Your Questions Answered - Bret Weinstein and Yuri Deigin Dar...

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**SPEAKERS**

Yuri Deigin, Bret

**Bret** 00:07

Hey folks, welcome to the Dark Horse podcast. This is the Q and A with Yuri Dagon, who many of you hopefully most of you have seen on my original discussion with him about the lab leak hypothesis for the origin of SARS Cove to the cause of the covid 19. pandemic. Our plan here is to have you give us questions, super chat questions will be prioritized. We're looking for high quality questions and Questions Only related to the topic in our discussion of the lab leak hypothesis. So you can ask us about other things mentioned there, but no general questions, if you would. Yuri, welcome to the Dark Horse podcast again.

**Yuri Deigin** 00:55

Thanks for having me. Again. It's a pleasure. A

**Bret** 00:57

lot of people were fascinated by our discussion. And I think it is having an effect in the world, people are waking up to the idea that they cannot just simply dismiss this hypothesis No matter how much that is their desire.

**Yuri Deigin** 01:14

It's great, although, at this point, there's seems to be so many other things going on the world. I think it's kind of fitting people's immediate interests.

**Bret** 01:24

Yeah, I would agree with that. On the other hand, I would say I don't think the two are unrelated. And because of that, we cannot afford to focus in one place and ignore the other. So certainly here in the US, we are seeing unrest of a kind. That is, I think, in almost every way unprecedented. And that unrest is obviously related to the lock down in the sense that it changed people's obligations in the world, it caused them to be more frustrated as the economy began to take its descent. And so to the extent that that unrest of this scale can happen in a country that is among the most stable in the world, to the extent that that can be affected by a pandemic that could emerge at any time understanding what the roots of that pandemic are, is paramount. We can't afford to have something, throw us into chaos, if that's something is, is preventable. So in any case, I do think you're right. People are much more focused on other topics, but I don't really see it as other topics.

**Yuri Deigin** 02:46

Yeah, definitely it will get connected.

**Bret** 02:50

It is that. All right, so how about we start with a couple of questions that came in during the initial premiere of our original discussion. The first one is not about the Coronavirus per se. But it is this. Am I right? That the glitchy computers conspiracy from your talk with Yuri Dagon was a joke? If not, how do you assess the probability that it was that it wasn't a coincidence? Thanks. You want to start with that?

**Yuri Deigin** 03:25

Oh, man, I mean, I think it's mostly a coincidence, because it hasn't really recurred. But I just soon as I started having problems completely wiped out the system and restore from backup. And the fact that it hasn't happened since at least to me, probably just voices the fact that it happened with some other people who are also involved with questioning the color lab like hypothesis. It could also be a coincidence, but we I think we're like half jokingly discuss it and put out feelers into the kind of the ether to see if there are other people experiencing something like this. And, you know, if we, as we I think alluded to, originally, if we hear about more people having some kind of technical issues, or any other kind of weird things happening in their life, you know, that could start being a pattern, but at this point, I think it's just a quick service.

**Bret** 04:23

I'm going to take a slightly different tack on this question. I think one has to behave as if it is a coincidence. And it is almost impossible to rule that out unless somebody sends you an unambiguous message. But you had a malware problem that took two Oh

**Yuri Deigin** 04:43

yeah, and I go ahead sorry I did start getting receipt to start getting start receiving a lot of like weird you know, phishing emails. Almost, you know, much, much higher number of them. Probably just started like a month back. I never Open them, but so that could be related to not sure it's one data point,

**Bret** 05:06

well, there's the possibility that people were eagerly trying to figure out what was on your machine, there's a possibility that they were trying to spook you. And there's a possibility that it was unrelated, and just a feature of the world as it exists. But I would say, we had collapses of our system here related to the podcast, that were very unusual at a technical level. In other words, we had collapses, that continued to plague us, even though we had literally swapped out every component that could conceivably cause it. So that's an unusual pattern when when one is troubleshooting, does it mean anything? I don't know, I do know that the timing was conspicuous. But of course, coincidence, coincidences happen of their own accord. And what I would say is, if you're going to find yourself in a realm like this, where you have, you know, essentially, some huge range of actors has an interest in this story. People want to blame China, China doesn't want to be blamed. Lots of people have turned this into a political football, and they have interest in how it is understood. And so there's no shortage of people who might want to dissuade people like you and me who won't look away from the story. But one can't assume that every hiccup is that and in fact, we had a hiccup at the end of our conversation, which I think you and I both read as very unlikely to mean anything, why would you disrupt the end of a stream, but I've had streams disrupted at moments that were very conspicuous before and it started to happen. I had one, the most amazing set of collapses we had was right after I first started talking about your medium piece and its implications. So I don't know what to make of all this. Again, I think one has to work from the assumption that this is an organic problem in a highly complex technological world in which lots of pieces that are made by different different people are interfacing together. That's, you know, that's a bug prone world. But there's also a lot that's conspicuous about the pattern. And because we all have a history of facing technical glitches in our computing lives, when something really out of the ordinary happens, it does have a different feel. Yep, yeah. All right.

**Yuri Deigin** 07:44

I guess we can leave it. Yep.

**Bret** 07:46

Let's leave it at that. The next question is, if the virus had escaped from her lab, why would v Zhang Li release the sequence for ra Tg 13? And place more suspicion on her lab? And then the second part of the question is, how do we explain the samples and original patients with exposure at the Hunan seafood market? You're probably in the best position to answer this theory.

**Yuri Deigin** 08:17

Well, let's try. Let's just address the first point. First, I wasn't very clear on the second one, let's address the first of all, why would she Janeway kind of release the RPG sequence rather than just I guess, keep being silent? Well, the first and foremost, she already released part of that sequence back in 2016, I guess I mean, she collected it in 2013. But they had a publication in 2016, where they released a fragment of that sequence to gene bank. And so actually, by the time she's only released it in 2020, the full sequence the full genome, there were already groups, I think, with a preprint, or just maybe some comments on virology blog somewhere, who identified that very fragment. And they were essentially kind of on the trail occasionally, saying this is the closest relative of source to that we were able to find using, you know, the blasting of genomic sequences in the database. So unless she got to release, the full shift basically should be made to release the full genome anyway. So it's, I think it's much better for her to do it proactively rather than wait for, you know, some uncomfortable questions. And secondly, she could of course, release the sequence that she most, you know, would be most favorable with. Again, I'm not saying she's trying to doctor doesn't in any way. But it's a possibility. So maybe she was trying to, she could have been trying to divert the attention of the people to From the, you know, maybe a closer sequence they have in their possession by using the, the fragment that she already released in the gtbank years ago, and then building around it with a 4% difference from pay the current source to genome premiere, she it's not like she had an option of just staying staying silent was precisely because she surely made know that they had the closest fragment in their in their possession. Yeah, I

**Bret** 10:30

agree with this analysis, she didn't have a choice that it was the I mean, if this had been an escape from her lab, and she is aware of that fact, that's a big if, but if that's what happened. And for whatever reason, she was hoping that that would not be the conclusion of the scientific community, she had very little choice but to, to release the sequence. And as we talked about in our earlier discussion, there's also the question about, is there something about the 4991 strain that is connected to something and possibly the database that was deleted? That was very conspicuous, and by releasing it as if it was a separate strain, that it might lead people in a different direction? Again, this is speculative. We're not saying this did happen. We're not saying we know, but we're saying this is not behavior that suggests that this person is necessarily trying to shed light on what happened. If, you know, let's take the possibility that the Chinese government has exerted pressure and said, We don't want this understood. It could be that she's doing this under duress. So there, there are lots of possibilities. But there's, I don't see anything exonerating in her releasing that sequence.

**Yuri Deigin** 11:55

Right. And also, I think she released it after there was this Indian preprint, the alleged some small fragments from the HIV journal being present in source too. And so maybe that was her kind of reaction to show that No, actually, those fragments were present in their ancestral strain, or like the close relative. So she had to release that ancestral strain to kind of, you know, add evidence to her claims. And she seemed very upset with that Indian preprints. She, I think, in whichever, somewhere somewhere, she said that she hopes those scientists close their stinking mouth or something like that, relating to that very, very preprint. And so that could be another another reason why she decided to release it. And also it does seem that there is no maybe if not panic, but definitely someone some duress, as you said, that her team is under, and I'm sure the whole history of my role is under and they're getting some, you know, external control from the military imposed on them from Beijing, the Major General chair, I think she over took leadership in organised virology. And so it's not necessarily like a cold, calculated move, it could be again, just something that we decided to do to exonerate themselves in the eyes of whoever may be, you know, they're you. imposed to the leadership from from the gene, they decided to show that it's not them. Finally, there is another kind of line of thinking is this, I agree, this is a bit of a more conspiratorial idea that maybe this is her kind of signaling about some other lab, whereas her phrasing is a little bit interesting is that she says she swears on her life, that it didn't come from her lab. So this kind of open sleeps opens the possibility that it could have come from some other lab and she might know, but she's not, you know, in a position to truly say this. And by releasing sequence, she's maybe giving some hints as to you guys figure out what I mean, exactly where this could come from.

**Bret** 14:10

Yes, it would be wonderful. If that's a possibility. It would be wonderful if it if there was some mechanism, as we talked about in our earlier discussion, if there was some mechanism that allowed people to securely offer information that would allow us to put together the origin story of this, this virus. Right. So let me ask you this since Oh, go ahead.

**Yuri Deigin** 14:36

Yeah. Just one final point. Sorry, I keep keep getting back to this is. It's also interesting what they didn't say. And what they didn't say is the whole backstory of the pneumonia in the in the mind and in the United Mahjong, where they originally collected this already pG 13 strain and they still I don't think they today ever addressed this. But there was this outbreak of six miners who got pneumonia after which she generally was called to the mind did collect the sample. And I don't think nobody from Ohio still to this day ever address this story. And we know that they're leading kind of SARS guy, the akademischen Xiong, I keep checking his name, which is like the Mr. SARS guy, he was in charge, essentially of this pneumonia investigation in he actually ordered the minor samples checked for SARS antibodies back in 2013. And I think they actually did the working in the Auckland Institute. And she's yelling was definitely in the loop of this work. And since this is still not mentioned to this day officially in, like in the Chinese press or in any of the scientific publications, it's definitely still a big question, Mark. But, yeah, anyway,

**Bret** 15:52

yeah, as you pointed out, in our last discussion, the place to pick up the trail would be those samples if, if we had access to them, yeah. So anyway, if the world is trying to figure out what to do next, that would be a good bet. In order to shed more light on the story. You raised the issue of the claim that there are sequences from HIV, in SARS Cove to and I remember when I first saw that claim, I thought, No way. And then I saw some stuff that suggested to me Actually, there might be and I, my first reaction was, wow, that would be open and shut case, if there were and then I remember looking into it, and realizing that it wasn't the reason it would be an open and shut case, I thought was that Corona viruses and retroviruses are so distantly related. I mean, if related at all, that the transmission of sequences from one group to the other would likely have been accomplished technologically. But when I looked into the that claim, I remember, I don't exactly remember what the evidence was. But actually, I got the sense that it would not be that surprising. And I I abandoned that that line of thinking, do you have thoughts or information on the possibility of HIV sequences showing up in source code to?

**Yuri Deigin** 17:19

Great, I pretty much dismissed it, along with everybody else where it was, you know, once it was analyzed, that those actual sequences, the fragments are just very short fragments. And it could have been just essentially coincidence that, you know, pretty much any short enough string of letters showing up in any other genome by pure coincidence, but I think this storyline was picked up again by Luke muntanya, the French novel prize winning scientist, and he still continues kind of, you know, promoting this idea, although the mainstream scientific mainstream is even farther from from this line of reasoning as from the general lab, like hypothesis, but I have to be honest, I didn't really you know, get back into this where I didn't read his prep, although he has published a preprint, where they seem to, you know, provide more evidence of some HIV related genetic fragments, same source code to

**Bret** 18:23

Yeah, I recall, looking into his work initially, his credential is obviously, based on such powerful prior work that it's very hard to ignore his belief that this contains HIV fragments, and that that essentially, is a smoking gun. But I remember looking into it and mechanistically I was just not compelled that the story added up, but certainly on the list of hypotheses, I believe it on. We have to we have to analyze it carefully and figure out whether or not what is being claimed, is sufficiently improbable that it implies a special origin origin explanation. All right. So let's see.

**Yuri Deigin** 19:16

The was the second part to that question.

**Bret** 19:17

Oh, yeah.

**Yuri Deigin** 19:18

This one and seafood market? Yes. I'm not sure what was being asked. But maybe. I think the I mean, at this point, we can pretty safely rule out the seafood market as the source of the outbreak as has been ruled out by even, you know, mainstream China. That's the official position now that the virus came into the market before it came out of the market to use the quote, precisely because even initially, there's this Lancet publication analyzing the first patients in the first I think three or four patients that were treated in the hospital with the first for this article. To Coronavirus, three of the four didn't have exposure to seafood. And that was kind of the early sign that probably not the source of the outbreak. And later on when they analyzed samples from from that market, although there's very interestingly not very many samples were collected before the market was completely sanitized and scrubbed. But even still, like there weren't any animal samples of anything close to the source code to just get a human samples, which almost certainly were just contaminated of people who had source code to already, you know, picked up, pick it out somewhere else outside of the market and brought it in. Yeah, I think at this point, you know, the market is a source,

**Bret** 20:48

we can rule out the market as a source. What we can say in retrospect is that the evidence for the market is circumstantial evidence, basically, of proximity that there's no evidence of the virus in animals in the market. And there's evidence of people who had no connection to the market who were sick in the first the first round, and so that effectively takes it to an extremely low probability. The interesting thing, though, is that in the announcement that China had revised its explanation and was no longer they did not it no longer believed that the will and seafood market was the source. It also dismissed the laboratory origin hypothesis. So it sort of had this poison pill aspect to it in which they, they were almost like negotiating with the logic will grant you that you're right, that the Wuhan seafood market is not involved. But the lab is also not involved with no compelling evidence of why we should assume that. Now let me ask you, as long as we're here, the there are a couple of pieces of analysis floating around, about behavior in and around the Wu Han virality virology Institute, Wuhan Institute of virality, and hospitals in Wuhan, China, where there is anomalous behavior detected. And the claim is that these things imply that there was awareness of an accident in the case of the virality Institute, and that there was awareness or that there was an a medically anomalous influx of patients into the hospital. I guess this would have been October. Is that right? Do you have any thoughts about whether that those pieces of analysis actually imply anything? Have you looked at them?

**Yuri Deigin** 22:52

I have. Sure as everybody just you know, once the news hits, I looked at the information, I think you're referring to, to kind of different sets of analysis, first being analysis of cellular signal around the lab that reported some kind of blackout period in October, I think, early October. So

**Bret** 23:13

when you say cellular you mean cellular phone activity? Right? Right.

**Yuri Deigin** 23:17

Exactly. Yes, cellular for all the activity that seems it's a, I guess, publicly collected, database, anonymized, which is used by all sorts of commercial intelligence providers to kind of analyze trends of potential consumers. So basically, a lot of companies are collecting all the cellular data of pretty much everybody. And this data can can be available to these providers who can mine it. Somebody mined that data and saw that the time of early October, there was a sudden drop in the usual number of cell phones and cell phone traffic associated with the area of the home or Institute's BSL four facility. On the basis of this, they can hypothesize a daily to signify some kind of accidents and can shut down an area. And also they seem to implicate that there was some kind of traffic shut down because not only the lab itself, but the area around it, the traffic around like the fee vehicular traffic with cell phones, I guess, they seem to apply her has greatly diminished for for a period of I guess, two weeks or something, saying all this from memory, and it's been a while since I looked a little bit off on some of the data points. So that was one thing and it was released back in like two months ago. And since then, nobody really had any follow up. So it kind of died down. There was no follow up investigation by regular Intelligence Agency, or anybody else. And then Recently, there was another circumstantial evidence of consumer trends released, which was the first of all part In lots around hospitals, exhibiting many more cars last fall versus the fall the year previously. And secondly, the keyword searches for hidden diarrhea and fever. If I remember correctly, that kind of spiked in again, I think it was October or maybe late September, something like that. So they were trying to tie that into the idea that actually the virus circulating in Wuhan, or in Hebei, province where it is much earlier than it was kind of officially Well, first of all, may be recognized. And secondly, just maybe realize maybe, you know, the hospitals or the 30s just didn't realize they have this kind of initial stages of epidemic on their hands. I mean, it's it's it's a valid hypothesis. The it's I don't know if how strong it is. Because I mean, generally, I guess, every year we have all sorts of viruses around this time. And whether it's spiking keyword searches for diarrhea is indicative of this particular strain or kind of Central strange resource to being present in the population. That I don't know whether it's a valid kind of conjecture or connection or the tube, precisely because I mean, even in Russia, there wasn't a spike in pneumonias back in November. And there's a lot of why there were at least I don't know if there's any more. But there were a lot of conjectures that maybe we Russia had been exposed to source cough too much previously, maybe we develop some sort of a human immunity. And this is one of the kind of popular people's explanation of why we're not getting the same level of pandemic back in March as the rest of the world was. The idea was, well, maybe we had it in November. I didn't we didn't notice, of course, then we got the same thing as the rest of the world, maybe just a couple of weeks delayed. And that idea died down.

**Bret** 27:01

Yeah. So I had the same same thought, which is that in order to assess, especially now it's actually true for both the cell phone data and the hospital data. what one wants to do is an analysis of if you survey an area at random, that looks something like the hub, a province, for example, how often do you see something this anomalous? Right? In other words, would you see lots of things that were there a virality Institute, you might think it was an accident, but there's no virality Institute, so you don't notice it? So anyway, I had the same sense that the ice was not very thick. With respect to these couple of claims. That said, it could be evidence and if you found that cell phone traffic dying down in the way that we see it in in October, around the wound on the woollen Institute, was a very unusual event than it would be stronger evidence. But at this point, we in the public don't know how common these things are. And so we can't we can't assess these pieces of data.

**Yuri Deigin** 28:03

Right. And another similar piece of data that kind of again, went investigated was this leak from US intelligence, that apparently somewhere in the US intelligence community was kind of ringing alarm bells in November, that there is already an outbreak in Wuhan that is going to be serious. And then they see all sorts of disruptions already in place. And supposedly, this was November. And this was published in Washington Post, I think, but then again, it was like, never followed up. So we don't know how real that info was, or why did it ultimately get ignored? So I mean, it's still a lot of unanswered questions, and maybe at some point, these are pieces of the puzzle puzzle fit or maybe it's just kind of like red herrings and some misorientation of files leaks that we just have to sift through.

**Bret** 28:56

Yep. Okay, let's move on to the next question. Next question says suppose we develop a Coronavirus vaccine that with minor tweaks could also be effective on bats as well. Thoughts on dispersing in bat populations as an extra buffer. I have some thoughts here is about biologist Do you want to start?

**Yuri Deigin** 29:18

Yeah, if I may let that one. So my first

**Bret** 29:23

thought is, first of all, as widespread as fear of vaccination is amongst humans, it's even worse than bats. And so my guess is they just won't go along with it. Alright, English that was a hilariously funny joke only worth a chuckle in Russian, I guess. But.

29:42

So that was good.

**Bret** 29:43

The I think the real question here first of all, the idea that you would have a vaccine in humans that works in bats. It's a question of how you would even establish that I mean, it's obviously doable, but is it worth the extra effort to figure out whether or not you know if let's say that minor tweaks are necessary, that's not a simple matter to figure out what those minor tweaks are. And figuring out how to vaccinate bats, and whether it has worked is going to be a long term project at the very least. And I think the really important issue is the same one that applies generally to this gain of function research for the purpose of figuring out how to prevent pandemics, which is if gain of function research is more likely to produce a pandemic, than it is to give us useful information about how to present prevent one, then it's not a good idea. And likewise, attempting to vaccinate bats against against viruses that could lead to humans and then could evolve into a pandemic, is probably going to create such a increase in the intensity of human back contact with exactly the bats that are harboring these viruses. That I would say it's probably a losing proposition to begin with.

**Yuri Deigin** 31:03

Yeah, absolutely. I think, you know, having some kind of vaccination program where it's like gene drive and bats to clear the off any sorts of coronaviruses is not a very good use of people's money, or time or Yes, and plus might create extra dangerous and I think we're just better off leaving the bats alone, just both for research purposes and human purposes. And actually, I think she's Ellie's one was one of her missions to stop the kind of the barbaric notion of people eating that. And that was one of her key points in her talk in 2018, Ted light talks given China, and she actually said that this pandemic is a payback for humanity for barbaric practices of imposing or like, you know, eating wildlife or suffering or disturbing wildlife. So in that sense, but you know, I think before we start going vaccinating bats, we have a minor issue of not even having a human vaccine first. This is desperately needed for our purposes. So let's first get that done in the clinic. Anything else?

**Bret** 32:15

Yeah. So I agree with you, the human vaccine is obviously the priority. I think in the meantime, if we just ask the bats to social distance, that's probably the best, best we can do, you know, fly, two wavelengths apart, that kind of thing. All right, next question. What concerns me most isn't that the experts got it wrong. Initially, it's how adamant they were, that it couldn't be questioned or that they couldn't be questioned. I absolutely agree with this. Experts, or they have to have leeway to get things wrong. And, frankly, even the fact of certainty is a big indicator that something has gone wrong, there was such a strong desire to shut down the lab leak hypothesis. To begin with, that we weren't having a scientific discussion, we were having a discussion with scientists, that was not scientific. And and as I pointed out in our discussion earlier, this creates a new problem for us a novel one, which is the very people we need most to speak without us doubting their credibility have all indicted their credibility simultaneously, that really couldn't be a more dangerous circumstance. So hopefully, we can learn that lesson. as painful as it is. Let's learn it never let that happen again. Yeah. Very good. Thank you. All right. Next person says, in honor of the mighty pangolin, I must say pangolins. I hate that they were implicated in this story. I'm a big fan of this creature. So yes, the mighty pangolin It's a shame but do realize for anybody who's thinking that pangolins and bats are grotesque that these viruses are parasitizing them the same way they are parasitizing. us so the bats in the pangolins are on our side, right? They didn't do this to us. Okay, delicious. That's a terrible, sorry, yeah. Terrible. Actually, I had an advisor, guy named Charles Handley, who was one of the great bat biologists was the Smithsonian, curator of mammals. And he, one point after the Vietnam War, I think, tried to convince the military that they should equip fighter jets with mist nets, so that if somebody crashed in a jungle that they could feed themselves on Batson in order to test that hypothesis, or the hypothesis that that was a viable way to survive. He lived for a month that way, and when When I asked him how the bats were, he looked at me with no humor in his eyes and said, crunchy. So, anyway, that also tells you something because I mean, the bats he would have been eating were new world bats, I'm not sure that they're harboring large numbers of coronaviruses. But certainly this concern wasn't on anybody's mind when he did that work. So that tells you that there are dangers hidden in plain sight. Okay. Next question. I'm struggling to understand what you're talking about. I am so interested. And I want to learn more. Thank you. I highlighted this one, because I thought it was worth giving a kind of one paragraph summary of what you and I are on about here. Why this is the focus why it matters, you want to take a crack at it? Or do you want me to? Please? So I would say, we have a pandemic, it's creating a tremendous amount of harm. There's the harm it's doing. And there's the harm that we are doing to ourselves in an effort to stop it.

**Bret** 36:07

The origin of that pandemic, is of tremendous importance, because, one, it may contain lessons about how we ended up here that will allow us to prevent this from happening in the future, whether those lessons are about a human behavior, like eating bushmeat that causes us to come in contact with zoonotic viruses, or whether it's about gain of function research in the lab, it is important that we figure out what we did wrong, so that we stopped doing it and this doesn't happen again. Second thing is that to the extent that one finds the scientific community, rallying around a point, expressing a consensus that is similar to what you would hear around the question of, does the Earth orbit the sun? Or does HIV causes AIDS or any one of a number of secure hypotheses when you hear that kind of resolute consensus, and then you look at the data. And you look at the analysis and the analysis far as falls apart. And the data suggest a hypothesis is viable, that has been eliminated from the table. It suggests that you have a whole different vulnerability. And that vulnerability is in the way your scientific apparatus functions. And we are so dependent on our scientific apparatus being above politics and above the market, and in a position to tell us when we are putting ourselves in danger, that even just simply detecting that scientists are reaching a consensus that is not justified and spreading it as if it were, that is in and of itself a problem. So hear me very clearly, even if it turns out that this virus jumped from the wild, and God into the human population, evolved the ability to jump from one person to the next and spread across the globe. And the implication of a lab leak is false. Even if that turns out to be the case, that consensus that scientists reached was not justified, even if they turn out to have been right. The consensus and their certainty around it was not justified and that is, in and of itself an existential threat because we need the natural disagreement between scientists to tell us what possibilities surround us. We don't need false consensus. We need frankness, and that's a tough lesson but I think it's an important one to remember. Anything to add?

**Yuri Deigin** 38:46

Oh, excellent point. You're taken aback by your eloquence.

**Bret** 38:52

Thank you. Alright, so let's see next one, this person just a comment they say a chi mera virus sounds scary. Downloading of downloading a virus is scary. I would certainly agree the ability to download a sequence that we know is infectious, and then effectively leave it on the honor system that no one will release it. That's a terrifying level of power.

**Yuri Deigin** 39:16

Right? So today imply downloading like, being able to print DNA from a computer sequence and create a live virus settlement?

**Bret** 39:26

Yep. I think they're going from what you said that you could, you could get these things printed at a lot of different locations. He said something about there being places in China that would do it very cheaply.

**Yuri Deigin** 39:41

Right? I mean, it's definitely printing DNA or protein is very cheap, but it's not. It's not like anybody could do it. You actually need a biology lab and didn't have to stitch those pieces together and put it in life culture. I mean, you could do it in a home lab and garage. Don't get me wrong, it doesn't require a whole different set up from just a garage, don't do it, do it yourself facility. But hopefully, if you're, you know, ordering virus parts online or through any kind of provider, there is some kind of screening process that sets off alarm bells. And, you know, you wouldn't be able to just like a bioterrorist wouldn't be good without anybody, any kind of authority that tracking down. But state actors, yeah, you could do it very easily, very quickly, very cheaply. So it is a scary possibility when we

**Bret** 40:44

go, so are you suggesting that at the moment, those checks exist, so that only a state level actor or something? Like it?

**Yuri Deigin** 40:52

I know they exist in the States? I mean, yeah, you get flagged on the FBI and whoever list, if you're ordering anything, large enough fragment of any particular known pathogen, you could try to probably try to circumvent that if you really tried, but I think especially after this pandemic, there's going to be very close watches. And usually the people printing this stuff, they kind of know where this is coming from. have enough biology, not knowledge for people doing this. Notice, wait a minute, why does he need you know, this particular plasmid printed, or this particular fragment? You anyway, so on one level, it's already being countered by various intelligence agencies, at least in the States. On the other hand, I think after this pandemic, as we alluded to, in the original podcast, you might get like new entrants, new terrorists, like looking at this, realizing how, how easy it is, and why why pitching in public, you have a few 1000 $100,000?

**Bret** 42:02

Yep. The net? hope not, hopefully. Yeah, I hope not too. But I really think hoping not, doesn't work, what works is recognizing that this danger is out there and figuring out how to make it inaccessible. Because you know, the very nature of terrorist terrorism happens when people are not powerful enough to cause a change that they want to cause for whatever reason, and so they seek some sort of power amplifier that functions through terror. And certainly, the relatively low price point for a huge amount of havoc that we now know is possible, is certain to be attractive. So that means we have to be much more sophisticated about preventing this because, sure, it's going to be out of reach for people who are small time enough. But people whose interests are not honorable, exists at every scale, and we can't afford to have this in reach for those with significant power and resources. Okay, so next question is an interesting one. I've heard this one a number of times, do you think it's worth finding out what happened in China, even if it ups tensions between China and the US or the world? This could have big implications on trade and geopolitics possibly even lead to wars or proxy wars? Thanks, Ben. I'll start here. I don't think we have a choice. We cannot shield an investigation into the origins of a phenomenon that's obviously putting a huge fraction of the world's well being in jeopardy, irrespective of where it is leads, yes, it is potentially going to lead to tensions between China and the US and the rest of the world. On the other hand, I think we were very clear in our initial discussion, that we don't really see this if the lab hypothesis is correct. We don't see this as the responsibility of China per se. This was the responsibility of the scientific community that decided that it was safe and desirable to engage in gaina function research on that Boren coronaviruses, and as terrible as the outcome is, I believe, if the lab hypothesis is true, as in the form that we think it might well be true, that that is an honest error, a spectacular one. But the blame is not what this is about. So I am concerned that the Trump administration has sought as much as it has opened the possibility that this that the lab leak hypothesis might be real. It is also politicized that claim and made it frankly much more difficult for those of us who wish to be careful about this, because it is seen when one talks about this hypothesis that they are on a political side, which is not the case. So I would advise us to solve the problem of geopolitical tensions by being clear about the fact that this is a matter of great interest for humanity's well being and that that requires us to figure out what happened. It's not a matter of blame unless something truly unexpected happened here. Like this was an intentionally released by a weapon that would change this dynamic quite a bit, because this would obviously be an active war. But assuming that's not what happened, let's, let's recognize that what appears possible and maybe likely here is an honest scientific mistake of spectacular proportions. And it wouldn't be the first one.

**Yuri Deigin** 45:58

Right? Absolutely. For example, there's this 1977 flu pandemic, page one and one, which I think the modern scientific consensus agrees now that it was a lab leak from China, we have been working on some sort of vaccine for that strain, which actually, at that time, was already extinct, extinct, I think it's the same strain, there was the Spanish flu strain. And maybe they were just in case returns trying to create a vaccine, which actually escaped the lab and started an outbreak first in China in the Soviet Union around the same area. And for many years, it was taboo in scientific circles to to even contemplate the idea that this could have been caused by a lab leak, although there were homeworks, like temperature sensitivity of the this viral strain, which is hallmark of like vaccine attenuation. And eventually, I think many decades later, it was then recognized and acknowledged by the scientific community. Yeah, sorry, it was a lab week, I think we might have just very similar to usual here, whereas, you know, in the immediate future, barring some, you know, whistleblowers, or unexpected evidence come out, if the status quo remains, nobody's going to acknowledge this was a lab leak if it was, or, of course, we are, you know, operating under the assumption that this is a lab leak. If later on, we have evidence that Oh, no, actually, this was a natural outbreak, and we show evidence of these sonarak animals who are the intermediate carrier, then of course, this question is off the table. And it will just be proven wrong and kind of eat our tie ahead, whatever. But if there was a lab leak, I think we're several years away, and maybe if not decades of actually, the scientific consensus technology and the kind of state governments acknowledging as well. But it is interesting, I think you allude to this, that the American government can stop forcing the issue a few months back, because they were pretty aggressive initially. And then they kind of just stopped stop talking about it. And maybe they reach that point, they realized that it was a lab leak, but it was a leak of research paid for by American taxpayers. So in collaboration with American researchers, it's not, you know, it's not a very politically high dividend case to keep pushing. So maybe they dropped with this, why they dropped the subject.

**Bret** 48:35

Yeah, I have the same sense that there was a recognition that a story that looked politically useful suddenly became so complicated in terms of what it implied that there was a loss of enthusiasm on everybody's part for talking about it, which is really the reason that we have to pursue it. Now, what I'm hoping is that somewhere out there in the virality community, there are people who have the same sense that we do that the story does not add up as a simple zoonotic jump, doesn't mean it didn't happen. But so far, we don't have enough pieces to see how it would have. And lab leak would make good sense. And they're going to look at each other across the table and say, you know, what, we actually have an obligation to say what we understand is true, and why it suggests the map of probabilities that we see that would be highly desirable. So hopefully, hopefully, they can hear how important it is that we need virologist to begin to rescue their credibility and by telling us what we don't yet know about the story. Hopefully that will happen. I really, I really do think it's possible and I should say there are a few courageous people in virology, who have very carefully indicated that this possibility He is alive. And that's a very hopeful sign. So maybe we'll see more of that, as people realize that this question is not going to go away until it's settled. Alright. Thanks for doing this, it's unacceptable that the scientific community is so dismissive, totally agree. DNA research has come a long way, since I was reading black and gray rectangles on an X ray film, you better believe it? I have to say I'm, I'm old enough. And I studied biology in college long enough ago that I have the same sense of, it's amazing how far we've come. And I guess the other thing I would say on that point is, these things don't, the rate of change is not consistent. Fields get stuck. They don't make very interesting progress for long periods of time. And then suddenly, they take a quantum leap. And so if you check back in, haphazardly, sometimes you discover a field that was sleepy, has made a ton of progress. And this is part of the reason that I said in our last discussion, that I wanted a list of all the things that we're doing that are dangerous that I don't yet know we're up to that I know I'm going to find out about after the accident has already happened. The list of times that this has occurred since 2008 is long. And I want to know what's going to be added to the list so we can address it ahead of time. That's really where we need to be. You have anything to add?

**Yuri Deigin** 51:36

just interested who left that comment must be a very old person he was the doctor was himself. It's looked at the X ray. X ray crystallography pictures. Yeah,

**Bret** 51:47

that is a long time we apps right? It's X ray crystallography here, not just Southern blot or something. Okay, I don't this one says I don't fully understand the ethical implications of gain of function tests. I've heard the concept discussed in a negative context a few times would love to see the steel man case made for the positive in a future q&a. I think we can easily steal man, the case for for Ghana function research, you want to do it?

**Yuri Deigin** 52:21

Why don't you start enjoying?

**Bret** 52:23

Sure. gain of function research allows us to survey the capacity of viruses. And the end to understand the harm, they will do ahead of time without having to actually find these needles in a haystack out in nature, we can take things that are in the neighborhood, we can composite them, we can passage them. And we can therefore essentially see into a future that we would have to spend a tremendous amount more to discover in the wild. And that amount of power is potentially very protective for humans. And the only argument against it is that we cannot control the we cannot control the substances that we have enhanced from the possibility of escape. But of course, humans are very capable of doing remarkable things. And figuring out how to prevent an infectious particle from getting out of a laboratory. While it's a difficult problem is not an unsolvable problem. That would be the steel man argument, I think. Now the answer is actually that there is a related rates prog problem. And the more of these enhanced viruses we produce, the greater the chances that one will escape. And because the ingredient that you cannot eliminate from the mix is human beings, who at the moment are absolutely required at the laboratory to do the work. You cannot eliminate human error. And if you cannot eliminate human error, and people have to go home to sleep, and to eat, and do all the things that human beings do when they're off the clock, you cannot prevent a leak. So it may be that the chances of creating a pandemic simply outstripped the chances of preventing one. If we're going to do this research, I will say as a final piece, I did suggest in a prior discussion, that if you were going to insist on doing this research, and I'm not sure that we need to do this research, I think it may be the best defense may be limiting unnecessary and dangerous contact with wildlife. But if you're hell bent on doing this research, then maybe you shouldn't be doing it on a ship. Right out at sea, a ship that when something escapes can be quarantined from rest of the world so that we don't run into this problem again. And if you think that's too much hassle, then I think you haven't understood how much danger we're putting ourselves in.

**Yuri Deigin** 55:12

Yeah, I actually like this idea because I mean, there was already wall expeditions that go out, study some marine life. And you can do join expedition with some isolated BSL four B cell three facility or little chip. But it's definitely going to decrease the number of people willing to do this research. Oh, yeah. Nobody wants to be stuck on a ship for a few months. But,

**Bret** 55:39

but if the argument, yeah, if the argument is that we have to do this research, then how much do you have to pay somebody to live on a ship to do it? Is there sorry, I didn't mean to interrupt. Yeah.

**Yuri Deigin** 55:49

No, it's a good point. But I don't know if I subscribe to that argument. I don't really see the this logic that we have. We are getting into actually from the Cato function research, excuse the pun, because we are trying to, I don't know what predict the pandemic by trying to recreate in a lab, one of the trillions of mutations that might or might not happen in nature. And then, and then do what the, I don't know, like create a as the work lab and other labs are trying to do Pan Coronavirus, vaccine or therapeutic? Well, first of all, I don't know if the numbers are in our favor, because we can't obviously, recreate all the mutations that might possible in nature might be possible in nature, that might actually jump over into humans, and trying to do so I think creates higher risk of happening in the lab rather than actually being able to prevent it by by using this approach, and secondly, obviously, while in this case, we did get a functional research didn't help us come up with any pair Coronavirus vaccine have therapeutic in time, which you know, I think they worked on within 10 years, maybe more. So. And, again, you probably don't even need gainer function research to work on a pan Coronavirus vaccine, you can just take the existing known strains and work on those rather than try to make them a little more pathogenic. So,

**Bret** 57:30

yeah, I agree. I agree with all of what you've said. And I would add a couple things one. If it turns out to be a lab leak, then we know that the very people who were telling us that we needed to educate ourselves about what an enhanced virus could and would do, because that would be protective. When it came down to it didn't tell us what they had learned. In other words, as I've been saying, repeatedly, part of what may be going on here is that this virus is adapted to laboratory conditions, some of them intentionally imposed, and some of them quite accidental. So if it is true that this research is supposed to arm us with knowledge in order to better protect ourselves, but the knowledge isn't forthcoming at the point that the thing escapes the lab, then that would suggest that the whole thing was a waste. So that logic doesn't apply if this truly didn't come from a lab, but if it did, I think we have to look very carefully at it. The last thing I would say is, as a bat biologist, I worked for years with bats, I captured them, I glued transmitters on them, I followed them around the forest. And at the time, it was not well understood that there were these very dangerous viruses that we might be coming in close contact with. Now the reason that I mentioned this is that I was not alone in doing this kind of work. There are 10s of 1000s of people studying wild creatures, handling them. And there is a famous instance of a fungus that is being transmitted to amphibians. The danger didn't go to humans, it went to amphibians, through humans. But it is not the case that all of these people who are working on an indefinitely large number of species in the wild are constantly creating zoonotic pandemics. could it happen? Sure, but I think what those who are arguing that we need gain of function research to address the possibility of zoonotic jump are ignoring is that human contact with wildlife is very ancient, and very widespread. We have lots of diseases that have jumped through agriculture, for example, but it may be much less dangerous having casual contact with animals in the wild than we are being led to believe and The real protection probably comes from preventing intense contact like the butchering of wild animals. The butchering of wild animals obviously exposes people to bodily fluids of these animals. And that is a very high likelihood of something jumping, which still doesn't make for a pandemic, because in general, if something jumps in such an instance, it will die out before it finds the magic, the evolutionary magic for transmitting between people. But you know, we have HIV AIDS, which we think came from a chimpanzee probably one butchered in the bushmeat trade. So that's a major indication that bush meats not such a hot idea, but the amount of contact is high already, the number of zoonotic jumps that have caused a pandemic from scientific research that is not gain of function in nature is very low. If not zero, I don't know of a case maybe somebody will alert us to one. But I think we've we've been, we've been falsely led to the belief that the chances that casual contact will cause a pandemic is much higher than it actually is. And the research has been portrayed as much safer than it actually is.

**Yuri Deigin** 1:01:15

Right? I think I know we have in mind.

**Bret** 1:01:20

Our Okay. All right. We are at one hour, let's get through some of these questions.

**Yuri Deigin** 1:01:29

All right, here's our just me final. Oh, sure. The final note to that question, I think you were referring to Peter Deshmukh, who was trying to make a case that these jobs happen on a regular basis. And he was using one of his kind of floored papers where they saw six farmers, the infected, not affected carry antibodies for a particular strain of back Coronavirus of like 218 people to justify this number that there's like a million to 7 million farmers in Southeast Asia who are exposed to these odors and jumps. But I think yeah, that's really, really correct. Finally, I think, as we mentioned in the original broadcast, or zymogen, I think it's a much better way to spend the money spent on getting unfunctional research to spend it on tracing of various epidemic outbreaks that happen all across the world to be able to very quickly identify such epidemics. And these days, the cost of full genomic sequencing, maybe you could sequence viral viral strain, pretty cheaply, and pretty quickly. It's so cheap now that you know, whereas it wasn't 10 years ago, so 10 years ago, you could have been making a case with me to be prepared. But these days, we can actually very quickly in real time, find what exactly is causing a small outbreak, a big outbreak and we can get the genomic sequences of all the virus viruses making a new appearance or confirming that this is a new viruses new outbreak or this is like a no same seasonal Coronavirus, strain or influenza strain pretty quickly and pretty cheaply, or very distributed scale all across the world. And I think this is what we need to investors globally is society into at this point, much better, I think will give us much better outcome than functional research.

**Bret** 1:03:24

Yeah, I agree with that point. And I guess I would add a couple things. One, I think we need some better language. The idea that is not a jump is a massive danger is really covering the fact that this is two steps. zoonotic jumps probably do happen regularly. zoonotic attempts that catch on that after they have jumped, make the evolutionary discoveries that allow them to spread across a large population, that's probably very rare. And so anyway, I think, dividing those two things and figuring out actually probabilistically Where is the place to prevent this? Right, would be a better investment. And then the other thing I would say, which this has just become very clear, in my mind is that part of the problem is that we don't take normal, regular pathogens that we're familiar with, nearly seriously enough, and that there's a lot we can do, monitoring the circulation of pathogens and interfering with their ability to jump between people that we've only just begun discussing in the context of COVID-19. And so I would advocate that we got smarter about how not to transmit pathogens to each other, you know, in the same way that hygiene greatly increased our resistance to things because we just figured out how they were spreading and figured out how to stop doing and we now have technologies at our disposal, that would allow us to prevent this from happening and all sorts of contexts where we are actually inflicting it on ourselves like our h vac systems, right? We could design h vac systems that are excellent at clearing viruses from buildings. At the moment, lots of them just spread these things around building so. So anyway, there's lots of room to make humanity safer and better that doesn't require this high wire act of Ghana function research.

**Yuri Deigin** 1:05:26

Yes, definitely agree.

**Bret** 1:05:28

All right. Next question. Have you interviewed a virologist or other expert, and they suggest a Lena Chan, perhaps a couple other people? I would gladly have a virologist on I'm a fan at a distance of Dr. Chan's work. I would say in the current environment, there is I think likely to be concerned even amongst people who are like minded about what may have happened here about talking to anyone who is being dismissed as a conspiracy theorist, and I've tried to be very careful. conspiracy theorist is a stigma inflicting term. This is a hypothesis, it functions like any other hypothesis, it's a question of whether or not the evidence supports the hypothesis or not. And eventually, hopefully, one hypothesis will turn out to be clearly enough supported that it then becomes a theory. It doesn't start out as a theory. But I would be, I would welcome such a person, I would have Yuri back on we could jointly talk to such a person. But I also understand that this is, in addition to being a very important scientific question. This is a dangerous question to people's careers. And people will have to decide for themselves whether or not they can afford to engage with people like URI and me whether that's safe for them. And I hope that they can figure out how to make it safe. Because as we've been very clear about this, this is a matter of global importance. Anything else to add?

**Yuri Deigin** 1:07:19

nor make you can rewind call to biologists or anybody who opposes the lab, they could have offices to join your podcast and debate this freely and openly on the podcast format that they see fit, I think it would be very, very good thing for the community.

**Bret** 1:07:42

I agree. Okay, let's see. If the virus is mutating, why is it important to know its origin? And might it mutate enough that its origin may never be known? Well, I'd say that this with respect to the second, there's no reason that it's current mutations and mind you it's not an it, it's many strains, and one of them could mutate so dramatically, that it's, I don't know, conceivably hard to connect to other things. But given that we're tracking it, that won't happen without our awareness. But even so we have samples from what it looked like very early in the pandemic. So there's really, there's no way it can hide, there's just a simple question of what the evidence is about what it is most closely associated with. And the fact that different components mapped to different origin populations is a conspicuous fact not impossible to explain through a natural process, but difficult to explain, especially in light of the absence of any ecological connection between different hosts that would make it likely So anyway, we're in a landscape that's actually the tools are well understood. They're the tools of the scientific method. And I see nothing special about this other other than the fact that it is so politically charged. Anything you want to add?

**Yuri Deigin** 1:09:07

Well, I think you can maybe address the point of why it's important to know the origin. Yeah. Thank you have a very good explanation that you presented to the original podcasts.

**Bret** 1:09:17

Yeah. And I think we've covered it here too. I mean, at the very least, preventing this from happening again, is justification enough for chasing this all the way to the bottom. So there it is, okay. Somebody wants to know about the Gaia hypothesis that's not directly relevant here.

**Bret** 1:09:50

How connected are the Wu Han scientists to the global research community? Wouldn't other parties be aware of what they were working on? From similar labs, here, you want to take that

**Yuri Deigin** 1:10:04

sure, highly connected is probably as connected as it could be there are two leading centers of Coronavirus in the world will hurt us by being one and the other is very cloud. And you can see they collaborating quite closely. There was a conference in Wuhan, I think almost every year, there was one in 2018, there was this nice picture of everybody, including Rob Barrett contusion away in the walkway conference, during a shot, call it to high crime. And so they're very well connected into the festival community. And I'm sure that, you know, behind closed doors, people talk about, you know, what they've been planning to do, or they have been doing and have awareness of things that have been unpublished, or were kind of the research direction they were planning to take many years down the road, and also the actual postdocs that are, you know, working one lab that's switching to a different lab, they all know, the internal kitchen, but I think there's a bit of a gray internal scientific code that you don't snitch on your supervisors and colleagues. Because you know, that it's the whole community, the whole field of biology, you know, functional research is going to take a huge hit financially or whatever, if this is indeed proven to be a lively hypothesis, so nobody has any motivation to speak out. Even if they can suspect anything, there's no way you don't have anything to gain respect to. So this is my understanding, maybe maybe I'm wrong. Maybe you have a different view, correct? Yeah, record views?

**Bret** 1:12:00

No, I think, I mean, I think people should look for themselves. And you can just see what the coverage of the family is, you know, she's given a TED talk. These two labs are connected Yuri, and his medium article does a great job of pointing out what the friendly competition between these laboratories looked like. But it's a very small community. And actually, this goes to this next question. on the list, why won't international virologists support an investigation, which I think is the same question. In some sense, I'm gonna say something very nasty. I've seen it from the inside. And this is a major threat to our ability to think clearly about scientific matters. The problem is that scientists have been turned into salesmen. In order to get your research funded, you have to portray it in a light that it is very important, and that you're in the best position to do it. And you end up saying a lot of things. In order to get your grant funded, that actually an objective analysis probably wouldn't support. And then you have these little networks of people. Most people cannot evaluate a grant by a virologist about gain of function research to the people who are doing the analysis of the of the claims are involved in the same work. So a they're predisposed to see the work as similarly important, and be little reciprocity networks develop. And so people are funding each other's grants and supporting their claims. And what it results in is science that is increasingly just disconnected from reality where you can't tell whether or not something is really promising or is really dangerous, because the people who are in the best position to tell you that have a conflict of interest. So what we're seeing is what happens when you don't protect science from conflicts of interest. The most important thing that a scientist can have is the ability to tell you what's actually going on, even when it isn't good for them to say so that is a vital capacity and we are destroying it by letting the market the market, adjust the way science ebbs and flows. The market is too closely connected to science, and it is turning our scientists into hucksters and we got to cut it out. I mean, what has to happen in order for us to see the danger?

**Yuri Deigin** 1:14:27

Yes, it's a great point for all the signs actually not just enrolled you because there's this huge conflict of interests and this internal kind of all boys club, being reciprocity in being in the center of all these relationships. Where do I submit a grant, you're going to be the reviewer for my grant, you know, you'd be nice to me. If your grant comes along to you. And this kind of self perpetuating decades of grant funding being spent on Sometimes the research that is not basically is done at a much slower pace that is good, because it's just much more comfortable to do it slowly because you know, you're going to get an X grant and the next graph, maybe you could have done it in maybe one or two studies, you are sometimes inclined to greatly spread out the research so that you know he did for five years longer. So I'd say it's a much bigger issue, much bigger issues, virologists whole issue of scientific funding, it's, it's a very good model at this point, but probably better than whatever was available, you know, decades and centuries prior. But still, I think it could be better to properly align incentives for scientists to be still kind of on the cutting edge to be honest, and to be, you know, not afraid to challenge the group think that sometimes it's very present in some of the fields.

**Bret** 1:15:58

Absolutely. Okay, next question. Is it possible that the Chinese themselves did not know initially that it had leaked, you'd think they would have acted sooner? Now, my, my sense is, I'm not sure what I would expect them to do. Because you have to think about what these things look like as they emerge. Right? You get some cluster of pneumonias, maybe somebody in a hospital, thanks. Is there something going on? But maybe three quarters of the time that somebody says, Is there something going on? It doesn't go any farther than that? Or it turns out to be just an anomalous cluster of cases that are unrelated, right? And then, in order to test so how often do you want a doctor who thinks, am I seeing an unusual phenomenon here? That could be an outbreak of something new? How often do you want that to trigger a search for a viral particle that might be causing it? And then from there, let's say, Okay, you've got a spate of pneumonias, and then you find a viral particle you haven't seen before, are the two connected, that's a difficult piece of research to do right there. So I think the point is that there are so many steps in establishing what's going on before you pull the the emergency brake, that you don't necessarily want, every time some cluster of something emerges. For the emergency brake on global travel to be pulled, for example, right, we set the bar somewhere else, because if we did that, then we'd be pulling the emergency brake all the time, and it would be for nothing. So I don't know what this look like inside of China. I know that in retrospect, and from the outside, it looks like they moved way too late. And I think there's a lot to hold them responsible for in that regard. But if you were in charge of building a system for figuring out, you know, when to pull the emergency brake and what to do next, I think you begin to recognize how complex a problem that actually is. And this is where being proactive and creating an environment in which things are less primed to spread would probably be a wiser investment. I'm very curious to hear what you think about that URI.

**Yuri Deigin** 1:18:27

I think I agree with most of the points, or probably everything you said. Kind of back to the original question. I think it's very possible that yes, the Chinese themselves, I mean, at some higher level of Chinese government themselves, they didn't realize what had happened. And maybe they were misled by kind of the local government, because we kind of know that the local government was denying there was any kind of outbreak. And then the Beijing had to actually step in, and I think they actually removed some of the local leaders and reprimanded others. And initially, I think it was the idea of the local government to kind of quell down all the mention of a potential pneumonia outbreak. It was the local authorities, who were I think targeting that Dr. Lee, I think the whistleblower the initial person who blew the whistle in the morning is in WeChat. Letter actually succumb to SARS, cov. Two, but then kind of the the big, the federal government stepped in and maybe kind of they were already painted in a corner where they couldn't really admit, even if there was a lab leak hypothesis, they couldn't admit that there was one because you know, saving face or whatever. But they initially were, it's highly possible that were misled by local authorities. And the actions of the federal government kind of hit that they were extremely unhappy with the handling of What the local government did and or the management of the woman instead of ideology? Precisely because they instituted this major general chair, as the head of the biology, who is, she's a military biologist, and she overtook the leadership of the of the woman Institute. I think that's a big red flag that kind of the government division government was very unhappy with what had gone on how it was handled in the lab, how the previous work was handled, or how the outbreak was portrayed, or how data was shared with the world or whatever. But obviously, the actions that they took the Chinese federal government, I think they're indicative of the happiness. So yeah, I think we addressed this this question thoroughly. Yep. Of course, we don't know why. any potential potential deeper details, and only time will tell them totally past.

**Bret** 1:20:55

Yeah. Why wouldn't a little bit of transparency be wonderful?

**Yuri Deigin** 1:21:02

Even Yeah, sorry. And like, not to belabor the point. But the thing that they did close uhand, they'll still allow the Chinese New Year celebrations to go even though it was, I think, at that point, pretty clear that there's something bad going on. That's a big, big, big mistake, I think for both local and federal government, which is probably costing a lot of lives. You know, hindsight is 2020.

**Bret** 1:21:28

Well, hindsight is apparently not 2020, because we're in the midst of making the very same mistake here in the US, where we have suddenly decided that some groups are creating a, a hazard of viral spread by protesting and other groups are not, which is a very odd situation. So as we

**Yuri Deigin** 1:21:53

I saw this kind of one California county saying that big gatherings are limited to 10 people elicits a protest and 100 is long, something like completely illogical like that, well,

**Bret** 1:22:05

it's even worse than that. It depends what you're protesting is the problem. And there's just no argument for this. So I agree. Obviously, a gathering of more than 10 people, if it's a protest doesn't make it any safer. We don't know how safe it actually is. Because as we've talked about before, it doesn't seem to spread outdoors. As I've also mentioned before, I predict that that will change and it will get it will evolve to be better at spreading outdoors. So we should be very careful about things like large gatherings. But the political double standard, in terms of who we're going to shame, for protesting, in the midst of a pandemic, is it's kind of mind blowing to see it. Alright.

**Yuri Deigin** 1:22:53

What can we do to Yeah, go ahead, go ahead. Sorry, in terms of maybe not learning the lessons, maybe countries are probably opening up too early, including Russia, probably core in at least Moscow because Russia is very heterogeneous in different places, some places didn't have any anybody sick. So they didn't even have according to Russia, I mean, Moscow had, I think it was like almost 300,000 people infected. But Moscow completely lifted all travel restriction restrictions last week, and now they're actually opening up some outdoor cafes and restaurants. And next week, they go fully open all restaurants. And maybe it's a bit too early, because we still get like 15, or daily new infected in Moscow, whereas you here in Beijing, think they had some traces of COVID of sorts to in in a fish market, and they completely shutting down the whole city. So the kind of difference in approach is very, I think it's illustrative that maybe, you know, the Chinese are taking much more seriously than the rest of the world.

**Bret** 1:24:03

Yes, I agree with this. New Zealand seems to have cured its problem, providing a model for what we should have done. But the whole thing is just so incoherent that really, if you're going to open back up before the thing is stamped out, or under control, or you have a vaccine, the obvious thing that you need is ubiquitous, highly reliable testing, so that we can just simply take those who are in a position to spread the thing and eliminate them from a position to do it. And we just we aren't there we have really crappy testing. It's not widely available. And so anyway, I find the entire response so incoherent is to be just absolutely maddening. And we're playing with fire. We don't know what this thing is going to become. We don't we don't even know what it is. We don't know that it hides in some tissues and recurs. If you can get it multiple times, if it gives you lasting damage that knocks decades off your life, we don't know. So anyway, we're playing with fire.

**Yuri Deigin** 1:25:12

Unfortunately, yes,

**Bret** 1:25:13

yes. Okay. What can we do to create safe spaces necessary to be able to examine uncomfortable data, not safety from a fence, but safety from having your life destroyed, forgiving, a fence of making an error. This is what science is supposed to be. This is what science is supposed to be. And the fact that it isn't, that tells you that we have a sickness that has no name, we have lost our greatest asset, which is a scientific apparatus that is capable of telling us what we need to know rather than what we want to hear. And I don't know how we create that in the current environment, because market forces are so dominant and are subscribing to them as something like a religion has caused us to turn something as important as science over to this thing that is incapable of managing it properly. But we must, if we are to navigate with the kind of power that is now at our disposal, we need a scientific community that is tolerant of all viable hypotheses, irrespective of what they might imply. Something to add. Okay, URI mentioned, there was some sort of tag that could be used to detect if the fern site was still present in a culture Could you elaborate on how that mechanism works is it commonly used thanks?

**Yuri Deigin** 1:26:48

Working try. So, the way your inside is coded for, in the new nucleotide sequence, to Argentines are coded for bass, the corals that are recognized, like the sequence of the corals is recognized with what's called digestion enzymes. And there are dozens, if not hundreds of different digestive enzymes that are essentially same as fewer. And as an enzyme for recognizing and cutting protein sequences. digestion enzymes are both enzymes that recognize a nucleotide sequence and cut it. And they're used for all sorts of genetic recombination or whatever sorts of purposes that bacteria or other organisms have, you know, invented them for. But for modern biology, genetic manipulation tools, we now kind of, were able to use them for their for our purposes, which is, you can slice in a given spot of a nucleotide sequence using the digestion enzyme. So there's a particular enzyme recognition sequence, and you put the enzyme and culture in it will cut that particular spot, wherever you use it, you give it and so this fuel site has one particular recognition sequence that can be recognized by what is called the fall one or fall one restriction enzyme. And so if you, you can use it as a screening tool and culture for what is called becoming our flip method of screen is restriction fragment length polymorphism. So basically, the different length of fragments that will show up on your on your if you're on a gel for your experiment, whereas you know, if you didn't have that, that that enzyme site, you'd have a one long kind of stretch, but if you have it in your culture, it will be cut. So you have two short fragments. So this is the the different length. And that's the polymorphism that is used to be able to screen for presence or absence of this cutting side. Hope I didn't confuse maybe you're much better at explaining things that I have. Well, let me let me your commenters have pointed out so maybe you can,

**Bret** 1:29:13

let me know I mean, you're Of course working across a language barrier. You're obviously fluent, but English is not your first language. So and this is tough material to let's put it this way. Let's say that you had a special kind of scissor that cut up it cut up a book only where it found a particular sequence of letters. And you could point it at any book and it would divide the book into all of the fragments between that series of letters wherever it shows up. So let's say you took the sequence of letters meta, and you had every book cut up at every place that Matter showed up in the text, well, that would create a lot of fragments of arbitrary size, you could then separate those fragments from each other by doing something like running them up a gel, putting an electromagnetic force at one end of a gel, and then the, the fragments would migrate some distance, the bigger the fragment, the slower they would move so that they would separate themselves out and you would get strata, you could look for a strata that had a target length sequence. So if there was a particular you were trying to figure out whether or not you had a particular paragraph, right, whose length you knew, because meta appears here and meta appears there, so you know what fragment you're looking for, you run these things out to get them to separate, and then you can see whether or not you have a fragment of the correct length. Right now, there's a lot of technical detail and how it is that you calibrate these things. So you know what length you're actually looking at. But nonetheless, it can be done. And what that means then is if you introduce this site into a viral genome in order to, you know, if you're introducing the first site for your own purposes, you want the first site there to enhance transmissibility, then you've created by adding this flanking sequence, you've created a, a target fragment that you can then search for and detect whether it is present or not. set about right here.

**Yuri Deigin** 1:31:25

Yeah, absolutely. Yeah. And then you can screen for colonies for either the presence of this fragment, or the absence of the straggler, depending on the purposes,

**Bret** 1:31:35

yeah, so you can screen anything for a fragment that's this length. And then if you want to do further scrutinizing, you can actually take what was run to that place on the gel, and you can investigate further what's in it, but the quick and dirty test is just Is there a fragment of the right length?

**Yuri Deigin** 1:31:50

Right? And can they the use of these fragments, in in biology was much more prevalent before, you know, the full genome sequencing or NGS was much more cheap, as you know, available as it is right now. Whereas before, you know, sequencing could take much longer, you wouldn't be able to sequence this frequently, because it was expensive. But using these kind of methods, like our flip was just quick and dirty way of screening colonies. And today, it's not as prevalent of using this method, because you can pretty much sequence any calling you have, but it could still be used as a very robust method for if you have a very large library, you need quick access to to be able to tell if you got the right calling or the wrong quality. And it's definitely having that sequence is definitely helpful. And it's just fine because they call Don's coding for this art for the orgies and creating this fear inside this digestion enzyme site. They're very rare codons they're not usually used in Coronavirus is, or this lineage of coronaviruses. Usually Argentina coded differently. So it's just odd to see. And it's like to exact same corals, very rare corals in sequence. So it's just odd coincidence that again, yeah, you know, if it was human made, it would make all total sense. It could be just a coincidence.

**Bret** 1:33:27

So if I can sum this up, there are lots of little techniques that people who are skilled in the laboratory arts use to make their own work simpler, right, just the same way a programmer would put out a little piece of code that would allow them to check whether some sub routine was doing what it was supposed to or something like that. There are lots of little tricks, you can put a little, you can add something that will cause a particle to fluoresce if it's present. And so then you can just, you know, shine a particular light at a colony and see whether the thing is there, that sort of thing. These things are everywhere, these little techniques that just facilitate laboratory work. And so what URI is saying is that, to code for Argentine is common, but the way Argentine is coded, the particular code on that is found in this particular sequence next to the foreign site is conspicuous in that it is absent for most coronaviruses. So for whatever reason, coronaviruses don't produce it normally, or not very regularly. And right at a site that we're talking about, how did this a Why is there a foreign site that's uncommon and conspicuous be why is it an insert rather than a series of mutations? And then see, why does it have this conspicuous sequence next to it that has a known use in the lab and that is coded for in a way that does not suggest a normal natural process in the As viruses because in general, we don't see it. That's three pieces of evidence related to the fern site. That don't, it's not the smoking gun. But it's certainly conspicuous that somebody working in a lab facilitating their own work might have added this sequence in order to be able to cut at that exact location, and done it in a way that fit their laboratory modality rather than some sort of natural process.

**Yuri Deigin** 1:35:32

Yep, perfect summary.

**Bret** 1:35:34

All right. Let's see. What do you think about the full full of information World Health Organization link under every video, even mentioning the virus? I get the problem, you got a lot of misinformation, you've got a lot of people spreading low quality conspiracy hypotheses. On the other hand, Google doesn't know what a counter intuitive hypothesis that is important. Sounds like it doesn't have an algorithm to figure it out. It doesn't have a team of biologists who are capable of sorting it out. And even if it did, that team of biologists is going to suffer from the same kind of perverse incentives that our virology community is suffering from. So in some sense, I think the only rational thing you want to do is leave it so that yes, cruddy information can be presented people are in a position to evaluate it themselves. But that means that the ideas that people want to shut down, but that are correct, are also allowed to, to get into the world. I just don't see an alternative system at this point. So I'm very much against these warnings, because I think they basically are a wink that says, This is not a sanctioned idea. And this is not a sanctioned idea. Yes, will eliminate a lot of garbage. But it will also eliminate the stuff that the system doesn't want to hear the true stuff that the system doesn't want to hear. Anything to add Yuri?

**Yuri Deigin** 1:37:09

No, I agree that you know, on one hand, you want to prevent misinformation. And I guess having this kind of generic warning is much better way to and censorship, to I guess there's no really like a win win situation in this emerging pandemic and a lot of unknown, emerging knowledge that we still don't know they could have the truth value of. So eventually everything will be sorted out. And we shouldn't definitely shouldn't censor or let stop anyone from preventing anybody from speaking. But on the other hand, or maybe you're having some sort of warning, and you have all these ideas are still in the stage of no unknown territory of their truth value. Maybe it's a good thing.

**Bret** 1:38:01

Yep. Okay, next one. Given delphix paper posits a bat from Malaysia as possible source, what is the relationship between the Wu Han CDC which collects bats and the Wu Han Institute of virology, which works on bat borne viruses, amongst them, amongst others? I must say, I don't totally understand the question. There are parts of it I get Do you understand the question?

**Yuri Deigin** 1:38:29

Well, I think I may. So there's, I think, two part question is really a two part question. Because I mean, there is a recent preprint by Dr. scheck and others where maybe it's already in his published paper. That did pause it that is probably the source to is probably came from Malaysia because pangolins are only found in Malaysia. And But again, it's just a conjecture. I mean, we don't really have any any solid evidence to back up that claim. In the second part of the question is the relationship between the EU and CDC though was like 300 meters from the western seaboard seafood market and the market instead of biology, because there was this kind of original idea by the Chinese scientist I think, shabu Tao who published a preprint and and thought that maybe it was someone working from someone working in the water and CDC close to the seafood market. It has an adverse inadvertently released kind of sample of bad Coronavirus and maybe arthropod Coronavirus, bad related Coronavirus found in Northport because this was junk one cow or something. Bear with me. He's He's a tech guy. He He is investigating bat war ticks and so he had been featured prominently in some Chinese publications where he was showing collecting baths, finding ticks on the bring, bring those live bats and ticks back into the wall and CDC to collect to extract the samples to extract the Coronavirus. And I think he boasted that he had been quarantined sometimes because he was exposed to blood or bad urine. And so this was the original idea of this Chinese author shalbatana that maybe he's the guy who caused the outbreak. But don't shove it out, pull that preprint in Canada, this line of investigation of the ones deceiving the possible origin of the lab leak, it kind of died down. And when I said virology took center stage, but coming back to the question, there is a very close knit relationship actually between the two institutions. Because first of all, there's many scientists that simply have double affiliation they kind of work in in one and in the other and sometimes they do work in in CDC, sometimes they do work in w IV. And also there was collaboration in the one CDC bringing live animals and extracting samples of various viruses which they would then turn over to the server ology for further work or analysis, whatever. So there's, there's been a lot of investigation online of looking into this one CDC what's going on there because they were actually in the process of moving from that spot near the seafood market to somewhere more remote location. And they actually had I think, a public tender up on their website back in September that they had a huge pile of like toxic waste they need to get rid of and so and there was a fire in a company that was later turned out that they won the this kind of the contract for clearing up the the toxic waste. So there's like too many very interesting things going on. That I must admit I haven't been following very closely. But the work on CDC and its connection to first saw all the live animals being kept there and second to the arthropod vectors that she Zhang Li actually tried to distance herself from when she was scrubbing her database in December 30 years, there's a lot of like potential for questions that still, we should still get answered. Because you know, ticks are found in bats. And you're still going to take our break in the past few years with Lyme disease and other diseases. And wild ticks haven't been found to carry coronaviruses they have been found to Curie closely related viruses in particular by actually with this person. Jing Jing Kuan Tao from from the CDC who actually had a paper on

**Yuri Deigin** 1:42:57

like the whole history of the whole host of viruses carried by by ticks, bad worm ticks. And, and there was, I think, another article on fangirling ticks. This was just one area of research that we're going to give up on way back when looking into ticks, another arthropods, mosquitoes, maybe whether they could be the source of either the natural source of the Coronavirus or source of the leak, maybe you know, they, in fact, have some lab animal and carried it out of the facility. But I just know for some reason I completely give up on that line of questioning, maybe someone can pick it up and look into it.

**Bret** 1:43:37

Yeah, I must say ecologically, something like a tick is much more plausible to me than something like a pangolin. I mean, even if it was a pangolin, or something like a tick that could transmitted between a bat and a pangolin. would would make more sense than some other mechanism. Am I right? The Wuhan. CDC does not do gain of function research.

**Yuri Deigin** 1:44:00

I don't know I wouldn't rule it out. But I think their lab is BSL two only so probably not. But again, I haven't looked into it and actually scrubbed the all the mentioned from their website on the one CDC of that location. And they actually change the location of the washington dc on Google Maps. And I do and whatever, from the one year to the seafood market to probably the new new building to which they were planning to move to it's much closer to the Oregon Institute of world crosstourer. Yep. But I mean, I'm sure people from the lab if they probably engaged in some sort of gain of function research because they were also affiliated with a wanting to do virology, but they wouldn't do it. Like in that location. They would have done it probably be in the Wuhan race to virology. They could have of course track back and forth whatever contamination they could have been contaminated with. between the two.

**Bret** 1:44:59

Yep, All right, we have just a few more here. Another argument for gain of function research is being certain that we really do understand how a virus becomes infectious and which things affect its infectivity. Yeah, that's certainly true.

**Yuri Deigin** 1:45:22

I mean, you can do it retro retrospectively, if we found a virus, for example, the new human virus related bat virus, we can then look at what exact mutations in the receptor binding domain causes this. But that actually to do it proactively to take some bad borne virus and try to make it effective for humans. To me, that's completely counterintuitive. It doesn't make any sense. Why would you want to do this? Again, as we already alluded to many times, there are a huge uncountable number of variations that could happen in nature manual, which could make a virus, you know, human, worn, but never will happen nature in trying to recreate it in the lab, but it just doesn't make any sense.

**Bret** 1:46:07

Yeah, I agree. It seems like if you're going to do this sort of research, you could have a model system that actually was far from humans. And you could study infectivity in the model system. Maybe this is done, I don't know. But you're right, the real danger is from increasing infectivity in humans, or in human tissue in order to study the process in order to prevent an infection of humans, there's an obvious hazard, that's going to be almost impossible to get around unless you could figure out a kill switch, or something so that nothing could possibly escape because it wasn't viable, absent some component that you controlled.

**Yuri Deigin** 1:46:52

Yeah, that's a good point. Because they do this in pseudoviruses. The in, there's actually been a lot of this kind of research where it's not only true gainer function research where you create a live virus with a human receptor binding domain, you can do it in a pseudo virus where you put the receptor binding domain and then completely unrelated virus, which wouldn't be able to be viable on its own. I mean, it could infect human cells, and you can even see it in a lab setting. But if it escapes, it wouldn't be able to propagate in a normal setting. Yeah, why it's a limited, of course, because it's not a true virus, it's suited to what's called pseudo virus. But I think for research purposes, it's good enough that you don't need to really go into to exponentially more risk and actually generate the live virus that is more infectious in humans than it was originally an original Host.

**Bret** 1:47:41

Yeah, the problem with the kill switch is, of course, it can evolve away and the evolutionary pressure would be for it to evolve away. So you would have to build it very carefully so that the room for it to evolve away didn't exist, it has to really stop dead in its tracks, at the point that you're not fueling it in order for that to work. But anyway, it's a theoretical possibility. And for all I know, it's happening in some way that I don't I'm not aware of, but all right, let's see. Another argue, oh, what is your opinion of Professor Michel limits findings regarding how the response to COVID-19 should have

**Bret** 1:48:24

and should be handled? Are you aware of this, of what this is about? No.

**Bret** 1:48:32

Yeah, I have a feeling shortly after we end the stream, I'm going to realize what this is about, or run across it and kick myself for not having a good answer, but I don't. All right. What is your opinion on Kary mullis, the inventor of the PCR test, who passed in August 2019. I must say I didn't know that he had died, if that's what that means, stating that PCR test should not be used to diagnose disease. So he questioning the HIV AIDS hypothesis. 30 years of descent. Do you have thoughts?

**Yuri Deigin** 1:49:10

Well, I know that people have been drawing parallels between journalists and Clinton years, both Nobel laureates who have since started expressing questionable ideas. Other than that, I mean, I don't know just because yeah, like person has done good work previously doesn't mean they're right today, and will conversely, just because you know, they're being windy, not popular might not be supported by the kind of mainstream orthodoxy. doesn't mean they're wrong. Yep. And I don't want to get any hot water with other deloreans which have been mentioned today in our q&a, but I won't, it's very, very at this point. Very dangerous territory to go into. In terms of the PCR being able to notch that it shouldn't be used for diagnosing disease, I think it's wrong absolutely wrong. Why not? I mean, it's it's a great tool that have been used by many viruses to confirm repairs are or any other sort of infection that we can detect by using the PCR methods?

**Bret** 1:50:27

Yep, I would say, you know, in Kary, mullis case, obviously, quite brilliant, little crazy. And my sense is, it might be that a certain, a certain amount of crazy, combined with brilliance combined with a whole hell of a lot of luck, so you don't get killed off in the process of getting your credential might make you more likely to make an important discovery like PCR. But then, it might mean that you're more likely to come up with things that have important kind of currency but aren't right, like the idea that HIV is not the causal agent in AIDS. And this is what I concluded and I think I said somewhere previously, the thing about concluding that HIV doesn't cause AIDS is AIDS is a syndrome, a syndrome is downstream of a failure in this case, many things can cause that failure. And something that's sometimes causes that failure cannot do it in certain circumstances, because you're in a complex system. So we should actually expect that the two things that I think, set Kary mullis off in this case, one, that not everybody with HIV gets AIDS. And to that not everybody with AIDS has detectable HIV, you would expect those things just by virtue of the fact that the syndrome is downstream of something that could be triggered in multiple ways. So what that means is we have to change our mechanism for investing, investigating complex systems because a simple falsification missed obligation to to Occam's razor doesn't work, not because it isn't philosophically right. But because complex systems tend to falsify every hypothesis by virtue of the fact that there are lots of processes interfacing with each other. So I don't know how much farther to go with that. But I do think, well, let's just let's just leave it at that. Melissa is a brilliant guy who contributed tremendously and I think we have to take seriously what he says but it doesn't make him right. In this case, I think he's wrong. Okay, last question. To avoid problems with kill switches. Why not genetically engineer a super smart slave species that can conduct gain of function experimentation on unpopular human subjects? No lab leaks? Well, that's a terrible suggestion. I'm sorry. I read it out loud. I'm pretty sure it's a joke. But damn, if you're going to make a joke, you got to include an emoji. That's the thing. That's how we know for sure. Okay, well, Yuri, is there anything you want to say in closing?

**Yuri Deigin** 1:53:26

Not really just want to thank you for organizing these chats. had a lot of fun doing it. Thanks again. Yeah, thank you hope you you bring on more guests, or much more qualified tonight to answer the virology questions and explore this hypothesis from all angles, not necessarily from legal then we'll explore I mean, if maybe Anderson will come onto your podcast and defend why he thinks there's virtually zero chance of this being elaborated the

**Bret** 1:53:55

great debate. Yep, I agree. All right. Well, thanks. Thank you, Yuri. Appreciate your your work and your dedication to this question, and I hope we find out something interesting soon, and that would be a great excuse to have you back. All right. Thanks, everybody. Appreciate the questions please like and subscribe. pass this around if you thought it was interesting and see you next time.