up, Zack back in February of 2021, there was actually an op ed in the wall street journal called YouTube cancels the US Senate, written by Ron Johnson, who's a senator from Wisconsin. So he details some of what we just were talking about

**Bret** 1:16:11

Ron Johnson, Well, apparently in the state of Wisconsin, like I'm working a lumberyard there. Alright.

**Heather** 1:16:20

Which we should all look them up. Yeah, I get Yeah.

**Bret** 1:16:24

All right. Oh, I did want to just work here. The reason we don't give alcohol to three year olds, there are a couple reasons. One is the medical reason that you pointed with the other is they don't know their limits.

**Heather** 1:16:34

Now they really don't know. Okay. To talk about cicadas, yeah. Oh, you Oh, no, no, you got someone else? Yeah,

**Bret** 1:16:43

I do have something. Yes. And I you know, I'm so sorry predations about it. But here's the thing. I feel endangered because we have not been vaccinated, because we have fears as we have discussed at length on this podcast. And my sense is that given what I have read, I'm not recommending this to anybody else. In fact, I'm not even going to recommend it to you. But you've seen what I've seen, you can make your own decision. But given the apparent effectiveness of ivermectin at preventing COVID given the fact that we are not vaccinated and therefore are more vulnerable to contracting it. I feel like I mean, I should also point out that the dosages which you can find on the consortium, that

**Heather** 1:17:29

nine COVID-19 Critical Care Alliance, the FL CCC, which will also link to

**Bret** 1:17:33

right they have all of this evidence. And they also have a protocol document about how you how you might use ivermectin if you haven't been confronted with COVID if you think you've been exposed, and the patient treatment of patients. And so anyway, the guidelines are fairly simple. And so anyway, I feel like I should be on it. Because as much as no drug is perfectly safe, I feel the danger of COVID in the world is much greater than the danger that comes from taking this stuff, which among other things, very cheap, but it's also does not be taken frequently, you take it to doses 48 hours apart, and then I think it's weekly. So anyway, I think cost benefit for me, it makes sense to go on similar

**Heather** 1:18:22

to a prophylactic dosage resume for most of them are anti malarial

**Bret** 1:18:25

drugs. Yeah, exactly. So,

**Heather** 1:18:29

you know, for those you wouldn't want to be on forever. But you know, we used to spend a long, long, long, you know, many months at a time. And places where malaria was endemic, and we're on malaria prophylaxis and stuff. So how many that looks like a large dose here?

**Bret** 1:18:47

No, it's not that I'm splitting this because my dose and your dose are these are six milligram two Actually, I should there is no telling I want to use the same standard of safety that the AAP uses and the fact is if I split one of these pills, anything could happen it could explode into shards that could destroy

**Heather** 1:19:14

your view I mean, frankly for those listening at home he's got safety glasses on now I have safety glasses on because you're looking at the world through safety colored glasses I am alright

**Heather** 1:19:25

okay

**Bret** 1:19:27

there we go. You decide if you want to take that

**Heather** 1:19:30

I have been thinking about this but I'm not going to make a decision at the first moment that you you confront me with it fair

**Bret** 1:19:36

enough.

**Heather** 1:19:37

That's so and I wouldn't I wouldn't I would hope that no one would actually that you but you think on it and you know I've we've been sort of in meshed in this for a while that does this hold stuff. Do I put this Yeah, you can put those on. I just I've never seen this object before.

**Bret** 1:19:51

That has been in my family. I swear this is at least 50 years old.

**Heather** 1:19:58

It's probably brittle. Robert is really brittle.

**Bret** 1:20:02

Yeah, unfortunate. Yeah.

**Heather** 1:20:03

So what I was gonna say was okay, so you just you just did that you just took your first prophylactic dose of ivermectin, and you offered it to me as well. And I said, You know, I, I think I will I'll report out next week if if I did, but upon being confronted with it in real time with an audience, you know, I feel about about like, I would if, if you had asked me to marry you in a very public place, no matter how I felt like, you know, it's not I'm gonna go someplace private and think on this and make my decision where I know that I'm in full possession of my faculties. And yeah, come back.

**Bret** 1:20:36

For the record. I did not do that. No, no, no, no, what I have it's not my style. No, no, no. Yeah, no. All right.

**Heather** 1:20:45

Okay. Well, there it is.

**Bret** 1:20:49

So, yes, it is right.

**Heather** 1:20:52

Um, so we just we cicadas are happening this year, right. Everyone seems to know as brood x here, what does that mean, and what is going on with cicadas? People seem to want us to talk a little bit about cicadas. And it turns out, we went to grad school with two of the periodical cicada experts. And they were

**Bret** 1:21:08

experts the whole time. The cicadas were periodic.

**Heather** 1:21:12

Oh, yeah. They were not periodically expert. No, I found both john and Dave is john Cooley and Dave Marshall, our friends from grad school. Who, yeah, working on periodical cicadas with consistent expertise. Yeah, exactly. There you go. So here, Zach, if you would show this, this map as a current brood distribution for periodical cicadas in the Mid Atlantic area, so they do continue on off this map. This is this is a decent one that I found. And so you know, brood x that's just, that's big, because it's not describing species. And it's actually only describing a temporal phenomenon, like when they emerge. So it's not a subspecies either. brood is the word that is being used. And they've just got given Roman numerals and brood x, we happen to be in a brood x here. And so that sounds all exciting and wonderful, but I bet we don't hear nearly as much about you know, brood X i X, you know, and such. So what you see are these overlapping areas where we'll broods will emerge at for, you know, really just a concentrated few weeks, reliably, in particular years. And if you look, boy, it's going to be pretty small for you guys. But brood x, for instance, last emerged where it is in 2004. It's emerging this year in 2021. And it's predicted to and I pretty much guarantee you that it will emerge again in 2038. So what is that period? So the the word, the term periodical cicadas refers to a periodicity with which they emerge?

**Bret** 1:22:48

Can I fill in a couple of details here as to where these critters are? So that people understand, okay, sure, merge means. So what you have is one of the few creatures on earth that can rival human beings for the length of its developmental period, for no particularly good reason. It's not like they have a lot to learn as kids, what they're doing is they're underground, attached to the roots of trees, getting nutrients, and then emerge means that they're adult forum, they'll final instar comes into the world and is visible and noisy as hell and very annoying. And anyway, so that's the phenomenon in question. It is this emergence of you said, how many years apart? Yeah,

**Heather** 1:23:31

that's why I was just about getting to go for it. So most of the Bruins have a periodicity between them. And you can do the math yourself by looking at this map of 17 years. And some of them have a periodicity that is a time between emergence of 13 years, and then they're only out and about as adults for a few weeks. So they spend the vast majority of their lifetimes underground, as Brett said, eating and and not being finable. And then they emerge. And you know, what's up? What's up with those numbers? It's 17 years or 13 years, it's it's never 14 years, it's never 10 years. It's never 18 years. And you know, again, if this were a classroom, we'd have asked that at the beginning of the class, and you ask people think on it and come back to it and probably should have started off their brains over. Right? Come back to the end. And because we were so focused on their stuff this year, this year, this week forgot to do it. But I mean, the answer The answer appears to be that 17 and 13. The thing that they have in common is that they're both prime. And that prime numbers are harder for other animals with shorter emergence times or lifespans or developmental periods to time. They're saying migrations or emergencies to such that if you have something with like a two year cycle, and it's going to come out every two years, and some of those Yours it's gonna be able to find cicadas it might be able to begin to rely on that, but not if you've got a prime number in terms of the periodicity between emergencies and margins. Well, I think that's that's the other thing like we're going to talk a little bit about for people who are in the middle of one of these periodicals to get emergencies. It can feel like an emergency, right? Like it's I've actually so we've we've experienced cicadas in the near tropics, which we'll talk about a little bit to different species, not periodical cicadas. They're just there all the time. They're just they're making a racket all the time. But it's not this kind of racket.

**Bret** 1:25:35

Yeah, well, it's pretty bad racket tends to be loud when it's sunny. But so let's talk a little bit about why selection would have done this, I agree, the prime number thing is the place to focus. But in some sense, many things, do something called predator satiation, where, basically, if you imagine that there's something out there that eats another thing, the thing that gets eaten can partially win by not being available at all, and then suddenly being available in such large numbers, that the thing that eats them has gotten to very low population density, because there isn't a lot to eat, and then suddenly, there are too many to eat. And so whatever it is, that eats them, does the eating and fills itself up, and most of the individuals are free from predation.

**Heather** 1:26:19

So even within brood acts, if they just spread themselves out, if they emerged over the course of the spring and summer in the place where they're currently emerging. You know, they would presumably be crows and sites, there'll be lots of things that would come in and basically make a season out of it. Yeah. As opposed to it's going to be super high numbers for a very short amount of time. And that and it's this is not a group selection argument, right? This is a there's actually safety in numbers argument that yes, some of you will die, but more of you would have had you spread out your emergence. So whereas you can be assured that there will be predators on hand at a brood x emergence, fewer of you, the members of brood x cicada group, are going to end up succumbing to those predators if you all come out at once. So

**Bret** 1:27:03

let's fill in the details of who the predators are likely to be here are almost certain to be birds, right? And birds are gonna have a very easy time picking off cicadas because cicadas are dim. So Damn, so don't really dim their Damn, and they fly like they're damn

**Heather** 1:27:18

Oh yeah, you're really sad when they fly. They sound like they're dim.

**Bret** 1:27:21

They sound like they're short circuiting. Yeah, but But in any case, so imagine if you were birds, and many birds are very smart corvids or something like that crows, you could imagine a predator figuring out the pattern of emergences, right and moving and predicting where the emergence was going to be. And that then the population of predators could grow because it would be in the right place every year. So the prime numbers thwart that strategy, because you have to nail it exactly. 17 years is a long period and 17 years has to be hit Exactly. If it were 16 years, then something that checked every eight years, or 16 years would nail it at 17. You got to hit that year number on the dot. Yeah. So that's in any case, I think what we're really looking for, and it may be that the ultimate explanation here, I don't know, I'm john, David, you want to write to us and tell us whether or not passenger pigeons have anything to do with this. But it may be that passenger pigeons, you know, were predators of these things, and that thwarting the passenger pigeons from knowing where to show up was, you know, a useful strategy,

**Heather** 1:28:35

but like, like, the brakes are off like, okay, we can do a little arm waving, adaptive hypothesizing here because it's cicadas and passenger pigeons are toxic.

**Bret** 1:28:41

Kate isn't quite so careful. And we know who holds our feet to the fire. So these guys

**Heather** 1:28:47

actually just quickly show this is an older paper exact, but this actually they would have written this while we were in grad school with them. This is David Marshall and john Cooley reproductive character displacement and speciation periodical cicadas a description of a new species 13 year magicicada neo Treta some? I'm sure I'm mispronouncing that, but they basically have septum desam, you know, 17 years and trade some 13 years. Yeah.

**Bret** 1:29:11

Anyway, the point was, if you emerge in great abundance, and you do so on a prime number, a long prime number of years apart, then a predator who tries to figure out the pattern and record it in its migrational pattern is going to have a very confused problem. And actually, now that I think about it, the fact of 13 and seven, if you imagine some population that tries to migrate the pattern, right? The way that the pattern will,

**Heather** 1:29:41

a population of a predator or a scan is Yeah, will clutter

**Bret** 1:29:44

itself by virtue of the fact that some of these things are appearing every 13 years and some are appearing every 17 years. It means that you don't quickly get a repeating pattern. Yeah, first you go here, then you go here, right, right. Yeah, anyway, it's all fascinating.

**Heather** 1:29:58

That's really good. So, the actually john Cooley is on this paper as well. I want to read just a few paragraphs from this 2020 paper called and zacky may show it. It's published in PLOS pathogens, it's behavioral betrayal, how select fungal parasites and list living insects to do their bidding. It's a pretty great title, I think, you know, at least tickles me. So I want to read just the first couple paragraphs under what is active host transmission, a little bit bigger insects under the explicit control of parasitic fungi, and in total pathogens are sometimes characterized by colorful terms even colloquially categorized as zombies, a moniker that draws comparison to both fictitious and factual elements of contemporary life. I also feel like this is the best room scientific paper. Your kudos to you, john and the other authors on this, though the effects of intimo and tomo pet, so I've never seen this word before. Until pathogenic fungi on their hosts are a far cry from behavior modifying viruses such as rabies, or the fantasmic world of brain eating zombies that drag their way through a popular culture. Both rabies and select and Toma pathogenic fungi are nevertheless archetypal examples of pathogens that actively unless they're living hosts for successful transmission phenomenon referred to hereafter as active host transmission. And so you begin to see a connection maybe to what we were talking about earlier here. Victims of the rabies virus experience hydrophobia. They refuse to swallow which allows the virus to collect around their mouths, and are much more likely to aggressively bite and interact with others. This unsettling rewiring of animal behavior supplants the interests of the victim in favor of the interests of the virus within the phenomenon of parasite induced active. Sorry, what is it active host transmission in animal hosts has evolved numerous times across a variety of taxonomic groups. For example, Toxoplasma gondii, I produce parasite suppresses the fear response of rodents and drives them to seek out feline foes to help complete the lifecycle of their produce partner, horsehair worms, pneumatic morpha, encouraged their host crickets to drown themselves which allows these parasites to complete their own lifecycle and water. Likewise, certain internal pathogenic fungi such as massive spore SBC is manipulate their host sexual behaviors to increase their odds of transmission. Such engagements appeared to serve the interests of the fungal pathogen over the interests of their hosts. Just one more two more senses here. manipulation of a host to focus on pathogen transmission is fascinating because it raises questions about the nature of autonomy, and shines a light on the physical and behavioral manifestations of parasitism. Active host transmission is a form of biological puppetry, in which the pathogen manipulates the behavior of its perilous post. Awesome, awesome, right? So not awesome that this has happened. Oh, no, but I'm kind of amazing. So I'm going to try to find my notes since Zack, if you would give that back to me, that would be terrific. Thank you. It's gonna be much easier now. This reminds me, of court steps, which some number of people will be familiar with, because it's something I've gotten somewhat Rhema famous Yeah, of labor court steps is a is a big genus is very speciose genus of of fungi, which is I actually think, maybe not limited to the Neo tropics, maybe I'm not positive about that. But it's very widespread in the neotropics, which is to say, the so called New World tropics, New World, simply being a societal description that Europeans discovered it last month, actually, humans discovered it last as well. But it wasn't, you know, it wasn't it wasn't doing the people who are already living here. The point the Europeans came, but the Neo tropics, the New World, tropics, have a ton of concepts. And you know, the authors of this paper that I just read a piece of distinguish between what's going on with with active host transmission and what's going on with quadriceps because they say that usually quadriceps the spores aren't spread until the host is dead. But we've seen we've actually seen cicadas in near tropical jungles that are clearly infected that have you know that hat like that have the back end of them something fungal and what they're doing is they're acting in very unusual ways they're climbing and and you know this there is a name for this called apparently summit disease where you like you, you get infected with this thing. And the thing basically sends instructions to your brand because you're a robot and you're like a robot insect, not a human, you're like I must climb must climb must climb. And so they get to the top where once the spores are ready to spread, they're more likely to spread because you're at the top of the canopy rather than in the understory where it's relatively still.

**Bret** 1:34:42

Well, this actually solves a problem we were thinking about. So I don't mean to short circuit the discussion after you but we were thinking about what to do for a thumbnail for this and that responsive sort of response that we have from our last trip. To the Amazon, a very nice picture of an insect that has been completely defeated by quarter steps, and is just basically a fungal ghost sitting on a leaf. And also somewhere we have pictures of these cicadas that have this. This growth off their back fungal growth. Yeah. So anyway, a that's interesting that suddenly one encounters with some regularity if you know what you're looking for. And yeah, the idea of the manipulation of hosts is so powerful. Yeah. Going to encounter rabies you might consider getting vaccinated for

**Heather** 1:35:34

Yeah, well, I mean, at least when we got vaccinated against rabies, it was very hard to, to get an extraordinarily expensive and yeah, but yes, you really, really don't want rabies.

**Bret** 1:35:45

No, it's not a good disease. I mean, in fact, I think there's one case in which somebody has survived it, really. But another any cases, I think, believe there is one and it's horrifying. And I probably should go back and figure out what it is that was done, which may not even be functional, a person may have just gotten lucky or unusual in some physiological way. But yeah, it's usually entirely fatal. If if it gets to the point that you've actually come down with the disease. That's obviously not fatal if you've been bitten, and you immediately get treatment, and the treatment isn't as horrible as it once was. Yeah.

**Heather** 1:36:18

So I guess you're bringing up the fungal pathogens thing, in part, because we're just we're talking about pathogens a lot today, but also, for those of you who live within the within the boundaries of breed x right now are being driven crazy by them. Just be grateful that you're not affected by cortisol.

**Bret** 1:36:36

Right? Yeah. I mean, you can be grateful for that, no matter where you live, but I agree. I think so suffering through the electron. Yeah, it's okay to be the right thought.

**Heather** 1:36:46

Indeed. Well, we might finally be there after a fairly chaotic episode. I will I one thing I will say, before we end is that we had had my mom here this week, and she actually, because she was flying out during our live stream, she actually just just drove off. So she will be live. This is the first of our live streams that she has missed since we've been doing this. Yeah. And so when you watch later, Mom, we'd love you. We love you,

**Bret** 1:37:12

Jesse. All right. So do we want to close out with the usual

**Heather** 1:37:17

the usual? Yeah, so we'll be back next week, same time, same place. But for those of you who are watching on YouTube and are interested in asking a question or just hearing us answer a lot of questions, we will be back in 15 minutes to answer your super chat questions only and we really actually enjoy them. And you know, we get we definitely a little a little punch drunk and Goofy by the end because it's a long day, but but we really do enjoy seeing the diversity of questions that come across the transom, add us consider joining my Patreon, where we have the Dark Horse membership, which gives you access to a private to our q&a every month on the last Sunday of the month at 11am. Pacific and we just leave that up to you if you can't join us live. Brett at his Patreon has larger ticket conversations that happen on the first Saturday and Sunday of every month before our live streams in the mornings. Please if you have any logistical questions, not questions for our q&a, but any logistical questions you have like how do I ask a question or you know when when is the private q&a? Go ahead and email Darkhorse dot moderator@gmail.com. And maybe that's it again, please subscribe, like, share comment.

**Heather** 1:38:37

Channel.

**Bret** 1:38:38

Yep. And we'll be back in 15 minutes. In the meantime, eat good food, be good to the ones you love and get outside. You will everyone