The Root Cause Hiding Behind One Family's Alzheimer's Diagnosis with Nicole Bell Transcript

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Opening and Guest Introduction

I think we've all, we all have gotten complacent with everybody's got body aches and everybody has anxiety and everyone has, you know, some complaints here and there.

And it's like, no, that's your body telling you that something's wrong. There has to be a why. As an engineer, like you're trained, root causes, roots causes.

But somehow when we think about the most complex system that exists that I know of is the human body, it was like it is no big deal. I don't think that is just the case.

I think we need to listen to our body. Welcome to the TBD Fit Podcast on Dr. Talks. I'm your host, Daniel Keeley, and I will be guiding you through this wellness journey in terms of optimizing health and longevity, where we unpack the science, the dos, dos and everything in between.

Come join us. Look forward to seeing you inside. I am Daniel Healy, I'm a functional medicine practitioner. My goal is simple. I want to find who's doing best in their category and bring those conversations to light.

And today's guest is someone whose journey is as heartbreaking as it is inspiring Nicole Bell, who is an author, entrepreneur. and one of the leading advocates for recognition of hidden infections in neurodegenerative disease with two degrees from IT and Duke and over 20 years of experience in medical devices and diagnostics.

Her life was turned upside down when her husband Russ became unfortunately very ill, devastating and mysterious health decline. Nicole chronicled that experience her powerful memoir, What Lurks in the Woods, true story of love lost in an unrelenting search to find answers.

And what she's discovered after his passing, including a hidden infection in his brain, would shift her life's mission and ignite her movement. Today, as the CEO of Galaxy Diagnostics, Nicole is on the front lines of transforming how the medical world detects stealth pathogens that often go unseen.

This is a story science, caregiving, courage, and what happens when hidden infections rewrites the fate of entire families. Let's dive in. Nicole, welcome to the show.

I love by opening every episode with understanding someone's origin story. So I kind of alluded to that briefly into the introduction, but I'm sure you can do that on a much deeper level.

Tell us more about how you ended up where you are today. Yeah, well, I mean, going back to the beginning, right? I'm an engineer by training. And so I've always liked to solve problems and to get at the root of the issue, that's what they train you to do as an Engineer is what's the Root Cause.

Since I graduated college, i've also always been an entrepreneur. So really right out of college my MIT professor started a company. And he recruited me to join and I really fell in love with the entrepreneurial small company aspect, right?

The ability to do everything from doing strategic planning to, you know, sorting through the mail, as a small, company you've got to to it all.

Nicole's Background and Russ's Illness

And so I just love that environment and that kind of makes my knitting of what I'd like to at a professional level and actually was where I met my husband was in one of my, that first startup that I worked.

He was, we were kind an unlikely pair because he was older than I was, but we really just fit on a lot of levels, ended up getting married. And unfortunately, his journey didn't end well, as you alluded to.

So we had a great foundation, great relationship to young children and really building a life together. He just started to change, right? It started with mood.

and irritability and depression and things that had us going to marriage counseling and just trying to figure out what he wanted to do, where we were as a relationship.

And then I started realizing that it was actually more deeper. He was forgetting things and having cognitive issues. I had to convince him of that, right?

Because he was a very smart individual and very, at that point, kind of combative. But we went through that journey. We went to the doctor and I had at the very first appointment, the first thing that I hadn't tested for was actually tick-borne disease.

And most people in their journey that have learned that, you know, when they have a tick borne infection, they go from doctor to doctor before they even think about tick born.

But it was one of the things that we thought of just because he was an avid outdoorsman. He was always in the woods. he did all the landscaping at our house and he had lived in multiple endemic areas across the country.

And so we had him tested. He tested negative. To make a long story short, they referred us to a neurologist where he was given a diagnosis of early onset Alzheimer's disease.

And as you can imagine, that was pretty devastating because he otherwise healthy and there's just really not a hope, a lot of hope in the Alzheimer space.

There's no treatments, there are no therapies. It's, just, hey, come back in six months and we'll track your decline. We navigated against that. I kept searching for answers because again, as an engineer, I like root causes and it just didn't make sense.

And again after a period of time, we revisited tick-borne disease and that was when I figured out that he actually did have Lyme in addition to two co-infections, Bartonella and Babesia.

Uh, we started treatment. We went down that journey. He responded favorably in some ways, not in others. Um, at the end of the day, his cognitive capabilities continued to decline and he ended up passing away in, in January of 2022, which, as you mentioned, kind of set me on this mission to make things better.

And so that's the short version, but I'm happy to unpack any of details along the way. Cause as, you can imagine, it was really quite the experience and journey So when you were able to detect kind of the root of problem, what was, would it treatment look like at the time?

Yeah, that, you know, finding a doctor that actually would help us in the tick-borne journey was not necessarily an easy thing. There were only a few, we live in research triangle Park, North Carolina, and there were a Few doctors that I ended up locating.

He ended Up going on a really broad spectrum antibiotic protocol, which was pretty harsh. But in addition to that, he was on a lot of immune-supportive therapies, some herbal therapies.

It was really quite the gamut of the kitchen sink, honestly, which was a pretty aggressive protocol. I think knowing what I know now, I might do things a little bit differently, but that was the journey that he went on, and I detail all of

that in the book.

Because I thing one of things that you're trying to navigate as a caregiver is, what's the right choice? What's right treatment? And that's not clear in tick-borne disease space, particularly for late-stage patients and particularly for late stage neurological patients.

You know, I was just talking to a person, a caregiver just yesterday and saying, okay, like, unfortunately a lot of the answers aren't clear as to what the best things are and we need more clinical trials, which is happening, but the space is still emerging as His path, he went on pretty broad spectrum antibiotics, including IV antibiotics as well as herbal support therapies.

And as I said, we saw a lot of improvement in some areas, but decline in others. I think we were never able to really get at the root neurological problem and the cognitive decline.

As you alluded to in the intro, I've since donated his brain to science. they still found evidence of infection in his brain, you know, both Borrelia and actually Babesia.

And that just really is a testament and a sign of the complexity of these organisms because he was on months of antibiotic therapies and we're still finding evidence that Borrelia in this brain.

Were you able ever to discern which, I mean, there's Borelli, Bergdorferi, Mayani, Miamotoi. I, mean there is a kind of a whole slew. Were able to identify exactly kind which species of each that he had gotten?

Yeah, so while he was alive, sort of, he tested positive for Berlieberdorferi, which, you know, obviously for Lyme disease, and that's been confirmed post-mortem.

The Babesia picture was a little bit more complicated. So during his life, He tested serology positive. for Babesia duncani. And this was a little confusing because he didn't kind of have some of the classic symptoms, particularly some the symptoms associated with duncanii.

As it turns out, he actually didn' have Babeseia Duncanae. He has Babseia otocolliii, and that's been confirmed in his tissues. And that's really important because Babesia otocoli is a different kind of Babsia.

Instead of really being in high levels and high parasitemia levels in your blood, it actually sequesters and forms kind-of fibrinets in the tissues. It's in lower abundance, more difficult to detect, and it leads to different symptoms instead of the classic fatigue and night sweats.

The symptoms can be a lot more subtle, which is, I think, what he experienced. And as our Galaxy's founders are out of NC State and doing a lots of research in this area and they're finding it, that pathogen in association with chronic fatigue syndrome and ME-CFS and a lot of more other diagnoses that this is potentially a root cause for.

At the time that I was dealing with Russ's illness, Babesia otocolliae wasn't even considered to be a species that was infecting humans. It was thought to only be in deer and I think now we're figuring out that that's not the case and it might be at the root of a lots of undiagnosed chronic conditions.

And so I think his case is really important and I'm excited for it to get published because it'll be the second case that I know of that's published where that pathogen's been found in brain tissue and the first that has been done in association with Alzheimer's disease and so really importance.

And then the final B, you know, we always talk about the three Bs, right? Borrelia, Babesia and Bartonella. The third B was Bartonella. And I think that's what I attribute a lot of his irritability, rage, more of its neuropsychiatric issues.

Diagnosis, Treatment, and Brain Findings

And there's a lots of research that our founders at NC State have done to show the linkages there with more severe conditions like schizophrenia and psychosis.

all the way through to just anxiety and hallucinations and other symptoms. Russ, during the various stages of his disease was on the spectrum in various locations and there he had Bartonella hensile and that was confirmed with serology while he was alive.

And then we still have not found in his brain tissue any evidence of Bartonella. But I think we have other indications that that diagnosis was correct.

He ended up developing the striae and other impacts that are very indicative of that pathogen. Yeah, this is definitely the blind spot in modern medicine.

Definitely get into testing in a moment here, but ultimately you had said, you know, some of these symptoms still present as typical, right? And previously there was only, a handful of cases of what's been documented, especially when you said kind of affecting brain and neuropsych symptoms, which almost 99% of the time is overlooked, Right?

You're presenting with a specific symptom. You go to that physician. they're not looking for stealth infection typically, right? When you're kind of being treated with schizophrenia or some of these kinds of mental health disturbances, rage, other such symptoms.

So it doesn't always present as what's typical as you had mentioned, but ultimately the understanding kind, of what is the catalyst is unfortunately always overlooked.

Unless you are going to the right kind physician who's looking through that, who is kind connecting these dots in a way that Um, is, it's not, you know, typical in allopathic care, not to undermine any of these physicians, but ultimately this is a real big growing problem, right?

As incidents now is growing very, very rapidly. Once we thought, you know, it was only relegated to certain parts of the U. S., we know that it's definitely not only in the US, specific species found in Europe and definitely outside of US.

And now within the, the us, I think there's an incidence in every single state. So. Obviously some states more so than others, but where I'm at right now is we speak in Chicago.

I know it's rapidly growing as our neighbors in Wisconsin and other Midwest territories continue to rise very, very quickly. And so the good part now and the reason why I wanted to have you on the podcast is the testing.

Right. How can we identify, how can stay ahead? How we can find out exactly what's happening before, you know, a little too late. So perhaps let's dissect the different options in testing and maybe what you guys do.

I know there's a whole plethora, whether it's. Yeah. Immunoblot, fish testing, Western blot, PCR standard versus the other T-cell, ELISA, DNA testing.

You know, tissue, blood and urine. Let's maybe dissect kind of the pros and cons and what you guys have been able to, to engineer, if you will, given your background for higher detection, higher success.

Yeah, sure. And I agree. I mean, testing is the key, right? I think on the other side of my journey with Russ, I kept going back to that first doctor's appointment where I want, you know, Lyme was top of, my list, and we tested him and he tested negative.

It's like, well, how would my, journey have been different if we had gotten a different result? And so, on, the, other, side, it's, like okay, let's dig in.

So why, why is it negative? Why is tick-borne testing so difficult? because I think that's central to how it's led to so much information and how Lyme has been controversial and a lot of these pathogens are not really suspected within some of the disease states because you're never going to get a positive on something either that you don't test for or where the test is not accurate.

And so as I dug into, you know, let's just laser focus in on Lyme, right? Because that's the most common infection in North America, at least on the tick-borne side.

Why is the testing so bad, Right? If you look at various published studies, it's anywhere, At least for acute stage disease, the current standard of care is anywhere from 40 to 60% accurate, It's like a coin flip.

in terms of whether you're not going to get the right result. And actually, a recent paper that was published kind of in the middle of last year from Bay Area Lyme was a 10-year study looking at Lyne disease diagnosis and using the current standard of care.

It actually showed that it was only 23% accurate in diagnosing the disease early. That's critical because Early is when the treatments are the most effective.

As I said earlier with my journey with Russ, once you get into late stage disease and disseminated disease, the disease paradigm and the treatment paradigm becomes way more complicated.

And so you want to catch it early. But Russ wasn't an early disease state because everybody says, well, testing is better once later in your disease. But I actually disagree with that.

I think that's because we're not testing the swath of people that are really affected. Because Russ was positive, I have evidence in his brain tissues, but he tested negative.

And the reason for that is once you've been sick for a while, your immune system becomes dysregulated. What is the current standard of care? It relies upon yourimmune system and it's measuring antibodies.

Right? So a lot of people don't understand that the current test, whether it's an ELISA or a Western blot, those are all just fancy names for I'm looking for an antibody response.

And that requires your immune system to mount a response to the pathogen and then for that response, to be measured by a laboratory test. So the problem with that is that's terrible for acute stage disease because antibodies take four to six weeks to peak.

And so you're missing that early therapeutic window when antibiotics are the most effective. That's one of the reasons why it's not great for a acute-stage disease.

But then in chronic disease, you know, if you think of somebody like Russ, he had been sick for a really long time. And so his immune system was not running on all cylinders.

If you looked at his overall antibody titers, they were actually quite low, just because he has been sickness and his body had be battling. So he tested negative because his system with fatigue and it was no responding in the way that it should be.

We see this quite commonly with chronic cases, people that have had these pathogens on board for quite some time. And so it really fails across the spectrum.

We often focus on the acute setting, but I think we just don't know the true numbers in the chronic setting because we don' have the clear definition of truth of who's infected and who is not because the standard of care is so insufficient.

And so that's very similar for the other bees, you know, the Babesia and the Bartonella's. And the reason for that is

because those are low abundance pathogens.

So if you're trying to figure out if it's on board, still the primary methodology that we use is antibody testing.

Why Tick-Borne Testing Misses Cases

If you think about COVID, right, everybody kind of got a crash course on diagnostics in the COVID era, and if I want to know if i have COVID I don't get an antibody test, right?

I get a PCR or an antigen test. And that will tell me whether I have the pathogen on board right now. The problem for these infections, specifically the BBB, is that since these pathogens hide, since they evade the immune system, the ability to detect them directly in the sample with an antigen test or a PCR test.

Antigen is just a fancy way of saying it's like a protein or molecule that's specific to the pathogen or PCR tests, which is looking for either DNA or RNA of the pathogens.

Your ability do that in a sample is difficult because it is in low abundance. You're looking a needle in haystack. where you've got a little bit of pathogen DNA among a whole host of human DNA and other things.

And so that's been the fundamental challenge. As a result, everybody uses immunological testing and antibody testing. which puts another piece in the loop because it requires that I have a specific antibody response and in that my immune response is healthy.

Research paper after research paper in humans and animals has shown that that's not necessarily the case. Monica Embers has done some work on rhesus monkeys, which is the best animal model and she's infected the same monkeys in a highly controlled setting with the exact same strain of Borrelia.

and shown completely different immune patterns and antibody responses. And some monkeys have had zero immune response at all over any time point, but was still infected at necropsy.

Right? And so that's the fundamental issue is, you know, antibody testing is complicated and, and direct testing as hard. and so back to your question of like, what is Galaxy doing and what drew me to the company as I scanned the research.

is that they were focused on solving that direct detection problem. It's a hard one, but with science and with a dedicated approach, you can actually solve that.

You can use sample enrichment techniques and smart design of the samples that you're going after to actually enable direct protection in a reliable way.

That's what we're trying to do at Galaxy. We have different tests for both LIME and for the BBB assays in both urine and blood that essentially enable you to try and figure out is the pathogen really impacting this patient at this time.

Walk us through what a patient would experience when taking a test and then what is degree of specificity and sensitivity when when you're taking your test.

Yeah, so we have a couple of different options on our direct testing and we do offer serology. I don't want to completely come across as bashing antibody testing.

It's a very useful tool. We have the best in class antibody test for Bartonella and it's useful in a lot of, uh, different cases, but that we find that even antibody, testing it best, in combination with direct detection.

And so, we, do that in couple different ways. So for Lyme, Borrelia doesn't like to be in the blood. It hides in tissues and it's not free circulating.

Other than the very early, like a very limited window during the acute stage when it starts disseminating into tissues, it is just very difficult to capture in a blood sample.

And so we don't use that for diagnosis of Lyme. What we do is we actually use technology that was originally developed from George Mason University and then commercialized by our partner series, Nanosciences.

and looking at urine as a matrix. And why do we do this, right? So, Borrelia as pathogen, it likes to trick the immune system. One of the reasons and ways that it does that is it sheds its protein coat, and it changes, sheds these proteins into the environment.

And it does that for a couple of reasons. It's kind of like changing its cloak so that the immune system can't recognize it. But it also does it because if you do have any free circulating antibodies, it will potentially bind to those free proteins and not the pathogen itself.

So it's a protective mechanism. And what the researchers at George Mason University found was that those pathogens or those antigens get filtered through the kidneys.

They aggregate in the bladder and then they're excreted in. And so you can use a capture and concentrate technology to essentially increase the concentration of that, then run it through a protein-based detection and use that for detection.

And for acute stage disease, in a limited cohort of patients, they found that the standard of care captured about 50% of the patients that were affected, and the urine antigen test actually was able to correctly diagnose all of those patients.

Right? And, so, huge improvement for Acute. And then in the chronic setting, also useful to try and figure out, you know, in a series of patients where all of them were still symptomatic after treatment for Lyme disease, and all them we're still testing negative on the current standard of care.

But we were actually able, or our partners were able to identify that with the Nanotrep test, they found that over 40% of those people that were suffering were expressing antigen.

And that means that there's likely, you know, Lyme still on board and further treatment intervention is required. And so very, kind of a different tool for assessing, is the patient still infected?

Because after treatment for Lyne disease, You can still be sick for a lot of reasons, right? You could be the Borrelia wasn't addressed and it's still on board, you can still be sick because you have immune dysregulation that was caused by either the bacteria or the treatment, or you could have an undiagnosed co-infection, right, because a lot of people are not necessarily tested for.

And so we found a lots of clinicians are using it as a way to discern kind of what's going on in their patient population. We think urine is a great matrix.

increasing our capabilities in this space and later this month we're going to announce another relationship which improves our urine detection capabilities and so I think for Lyme that's a great solution.

And then for other pathogens we use a PCR based approach. So I guess what I want to understand is painting a picture of when a patient presents with some of these symptoms, right?

Acute versus outside of the acute window. When do you distinguish that and when do decide to undergo any specific test? I mean, ideally you would get testing at first onset of symptoms, you know?

And I think we're going to be doing some studies to really, and actually our research partners are looking at the studies as soon as you get a tick bite, right?

But certainly the data that we have is generally first-onset of the symptoms because people don't go to the doctor just from getting, some people go the the doctors just for getting bit by a take, but most people, though, when they start getting experiencing symptoms.

And that's the best time to accurately diagnose. And so ideally, in an ideal world, that would be readily accessible. The great thing about urine is we're not there today, but someday I would love to have a situation where you can walk into Walgreens or CVS and pick up a cup and pee in it and send it off to the lab to see if you have been exposed to Lyme disease.

That's, I think, where we'd like to be. Clearly not where are now, because that is what we are working towards. And then, like I said, in the chronic care setting, it's really helpful for understanding and discerning between people that have been sick for a really long time.

And it is difficult to understand if Lyme is one of the root causes, right? So, if you've got a patient who has a previous diagnosis of Lyne and they're still sick, this moniker that some people really rage against, but it's a research case definition of post-treatment Lyme disease, right?

Meaning, I've been diagnosed with Lyne. I'd been treated for Lymen, But I still feel terrible. Why do I feel still terrible? And the urine antigen test is a good way to show if you're still expressing these antigens over time, then that's a clear signal that ongoing and persistent Borrelia could be part of the problem.

And we would like to expand all of our capabilities across the spectrum of infection. As we embark upon 2026 and 2027, we're really expanding our clinical our clinical information and reading studies to essentially show what's the performance, you know, in the different patient populations and groups.

And so we're really excited about that as we go forward. So now continuing forward in terms of your testing, so going back to the specificity and sensitivity, what can we assume is the degree of accuracy here?

So that's an interesting question, right? Because like I said earlier, there's still not a really good definition of what truth is and how many people are truly infected, especially in the chronic care setting.

And so, as I've said, we've got that one published study in The Acute Space where we were able to demonstrate 100% sensitivity on that patient population.

Now, is we expand the patient populations, no diagnostic, even the most advanced ones ever achieve 100%. It's always 99, 98, whatever. Those are the things that we're still collecting the data.

Galaxy Diagnostics and Direct Detection

And then in the chronic population, it's even more difficult because it, you know, who actually has the pathogen? Like for example, my husband would not have been included in a cohort of somebody who has Lyme disease or chronic Lyne, but he certainly was.

So we are continuing to do that. I mean, and I think when you look at sensitivity and specificity, there's lots of ways to define that there is analytical sensitivity, which is the lab level, then there are clinical specificities and sensitivity.

There's a lot of nuances to that question that I think, you know, people ask for a simple answer, but the reality is when you work for lab, it's not. And so what we're doing is we are working every day to improve our detectability.

What I tell people is direct detection is hard, But it is the silver bullet, right? It is just the truth. Even if you go to your skeptical infectious disease doctor, if have a PCR result, that shows you have this pathogen on board that's very difficult to deny that that pathogene is present.

Whereas if you're dealing with antibodies, they'll say, hey, like even that Lyme patient that still feels sick, if they have antibodies for Lymes, it's like, well, yeah, of course you've antibodies.

You've had LyME. That doesn't mean you haven't active infection, right? Just going back to the COVID example, If I have antibiotics for COVID, that doesn' mean I've COVID right now.

And so getting to that direct detection and that capability is critical. And we're doing the studies in a clinical patient population. So we have analytical and lab results that shows we are in the high nineties for specificity and sensitivity.

But getting that real clinical information for different patient cohorts is something that we really undertaking this year. We've got more publications through our research partners than really anybody in that field, but we still learning and growing and pushing the envelope in our department.

Historically, right, when you look at kind of this two tier testing, the standard two-tier testing enzyme, you know, assay and intellect for fluorescent antibody test, followed by IGM, IgG, immunoblots, and then the modified two tear testing.

So two different EIAs performed sequentially. Um, and kind of where, where you guys are at now, how have things kind evolve in the space? I know you kind have touched on that.

How do you think things will continue to evolve? How far are we from this utopia or ideal scenario where are you go into Walgreens and you can use urine as a form of detection?

I mean, in some ways we're there now, right? Like Galaxy, we offer tests as a lab developed test. And so you can go to your provider today and get, you know, urine antigen testing performed and gets those answers.

Now, the things that we are working on are, that being covered by insurance and that, being readily accessible and getting to not just kind of functional medicine providers, but to you primary care, because if somebody gets bit by a tick, generally they're not going to go to a functional medicine provider who's open to new diagnostic techniques.

They're going go their primary care physician. And so making sure that that tool is in their toolbox is something that we're working on. I think in terms of where we are, I'm extremely hopeful.

The government is finally starting to acknowledge that Lyme and other tick-borne diseases are serious issues. that there are serious issues that are linked to major health problems in the United States and that the current testing is insufficient.

And so, you know, in December of last year, 2025, there was a roundtable that was hosted by HHS where they openly said that, the, gaslighting of chronic Lyme patients is over.

and we are going to lean in and help fix this problem. And so that's fantastic. One of the things that they initiated and expressed support of is the Limex Diagnostic Prize, which is essentially a group of innovations within Lyme disease and helping to get those technologies through the FDA.

Galaxy is a part of that initiative and competition and they're going to essentially help and support us through to get to FDA approval and FDA. Approval is not something that's needed to.

Get the test on the market, but it is something. That makes it easier to commercialize and to the LabCorp's and Quest's of the world. Because if you want to go into Walgreens, right, and to get that test, you don't want Galaxy running the test.

We're a lab and we're growing and were fantastic, but LabCorps and Quests are where most of our clinical testing happens. And so part of out mission is to develop and then get the tests to be high throughput ready so that we can sell them to the lab cores and quest of world and that they can run them.

And that's how it gets access across the spectrum of healthcare and we get things reimbursed through insurance and so forth. So we're working on all that.

I think we are two to three years away from having a really reliable, robust tool on the market that can be more accessible to the patient population.

Which is exciting. As technology continues to evolve, hence the name of our company, Total body diagnostics. Diagnostics continue to evolve. While I say that the power isn't always in the test, it's in interpretation.

It's like you need the right tool for the job. And the good part, and that's why I had asked about sensitivity and specificity, obviously your common response and kind was about detection and what truth looks like.

Things have evolved very, very positively in terms of what we're able to do to, to catch kind of certain things early on or even chronic with, you know, enhanced PCR, with Borrelia species, anaplasmosis testing, Babesia as you alluded to.

Especially with PCR being 95% sensitive and in some cases, 100% specific and acute babesiosis. I understand the problem is. often enough is with chronic issues, but even then with kind of integrating or layering some of these tests.

So in terms of what you guys are doing, is there anyone else that is kind on par with testing or is your test sufficient as a standalone or would you ever suggest kind layering in other tests?

So I think we are the most advanced in direct detection of these pathogens, right? And I haven't really talked about our PCR approach, you know, for Bartonella and Babesia and so forth, but we're using pretty much the more advanced PCR techniques as well as sample enrichment to essentially improve the detectability.

And so that's something that is, we've been leading on actually, it was pioneered by our founders over at NC State and we were the commercial partner for that.

they're essentially pushing the envelope and identifying patients and linking this to chronic disease. For example, the linkage between Bartonella and schizophrenia was unearthed by the availability of these diagnostic tools within the research setting.

One of their research findings showed that 65 percent of schizophrenia patients test PCR positive for schizophrenia. which is mind boggling, right? Because most people and most doctors and people in the mental health field, if somebody presents with schizophrenia, their first response and their thought is not, well, let's start screening for pathogens, but what we're finding is that they should be.

And as that group and our founders have turned their attention to Babesia, they're find even more linkages to chronic disease, not just in neuropsychiatric space, but also in like ME-CFS and chronic fatigue and a lot of other issues that we're saying there's never been a root cause of a of these diagnoses.

I mean, one of the frustrations as a caregiver is that, we have these monikers and labels, right? Even Alzheimer's, really just says you're getting massive neurodegeneration and the buildup of amyloid plaques and tau in your brain.

But they still don't understand the why. And then the question is, is like, we know that amylite is an immune response. Actually, it's the protein is part of urinate immune responses.

So the the questions is why is your immune system responding? Potentially a pathogen or a toxin or something that's causing that reaction. And so this is a really critical piece that our technology has been able to unearth.

And then what we're trying to do is to make it more readily accessible, right? And to get it in the hands of patients so that they can figure out is this causing my symptoms and is that going on?

So I think we're doing some unique things. We have relationships with universities that are really doing, some innovative new technologies. And your other question of, you know, is it a standalone?

So, I, think serology is a useful piece and we have that in Bartonella. we'll be looking at adding it into other pathogens. Sometimes that's useful for diagnosis.

It's complicated, right? so it's a, useful tool to say, okay, You're having a strong antibody response, but what does that mean? We've seen lots of patients where they have antibody results for an array of pathogens and everything lights up.

They've got every pathogen on the panel and it's like, is that realistic? Definitely, we know co-infections are possible and they're common, but the reality that somebody's got six or seven pathogens is something that needs to be explored further.

Is it more that you've got maybe two or three or one or two pathogens and that's causing a hyperimmune response? We've seen this in multiple patients where it's not necessarily that they have all the infections is that their immune system is on overdrive and antibodies are notoriously cross-reactive.

Depending on the technology that the lab is using, it might show up as an antibody to one pathogen, but maybe it is cross reacting and it actually an antibodies to something else.

There's a lot of subtleties and complexities. that go along with diagnostics in this space. But yeah, we never try and tell people that we have all the answers.

We think that this phase is really difficult and you're going to need to look at potentially other tick-borne testing labs or other biomarkers that show this patient have a strong immune response like a fantastic, a CBC with a differential can tell you a lot of information about somebody's immune response or other biomarkers that will say what's going on in this patient.

Sensitivity, Specificity, and Clinical Use

Any other immune markers you suggest to go deeper than that that can be indicative? Dr. Jai Miller is our head of clinical operations and scientific operations because she literally spent her PhD thesis and in her subsequent career studying the host immune-response to Borrelia and a lot of these other tick-borne pathogens.

There are different markers that will show that infection is on board. And I don't want to make any recommendations without a detailed expert backing me up on how those are interpreted.

Because a lot of times they may say, hey, your immune system is responding to a pathogen. The question is, is which path gene? I Don't think there's any biomarker that you can look at that's going to say with one test, you have Lyme disease.

I think some people interpret certain things that way. But the reality is what you want and what do you wanna look as you're doing your clinical work is Is there evidence that there's an infection going on and that your immune system is either hypervigilant or suppressed?

In either case, what's causing that and then taking it a level further to say, okay, in either of those cases, is the tick-borne pathogen what is causing the dysregulation?

We have experts both on our clinical advisory board, our scientific advisory boards. As I said, Dr. Jen Miller is really an expert in the space. And we like to partner with clinicians to learn and to tell and talk about particular patients and understand how we can do better and how can help clinicians figure out what's going on in these complex places.

And while the goal of today's conversation wasn't necessarily in terms of treatment, that is a whole conversation in itself and we've had several other guests too.

to dissect that, but that's where certainly you need a very comprehensive approach and process because there's

going to be mass cell triggers. There's gonna be methylation dysfunction.

When you mentioned, you know, these co-infections are several. In fact, obviously we've become a good host and then that leads to limbic dysfunction, vagal nerve dysfunction and digestive dysfunction And people begin to raise their hands when you can't eat what you want to eat anymore.

And then you're so restricted and then there's persister cells that go untreated and inadequate detoxification. Now you have hormonal issues. Then again, going back to these co-infections.

I'm curious in terms of your partner at the time, because there are patients who have exposure and yet, you know, walk away relatively healthy and others that are, unfortunately, kind of share your partner's fate.

And how was his health at the time? I mean, he was an extremely healthy individual, right? And I say that in quotes, even as he literally losing his mind with Alzheimer's disease, we went to the doctor and they're like, oh, all your labs are normal, that I think a lot of people in the chronic disease world get that frustration you feel terrible and then your doctor says your labs are normal.

But he exercised, he was physically fit, and he ate a Mediterranean diet. He did all the things that you're supposed to do for longevity and health. Your immune system, I like to think of it as like a tipping point, right?

You can have some of these pathogens on board. There were a couple of things, that I think really put him over the edge and descending into disease because I think he had these pathogens on board for it's hard to know when it started but I Think it was likely over a decade where he have these Pathogens that he Had been exposed to and his immune system was managing them effectively, right?

And so that's one of the things that we see is people have These pathogens onboard. Maybe they have mild symptomology But then something happens and all of a sudden they descend into illness and that could be a period of stress It could Be kovat.

It Could be A traumatic injury, it could be a lot of different things, and then all of a sudden they go from managing that pathogen to descending into disease.

And so Russ, I think, had multiple pathogens on board, which helps to tip the scales or the bucket overflows, whatever analogy you like to use. He also had very elevated levels of both lead and mercury, so I also think he had toxin exposure.

And I think that was also contributing to his case and preventing him from mounting an immune response and detoxing in the way that he needed to to really manage these diseases and pathogens effectively.

And so when we hit that tipping point, how it occurred, I don't, there was no one event, he had a surgery and then he went downhill. It was kind of more of, The symptoms just got louder and louder until all of a sudden it was like, hey, I think we have a real problem here.

And as we unpack his case, as you said, these pathogens, they become opportunistic. So EBV, Epstein-Barr, HSV. He had elevated titers of both of those.

We all have those and they can get out of whack when your immune system is dysregulated. And that was part of his case. He had Candida overgrowth in his gut and that also impacted his cases.

So he's kind of a poster child for the pathobiome, you know, of like how all these things can feed upon each other and get a negative, a really negative response in your system.

We're still unpacking that. Even daily, I mean, with his brain tissue, they also found evidence of a respiratory pathogen, chlamydia pneumoniae, which is often being studied and implicated in Alzheimer's disease.

And that wasn't even on my radar screen as a caregiver because I was laser focused on the vector borne pathogens. But there's a lot of oral pathogens, respiratory pathogens that also contribute to the neurodegeneration that need to be part of the cohesive picture to figure out what's Ultimately, at the end of the day, it's immune dysregulation, immune barrier disintegration.

When you lose the integrity of your immune function and the barriers, whether it is the gut, the lungs, brain, heart, bladder, et cetera, that's what happens.

These pathogens are super opportunistic and I call them my unlucky seven because while we evolved to deal with Parasite or bacteria or fungal or viral, which you kind of outlined, we never really evolved to deal with them all at the same time.

And certainly not the addition of heavy metals, Which coincide a lot with, with parasite, what was present in your husband case, very, common, uh, environmental toxins in our modern environment.

And stress and trauma, needless to say is when you're kind of under this duress, this deluge of pathogens, there's no way the body can keep up. And the barrier dysfunction becomes so high is that you are just like an open highway.

Things get into other places that otherwise shouldn't be there as you express. the level that was going on in the brain. That blood brain barrier is so thin, one cell layer thick and something as simple as LPS process that very, very effectively, let alone some of these pathogens.

Needless to say, it's a harsh, sad reality. So I certainly sympathize with your story and I applaud you for kind of taking that next step to be able to save other lives.

in your mission and to provide a tool for us clinicians to be able to detect these stealth infections. Because as we continue to treat more mental health patients, oddly enough, no one is kind of asking those questions.

It's the same thing with Alzheimer's, it's kind the biggest kind missed up in modern medicine where we're treating kind to the end result and yet the beta amyloid plaque is super antimicrobial.

It's the body kind of trying to sequester an infection and inflammation, right? The body has this innate intelligence. We need to work alongside it. But our environment is getting far more aggressive.

So the onus is on us is to do all the right things. While I applaud your partner in that regard, trying stay ahead, it becomes almost impossible when you're a victim to everything going on at once.

it's very difficult for the Uh, any kind of last points of, um, of galaxy testing or things that you want to highlight? Yeah. I mean, I think that again, direct detection is really the key piece of like, what's the source of truth and, and getting the best possible results to say, okay, is this pathogen currently causing the, the dysregulation that's going on in this particular patient?

And that what we're working on. We talked about the Lyme urine antigen test. We also have our BB, which looks at the genus level. So all species of Borrelia, Bartonella, and Babesia.

And I think that's important. I like to caution people generally. Again, I said, Borrelia doesn't like be in the blood, right? even though if Borrelia is in the blood, we will catch it because it's genus level.

Generally, if we're getting a positive on the BBB test, it is relapsing fever Borrelia, because relapse fever can be in higher copy numbers in blood. But for Bartonella and for Babesia, were looking at the genous level, so if it Babsia otocolli or Dr.

Brishward at NC State is identified more cases of Babesia divergence-like.

Complex Chronic Illness and Co-Infections

And so it's like divergence, which is a European species, but it is not quite divergence. It's something I think it'll probably end up getting its own name here pretty soon, But it that emerging that it not even named.

But he's finding it and sequencing it in a lot of these complex patients. So if you're looking at serology, generally they're going to be looking for one particular species.

I just don't think that simple, right? We don' know there's literally dozens of these species for both Bartonella and Babesia in our environment and some are known to infect humans and others are not assumed to affect humans, but that knowledge is literally changing daily.

We test at the genus level so that if it's there, we're going to capture it all. And then we are reporting those results. We regularly diagnose patients that are missed by antibody-based approaches or have complicated treatment histories.

Maybe they're testing antibody positive, but the physician wants to see if that's still actively contributing to their case. That's where direct detection really slots in and what we were working on.

every day to get better so that we can provide clinicians with better tools. Because at the end of the day, like we were talking about, treatments are really complicated, but how are we ever going to assess the efficacy of a treatment in a clinical trial if we don't have good diagnostics to tell you who's infected in the first place and then if the infection is cleared?

Right? So those are the things where we need to elevate at the diagnostics level in order to really advance the field. And that's what we're working on.

We're, we are working with some of the best researchers in the fields to bring those innovations to the market because something working really well in a university lab is very, very different than something in working in hands of LabCorp and Quest.

That's the gap that we want to fill as Galaxy first. through our lab where we offer it directly to physicians, but then longer term offering solutions where can partner with those big labs to empower them so that it can be more accessible to everybody.

So that's what we're working on and we are really excited as we go forward that the government is finally paying attention and on board that this is critical because the brain and some of these really complex cases is kind of the frontier that we need to figure out.

And I think that there's a lot of neuropsychiatric, a lot of dementia, misdiagnosed chronic infection that has these pathogens. Yeah, for me, it's these idiopathic diagnoses.

It's a question of what pathogen, ultimately. And yes, there's trauma and stress, but ultimately, like I said, one of my unlucky seven. Our job is to go digging as to what is driving this.

Certainly, people like yourself who are trying to stay on the cutting edge and provide the best tools allow us to resolve those issues much faster, but with the right treatment plan rather than providing symptom-based management until it's just too late.

You're not really reversing the root of what's underlying the representation. I mean, as you said, things continue. The CDC only recognizes two Babesia species, but there's so many more as, you just kind of so elegantly suggested it.

And the problems are only getting worse. I had a conversation with Dr. Jill Carnahan. We were just recently did a podcast swap and. It's almost as if things are becoming more aggressive, more tenacious and affecting us worse.

Now the question is, is it a premise of our pathogens becoming, are they evolving to be that much more robust or are we becoming weaker? And to me, my suspicion is likely both and it's our kind of modern chemical soup that we reside in that deems us more susceptible, right?

So the reality is we have to try to stay ahead. We need better tools to help figure out the whys, right? I can't tell you how many we, we deal with really well-versed clinicians that have been serving and figuring out tick-borne illness for years.

And we've had conversations with some of those like leading. clinicians and they'll go in with a particular patient and it's like, well, I have a strong suspicion of Bartonella, or I've a strongly suspicion in Babesia.

And then we run the tests and its the alternate, right? Like they think it is Bartinella and actually Babesea or vice versa. I think that just speaks to the fact that we've been forced to do clinical diagnoses, because the diagnostic tests have been so bad.

But it a really hard space to a clinical diagnosis because of what you just said where patients are literally living in a soup of things that cause immune dysregulation and that leads to all sorts of different symptoms and then a doctor is supposed to magically figure out which one it is.

It's like it's unrealistic and so that's where we need the tools to actually give answers to clinicians because guess what? The treatment for Bartonella is very different from the treatment from Babesia.

One's a bacteria, one's parasite, right? So the profile that you might use is And when you have a patient who's chronically sick, if they're going to a doctor and their clinical suspicion is maybe off a little bit, then that treatment then confounds the case even further because then what is the treatment?

If they go on antibiotics, for example, what are the antibiotics done to the microbiome and to your mitochondrial function and all sorts of other things?

So it's just this really difficult space where to me, accurate and better diagnostics have to be a focus of the solution because it just what doctors have have to contend with, you know, with these really sick patients, it's difficult.

And then with patients with constantly going from doctor to doctor and not getting their answers, and it likely will as again, this is becoming more understood, right?

Versus once upon a time and accepted. So the reality is we now understand a lot more than once-upon-a-time. And also in terms of exposure, we thought once upon a time, you have to go camping to contract this or you needed a bullseye rash.

And there's so much that we realize is less fact now and more fiction in term of how we're exposed and location. as well as that continues to, to change.

And unfortunately it's becoming more ubiquitous, but the good part is we've highlighted today is that the testing is going to continue to evolve and to get better and, and.

To be more robust and more accessible. everything that you have been able to achieve in terms of helping us treat on a much higher level. Certainly this is something that I'm looking forward to integrating within our patient population where we're prudent.

Obviously your story is one that, I would say, pain drives purpose, right? And it's kind of one you've had to figure it out on your own. And so I applaud you because this nothing short of a tremendous feat.

And so your incredible story is one that's, I see very science driven and all, most of all though, one, that you lead from your heart, your journey from caregiver to ultimately change makers, reshaping the future of how we understand chronic illness.

And the premise of neurodegeneration ultimately the most being one that's kind of really hardest afflicted. When we see our loved ones really just overnight, completely regressing.

That's a very, very tough pill to swallow. I've seen it within family members when I was younger. So ultimately, again, I applaud you. I thank you, um, encourage everyone to explore your, your memory and, uh, we'll continue to obviously collaborate as Galaxy continues to, to evolve and we're going to link everything in the show notes.

Anything else you want to leave our guests with? I think that the biggest thing that I'm trying to raise awareness of is, you know, symptoms seek that root cause, right?

I Think we've all, we all have gotten complacent with everybody's got body aches and everybody has anxiety and you know, some complaints here and there.

And it's like, no, that's your body telling you that something's wrong. There has to be a why. As an engineer, you're trained. Root causes, root causes.

But somehow when we think about the most complex system that exists that I know of is the human body, we're like ah, it is no big deal. I don't think that's the case, right?

I think we need to listen to our body and if you have symptomology and, you know, I want people to just think, is tick-borne something that I need explore?

Am I exposed to these types of things? And don' t just tink about ticks, it's also vectors. And that's why we do vector-borne disease. So flea infestations or lice infested, those are some of the biggest transmitters of Bartonella.

And a lot of people don't even think about the fact that they had a fleas infestion or they adopted an animal. Really start thinking that in your risk profile.

If you have that, then consider getting tested. How you get tested and where you got tested really matters.

Hope, Awareness, and Where to Find Nicole

Yeah, again, going back to the exposure. So from flies, from mosquitoes, and from horses, we have a lot of people who are riders and who have horses and they're not making that connection.

And certainly, like I said, the problem is becoming far more ubiquitous in that regard, but it's often coming from our environments, our animals, or just kind of some other natural exposures as well.

The prudence is on us to do all the right things in terms of trying to stay ahead with our lifestyle. So I call it lifestyle medicine. But definitely if you feel that you have been exposed, find a practitioner who's doing the degree of testing that offers the detection level that that has been able to provide so that.

You can get treatment right away so this doesn't become something chronic and worse yet fatal. I think that what you said so beautifully is that we get these little symptoms, right?

Little kind of like pains or nagging things and we don't correlate that often with certain underlying drivers, if you will. And so the body speaks, we just have to be open to listening.

and to take action and finding practitioners or individuals that are able to provide the right answers with the proper tools going back to the diagnostics.

There is power in that and certainly solutions can be found. So I definitely want to encourage the component of hope that Solutions and answers definitely can be found, but I say this all the time to our patient population, I have an unrelenting non-negotiable commitment to my patients to find that answer.

One way or another, we're going to exhaust any possible option to ensure that treatment and the right kind of treatment is had. Again, and it's partnering with people much like yourself, organizations much yourself that are trying to stay on the cutting edge of allowing us clinicians to practice at the highest level.

So I appreciate you. Last question that I love to end every episode with is if you could have one superpower, what would it be? Hmm, cool. A superpower.

That's a good one. I mean, I think keeping in theme with the conversation, i would love the superpower to immediately get to root causes, right? And to figure out, not just with humans and with physiology, but in places, in problems, when things are going wrong, so much of our lives, we just kind of attack the easy things.

Like what's the immediate thing or the symptom or, you know, Generally, the answer lies a few levels deeper and you have to ask the five whys, if you're familiar with that paradigm, why is this happening?

Why is that happening and why's that is happening to get to that root cause? And I think if we could do that, everything would be more efficient and we can solve a heck of a lot of problems.

This has been very insightful. So again, I appreciate your time today. Where can people find you or want to tune in? I know you're a company, right now it's going through positions, but where can kind of plug into what you are doing?

Yeah, so obviously our website is a good source. So that's galaxydx.com. We also have, you can find Galaxy Diagnostics on Instagram, Facebook, and LinkedIn, where we kind of regularly show updates and kind I think our website also, as for clinicians, we're developing a clinical learning center where we are really sharing a lot of the information on the front lines that we were learning on, not only the diagnostic front, but also having clinicians share some of their learnings on their treatment side.

So those are great resources. For me personally, I'm also on Instagram and Facebook as Nicole Danielle Bell. you know, often kind of go with updates, not only with what we're doing at Galaxy, but as you mentioned earlier, you're involved on the advocacy side and work with the Center for Lime Action and Project LIME and several others to really show some of the advancements for the community that we are doing there.

And so you can connect and follow me there as well. Wonderful. I look forward to continuing this conversation as your guys continue to evolve and detection continues to improve.

So again, thank you so much for your time today, for everyone listening. Please like, review, subscribe, pass this, share this with someone who needs to hear the story.

Nicole's story is one that perhaps is not inevitable when we're able to take the right steps early on. But needless to say, it's driven your mission and I appreciate you and thank you again so much for your time today.

Until next time, everyone listening, stay healthy, and stay wealthy, my friends. Thank you for tuning in to the TBD Fit podcast on Dr. Talks, where we unpack all things health and longevity.

If you enjoy the show, like, review and subscribe. This allows us to have a greater reach and help others on their health & wellness journey.