Introduction and Guest Background

Hello, everyone. My name is Dr. Richard Horowitz. I am the co-host of the Healing From Lyme Summit in DrTalks, and it is my great pleasure today to introduce you an old friend of mine, Dr. Garth Nicolson.

Garth and I met many years ago at one of the Lyme conferences in Pennsylvania. Will talk to you a little bit about that, of how we met and how we saw overlaps with mycoplasma and multiple infections in our patients.

and it's a real honor to have Garth here today. Garth is a biochemist who made a landmark scientific model for the cell membrane. And we're going to discuss today the importance of membranes in biological function, especially biofilms, and what happens to people when these membranes are damaged and he is actually one of the first people who talked about the fluid mosaic model, in medicine.

And he is the founder of the The Institute for Molecular Medicine at California. He serves as the president and chief scientific officer and emeritus professor.

and Garth has received honorary Colonel in the US Army Special Forces. He's an honorary US Navy SEAL. for his contributions to our military. So, Garth, that's a really a great pleasure to have you here today, my old friend.

So thank you for taking the time out to do this. Well, that's fine, thanks very much. Yeah. Garth, Can you tell us a little bit, how did you get into Lyme?

How did you get into mycoplasma? How did you get into the this mosaic cell model? How did all of this happen in your life? Well, it kind of went from one story to another story, one problem to another problem that sort of led me down this pathway.

And originally I started out my career working on very basic problems like membrane structure and so on, and we published the fluid mosaic membrane model, which is the textbook model now for membranes.

But I wanted to do more. I wanted to integrate that into a medical picture. How is that important in medicine. And so I got further and further along and tried to look at not only membranes, but also other processes as well.

And along the way, I did get involved in working with veterans and trying to help them and their family members, particularly after the Gulf War. so I worked very closely with marine families here in California, and also when I was still in Texas, before I took early retirement, I worked with, veterans down there, and they all had some very common problems.

And we'll we'll get back to that in a moment. But, some of this centered around infections and whether they had the infections before they left for deployment or they got them during deployment or got them afterwards.

Some of the common problems, particularly as their illnesses progressed, were that they tended to collect more infections. And then we've seen this over and over again with all kinds of chronic illnesses that people tend to collect infections over time.

And so, lately I've been working on, mechanisms for that, with a colleague of mine out here in California, professor Soffer. at UC Riverside in Patton Hospital.

And we've been working on barrier function and how this really impacts the numbers and types of infections that get inside your body to do real harm. As you know.

You know, you could have superficial infections, and a lot of people see this in their daily lives. It's a common

occurrence to get them in your sinuses or your oral cavity or whatever.

That's not what we're talking about. We're really talking about vaccines that have penetrated into the blood and spread to various organ sites where they can cause real damage.

I don't think, when we think of infectious disease, that these superficial infections for the survival of of your yourself essentially are all that important.

But when they do penetrate into the blood and pass to various organ sites and so on, they can be very, very debilitating. Right now, we're going to talk today in detail about mitochondrial function and chronic Lyme disease.

You're the first person, actually, in the peer review literature who really talked about, the necessity for, replacing these, these lipids, in the mitochondrial membranes that get damaged.

and also, you know, your articles on multiple chronic infections, not only in Gulf War, but also in these people with chronic fatigue and illnesses. Right. Which is, of course, what we're seeing day to day.

So, let's talk a little bit about these membranes.

How Garth Nicolson Entered Lyme and Membrane Research

Like the membrane barriers, extracellular matrix, intracellular. why are membranes so important? The gut, the barrier in the gut, the, blood brain barrier.

Let's talk a little bit about how these get affected in these chronic illnesses. Well, at every level in our body we have barriers. And barriers are very important for, dividing in somatic function, metabolic functions within ourselves.

But they're also very important in separating organs and other tissues and also in keeping microorganisms out of our bodies. For example, the gut barrier is extremely important, in our barriers, our mucus barriers and so on.

And our skin barriers, all of these barriers keep us, you know, safe from invading bacteria, viruses and so on and so forth. So they're very important in that regard.

And that's why it's important in Lyme patients, because any destruction of these barriers not only results in an a worse outcome for Lyme patients, but they tend to collect additional infections.

And that just makes their situation worse. And they can't simply they can't recover if they keep having infections penetrated into their body. and they trying to fight an existing multiple microorganism infection process like Lyme disease to begin with.

So this just compounds the problem. So this is something we have to work on right. So when people get like and you and I know this because when we met for the first time and it had to be, I think, I don't know, close to 30 years ago at that Pennsylvania Lyme conference where.

at least I was. I was presenting on my 16-point MSIDS model, and you were presenting and we looked at each other and is like, oh my God, we're come up with the same conclusions on these chronic illnesses, having never met each other.

Right. Coming from it, you know, scientifically just examining it. So, you know, it sounds like we have arrived at the same conclusions over the years, which so what you're saying is when people get these viruses and they get Bartonella, Babesia, Lyme, all these mycoplasma, if the barriers are not damaged, they may not actually get the same types of pathological effects.

Is that pretty much the essence of what's happening? Well, essentially, in the case of Lyme disease, of course, you you get these infections injected into your system rather than recovering them through your sinuses or your gut or

other ways that you get into your body.

So, that's one process in itself, which is very damaging. But when you're sick and your barrier functions are down because you can't replace the barriers adequately, you tend to collect even more infections.

And this makes it even harder. It makes it more difficult to figure out what types of additional infections you have. And it also, makes it more difficult to treat all these different infections.

It becomes a real problem in terms of how do you address a situation from a medical standpoint. So, we've been trying to work on the barrier function as an important adjuvant therapy of multiple infectious disease processes, because during the multiple infectious disease process, these barriers are damaged.

And we can go into how they're damaged. But, we've been working on, for example, the mitochondrial barrier, because that's essential in terms of generating energy.

And your cellular energy is essential in driving your immune system. And every metabolic process in your system depends upon that barrier to be maintained.

So the mitochondria can keep producing ATP and high energy molecule. Because remember, the mitochondria provide up to 90% of your cellular energy. So if they're damaged you're in real trouble because you can't operate your systems can't operate in a way that can defend itself against these invading microorganisms, viruses, bacteria, mold all these different invaders, causes their own sets of problems, and it becomes. So.

Complex. Right. So we're talking about the mitochondria being important literally in every organ of the body, right? I mean, there's no organ, whether it's the brain, the heart, but everyone has to function with mitochondria.

But now even in Alzheimer's, you're talking about mitochondrial dysfunction being right. One of the potential drivers of, dementia at this point. We know with leaky gut the the the gut barrier now which associated now with aging.

This was just published actually just a couple of days ago. We see a lot of inflammation in it. so we're really you're talking about these barriers. So how do you how do you get these barriers restored?

Like let's talk a little bit about the phospholipids and how you actually do this for people when they have mitochondrial damage or they have this barrier function damage.

Well, again first let's talk about different barriers. It's the mitochondria have their own set of barriers. And the one barrier that's incredibly important is the inner mitochondrial membrane.

And if that barrier breaks down you can't generate energy. You can't produce ATP. So it maintains an electrical chemical, barrier. Our, our, transmembrane potential across that inner membrane barrier.

And that has to the barrier has to be maintained to generate that, transmembrane potential. And there's a number of ways that the barrier is broken down.

But one of the easiest ways to break down that barrier is to with oxidative stress. And, other means of damaging the lipids in the membrane. you create a situation where there's leakage on the inner mitochondrial membrane, and when there's leakage and you can't maintain the trans membrane potential, and so energy production goes down in those cells.

And of course, at least all kinds of problems, particularly if those cells happen to be immune cells or those cells happen to be critical cells in critical organs, you're in trouble.

So your organ function tends to, to degrade until you can regain that barrier function, regain the mitochondrial function, produce the energy necessary to provide all the functions that our organs provide.

Barrier Function, Infections, and Chronic Illness

So as people age, there's a natural deterioration that goes on. And so this barrier function actually degrades slowly over time as you age. But there are ways to try and help maintain that barrier.

One of the ways that we use is to replace the lipids in the barrier. Because this is one of the critical key points that determines barrier function. If the lipids are damaged, then leakage occurs across the membrane because the way the lipids fit into the membrane and those lipids have to be replaced.

So we have a natural mechanism to replace them, but it's not adequate when we have a disease process going on, because then the damage is is increased so far above our ability to repair it, that it causes all kinds of problems.

And that's what eventually leads to cellular senescence, because it actually can turn on, what's called apoptosis or programed cell death. And cells start to die.

And before they die, of course, they're sick and they can't function properly. And this happens to every major organ in your body. There's a potential for this to happen.

So, we know that this is an important process and this is what ultimately will lead to a fatal outcome of a disease process. So I got really interested in this whole thing during the book, the Covid epidemic, because we were finding that if you just had the Cobas virus infection alone, yes, you could survive. But, but if you had multiple infections that lowered your chances of survival, and the more infections that you had, the worse off you were, to the point where, if you had already multiple infections like a live patient then or a mycoplasma patient, then you were a very high risk of actually having a lethal, outcome for Covid infection.

So again, it added to the point, because we had seen this earlier, where if people had multiple infections, they were much more likely to have a fatal course of their disease process.

And it can go in different directions and you can have different, primary problems for the actual lethal event. But the underlying problem really goes all the way back to these barrier functions.

The loss of energy production, the loss of function for our immune system, the loss of function for all our critical organs, all sorts of breakdown when our barriers are, are broken down.

So I learned this from you years ago. So, I mean, some of the things we've used for the mitochondrial dysfunction and of course, in long Covid, now they're showing the same mitochondrial dysfunction, of course, that we're getting in chronic Lyme and in other diseases.

It's literally in every infectious process. It's going on to various degrees. And this is what confused I think a lot of people with this, why in some cases of you may lose a little mitochondrial function, but you can maintain you might be sick, but you can survive, but other cases, it gets to an extreme point and you actually succumb to the disease process.

Now when you use when you use these anti factors, these glycosylated lipids, and usually when we do it, we're doing it for at least a month after and after people go through whatever oxidative stress of killing the bugs.

We do it for at least a month. We're using CoQ10, an acetyl l-carnitine, to, you know, shuttle the fatty acids the energy into the mitochondria. we're also using things like Mitu and our, nicotinamide ribose side.

We're using that right now. you know, other things, glutathione to make sure they have enough oxidative, capacity, nad right in order. We're using in some of these people.

So do you have certain products specifically you like for this or and how do you combine them? Like what do you do in someone that has this kind of mitochondrial dysfunction?

Because in the paper you published, I think it was had to be at least 15 years ago, was about a third of the chronic Lyme patients. Their chronic fatigue did get better with mitochondrial regeneration.

So what were using in that paper. What do you like is as far as the products. That that were present, we were primarily using really just the anti factor lipids, which is a formulation which is the sort of phospholipid acids that form the bulk of the mitochondria or membrane matrix.

And they're they're also precursors for very important molecules like cardio lipid in the inner mitochondrial membrane, which is absolutely essential for function.

These get damaged. Normally they're replaced because they're not damaged at a rate which would really put you at risk, for having a very difficult disease process.

But as you get more infections or as infections become more severe, then you can't always replace them. So we need to help in that process. And that's why we use these lipids.

And we've been going to higher and higher doses. And it turns out for different types of things like diet of our program. I might tell you about my recent public study where we've looked at people with chemical contamination.

And it turns out the higher doses of the anti factor lipids actually encapsulate the damaging chemicals and slowly remove them from your body. And so for a lot of people that have combinations of chemical damage and infections, and this is actually very common for veterans that you need this.

The very high dose of the anti factor lipids to help remove these contaminants in your body. Otherwise you just can't recover. And this is. What you're talking about.

For example, we're finding more toxins now in a large number of us. And most toxins are fall into this category because they're hydrophobic chemical entities.

And these hydrophobic chemical entities get buried in your cells, interfere with a lot of processes that go on inside your cells. And if they get in particular cells like nerve cells, they can cause a lot of havoc.

And so we we know that they interfere with mitochondrial function in with other membrane functions of the cell. So all these membranes of the cells are all form different barriers.

And that's why the general topic is on barrier function. And once that barrier function is broken down again at different levels, this really leads to a disease process.

It's very hard to overcome unless you repair those barriers. And so that's why we say every chronically ill patient needs these anti factor lipids, for example, to help repair all of these barriers right now.

One interesting point. And I don't think most people know this, biofilms can be a response to reestablish the barriers because the barriers are broken down and the biofilms are forming, actually to reestablish these barriers that one of the things it's doing, apart from just creating like a mechanism to give food to the bacteria, you know, for the shell. It's our bodies.

We don't really, you know, have a inside, into some of those processes that are going on. They just naturally react and maintain a barrier function is a natural reaction for cells.

And so there are various ways to maintain those, those barriers. And I think that the formation of biofilm is, is really are a attempt to reestablish or maintain barriers to not only keep those invaders out, but to also interfere with some of the things that they do to our cells.

So I think it's part of a natural process that occurs. And we also see this in terms of natural filtration in the gut. We form these barriers. with you can essentially a form of biofilm in the gut to kind of filter molecules out and to try and

keep invaders like microorganisms and viruses out of our system.

So that's really almost the first line of defense in the gut, is to form this biofilm matrix to, to filter out some of these invaders. And then there's another level of barrier when they get to the membrane of an epithelial cell of the gut, for example, they have to penetrate that and their other functions. So on that I won't go into.

So these barriers occur at different levels and they have different functions. But they're all essentially important. And tried to maintain our our health a healthy body and healthy function.

Mitochondrial Damage and Lipid Repair

And when the function of our various organ systems go down, you can really generally trace that back to loss of barrier function in one way or another.

Right now, this is this is fascinating. if people have questions, by the way, about some of the things we're discussing today, and they want to, you know, get questions on mycoplasma answered or, you know, the gut barrier function, where can they reach you?

What is a good email to reach them? Well, they could reach me at the Institute for Molecular Medicine. My personal email is G Nicolson at I'm m e d.org.

They can reach me there through the Institute for Molecular Medicine general mail or through my personal email. And I'll be glad I answer every email.

Sometimes I'm a little tardy at doing that, but I try and answer everyone that sends me emails, right? Okay. That's great. Now you have you have new papers that are coming out at this point about some of this.

You want to talk a little bit about some of the recent research you've been working on? Well, I do have, some recent research you were mentioning, the fact that, it's interesting that the certain, diseases, particularly, that are related to brain function, also, these involve barriers, as it turns out.

And it's very interesting, have gotten involved in, in some work on schizophrenia and other psychiatric problems, which, absolutely involve dissolution or bare loss of barrier function.

And so we're going to use there we're going to use the lipid therapy to see what we can do with, helping those patients. And we know in the case of nerve cells that the barrier function is very important.

It really modifies the nerve cell activity. And we've been able to show this, that, for example, we can, either attenuate, depolarization of nerve cells using the anti factor lipids or we can stimulate it depending upon what, what formulations that we use.

So, some of these things are very intriguing. And we hope to, dwell into some of these psychiatric problems with using, barrier repair or barrier function.

They also have mitochondrial function problems, as you just mentioned already. And of course at the same time, this this helps repair the mitochondria.

So the mitochondria can function. And that of course is absolutely essential for nerve function. So there are a number of reasons why these things are very important in I'm just writing a review now on aging and how you lose mitochondrial function as you age.

Naturally. so in your 90s, for example, most people have lost 40 or 50% of their mitochondrial function. They become feeble of the two because of that.

So what we've done is we've taken older people and repaired their barrier function with using the anti factor lipids,

and they go on to leave with very active lives.

And it helps them in a number of different ways. It helps in terms of their coronary function. It helps in their musculature so that they're less decline in their musculature.

It helps in their nervous system and so on. So, you know, that can be traced back to loss of barrier function in various ways. Right. So I mean, I just think people realize that it really is an essential function with aging.

By the way, I take lots of mitochondrial supplements every day based on all the literature I read on this. But also, of course, there are natural ways of stimulating mitochondrial function, like exercise.

I'm certainly is is one way to do it. resveratrol and, alpha lipoic acid right there, there other certain things also that will help to create new mitochondria.

Right. So, are there anything else you like, like any other tricks you like as far as creating new mitochondria in the body, apart from, you know, the ones we just mentioned or, it's kind of limited as you're getting older.

Well, we can we can create new mitochondria, but it turns out it's somewhat limited. It's not that you can completely replace all your mitochondria by by taking a supplement.

That's that's not exactly what happens. You can increase the number of mitochondria in your cells. Of course that that's important. But there are things you could do to actually increase the function of your body control, or in some cases, even increase the size of your mitochondria, which means more membrane, which means more function.

So there are different ways to do this. And various supplements have been used that have slightly different properties and so on. And I'm for all of these approaches.

By the way, as you know, we've we've done combinations and we often add with our lipid products some of the very same supplements that you mentioned in some of our studies.

Go back, as you mentioned 20 years ago, we were doing this and finding that this was actually helpful. But the most helpful thing that we found are actually the lipids themselves, because they're so important in maintaining this transmembrane chemical potential, chemical electrical potential across the inner membrane.

And if that goes down, the other supplements, no matter how you shuttle molecules in or how you do this or that, it's still not going to help with your overall ability to produce high energy molecules.

And the number one is. Right when you're talking about these phospholipids, you're talking about like, because when I, for example, I detox mode, I use phosphate, little choline.

And you know, two and a half to three grams twice a day with glutathione and binders. You're talking combinations like phosphate, little choline phosphate, little serine phosphate, little ethanol.

I mean, you're talking combination of these for the cell membranes to keep them fluid. Yes. And in fact our formulations are balanced, for the composition of membranes, which is, which is important, although you'll do a certain amount of modification inside your cells, inside your compartments, like your mitochondria compartment, for example.

there'll be some enzymatic modification, but unfortunately, that can't keep up with the damage, to those molecules that occurs during a severe illness, for example, severe series of infections or whatever.

So, it could be severe trauma, for example. that's another thing that we found that I've been working with veterans on gunshot wounds, for example. and showing that there's really a tremendous increase in the rate of healing, if you start replacing these lipids because the mitochondrial function is absolutely essential for the healing process and the regeneration process within tissues.

So it all really goes back to things like mitochondrial function. So we have to maintain that mitochondrial function to heal. Right. It's essential. And it's really in the product.

By the way the product you developed years ago. Just tell people a little bit about this product in case they actually do want to get it. Well the anti factor lipids is one of these balanced products.

And the reason that that's important compared to just say lecithin or some other product is that the lipids are protected. This is absolutely essential because if you put damaged lipids in that's not going to help you at all.

You need to have protective lipids. And so we have a patented process where we use a natural, product called inulin, which is derived from plants that actually protects plants membranes.

And you find this in plants that survive freezing, for example, up in the northern latitudes, plants use inulin to protect themselves during the winter from freezing damage to their membranes and so on.

So what happens is the inulin molecules, which are fructose local Zacharias, fit in between the head groups of the phospholipids in the membranes and protect them.

But also when you have lipids isolated from membranes they form globules. And you can liposomes and various things in the inulin will still protect those, those lipid molecules.

And that's a patented process that we have to protect the lipids within your lids and other things as well. Too many oxidants and so on and so forth. But, you know, there's the one that comes from Jerusalem artichokes.

Is that one of the the sources where this is coming from? It's well, that's the that's one source there are many sources of amino acids of different types of insulins, of course, but and the plant world has developed all these really neat molecules to, to help protect themselves.

And, just artichoke is a convenient source and, and, it's very easy to isolate. But there are other sources as well. And essentially all plants have these to various degrees.

So, you know, years ago and I learned this actually from years ago, I had a patient with, cardiomyopathy who had a very severe congestive heart failure, and the cardiologist were giving them like digoxin and Lasix, and in a tropic medicine, anything they could do.

And his ejection fraction was horrific. It was something like 19%. It was just terrible, normal being like 50 to 60. And we started him on a mitochondrial regeneration program, right, with these, anti factor lipids and, and CoQ10 and the rest.

And interestingly enough, they rejected ultrasound and did a echocardiogram on him about six months later, his ejection fraction, it pretty much just doubled.

And they couldn't explain like how it had gotten so much better. And it's because obviously the mitochondria of the heart muscles were working a lot better.

And and I don't think the cardiologists, I mean, neurologists are now getting into mitochondria because Alzheimer's is now showing up as a mitochondrial disease, apart from the effects of phosphorylated tau and beta amyloid and the rest.

But but I don't think like every area like GI, if you ask most GI doctors what is leaky gut? What is membrane? Unless you've done functional medicine, they don't really think much about it.

And yet, as you were saying, it's those membranes in the gut. You know, from our perspective, most I'd say at least 70% of my patients, 80, 90 have leaky gut.

When we check them, the gut barrier is compromised and we have to use bovine immunoglobulins, get them the right probiotics, because as you're saying, these bugs in the butt, whether it's viruses, bacteria, they're going to get in there and they're going to start causing a lot of havoc and inflammation. Right.

If the gut barrier is is compromised. Absolutely. And and of course, the again, this is something that we're very interested in.

Biofilms, Detoxification, and High-Dose Lipids

And and there there are a lot of disease processes that, are really driven by this sort of degradation of the gut barrier. And certainly in the extreme cases that I'm sure you deal with.

And and we saw in the case of the veterans, because they after they came home, they picked up all kinds of different disease problems and they end up being the most severe cases.

So no matter what type of disease process, ultimately, they have problems with. And so, this can go in a number of different directions, but ultimately you trace it back to its barriers and health barriers and the mitochondria, the barriers, the gut, the barriers in the brain.

All of these and very important and different disease processes. And so this is the thing I've been trying to harp on, is that you've got to go back to some basics here, and you're patients are never going to completely recover until these barrier functions are essentially healed.

And one of the other things I've seen that interferes, you know, we've talked a little bit about the cell danger response in some of these people where, the mitochondria has, you know, M0, m1, and there's a healing phase and there's regenerative phase and there's a damage phase.

What I've learned before about this, though, is that we need to have more extracellular ATP, right, to kind of reverse and help and autism. And we should talk about this because you've done papers, on autism in these kind of diseases.

the only molecule that I know of, I'm very curious to know if you know of any others apart from using cinnamon. Right. Used for sleeping sickness with tremendous meiosis.

I've seen some studies on John Hopkins using sulforaphane, glucosinolates, broccoli seed extract seemed to help the autistic kids. Is there any other way you know of to increase extracellular ATP when you've got this?

These mitochondria that are damaged, they're in the cell danger response. They don't move. do you have any tricks? This was not something I was planning on asking, but I realized as.

Well, you know, one of the things that we did early on with, with autistic children was to, to give them these lipids, because that did repair their mitochondria.

And once their mitochondria repaired that, all these processes tend to be reversed. And so it's something that we think is essential in terms of treating, autism spectrum disorders, is that without, treating the mitochondrial function problems, they're just not going to get better.

And now we're finding the same things with the mental illnesses by the way, that are being treated primarily with various drugs which mask the problem rather than treating the problems.

so, if you start repairing things like the mitochondria, now there are some new avenues we're going to open up for treatment of, psychiatric illnesses, for example, and all kinds of middle mental problems and mental issues that people have, particularly when they age.

And it's all I think part of the aging process, again, is to break down the barriers, and then we end up with a lot of

different problems that you add on.

And infections are just one part of that. But the point is, and you stress this earlier when we have these multiple infections and of course by bottle, it's called medicines for a reason.

It's multiple systemic infectious disease. We are seeing Lyme and Busia and Bartonella and Mycoplasma and tularemia and Rickettsia and or Licky and we're seeing and viruses reactivating with Covid. It's happening.

Absolutely right all the time. You can't fix the problem with the mitochondria. If you got active infections, right, damaging with oxidative stress, you could kind of give all the anti factors and things you want, right.

But you've got to get to the sources of where the inflammation is coming from. Well and here's the little secret dirty trick, that goes on here. Is that a lot of the oxidative stress is actually coming from the mitochondria itself.

And that's because when you damage the mitochondria membrane, it short circuits the electron transport chain. And then all of a sudden you get the production of reactive oxygen species right in the mitochondria.

And it becomes a major source of oxidative stress itself. So there's a more than one reason for repairing the mitochondria. And that's another reason is because then that oxidative stress goes and affects every other aspect of, of the cell in terms of its metabolism as well.

so that's another little dirty secret that, is going to be coming out. I'm sure. Got it. So, so the oxidative stress and inflammation, it's not just from infections and toxins and lack of sleep and leaky gut and the microbiome and nutritional deficiencies, mold, heavy metal.

It's actually the mitochondria themselves that are damaged. Well, that's that's ruining it essentially so much. You mean downstream. It's also an upstream effect, right?

It's happening in both directions. Exactly. When you think of the most, intensive, oxidative stress that really is both. And if you can repair the mitochondria and sort of reverse that process, you can remove a lot of the problem.

And by the way, I don't think people are ever going to get well, let's we address this situation. And because again, the barrier function, the fact that you're going to have more infections, and also the fact that if you don't repair the barriers, the mitochondria barrier, the cell membrane barrier, the gut barrier, the brain barrier, all these barriers, we have to maintain these barriers, not only keep stuff out, but also to keep our metabolism intact and running like it should inside cells.

So that's why I'm saying at the very simple it's level, it really goes back to this barrier function that we have, at various levels. So so I've got a quick question.

You, you published, I think at least you're on the top of the list of someone who's published more scientific publications than anyone I know. It's over 600 scientific publications.

I don't even know how you managed to do that, because I think in my career, over the last 35 years, maybe I've got 30 or 40, you know, maybe once a year, twice a year, I'll get one out there.

I mean, you are very prolific. you had published years ago, and I thought it was fascinating. You were talking about these multiple infections in these chronic, fatiguing illnesses.

Can you speak a little bit about exactly what you were finding in these people, the viruses, the mycoplasma? You're you're one of the mycoplasma experts.

We really don't have anyone else that you know, is like an expert like you. In fact, I brought you on to the HHS Tick-Borne working Group committee, right down to the co-infection to talk about it, because I thought it was so important.

Could you talk a little bit about more about Mycoplasma, how you think it's kind of infiltrating some of these infections? Because we're I don't think most people are really talking about it or how they're all.

Interwoven like that. That's because most of the experts are either dead or retired. And I guess I'm one of the few left standing. And I've been retired now for 20 years, so I'm not even somebody that's, you know, hanging around the lab doing lab work anymore.

I mean, here I am in my home office running little small scale clinical trials and so on. But, I really don't have the capacity, or the, the organization to, to really dwell into this any more. But, and unfortunately, I'm one of the last people standing, but I think the mycoplasma is just sort of an example of some of the things that can go wrong.

And when Lyme hit, this gave us a whole new set of examples of things that can go wrong in terms of infections and so on, and how you get cooperation.

Not really good cooperation, but negative in a negative way. between different types of infectious processes and how this can snowball in patients and really cause tremendous problems in terms of not only the patients themselves and their disease process, but the treatment processes and the ability to help them recover.

And it gets to a certain point, and we really have to take a really kind of holistic, view of these patients because they're all individually, they have their own separate problems and so on.

But after a while, this business of multiple infections is very hard to, to ignore. And it crops up over and over in all kinds of different, separate disease processes.

For example, if you're a rheumatologist and work on arthritis, you don't think so much of infections. But yet infections are one of the core parts of the arthritic process, and it's the people that have very severe arthritis.

40% of them, have various chronic infections, and they can be a different set of infections for each patient and so on. But it does cause them very severe problems.

Aging, Brain Health, and Psychiatric Applications

And those problems can't be overcome by simply addressing inflammation, for example, and not addressing the infections. Right. And that may be by the way, if you're a rheumatologist and they were treating, for example, rheumatoid arthritis and using a diet regimen like Blackwell and minocycline, you and I both know that it's possible because they found mycoplasma in the joints, right, of some of these species, apart from chlamydia, pneumonia and others.

It's very possible it's not just an anti-inflammatory effect, it's the actual antibacterial effect. Right. Oh, absorbing the inflammation because. It's.

Absolutely raising TNF alpha. And I don't want il6. It's raising all these inflammatory cytokines. Yeah. And again this process can really snowball. And when you when you have those infections there are ways to treat it as you know, but it becomes more and more difficult if you have the when you collect more and more infection, because often there are different types of infective viruses, bacteria, mold, all kinds of different types of infections that you can, you can, sort of accumulate over time.

And it becomes more and more difficult when you take these very severe patients to take one avenue approach to treatment. You're going to fail every time because you you have to address all these different problems that they have.

And if you don't, you're you're doomed to fail. So we've this. We had talked about earlier when we were on the HHS tick borne Disease working Group subcommittee for co-infections.

We were talking about mycoplasma fermentations, Mycoplasma penetrance, mycoplasma pneumonia, which is

showing up in ticks. Do you want to talk a little bit about the fact that mycoplasma in ticks and, and kind of how this might be affecting people since just about everybody when you check mycoplasma pneumonia titers.

Right, just about everyone has been exposed at some point in time. Well, this is again, that's a very common mycoplasma in some of the others you mentioned are less common.

but Mycoplasma pneumoniae is the most common, infection in atypical pneumonia, for example, in children. So we're exposed to this often at a very young age.

And just like a variety of other types of viruses and bacteria, you know, we can collect these. We can kind of hold them in check. but if later on in life they're really ugly head, whether it's chickenpox or whether it's atypical pneumonia because of mycoplasma or whatever, once these things get, uncontrolled again, the disease process can occur.

And often it's quite different from, what you've seen as a child, for example, or even as an adult that as you age, I think you're more and more at risk for these.

So I think people that, succumb it it before their time, let's put it that way. I think that, this is a process. It's going on in most physicians don't have any clue.

And they by the way, they've been finding some of these and even the autoimmune illnesses. Right? I mean, and autism spectrum disorder and some of the autoimmune illnesses, I mean, we're finding a lot of these in there.

And I don't think doctors are always recognizing what the role is. Right? As far as driving some of the process here. No, they they tend to think of them as secondary to the disease process.

But it turns out I think they're more integral to the entire disease process than people would like to admit. and just like mitochondrial function turns out to be very integral to disease processes, much more than people would like to admit.

that's what we're finding with these things. And so, it's very hard to, to escape it, to get away from it, to ignore it. And of course, medicine has been ignoring these basic processes for essentially forever.

And we've got to turn that around. No, I mean, the the way we address chronic disease medicine in this country, it does not work. Well, I mean, 86% of our health care costs and 70% of the deaths in this country are due to chronic disease.

And we don't even have a model like a multifactorial model like M Sits, which I've been working on for, you know, 35 years to at least have a framework.

You know, I just I just put a study in the literature two days ago on some case studies of using some combination therapy. And, I was talking about the overlaps with long Covid and chronic Lyme and all 16 factors on the 16.6 map are now been associated with with long Covid.

I mean, it's it's a very similar process that's showing up in these chronic fatiguing illnesses. But but unless you're a functional medicine train doctor, I think you're ignoring this.

And I think the utility of the message model, it's like a checklist just to remind yourself, hey, don't forget mitochondria. Don't forget gut function, right? With leaky gut.

Like these are things you have to remind yourself in a chronically ill patient. Absolutely. I'm all for it. Because, this is the sort of pathway that we've been on for, as you know, for 35 years or 40 years.

so, you know, it, I think we're we're, thank God for people like you, Rick, because without people that can expand their minds a little bit. we would be in big trouble.

Well, and thank God for people like you. And, you know, my favorite statement about. I have an open mind. Does it mean your brain's going to fall out?

It's an old statement, but it is true. I just don't understand. In this day and age, when you really do a good scientific review of like, what is long Covid? Why are people ill?

what is chronic Lyme? It's not that these things have not been published in the scientific literature. it's just a question of knowing the literature, reading it, and then understanding there's a political component to this.

Some of these disease processes. Right, as opposed to there's just the science itself. Right. Well, part of it goes back to medical education. This is something that I've really stressed over the years.

Part of it goes back to medical education. The way we train practitioners not only in this country but in other countries as well. they tend to be isolated, they tend to follow certain dogma and certain routine.

And, I think with chronic illnesses, the way their, the way they're expanding, particularly the age related ones, we can't rely on that system to produce the types of practitioners that we need.

Yeah. I mean, the, the, the last studies I looked at and I recently just spoke to, doctor Dale Bredesen, you know, Alzheimer's expert in California and the studies that, you know, preclinical dementia, 46.5 million Americans.

We're looking at over 50 million Americans in years to come. I mean, you're talking an epidemic of a neurocognitive deficit in people where their brains are not going to function.

And the mitochondria are definitely playing a role. Apart from infectious, right, where beta amyloid is actually trying, in a sense, to protect it. But they're finding these bugs now under the biofilms in these people with dementia.

while the mitochondria getting damaged and interesting. You know, I use methylene blue all the time with that zone. They're using low dose methylene blue for mitochondrial function studies.

Now, right at this point in time and it's just fascinating how the field just keeps expanding over time. Well, thank God it is because we do have to address these problems because I think we're we're reaching a kind of a critical point where we're going to have so many people who are functionally incapable of being productive members of society, and they're going to be a drag on society. And, their family members certainly would like to, to see these chronically ill patients do better, lead better lives, lead longer lives and healthier lives.

And that certainly is true mentally. Right. And, again, this is something that, our brains are critically dependent upon mitochondrial function, not only for activity, cognition, memory, everything you can think of that's important with our brain is dependent on mitochondrial function.

So this is one of the the critical elements that we have to keep in mind and keep addressing. this is the one reason why we've been sort of pushing this business of, membrane lipids.

And I'll go back to, pilot study. We're trying to organize in the California State Hospital Association to look at the schizophrenia and other psychiatric problems, because they, too, are related to mitochondrial function.

And I'm going to try and see what we can do with that. We don't know yet. But, by the way, if you if you ever get that study done, one of the studies I'd love to have done is I've always been thinking about this in the back of my mind is to go into psychotic battles and check these people for Lyme disease and Bartonella, and even just do a skin examination to see if they've got the Bartonella, which are now showing up.

Major league in the literature and in our patients with these people with neuropsychiatric disorders. One of the. We absolutely along with mycoplasma, because this is something that I was just beginning to to get involved in before I retired, the test was showing up.

And of course, we found it in children with autistic spectrum disorders that, 70% of them, had these infections and so on. So and even in areas, of course, the most severe cases of autism we found in areas where there was chemical exposures as well, and like agricultural areas, for example, so all these things tend to snowball.

And so that by the way, you see. By the way, you've seen clinical results like using, membrane lipid replacement in the autistic population. Oh yeah. Oh yeah. You've seen the results. Oh yeah.

And I originally I started with, with the Gulf War illness family because their children were becoming autistic. And so we were using the, the lipid therapy for the adults in the family.

We started using it for the children as well. And we saw really remarkable results. And then we started, using it, for example, in, in agricultural communities where there's a very high incidence of autism spectrum disorders.

And in California, we have some of these communities where they're kind of lower income communities because most of them, most of the family members work out in the fields.

And, and they they're exposed to a lot of chemicals. They bring chemicals home, and the chemicals are in the water that the children drink. And they're they're everywhere, essentially.

And so we have a high incidence. There was a study just published a couple of days ago. They're now finding microplastics in the placentas.

Mycoplasma, Co-Infections, and Chronic Disease

of all of the children, being born, they used to find in the California studies, I looked at the robot like 50 pesticides that were showing up in breast milk.

I mean, I don't think people realize between the infections and the toxins, I don't think people realize, like, these are really major dangers to human health.

And and productivity, and they're going to raise health care costs. They absolutely are. And of course, this is one reason why I've had this emphasis on using the higher doses of the membrane lipid replacement to slowly remove these chemicals from from the body.

In the course of my study about a year ago with Gulf War veterans who were chemically exposed to major chemical exposures in the Gulf War and have been sick ever since, and they're slowly recovering their health.

And you can you can read my paper, The International Journal of Translational Medicine. although. By the way, what doses, what doses we're using in there to to reverse some of.

These side effects, six grams per day in that study. But we've got even higher. And the latest use of this or in transplant studies where, people that have organ transplantation, even higher doses and that are very important to, to maintain organ function in the transplant.

And also it reduces inflammation and a lot of the other problems that are associated with organ transplantation. So there's just so many different potential uses of of of these lipids that I've been working with that I've had up. And again.

These are, these are combinations. This is a factor like glycosylated phospholipids not just phosphorylated choline. It's a combination of the. It's a combination. It's a combination.

And they're protected with inulin and antioxidants and so on. So and of course then we add in other things as well. But but that's the the most important ingredient, it turns out, is the inulin protected phospholipids of various types.

Right. No, that's absolutely fascinating. so, you know, we're coming on. Well, we're close to an hour, actually, for

our talk. So just any other points you want to make at this point like that, you think that the audience needs to understand?

I think we've gotten really home some of the points that multiple chronic infections are playing a big role, as are toxins. They're getting it to the membranes. They're damaging the mitochondria.

Mitochondria responsible for every organ function in your body. It's responsible for aging, for it, for barrier function. I mean, I think we've covered some anything else you think we haven't covered adequately?

Well, we kind of just touched a little bit on, middle, problem, middle capacity psychiatric problems, this and that. And I think this is an area that I want to see, grow because we have so many problems that are creeping up on us, particularly in countries that have aging populations.

This has become a real problem. And it's going to be a tremendous drag economically. on the countries that have aging populations that have psychiatric problems and so on.

So this is this is an area that I'm very, very interested in right now, what to want to push forward in. No, I think I think it's extremely important.

And of course, you know, just from the pandemic itself, from from people getting sick, from long Covid, losing parents, I mean, the psychiatric effects have been terrible.

And people like Bob Mansfield and Brian Fallon, they've been publishing for years on the neuropsychiatric effects of these illnesses. But certainly with the pandemic, it's gotten compounded and you're right, with chemical exposures on top of the infections, we're dealing with a huge percentage of our population with mental health problems.

And I, I don't think most people think about phospholipid replacement and mitochondrial function in these people. So I think you're bringing up an important point of research for the future.

Yeah. And again, it all goes back to barrier function, which is what I started our conversation on, because, the barriers at various levels, at the mitochondria level, at the cell membrane level, at the nuclear level, at the functional level of organs that the barrier, the gut barrier, the brain barrier, all of these barrier functions turn out to be very integral.

Right. Great. You have any favorite, test you like? I mean, apart from you can go to LabCorp and get a Coke. You can level and see a little carnitine.

And I know they're in Europe. They have a bit more testing actually from mitochondrial to look at, you know, what's going on. Do you have any favorite test you like actually for, for testing mitochondrial function.

Well, unfortunately that the types of tests that we've, preferred to see are ones that are too difficult to, to really, do commercially, or at least that there's kind of an impediment, you know, commercial tests, they tend to prefer simpler tests that, they could reliably, perform and, maintain their laboratories in terms of performance, for routine testing.

So routine testing is a lot different from, as you know, from research testing. Now, research testing, we can have we're not limited more or less in some of these, you know, more, I guess everyday problems that crop up.

Right. but that's one of the problems I think we need to somehow take our research tests and rethink them so that we can develop simpler tests that can be done commercially.

If this is a real impediment, the research is going way, way far beyond what can be done practically by in a commercial laboratory. And having been involved in running a small commercial laboratory at one point in my career after I retired, I know that this is a real problem.

Right? So so, but if you check, for example, lipid peroxides that fly so proteins, I mean there are certain things you could check eight hydroxy guanine protein carbon notes.

I mean, there's signs of oxidative stress, right. That you can measure. Yes. It would be like the indirect marker of abnormal mitochondrial function. Yeah. Exactly.

but to really do, you know, a good study of mitochondrial function, I'm afraid you can't get that done commercially, unfortunately. Right. Yeah. because you have to look at various aspects of mitochondrial function, and that just can't be done in a, in a commercial test because it becomes too expensive.

And, you know, the you can't get reimbursed for expensive tests, essentially. That's the bottom line, right? Yeah. It's usually specialized hospitals.

Mayo Clinic, they'll check mitochondrial right DNA and different changes. In fact, I have a young woman coming in in the next week or so. she has a mitochondrial disorder, a genetic mitochondrial disorder, and has Lyme.

and so far, they've not been able to get this woman better. And she's going to be coming to see me where I'll be using, obviously, a lot of the mitochondrial things we're talking about today, apart from, you know, getting rid of the infection.

So, you know, it should be fascinating to see how this young girl, she's only 18 years old now. Yeah.

Closing Thoughts and Contact Information

And this is kind of what we've been talking about in general, is that you have these various aspects of disease. They tend to be compartmentalized. And that's sort of what, you know, I was back and forth mentioning, but not directly addressing in our conversation today that they all have impact on each other.

And it's very difficult for a given, practitioner or even a team to approach because it involves so many different aspects of their metabolism. various things like infections, immune system problems, all these different things take different specialists in a way to do it.

So you you almost have to have a team effort to the really address the difficult problems. No. You know, and it's it's why I'm actually happy ended up becoming board certified in internal medicine because, you know, in internal medicine you had to know a lot of things, right?

At least a little bit about a lot of. Things, a little bit about a lot of things. Right. So enough that you could kind of dive into some of these things and have some knowledge of it, right, as opposed to some specializing in just one area.

And it turns out to be, of course, very useful for this chronic fatigue population with, tickborne infections. So. Garth we're we've reached our, our time.

I just want to thank you so much for taking the time. Can you tell people again if they have any questions. Best email to get in touch with you. It's gnicolson@immed.org or my home is at garth.net.

So either of those two email addresses I can get in touch with me. Great. Thank you so much. Dr. Garth. That was so good seeing you. You and I have been, we've known each other for a long time since we met at that conference.

And, you know, you're on the message board with me, and you've been a tremendous, real boost for the scientific community with your work on barrier function and mitochondria.

The Cell Membrane Fluid Mosaic Model. I mean, thank you for all your contributions to science. You've, you've been really a pioneer, and I, I yeah. We passed, we passed the 50 years of the Fluid Mosaic Membrane Model, and it's still in the textbook, so I think it's there for good.

Yeah. No, I you're the one who got it in there. and anybody who reads a biology textbooks or learns about the Fluid Mosaic Model, it's you. You're the one who started it.

So, it was a real honor to speak to you today, and I'm glad we had a chance to talk. So, again, for those of you who've been tuning in, my name is Dr. Richard Horowitz We're hosting.

I'm co-host of the Healing From Lyme Summit. We've been speaking to Dr. Garth Nicolson about mitochondrial dysfunction and barrier function and those with chronic Lyme and chronic fatiguing illnesses.

Again, thank you for joining us all today. We hope you'll be tuning in to another episode very shortly. Thank you.