The Pathobiome: Stealth Infections and the Brain Transcript

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Introduction to the Pathobiome

Diverse infections are being found in brain specimens from people that we lost to these devastating conditions like Alzheimer's. If you can make animals sick using the same infectious agents and you get pathology, which has been, by the way, branded as being all bad, and that's another matter we can discuss in a moment, that these things are credible pieces of evidence.

And if we say, we think the number of lives lost every year to Alzheimer disease in the states alone, but then globally, it's staggering. Alzheimer's being the most common form of dementia, we essentially don't have anything really to do for the majority of people.

People will continue along the progression. The new drugs are not particularly safe, accessible or affordable or effective. So it really does lend itself to needing a bigger movement and a better push.

Hello and welcome to the podcast. This week we are talking about the pathobiome. We are going to be talking it with Nikki Schulteck. She is the Executive Director of the Alzheimer's Pathobion Initiative.

she's also the founding director of Pathobiome Research Center. we're going get into the Patho.biome, we'll talk about what it is, how it affects people's brains, and how clinicians like you can be on the front lines of helping take this movement forward.

I think it's going to be particularly interesting to you if you have gone to many environmental medicine conferences, you've learned about Lyme, Mold, and all the different types of infections and particularly how they can deal with brain diseases and lead to brain disease.

This is going be a very validating session. Enjoy. A warm welcome to the Evolution of Medicine podcast for the first time. Nicky Schulteck, welcome. Thank you so much, James.

I appreciate being here. Nicky, I'm really excited to have you on here because it's a confluence of so many things that we've spoken about on the evolution of medicine over the years.

But let's just start off. You are the founding director of the Pathobium Research Center. And maybe we could just stop as to what the pathobiome is and how it reflects the work that you do.

Absolutely. So people often know the word microbiome because it's really entered common vernacular, right? And when I hear the words microbiomes, I think of, you know, a friendly community in balance.

And especially when we think about the gut microbiom, people have come to realize that this is an important concept, so fueling the good or even neutral things that are living in your gut rather than fuel things can be inflammatory, certain bacteria, for example.

The pathobiome is a newer word and I love it, especially given my own life experience and it refers to not just the microbes or the microbiome, but it also refers how the body is responding to them.

So you can have, for example, certain bacteria, viruses, fungi in your body at a given point in time, and they're not hurting you. You have a relationship with them in which they are just either neutral or, you know, they aren't harming you, not creating an inflammatory state or a disease process.

But then you have the ones that either because they become more prevalent, certain groups of organisms that have behaviors that are very pro-inflammatory or due to aging itself, you know, immunosensence or the aging of the immune system, You get a disproportionate share of bad guys.

And sometimes I even refer to this can become a situation of organized crime where they're working together and you get disease state. You know, for example, there's evidence for a brain pathobiome in Alzheimer's disease, in multiple sclerosis, and the pediatric disorders, pandas and pans.

So really across the human lifespan, this has kind of been neglected, the concept of a pathobiome as a very plausible disease driver or part of the puzzle.

What the Pathobiome Means in Brain Disease

Yeah, well, I'm really excited to go there. You know, in the functional medicine community, you've had a lot of people with the intellectual curiosity to follow this threat, right?

The earliest people that I ever met who were talking about pandas or were taking about Lyme disease, otherwise, were people in those communities. But it sounds like you really have a focus on research, finding truth, and understanding what's happening at a very deep level.

Absolutely. After being sick myself and realizing how siloed my own care was, the approach to my case, which involved multi-system complex chronic illness driven by infections like Lyme and co-infections with even human to human pathogens, things that people You know, the average clinician gets no training on essentially in medical school or practitioner, I should say, things like chlamydia pneumoniae, which is a respiratory bacteria that is incredibly prevalent in the human population.

50 to 80% of people have been exposed and infected by middle age, and yet most people don't realize it can become chronic. because it lives inside your cells in the very building blocks and can drive chronic inflammation.

It's not an infection that wants to harm you or kill you, it just wants steal from your mitochondria, your very energy source. And so, you know, yes, we're interested in research because what I experienced as a patient is literally informing everything that we are doing as team and it's a global consortium that have formed called Alzheimer's Pathobiome Initiative.

My research hub for me is at the Philadelphia College of Osteopathic Medicine in my pathobiome research center that I founded there. And the importance of it is this, it's that we decided that these problems are very complex and they involve multiple systems of the body.

Even just to understand the brain, we have to go beyond the bring, take a systems level approach, the bodies as an ecosystem, and understand how the exposome which is everything that you come in contact with across the human life, coupled with your genetics and a variety of other factors, whether you're a man or woman, or whether an adult or a child, and how those lead into the development of devastating neurodegenerative, neuropsychiatric, neurological diseases.

Because we really don't have good solutions right now for patients with diagnoses like the things that I was being worked up for when I ill 11 years ago.

You call yourself a collaboration architect, and I just wonder if you could give us sort of the space in which you're collaborating and some of who some key collaborators are in your work.

Sure, absolutely. So I work with an incredible group of people, some for a decade or more. Some of them are more recent to our collaborative I literally just got started, James.

I had been a stay-at-home mom. When I got sick, I previously worked for Genentech and Pfizer in the industry. Really appreciated that experience from understanding the business side of healthcare.

Also had the privilege to work in a lot of hospitals, which gave me a really interesting view of somewhat of this lack of integration and the silos that existed in healthcare, you know, our team came together first, very grassroots.

So I decided after being extremely ill for a year, finding a doctor that studied infection-associated chronic illness and was an infectious disease specialist, Dr.

Charles W. Stratton at Vanderbilt, who became my physician and diagnosed and treated me for these chronic infections, placed me into remission. I like to say about 95% of what I was before this all happened to me.

And I said, how can I help? This is a crazy big problem. It hit me like, wow, if all of these different autoimmune processes in different parts of my body were being driven by an infectious process and my immune system's response to it, what else and who else was being impacted by this at any given moment.

My kids were three and five, I feared that I would not get to watch them grow up. I was literally making those plans, taking notes, writing things down that i would want to pass on to them because in my differential was multiple sclerosis because I had neurodegenerative and neurological and neuropsychiatric symptoms that were devastating.

And for me finding out that a tick bite was a tipping point, right, that could lead otherwise extremely healthy young 30 year old who was running half marathons to be this sick, but I had 12 specialists that were so focused on their one system of the body that I got misdiagnosed repeatedly for a year until I met this polymath who understood this interaction, Dr.

Stratton. We ended up conversing and becoming closer. He started as my doctor, he became my friend, then he become a collaborator when I started Intracel Research Group.

Intracell owing to the fact that a lot of the organisms we study are inside the human cell. And then we really zeroed in on the brain. At first, it was just a collection of scientists I started introducing to one another very informally that studied this bacteria, chlamydia, pneumoniae.

And then we really started to grow because, of course, in my own case, I realized it's not about a single pathogen. We have to get immunology involved, we have think about microbiologists, people studying fungi, parasites, bacteria.

people that are experts in population health, epidemiology, veterinary medicine even, because of the one health and the integration of, you know, different species interacting.

So today, what it has become, and indeed I call it collaboration architecture, is what I felt is my best contribution to being part of a solution to a problem that is really big.

And it's to put some incredibly powerful tools of science and some of brightest minds that never might meet one another because they work in different areas.

to get them together. And that has been the thing that I'm most proud of, you know, work-wise is getting these incredible collaborators together, so we work with people like Dr.

Or Shemesh, who learned how to do expansion microscopy at the MIT that now has two labs, one in Pittsburgh and Hebrew University.

Building the Alzheimer's Pathobiome Consortium

This allows us to see things in brain tissue that normally would only be able to be visualized with the world's most expensive microscopes, but now we can do it at a much more cost-effective rate and more accurately.

We have, you know, Dr. George Perry, who founded the Journal of Alzheimer's Disease. Dr. Brian Baylin, who is the pioneer of chlamydia infection and Alzheimer's disease here in the United States.

We've worked with Dr Ruth Atzaki in, in UK, Who first is, is an individual that really brought to light the issues of

herpes viruses that cause the cold sore getting involved in Alzheimer.

Dr Brent Harris, he's an incredible neuropathologist helping us with understanding the nuances of specimens that we end up utilizing for our research.

And the whole purpose of our project is this, how do we use this incredible team and take the knowledge that we can amass, leveraging technologies that have yet to be brought together and aggregated and also data sharing to advance this chronic illness concept of the pathobiome and into a place where it is receiving enhanced federal funding.

Philanthropic funding is also already kind of onto this. Like, I think that there are a variety of individuals who have lived experience with these chronic infections.

or identify as Lyme patients that have started various advocacies that had done an amazing job funding research. But what we really need, James, is like a bigger picture federal investment in this concept.

And I think that probably resonates with you too, as my guess, based on your experience. Yeah, it definitely does. On behalf of the clinicians who will listen or watch this, because I know for them, they feel that because some of leaders in this world, let's say someone like Dr.

Richard Horowitz in the lion world speaks at integrative and functional medicine conferences and many doctors in their space take on this information and some have even treat these kind of cases.

They feel like the rest of world isn't listening or isn' paying attention, but what you've just shared is that there is a large and it sounds like growing group of people who are paying attention to this world, even though the average doctor down the street might still poo poo a panda's diagnosis, for example, right?

Today's podcast is brought to you by a number of different organizations that can all help take this movement forward. First and foremost, I want to mention the Integrated Medicine for Mental Health Conference.

In this podcast, you're going to hear about Dr. Richard Horowitz and the way that he's working with this group, but he is going be doing an extended session at IMMH this year.

You've got Dr Dale Bredesen, You got Katubes, and you got a number of people speaking on things like pandas and other areas of integrated mental health.

So check out immh.org. And if you are interested in conferences, i highly recommend this. It's four days, there are tons of CMEs. Get in there. And also our mission partners, because if you look at this disease type specifically, what will it take to build an army of practitioners that can contribute enough data to move the needle?

One, you've got to have a system that contract the data. That's what TrueNura is. Join the mastermind. Come and join the software. Be part of a community that is moving the Needle in this space.

Second, freedom practice coaching. How do you build episodes of care and how do actually learn to sell episodes so that you can actually have patients in the system and they buy all the testing so you actually contribute towards changing the field.

Three, full script, right? How do you actually order the tests from full-script labs? Journey, all possible within Fullscript. And then finally, Big Boost Marketing, the team over there, how do you actually bring these kind of patients into your practice?

This is why they're the mission partners, because all of them are here to help you achieve the Mission that we are going to talk about with Nicky today.

Enjoy. Yeah, there has been, I would say, having been in this for a decade now at this point, in the last three years,

this tremendous uptick in momentum.

The federal government here in US, HHS, announced back in December a Lyme disease initiative, more specifically invisible illness. There have been just tremendous advances in terms of, I think, patient awareness around these issues growing.

And really, what we can learn from medical history, particularly with HIV, is that patient advocacy and being loud as people that suffer from complex chronic illness will go a long way.

But some of the challenges I that we're looking to address with our consortium approach, they help handle what I thing is a really big problem, why we haven't seen movement in this field faster, the different research groups that work on these problems.

So let's say you're someone studying human herpes virus 6 and its relationship to asthma or its relationships to a neurodegenerative state. You're not necessarily collaborating with the other virologists working on different pathogens like cytomegalovirus or human one of the herpies viruses or HSV or a bacterial group such as people studying Borrelia burgdorferi or Bartonella hensile tick-borne infections.

And they're not necessarily working with the people, studying fungal infections and all these groups are out there. They're linking these infectious processes with very credible data to these diseases, right?

Like X-bacteria or fungi can drive this biological process and symptomatology in an animal model. Also, we find it in the specimens from people that died with a disease in areas that were sick of brain, for example.

It doesn't advance because it seems that it's small if you look at it and it is dispersed in this way. But when those groups really come together, the Lyme people, viral, fungal, parasitic infections, with people actually studying the diseases that have curiosity about the exposome, it becomes a really large group and a large groups of patients potentially impacted.

The trouble is they're just classified, they get a label for their disease. They may be told, you have rheumatoid arthritis, mild cognitive impairment, MS, And really what they may have going on is an infectious immune-mediated syndrome being complicated by other things, even molds and mycotoxins, like we were discussing before, you know, other exposures such as heavy metals.

So things that are modifiable have to be emphasized. And we felt that mechanistic research, basic research has to happening at the same time as clinical research and population research it has happen.

But, I think the change is coming and I'm incredibly optimistic. I share that optimism. And part of the reason I shared that is that for the last year and a half, I've been engaged in a weekly mastermind for doctors who are interested in reversing cognitive decline and Alzheimer's.

In that methodology, the way those practitioners have come together, there is testing for mycotoxins, for Lyme, and for these other co-infections because it is so prevalent.

I would say that know, doctors who are interested in treating chronic systemic illness, when they come into this group and look particularly at Alzheimer's and cognitive decline pathology, even though, you know some of the patients that we look at and some other cases we looked at would be, mental illness or others because there are psychiatrists and so forth in there as well, but they are all continuously shocked at the prevalence of these, of pathobium in these patients looking under the hood.

Evidence for Infectious Drivers in Dementia

And so I'd love to like jump into the weeds a little bit for you because I know that Some of those people listen to this podcast and as someone who's on the cutting edge of bringing those fields together and looking at it specifically in the realm of Alzheimer's pathology, what can you tell us to get ahead of what we might find clinically to help

understand what's really going on in Let's start with the pathogens that you see and those sort of patterns of pathogens, that even like the progression of illness, because I know that an untreated and autoimmune disease might turn into Alzheimer's, you know, over time because ultimately the root cause hasn't been dealt with.

Yeah, so I think what is becoming abundantly clear from work within our consortium and then outside our Consortium is that it's very heterogeneous. So every single patient, I thing, is an N of 1. The preponderance of different organisms that can be found in the diseased regions of someone with Alzheimer's is pretty incredible.

So lots of viruses have been identified, various bacteria, including spirochetes, both spirechetes from the mouth, as well as the old spiraquete that nobody really thinks about too much, but we should be, syphilis, trepneuma pallidum.

You know, it's a really interesting thing, James. If we go back in history, recently I made a video about this and then spoke about it at the American Society for Microbiology.

The discoverer, you know, the Alzheimer himself and Dr. Oscar Fisher were neck and neck publishing within the same year. So very easily we could have been calling Alzheimer's disease Fisher's Disease.

Fisher actually had a bit more of a robust set of work. And in Fisher writings, early writings mentioned that the tangles and plaques looked like they contained bacterial colonies.

And at that point in time, syphilis was raging. This was before penicillin was discovered. And then it wasn't really until the 1940s that penicellin became widely available.

The thing is, we have totally forgotten, it would seem, that with regard to dementias, there are plausible infectious and dementia pathways that we know about.

So, for example, tertiary syphilis results in dementia, right? And the neuropathological findings, according to Dr. Judith McClossie, who has five board certifications, including neuro-pathology, she's one of the most published individuals in the Lyme space with regard to dementia.

That a dementia brain and a neuroborreliosis brain or a neurosyphillis brain neuropathologically are nearly indistinguishable. And so what we know, though, is also that other groups and our group are finding other things.

So fungi can be found in brains. Then animal models are very informative. If you take some of the things that have been found, like chlamydia pneumoniae, and give it intranasally to mice, they develop amyloid-like plaques.

These are not transgenic or genetically modified mice. These are wild type mice, multiple groups have shown that, including Dr. Balen and Dr Chacko and her team in Australia.

Then you have the herpes viruses that can induce an inflammatory state. Phenomenal work by Dr Dana Karens at Tufts, you know, highly recommended that essentially human, uh, reactivations as demonstrated by an animal model of herpies may not even necessarily involve a cold sore or a sore showing up, but that these reactivations due to stress events, when someone's put under stress, whether it's another illness or mental stress or physical stress that this thing can reactuate and essentially it is like a traumatic brain that occurs.

And if you think about these things cumulatively over the course of a lifetime, these things can be compounding on one another, and that's where polymicrobial issues are very likely.

And so understanding each individual patient, you know, each individuals case and what's happening, for example, one person might have terrible periodontal disease and porphyrimonus gingivalis, which can cause period disease, could be the primary driver of their cognitive decline.

But that same person might also have had a tick bite and contracted Borrelia burgdorferi and Bartonella hensley and Babesia micradi. So understanding the landscape of the pathogens, but also inflammatory markers in that

patient, considering genetics, considered nutrition, consider exposures in the home, such as mold and mycotoxins, hormones, where do they stand hormonally.

things, other things other than pathogens have to be evaluated too. And so we very much stand in advocacy for a precise approach, which I think is something that you obviously believe in also.

Yeah, absolutely. I mean, we're obviously on the clinical side, right, and seeing now a methodology that reflects looking at all of those kind of markers.

Dr. Burke's key thing is time is brain, in that, you have understand what is driving the pathology as rapidly as possible because you're losing two mocha score points a year in your 20s, and it goes to four moca scorepoints below that.

So there's a curve by which people are dropping off. And so if you don't have a clear understanding right from the first moment of what's driving the pathology, then you can swim upstream for a while and do some lifestyle stuff.

But ultimately you're being sort of dragged under by the anchors of these, you know, these infectious agents or toxic agents, or otherwise. And yeah, it's very for the individual.

One of the things that's been really exciting for me is having seen how long it has taken for doctors to get to be able to reverse some of those chronic illnesses.

So like SIRS and autoimmune disease and some these brain diseases. You know this has been a long journey because you are not taught this in medical school.

So you have to go in and you to a bunch of conferences and implement and get it wrong a bit and find out what's going on, go to another conference, have a conversation in the hall.

And one of the things that I've seen in last year and a half is just that a patient case with all of data laid out and then someone talking through, someone who knows how to do this, talking though how they weighted all that information and what it led to in what order has led the confidence of clinicians really speeding up.

And that to me has been a huge unlock because I think like you sit at this and say, if this is true, what are we going to do about it? Right? And so that's been really incredible to see.

So I share some of the optimism in the fact that this is being seen and ultimately all of that data is crunching into a place where we can say, okay, when a new patient comes in and they have this sort of certain phenotype, this combination of, you know, of pathobiome, for instance, You know this kind of treatment protocol worked in this way previously and learning for those, those kinds of cases.

So I'm confident on our end that a lot of insight is happening and acceleration is Happening. But I would love to know from your perspective, like, What would be the most helpful to your work?

You mentioned a federal support, but for the clinicians who listen to this, who are working on the front lines, some of whom are tracking their outcomes, what is the more useful for your to move forward in a powerful way?

You know, if clinicians are listening, so I'll say this. In 2023, we published our landmark paper for our Alzheimer's Pathobiome Initiative in the Alzheimer and Dementia, the Journal of the Alzheimers Association.

And it was a massive effort of me bringing together and co-lead authoring this essential research plan to identify infectious agents, identify the key questions that need to be resolved and answered using the tools of science And then to also, it was a call for collaboration.

So basically we put our ideas out to the world. It was little unconventional and invited people in, you know, to our midst to say, hey, how are we going to tackle this?

Join us. And it did result in a great deal of that. But one of the things that keeps me up at night within our own paper is 86 cases of infectious dementias.

Now, these were all different types of infections that were identified. And in most cases, the reason that the case report got published was that, The clinician treated the patient for the infection using precise treatment, right?

So, if you had cryptococcus, neoformans, a fungus, you got an antifungal. A majority of the cases were identified using cerebrospinal fluid. If you had, for example, Lyme disease, Borrelia burgdorferi was found, you were given intravenous penicillin was given quite a few times.

And then the reason they published the case was that the patient experienced a reversal. One example was an Alzheimer's case for nearly a decade and a half to two decades that experienced a drastic improvement in memory scores following treatment.

So these beg the question, you know, if diverse infections are being found in brain specimens from people that we lost to these devastating conditions like Alzheimer's, using the same infectious agents, and you can get pathology, which has been, by the way, branded as being all bad.

Amyloid, Tau, and Immune Defense

And that's another matter we can discuss in a moment. You know, that these things are credible pieces of evidence. Just to think about the number of lives lost every year to Alzheimer's disease in the states alone, but then globally, it's staggering.

Alzheimer's being the most common form of dementia, we essentially don't have anything really to do for the majority of people. People will literally continue along the progression.

The new drugs are not particularly safe, accessible, or affordable or effective, most importantly. So it really does lend itself to needing a bigger movement and a better push.

You're asking regarding what is needed. I think because the United States government is the biggest funder of medical research in the entire world, as a single entity be phenomenal to see, and I think we are seeing some greater support for this federally, you know, entire pools of funding at different institutes within the NIH, for example, or even beyond NIH to look at multi-system complex chronic illness from this lens of the pathobion.

And that the mechanisms to fund the research become a bit more innovative and open and multidisciplinary, so that teams that are doing things that potentially transformative can work together.

And we really love the team science mechanisms that the government has created. But truly, you know, the way to support the effort forward is to stimulate multiple different spaces at once.

So we need mechanistic research, so basic research. Population studies like the work that our colleague Graciela Muniz-Terrera is doing, looking at large human data sets as well as longitudinal cohorts to get information about the prevalence of various infections, the use of hormones, and how that impacts disease trajectory ultimately.

We also need pilot studies because we have drugs to potentially intercept and help people today, so there's no reason to wait for the perfect solution.

And we're working to develop a testing approach that would hopefully integrate looking for multiple microbes that could be problematic, and then also host markers to the markers in the person that can tell someone, for example, the way that we get mammograms or colonoscopies or various other screenings, we may be able to start looking at this at a point in a not so distant future and tell some one coupled with clinical baselines, which most of us don't have, right?

Most of are not given a baseline of our cognition when we're at our finest. We end up getting cognitive testing much

later on and very intelligent people.

Those people can often be missed because they may perform at a level, you know, they need subjective memory complaints, but those people are challenging.

So yeah, I think we really need really a tremendous amount of federal support and philanthropic support too, to stimulate multiple different angles of this.

Well, let's go there where you said we should go, which is understanding of the Alzheimer's pathology, you know, as maybe a protective mechanism rather than a pathological mechanism.

Is that something that is aligned with what you're seeing? Yes, and we have members of our group, our consortium are really the innovators that have documented these qualities.

So when we talk about amyloid and tau, you know, some have referred to it as, kindling and fire, but it's more akin, according to the research that's been published demonstrating these things are innate immune defenses, that these might be the firefighters showing up in response to an insult or something that is aggravating them.

And not the only, it doesn't have to be, the one thing, one of the things that can induce these things is infection. And that's been demonstrated by Dr.

Will Eimer at Harvard and Mass General Hospital, as well as Dr Orshamesh that I spoke about previously. They're in the same consortium, but worked independently and both published within the tau, hyperphosphorylation of tau-tau tangles in response to infection.

And so if these things are a response of infection and then Dr. Eimer and other colleagues, Dr Sosha, Rudy Tanzi, they've demonstrated that A-beta has antimicrobial properties.

So if the pathology itself is there, I think evolutionary biology is so important to keep in mind. Why is it showing up? Is the human body this incredible machine, right?

What an incredible brain, too, that human beings possess. It's a supercomputer. Would it do something at such a large scale if it weren't serving some sort of purpose?

And can that become problematic? Sure. There's always the double-edged sword of immunology, right? That fine line between autoimmunity and an immune system that is handling something the way it should be.

So I think it's really important, not just in Alzheimer's disease pathologies, but when we think about disease-related pathology and other neurodegenerative conditions and conditions throughout the body, that we understand what are the induction pathways.

Because largely the treatment space has gone to developing biologic drugs. to suppress pathways. And when we suppress some of those pathways, we don't get people better.

Not many, at least. So many people suffer with autoimmune conditions, as you know. I get to be one of the people that is mostly well today from things that typically don' t get reversed.

I had a diagnosis of interstitial cystitis, which is an incredibly painful bladder pain disorder. That responded robustly to antibiotics. So the question remains, you know, just because you have an absence of proof isn't proof of absence.

And the example of clean urine from people with interstitial cystitis is a great one. Routine urine screenings look for obvious pathogens, but they're not able to detect pathogens that are intracellular or less, more stealthy is the word I'm looking for.

or things that could be in the lining of the bladder itself that would require a biopsy to reveal. So the whole idea of I think where medicine has to go is digging deeper and being more precise.

Yeah. Precision is the future. I totally agree with that.

Precision Testing, Access, and the Future

And, you know, one of things I'm just feeling right now is that I am feeling know, maybe a big out-breath from my community listening to this, because, you know I think doctors and practitioners in our community that have taken on these kind of cases and have, gone to lectures where these kinds of ideas have been spoken about, have sort of been made fun of, I've think in the last decade or two for, pathogets.

I mean it just literally came out of your mouth. You're talking about like these stealthy, stealth things. And so it's wonderful to actually hear that this is being taken seriously and that there is research coming in from around the world to back this up because I've always felt that one of the focuses on the functional forum was to be a collaboration architect, was introduce practitioners to each other, but really take what was happening at these conferences from being sort of hokey and hippie to being, you know, future forward facing.

And to say that this is, you know, where medicine has to go, because ultimately, if you've experienced something like you experienced, or I think the most obvious would be something Pandas, when you have a rapid onset mental illness in a child where there's no history, and then if treat it right, nothing else works, right?

You can do all the drugs and suddenly you bring it back to treating the infection, then the child not only gets better, but ultimately has like an extremely high quality of life for maybe another 70 years.

From an economics point of view, from a human point, of you from the first do no harm point. That is such an elegant solution that once you've seen it, you can't look away.

So any of the people in our community, once they've experienced that kind of elegance of solution, are hooked by either working on cases of adult brain disorders or geriatric brain disorder or pediatrics.

And I would love for many more in our community to get involved and to track their outcomes in the right way so that we can contribute in some ways to the work that you're doing and also to a greater mission of just removing this unnecessary suffering from society.

So many things you said there that I want to respond to. So first of all, we are working in pandas and pans, our team, the brain pathobiome is our wheelhouse and we're super aware of the devastation that these conditions have.

You know, firsthand, you know we have many people experiencing these. these terrible things and kids can also go from sort of more of a slow progression, a Slow Burn, as some parents call it, where it's sort a relapsing and remitting course where they may only have some behavioral difficulties and handwriting problems and they think it is a disciplinary issue at school.

And there just is, like you said, there are solutions to these problems if that child gets properly identified and treated. But it really does require something that we're passionate about, which is the bidirectionality communication between clinicians on the front lines that are willing to treat to come back to research groups like ours and say, this is what we found clinically.

How does this match up in your mechanistic models and your population studies, in you animal work? And then back again from the research lab to the clinicians indicating, you know, and this the point of a consortium that includes clinicians, right?

So we had the privilege of Dr. Horowitz coming to our weekly call, our team global team convenes once a week for 30 minutes for years. And he presented his incredible case of reversal of a patient with p-tau and amyloid beta

plasma biomarkers indicative and cognitive issues indicative of an AD diagnosis Alzheimer's that was able to be treated effectively leveraging his approach to handling all of the things that we've discussed, including infectious agents.

And this is something that is beneficial for so many different categories. It saves lives, it saves money, and it dramatically reduces human suffering.

But the challenge, I think, you're describing where, you know, the eye rolls, right? You talk about a stealth pathogen, somebody rolls their eyes. I think hit them with 10 studies or 20 or 100 or 1,000, because that's where it comes to citing the evidence and having the Evidence that you need.

And that is where we come in. You know there is a very robust body of literature. When you just say stealth pathogens, I mean the way that these organisms operate is really particularly things that live inside our cells.

They are using us to survive, right? We are their earth. We're their ecosystem. And so the consequences of those things, they're not going to be the things that make you sick very quickly.

It would be more of a simmering pot over many decades. Because they don't really want their ecosystems to die. They want the host alive so they can continue stealing from our mitochondria and utilizing our resources and sequestering things so that they could remain alive.

And even you're, I'm sure, very aware of this, but there's a linkage, of course, between microbial infection and atherosclerosis, heart disease, you know, which had been previously first demonstrated with oral microbiome, and people with dental issues having this relationship to heart diseases.

Healthy mouth, healthy heart. Well, really, we also know healthy mouth healthy brain. But in some cases, some patients, their microbiomes are It's a pathobion.

Even if they take great care of their mouth, they're still developing recession of gum tissue and so forth. So it's understanding disease risk too in certain individuals, you know, that may have, like when I fell ill, I was already doing everything right.

I wasn't eating healthy, running, exercising, not abusing my body. And I tried a ton of natural strategies to mitigate inflammation during the year when was misdiagnosed.

I ended up having to lean on traditional antimicrobial drugs. And I think that there are going to be cases like that, of course, like mine, you know, where you have a advanced case.

But I do also feel that a lot of people can benefit just from lifestyle changes alone, and preventative strategies. Yeah, exactly. Well, final question, if you want to go and do an episode of that does all of this testing, it's expensive, right?

I'd love to just get your thoughts on the democratization of science to the rest of the population and the pathway towards that, because ultimately, we want this to be a standard of care, not something that's only accessible to people who can afford the testing.

Yeah, this is one of the greatest challenges. You know, I've made my whole story of what happened to me and the work we're doing public, and people will reach out and say, you know what do I do?

Where do i go? And frequently, um, You Know, i'll make recommendations and give people resources, for example, the International Lyme and Associated Diseases Society Provider Search, which has been now added to the HHS Invisible Illness website.

I sit on the board for their iLADS Education Foundation, and I'm so thrilled to be able to support this organization. But I know there are other root cause practitioners in the world looking at upstream drivers.

I think it's going to a really big challenge, as you said, democratizing, making these things available to more patients. One of the keys is going companies developing solutions around these problems.

So things that people think about profitability is a bad thing, but I studied business and appreciate economics. The economics of the infection-associated chronic illness story are kind of missing.

With proper economic stimulus, also federal funding follows. And so I think I would love to see more companies, and they're out there, developing better testing for infections, companion biomarkers that things like molecular biosciences has with their brain autoimmune panel that can help diagnose kids with pans pandas and auto immune encephalitis.

You have then the need for companies to develop innovative solutions for infectious agents, you know, targeted therapies, right, where you're not knocking out, everything but the kitchen sink in your gut.

with antibiotics, but you have something perhaps more tailored to specific organisms. So I think once those things start happening, you'll start to see the tip of, the pressure and tipping point of things becoming covered, right?

So insurance coverage, I thing, is a huge issue. I know it is in the Pan's Pandas community where the testing itself may be inaccessible to parents to even unveil the problem in first place.

Well, look, I think there's a lot of work for us to do together. Thank you so much for spending the time with us here today. I know you're very busy and got so many things that you'll balancing.

And I really do look forward to continuing the conversation, particularly with these group of practitioners that I've got to know quite well over the last year and a half that are learning every week on how to reverse cognitive decline using a precision medicine approach.

It's the future and it sounds like that's lining up with what you are seeing. Thank you for being on the front line and bringing everyone together and I look forward to updates from my community to yours and your community back to ours and ultimately that we can be part of, you know, something tremendous in understanding the root cause drivers of all these brain diseases in our lifetime.

I'm your host, James Maskell. This is the Evolution of Medicine podcast. We've been here with Nikki Schulteck from the Alzheimer's Pathobium team and many others.

Will put all the details of her work in the show notes so you can see all the different areas that she's working in. Thanks so much for tuning in and we'll see you next time.

give the patients what they want, they wanna know about themselves and it's the easiest way to bring them into your practice. We have all types of practices from across the country that are building their own unique lab panels for their unique practices, selling them to their community and acting as a great funnel into their practice, this is a massive innovation, I think this will accelerate the evolution of medicine, you can go to goevomed.com slash journeys to find out more, set up your own journeys in half an hour and transform the health of your community.

Go get it. So that was the podcast. What an epic session. Thank you so much for tuning in to the Evolution of Medicine podcast, we'll be back again next week.

And thanks so