



EVERYDAY IMMUNE RESILIENCE

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Hi, everyone. Thank you for joining me. Today's topic is going to be on the role of mold in chronic illness. I'm going to try to give you some basic concepts and reviews maybe for the first 15 minutes, and then we can take some questions as we cover the things I know that a lot of people have questions with already.

Now, mold is one of these things that there's some issues with it and some concerns with it as far as what's available for the healthcare system and what our patients face when they have a mold related illness and so forth.

The first basic concept is that mold releases things called mycotoxins, or aflatoxins specifically as one type of mycotoxin. Then these compounds tend to trigger an inflammatory response in some people. There's also various things that may have an impact on how severe the reactions may be from one person or the next.

One principle is not everyone has the same reaction to mold exposure, and part of that could be due to what's called immune tolerance. I've written several articles about that on my website Dr. K. News, D-R-K N-E-W-S.com and that's associated with how your immune system is fit to react or not react against an environmental pathogen, the integrity of the lung barrier, and also there seems to be some genetics involved like some people react more to certain mycotoxins from mold more than other people.

Now, one of the key things that I think a lot of practitioners face, a lot of patients face is the frustration of why doesn't anyone know how to treat mold and why am I — if you end up with a mold toxicity or let's say illness from mold would be a better word to use — why am I having a hard time getting anyone to believe me? Why am I having a hard time getting any kind of care? Well, there seems to be... well, there is a research gap between what practitioners see and what's been published. To be quite honest, there really aren't a lot of great research studies out there. It's very clear that mycotoxins can cause human illness, but as far as how to diagnose it, how to treat it, how to manage it, what kind of strategies to use, there isn't much published on that.

I think for the average physician that's looking at what's been published in evidence-based medicine, there's a gap there so it's not like everyone's ready to jump on board because, to be quite honest, the people that work with mold on a regular basis haven't done a lot to publish about it and this isn't an area of a lot of research enthusiasm right there so we have this gap. We don't have any clinical trials of how to effectively treat mold anywhere in the literature. Some people have published some case reports and some studies like that, but nothing to really be compelling for a dramatic move in the healthcare system. I think that's one of the things you should know as you walk in the healthcare system with that issue.

Now, everyone knows that there can be some issues with mold, that people can get mold related illnesses, but it also has really caused some significant litigation so there's been some hesitation to really jump on board with some political reasons with it as well. It's a combination of all these factors. But at the end of the day, what happens is that there's a lot of people that have their own immune uniqueness that makes them sensitive to mold.

Then when they get sensitive to mold, they start to have a whole list of inflammatory symptoms and reactions that are very diverse. Then they tend to be very frustrated and want to figure out what to do with it. Now, remember one of the key concepts is, not everyone's going to respond to mold the same way. You could have someone that walks into a very damp old building with mold all over the place and they're fine. Someone else walks in the first two minutes and their asthma flares up and their eyes get teary and they feel sick and they don't feel well for the rest of the day just from a short exposure.

Same building, same environment, but complete different reactions. That's one of the things that is a part of the concept of mold. There's also another thing that's important to understand, there is difference between mold and mildew. Mold is typically green, black and there's actually... not all species of mold produce mycotoxins that significantly impact human health so even some of the black and green mold that's out there isn't necessarily toxic. Some species are, that's why testing is important.

Then mildew is more like green, white, and it also smells. If you go to an old building that has mildew on it, it'll smell funny and not be pleasant to be in but it's not necessarily toxic mold or releasing these mycotoxins that are very damaging.

The ones we're really worried about are the black mold and different species that are involved with that like aspergillus and stachybotrys and so forth that really can cause some reactions.

Now, I can tell you just from a practitioner — and I think all practitioners that work with chronic diseases will absolutely have patients come in and tell us that, "I was healthy. I was healthy, I moved into this building. There was a timeline and I got really, really sick and they came in and tested mold and then I felt a lot better." I know the common thing we hear in medical histories is, "I feel better when I leave my house. I feel better when I travel, I went on a vacation for two weeks and never felt better. Came back home, started to crash just literally day by day."

Those are all indications that there could be a mold related issue. We know that mold can grow in damp, we know buildings have been exposed to humidity and water, and then you can have these species grow and that can create some health problems.

Now, there was a very interesting study that was published in *Frontiers in Immunology* back in 2017, it was a Finnish study. What they did is they monitored two different cohorts. One was a family of nine people that lived in a mold infested building and felt like that was fine, that there was no health issues and they wanted to stay there and they agreed to be monitored for the next few years.

Then they also did the same thing to an old school building with 50 students and 30 teachers and they wanted to look at their symptoms and get a baseline and monitor them over a series of time. They really found some very interesting things. They found, not everyone reacted, some people reacted but for the most part, they would see people develop this phenomenon, which is really important to understand if you're being exposed to mold, between immune exposure to mold and immune reactions to mold versus what's called mold sensitization or mold allergy.

When we get exposed to mold species and we start to have immunological reactions against them, then those reactions produce antibodies. We can measure those in the blood and those are called IgG antibodies, for example, and that lets us know that the immune system is getting exposed to these toxic mold species and the immune system is probably going to have an inflammatory reaction to them. It's simple blood test in the clinical setting that could be done to measure that.

Now that's different than what this study found, is that some of these people then get sensitized and then they get into an IgE reaction. An IgE reaction causes immediate symptoms and at this point they become primed, what's called sensitized to mold. Some people call this mold allergy, where at that point, anytime they get exposed to mold, they're going to feel sick. For those people, they can walk into a building and immediately get sick if there's any kind of mold spores.

Typically, it's old damp buildings they walk into. That seems to be an ongoing permanent thing because they've changed their immune response where they have this IgE immediate immune response shift in their immune system.

One of the things... when people have reactions to mold in a clinical setting, we're always thinking about, okay, well, is this person just has some exposure like IgG or do they have IgE? If I have a patient comes in, for example, and they tell me that they really are sick and they really think there's mold in their house and they've actually had it tested and they can see it visibly, my first question is, are they having an IgG or IgE reaction? That would let me know how to determine their prognosis down the road. Some people just have some reactions and some people then develop full blown sensitization to mold.

Unfortunately, the ones that develop full blown sensitization to mold, they seem to have this ongoing issue and the best you can do is to try to calm down their inflammatory response, try to improve their immune tolerance and hope that they can react for... I'll get into some treatment applications before I take some questions but I just wanted to really expose you to some of those concepts.

Now, the other thing I want to talk about is, besides this Finnish study is that what they found is that if they kept people in these mold infested periods, that was one of the key factors — these mold infested buildings — that was one of the key factors where they actually shift from IgG to IgE.

Now, one of the things to also add that is important to understand, when you look at mold research and mold mechanisms, there's a mechanism of pulmonary epithelium permeability that's called... you can simplify it, it's kind of like leaky gut, but it's leaky lung syndrome. They don't call it leaky lung syndrome in the literature, but it's basically the same concept of leaky gut.

Let me explain and correlate how these two things work. We know that when people get chronic inflammation of the gastrointestinal tract, their intestinal tight junction proteins break up. Now these are zonulin, occludin, tight junctions, and undigested food particles go through and that creates a significant inflammatory reaction.

Then people that have like, for example, genetic susceptibility to some disease like celiac: if they get exposed to gluten, they get serious destruction of their intestinal barrier and they get leaky gut and then they perpetuate autoimmune diseases over a period of time as an established model in the literature right now.

Now, we also know that there's people that don't have to have celiac disease, but they just get exposed to chronic foods and chronic inflammation in their gut, or they have inflammatory bowel condition and they also get intestinal permeability and they start to react to food proteins and all of a sudden they're reacting to all these food proteins.

Well, similar mechanisms take place in the lung and within the lung barrier. There's a pulmonary epithelium barrier and the pulmonary epithelium barrier has also zonulin proteins that keep the epithelium tight together. They also have proteins called occludins, has different occludin versions like occludin-4 or five, six, three, but all they do is they just keep the intestinal epithelium junction in the lungs together. Things like mycotoxins, just things like air pollution, things like cigarette smoke tend to break these junctions down or any inflammatory mechanism that injures the lung epithelium can break down these barriers and now the person has these barriers open.

It's possible that people that get chronic exposure to mold that's releasing mycotoxins have this... they breathe this in, this inflammatory response starts to break down their pulmonary tight junctions and as the pulmonary tight junctions break down, they open up and now they become extremely sensitive to things in the air. They start to get asthma and they start to get systemic inflammatory responses because what they're breathing is now causing an immune response. In the pulmonary epithelium, we also have dendritic cells and different types of immune cells that then trigger an inflammatory response that becomes systemic.

There's a whole host of symptoms that people get with these lung barriers open up, just as the gut barrier can open up and promote auto immune disease, which has been established in animal models at this point. We know that if a lung barrier opens up, it's really the same thing but instead of getting the exposure from foods, you're going to get from things that you breathe in.

We know that chronic exposure to mycotoxins could be a factor, some people end up with pulmonary permeability and when this pulmonary permeability or leaky lung happens, it just

like leaky gut, they can develop chronic inflammatory conditions and even develop autoimmune diseases. It's not so much from their gut barrier but it's from their lung barrier. Those are some important mechanisms that are involved. I think my volume is still low.

Okay, let me move on. Anyways, when you're looking at mold, by the way, when you're looking at these reactions, so this lung barrier breaking down, it's very similar to these leaky gut patterns, this is one of the things that happens.

Now, one of the things that is also clear is that when people start to have these inflammatory reactions in their lungs, some of the most common symptoms are like asthma, difficulty breathing, when they try to work out they have a hard time recovering, and they may also notice coughing irritation and so forth. Then the question is, okay, so this exists, what's out there and you can test for it.

You can also, by the way, measure urinary mycotoxins. Most labs will measure antibodies from mold like LabCorp or Quest. Some people if they want to measure mycotoxins, they have to go to a specialty lab. One of my good friends, Dr. Andrew Campbell just opened up a lab called MyMycolab. It's something you might want to check out if you want to learn about mycotoxin testing and also reactions to mold that way. But the key concept is you can measure mold antibodies and mold mycotoxins and then determine what's happening.

Now for some people, when they get exposed to these mold spores, these mycotoxins get... they breathe these mycotoxins in, and these mycotoxins they're very resistant to temperature changes, they're low molecular weight, they hang in there and they cause inflammation. Then they do show up in the urine so people can measure those and see if they're still getting that exposure, if they're concerned about it.

One of the key things about any kind of mold related issue is the environment. As a clinician you see people sometimes say, "Well, what do I take? What if there's something I take?" It's not necessarily taking something, if you don't remove your exposure to the mold, you can't beat it. There's just no supplement that's going to counteract that constant mycotoxin exposure. It'd be almost like saying, I have celiac disease, I still want to eat gluten so what supplement can I take to still do that? That doesn't really work. The key thing is you have to have ventilation. That's a key factor. There's mold remediation contractors out there that deal with cleaning up damaged buildings. They can come into any home and test for air quality and so forth.

The key thing is first identifying if that exists, if someone has reactions to mold with antibodies, that means your immune system is having inflammatory reaction to mold species. Then the next question to ask is, has it gone into an allergy or a sensitized state where they're making IgE? That's a whole different set of outcomes.

Also, are they producing high amounts of mycotoxins, which are inflammatory mediators that can be involved with that. Now, when you're looking at exposure to mold also and mycotoxins, some people could be in the same building as someone else for many years, they could have one family member or one person, a student in the old building that's getting exposed to

mycotoxins on a daily basis and another one and they have no symptoms, whereas another one starts to develop symptoms pretty quickly.

One of the concerns with that, with the mechanisms behind that is basically their immune tolerance — immune tolerance is really a combination of how healthy are — your blood brain barriers, lung barriers, gut barriers, how active are your dendritic cells, what's going on with cells called T-reg cells? I did create a program about immune tolerance. If you go to Dr. K. News, it's an online program that talks about that [3D Immune Tolerance], but let me give you one part of that, which is really important when it comes to mold.

This is specific to the lung pulmonary barrier. Our bodies are constantly getting exposed to different environmental compounds and different pathogens and different things to impact or cause inflammation in our surfaces. So, air pollution, cigarette smoke, mycotoxins, they're all degrading our pulmonary barrier to some degree so we have some breakdown of the barrier.

But what's also important is how quickly you can regenerate that system. Antioxidants are a really key part of that. There's sometimes situations where someone's reacting to mycotoxins, but they can't leave the environment for whatever the reason may be. You really want to, at the very least in those situations improve their immune tolerance, but for sure try to improve the integrity of their pulmonary barrier. Things like vitamin A are really critical to help the pulmonary epithelium regenerate. Antioxidants, all types of antioxidants can be useful to prevent mycotoxin destruction of the barrier. High amounts of different types of mycotoxins [he meant so say antioxidants] like acai extract, pomegranate extract, those types of things are important. Glutathione, things that raise glutathione like N-Acetyl glutathione or actually taking things like liposomal glutathione, can all be effective strategies to try to provide antioxidants to protect barrier breakdown if you are a person is getting exposed to mycotoxin exposures and so forth.

Now, there's some... and I know people are going to ask about clinical strategies and what to do so I'm going to finish this last section here and take some questions, but I'm going to talk about clinical strategies to consider when you do have exposure to mold.

The very first thing is if you have exposure to mold and you feel that mold has made you sick is, asked a question, are you constantly being exposed or are you a person that is now being sensitized to mold and have IgE reactions where no matter what room you go into, or, I mean, whatever damp building you go into, you're going to have a reaction. Those are two different expressions of how mold impacts people. One just causes an acute inflammatory reaction but hasn't sensitized into IgE or mold — so called allergy to mold... ongoing chronic mold sensitivity or not.

Now, ultimately despite which form you have, you have to really avoid damp environments. One of the things I use in my patients is I use something called a hygrometer, which measures indoor humidity. For people that are sensitized to mold, you really want to get a hygrometer and measure the humidity of your rooms and you definitely want it less than 50%. If you can't get your room less than 50%, if you have sensitivity to mold, you should get a dehumidifier. The dehumidifier can help reduce that humidity because that humidity will trigger people that have

this IgE reaction to mold to have this aggravated response. The other key thing is really healthy ventilation in your rooms, that's really critical. Then if you do have any concerns with mold or have mold issues, you definitely want to get an air purifier and it has to be a HEPA filter to really be able to remove mycotoxin compounds. So, a certified HEPA air filter, dehumidifier, hygrometer are all things you can use to reduce your immune reactions if you've already developed mold sensitivity.

Now, in the field of nutrition, there are lots of different clinical approaches and I've got to admit that these have not been vetted through clinical trials or have been tested. This is where some of the pushback comes in with people that are looking for, what do you mean you're treating mold with nutraceuticals or botanicals and so forth? I think this happens a lot because patients need to feel better and so there's been some strategy and protocols people use, but we still don't have these clinical trials to show the evidence that these things actually do work so part of it is anecdotal for the most part.

When people have mold issues, there are certain natural compounds that seem to have antifungal, anti-mold properties, things like tea tree oil, things like retinol oil, things like cloves, things like thyme. Those can all be taken as botanical extracts to kind of support that. There are also what are called biofilm disruptors, because as you get injury to your lung epithelium, you start to have these mycotoxin species start to stick together and develop a protective film so you have a hard time getting rid of that inflammatory immune response. Those things are natural compounds that have some properties to support those systems.

Sometimes people use what are called binders. Binders are there to kind of bind to the mycotoxins so it can be cleared from the body. Cholestyramine is a drug that is really the most powerful one people have use that in different mold protocols, is a lipid sequestering anti-cholesterol drug that was used long time ago. It binds to bile acids, but it also binds to different toxins. But from a nutritional point, things like zeolite, things like activated charcoal, there's various clays out there that people use as a binder, as an attempt to get these things out. Supporting the pulmonary system with lots of antioxidants like glutathione. Nutritional support for the lung barrier vitamins A, D and K, they're all important.

Then a strategy to really improve immune tolerance and the strategy to improve immune tolerance, I call the 3D Immune Tolerance Program. This is a term that I use for the program we developed, it's called... the three DS stand for diversify, which is how to diversify your microbiome. The more diverse bacteria you have, the better tolerance you have in your overall immune response. Downregulate, how to downregulate activation of dendritic cells and T cells that cause a response, and distinguish, how to really improve your immune system's ability to distinguish a pathogen or not.

There's also some people that have had some success with using mold desensitization therapy, where they give little small injections of different mold compounds to start to get their immune system to respond to it. There's been some success with that as well. You can also use like a nebulizer to breathe in oils like tea tree oil, or sea salt to help try to get some of the anti mold properties into your lung system.

There's also different... what are they? Purifiers with oil? You put the... I'm asking my wife.

Anyways, you can use different essential oils and they release the oils in the air.

[diffuser]

... but you put the oils in and it just releases in the air. Those are very useful. Those are the basic concepts between how you can do things to support mold. I have tried to cover the basics for you and I know those are the typical questions that people ask so, let me try to go through and take any questions that people have. Let's see if I could-

Someone's asking me the exact name of the meter. I don't know what meter that is.

The exact name of the meter to measure humidity?

Mm-hmm (affirmative).

It's spelled, H-Y-G-R-O-M-E-T-E-R. You can get this hygrometer at Amazon. They're like \$15, \$20, not very expensive. You can put one in every single room if you want. But that's one way to measure humidity. If those, again, if those levels are above 50% and you have sensitivity to mold, you definitely want to get a dehumidifier to decrease the humidity so your reactions are less or suppressed.

Okay. **Can you please repeat the name of the new mold lab?**

Yes. The new mold lab is called MyMycolab, M-Y-M-Y-C-O-L-A-B. The director is Dr. Andrew Campbell. He's a brilliant environmental medicine physician and you can just go to their website, which I believe is mymycolab.com to find more information if you're interested in that.

The question then from Savannah, **do specific binders work better for specific mycotoxins?** Well, the whole concept of binders for specific mycotoxins has not really been investigated. I think with everything in natural medicine, when you start to use them, then practitioners will have different preferences. But there's no clear evidence one works better than the other. You'll have some practitioners will love something like zeolites, some will love activated charcoal, some will prefer various binders.

– It's a diffuser. Shane chimed in and said, it's a diffuser –

Thank you. The diffuser, by the way, when we couldn't remember the name of the... how the essential oil gets into the air is diffuser.

Thank you Shane.

Thank you. I think we have our own mold related brain toxicity.

I found pomegranate seeds seem to break up biofilm, is that accurate? Seems to.

Mark asks, he founds pomegranate seeds breakup biofilm. Is that accurate? I'm not sure if pomegranate seeds are biofilm disruptors, but if they are biofilm disruptors that's new to me,

but pomegranate is a very powerful antioxidant and it can preserve integrity of barriers as an antioxidant in lung barrier, gut barrier and so forth. It's definitely one of the things to consider if you're getting exposed to environmental chemicals. It's a really powerful antioxidant and pomegranate extract is one of my favorites. I think it's just such a powerful, super food, super botanical and very, very high, they call ORAC values for antioxidant activity.

Katia. Do saunas help?

I don't know, some people that are really sick they go to saunas, they just completely crash. They can't handle it. There's a significant impact of stress that happens to the immune system when you drastically change temperature too. I mean, theoretically, the concept being if you sweat, you're getting rid of toxins and so forth but at the same time, the challenge of a significant change in temperature does impact thermoregulation systems and some people that are chronically sick just don't feel well with it.

Some people say, "Well, that's just an immune toxic reaction. They're getting all this stuff out so they feel worse." Maybe not. Maybe it's just that the drastic changes in temperature have a direct impact on the neuroendocrine immune system and immune regulation is a serious thing and you can actually tax your immune system and your function and your antioxidant reserves when you actually do crash.

I really am not a big believer in thinking that you should go in a sauna and then completely crash and that's okay because that's how you're getting rid of toxins. I really think that at that point, for some people that are really sick, getting into a very hot sauna and completely crashing is going to actually shut down their antioxidant function and their reserves so it may not be the best idea, you might want to try other types of approaches.

But the general concept within the world of natural medicine is that, when you have toxicity, you want to obviously sweat as much as possible, have healthy amounts of bowel elimination, urinate, health... you obviously want to sweat and have normal bowel movements and have healthy hydration so you can urinate and get all these compounds out. So just basic concepts of human toxicology.

Okay. Erin asks, is the urine test accurate? My functional med provider is suspecting mold as an issue for me but she wants our environment tested first.

The question is, is urinary mycotoxins accurate? This is actually a really good question. There is a possibility that you may not actually have mycotoxins that are significantly in your system causing them, but you may just been exposed to food particles that have some mycotoxins that show up on lab tests. So, it's not really toxic mold you're breathing, but there's some degree of mycotoxins on foods that's stored in bins or things like grapes, things like even coffee beans, things like corn, things like wheat, anything that's stored in bins may have an impact on changing those mycotoxin levels. You really want to look at the history and the big picture and see what's useful to you. But there are some concerns about urinary mycotoxin accuracy and how much of those mycotoxin readings are really just from some exposure to foods versus mold that they're breathing in from, let's say their environment.

Okay. Tiffany, **if you test positive on a prick test for mold allergy, is that IgG or IgE? Does it mean you have an immediate reaction?**

The question is if you test for a pinprick for mold allergy, is that IgG or IgE? Well, all skin tests, all skin prick tests are IgE. If you react with a skin pinprick test, that means you have IgE activity, which means you may have the sensitized immune system now to mold. What would be probably one of the best therapies that you may be a candidate for is to consider where they do mold desensitization therapy with little injections of the diluted antigen. You still want to improve your immune tolerance, you still want to build your antioxidant reserve. You still want to reduce your... at that point, you definitely want to reduce your exposure to any mold and you really want to make sure that you check the humidity of your house and have a HEPA air filter, but the skin prick test will be an IgE reaction.

Okay. Marie says, **I have Hashimoto's and mold and SIBO. Do you see them being related? If I clear the mold would my Hashimoto's get better?**

I don't know. You never know. Clinically, when you look at most patients that have chronic autoimmune disease, they have multiple things happening like that. Obviously, if you have mold exposure, that doesn't necessarily mean that it's an ongoing issue. I mean, for all of us have some good mold exposure. The question would be, do you have a immune... do you currently have antibodies to mold? Are you still getting exposed on a daily basis? Or do you have like an IgE response to mold? Those are all the key factors. Now, mold exposure itself can be a trigger because it's creating these mycotoxins that are causing inflammatory response, but doesn't necessarily mean you get chronic illness.

Remember the people that get exposed to mold that are never the same afterwards are the ones that get sensitized and then develop these reactions. If you have Hashimoto's, you could be the one that has just an acute reaction because you're getting exposed to mycotoxins that are causing the inflammatory response or you may have progressed into those that are sensitized, have an IgE reaction that are always sensitive to mold. If that's the case, then you have to constantly deal with mold to calm down the expression of your immune system so you don't flare up your Hashimoto's.

If you just had some exposure, you don't have an IgE reaction yet the key thing is really to remove your source and see if you can improve the integrity of your pulmonary barrier by raising your antioxidant levels and glutathione levels and vitamin A levels and just making sure you have a good HEPA air filter and are breathing good quality air, so you can let your lung barrier heal.

I think with autoimmune disease there has been such an emphasis on the gut, and the lung barrier is a key factor. Also, I would say in some recent studies that have been published with the prevalence of the outbreak of COVID-19, they found in areas that have the highest amounts of air pollution, like Paris, like New York, like different regions of Italy, where there's so much smoking, so much car exhaust and such poor quality air that they're seeing these outbreaks. There are some researchers that are theorizing that potential mechanism may be how people react to, for example, the current coronavirus strain is that if their barriers are compromised,

that they can end up having greater outbreaks in those regions with people that have those air pollution issues. Okay. Next question.

Someone's asking about Dr. Shoemaker [inaudible 00:34:38] and I'm trying to find that response. [inaudible 00:34:38] Dr. Shoemaker.

Dr. Shoemaker has his own protocol for treating mold. I think he's helped a lot of people with that. It's definitely something to look into if you have mold illness. He's doing some good work to try and get some information published about what he's been doing. Those are things to definitely look into if you're dealing with it.

Question is, **what glutathione I'm I supposed to use?** When you look at glutathione, there's different types of glutathione sources out there. We actually made a whole video on glutathione. I personally prefer liposomal form of acetyl glutathione that seems to have the best approach, but sometimes if you're just trying to reach glutathione, the easiest way to do is just to use things like N-acetyl-cysteine.

Okay. Kate. At the Cleveland clinic, the systemic blood lab test... oh no, I'm sorry. These are just not good. **What is the best mold test? How long after exposure can tests still find you have reactions to mold? Months, years, et cetera?**

Reactions to mold, if you have antibody production, antibody production typically lasts somewhere between two to six months, so any exposure to mold within a two to six month window would be something you can look at. IgG is just telling you that you're having a acute response, your immune system is reacting to mold. IgE is telling you that you will be more sensitized to mold. I think for the most part, as far as we're looking at these antibodies, you're going to get exposed to mold all the time. You're going to be able to tell if your immune system is reacting to them or not. That's the key thing.

The other thing to point out is, if you do feel sick and you're having these reactions, you do definitely want to check the air in your home and have someone that does mold remediation come in and check the air quality and see if there's any areas. Obviously, sometimes it's very obvious because you can smell mold in certain rooms if you have any water damage. But I don't think you have to be too concerned about the length of time with the antibodies. You'll be able to see them because we typically get exposed all the time. Okay.

Okay Joy, **is VCS testing accurate?**

I'm not sure what VCS testing stands for.

I don't either.

So, I can't answer that.

Okay. Riley, **what about red infrared therapy instead of sauna?**

Red infrared therapy versus sauna. To be honest with you, I don't have a good answer for you. I hear about that myself and I have some patients that swear by it and some patients that feel

like it hasn't done anything for them. I think there could be some uniqueness if that kind of therapy works or not. There surely aren't any studies published on it so, we don't have that to count on to look for. What we have is some anecdotal information, one person to another. I don't have enough experience with it myself to give you a personal opinion on it so that's the best I can do to answer your question with that.

Okay. **Is there any other biotoxins similar to mold toxin?** Boaz is asking.

Yes. There are other similar biotoxins similar to a mycotoxins. The most common one is just what's called lipopolysaccharide and this gram-negative bacteria produces this biotoxin and it's one of the main reasons why intestinal permeability can make many people very, very sick.

When people have intestinal permeability, discriminative bacteria takes place, especially if you have dysbiosis, is released in the bloodstream and then this biotoxin binds to what are called toll-like receptors and specifically toll-like receptor 4, and that tends to cause a systemic inflammatory response throughout the body. Mycotoxin could also bind... they also bind to what are called toll-like receptors, which are little receptors on immune cells and when they bind to them, it triggers this inflammatory cascade.

That's why the symptoms of any kind of biotoxin or mycotoxin exposure causes a diverse list of symptoms because it really turns on inflammation throughout the body. Depending on your preexisting inflammatory state, you may get different symptoms when you get exposed to a mycotoxin or a biotoxin, because it basically adds fuel to the fire. If you already... if you've had a brain injury and you've had some inflammation in your brain and you have some primed glial cells, for you, you just get a systemic inflammatory response and you really shut down your brain function.

For someone else, they have RA, they have early rheumatoid arthritis, they get inflammatory response and their joints start to hurt from the mold exposure. For someone else, they had a knee injury that never really healed and for them it just really causes significant pain there. Biotoxins or mycotoxins really just turn on toll-like receptors throughout the entire immune, throughout the entire body in different immune cells and then you just create inflammation. But one of the key things that clinically determine symptoms is, where is the inflammation before the exposure.

Okay. Jonnalyn, **how can we improve lung barrier?**

How do you improve lung barrier? I talked about a little bit earlier, the best ways to improve lung barriers is to have a good air quality. I think everyone should invest in a good air filter or air purifier in their home, especially in their bedroom where they're constantly breathing air. That's always a good idea. Then from a nutraceutical perspective, vitamin A is really critical for the lung epithelium and just a high rich source of antioxidants in your diet, or even if you want to take anti-oxidants preventively and nutraceutically-wise, the whole list of things from pomegranate, to pine bark, to acai, to resveratrol, to turmeric, they all have very good antioxidant properties. Those are the key and then again, glutathione, whether it's liposomal

glutathione or things like N-acetyl cysteine are pretty good strategies to improve the lung barrier.

One of the things I also do in my office is, I have patients take in several deep breaths, [demos it] like that over and over again. I have them do about five of those and I want to see if they cough. Sometimes when people have some compromise with the barrier as you kind of vacuum particles in and across the lung barrier, if there's any kind of inflammation there, then you start to get a coughing reflex. It's not the best test, it's just when you don't really have a lot of good laboratory markers, it's just one of the ways to suspect it. Obviously the exposure to mold and a timeline when you got sick, would be the best scenario and it's pretty likely that if they are having reactions to mycotoxins that their pulmonary barriers can be compromised to some degree.

Celina, what is the best way to down regulate T-cells/dendritic cells in situations where mold is a problem?

The best ways are really to, first of all, decrease your exposure and then secondly, these dendritic cells are very also dependent upon vitamin A. There are retinol receptors that make their efficiency more efficient when there's high amounts of vitamin A. Really the other key thing is to... A and D are critical for the dendritic cells and regulatory T-cells, and really trying to improve diversity of that system. Once again, I made an entire online program called the 3D Immune Tolerance Program that you can take a look at too. I go into all the mechanisms and research in much, much greater depth if you really have interest in those strategies for immune intolerance. I also have a free Immune Tolerance Program on our site called Dr. K. News, which can be useful as well.

Okay. Jackie asks, **what are good biofilm disruptors?**

What are good biofilm disruptors? For the most part, the common things that are biofilm disruptors are things like garlic extract, wormwood, black walnut, barberry, you ever see olive leaf extract I think is probably one of the best ones, but those are all basically biofilm disruptors. So all of those... so any one of those could have some impact on breaking down the biofilm.

Okay. **Can you comment on the C4A serum test in diagnosing mold?**

I think you're talking about the complement protein test to diagnose mold. Yeah. This is terrible stuff. There's such bad diet science out there. Just because you have a raise of any of the CD4 proteins or complement proteins has no specificity for mold. It just means your immune system is getting exposed to something. You typically will see activation of things like complement proteins when people are dealing with mycotoxins, but it's not specific for mold, but it is... it's a finding you see with people that have exposure of any kind of pathogen or any kind of immune activation pattern. Complement proteins are like landmines and there's different complement proteins, C1, C2, C3, C4.

There's no specificity for any complement protein for any kind of pathogen so that's why you can't use it to diagnose it. But if you do have someone who has exposure to mold and you look at their complement proteins, whether it's C3 or C4 or whatever the protein may be, you can use that as a baseline and then as they reduce the exposure and improve their immune integrity and their immune health, then you can use this, and you can look at that to see if their coughing activity has started to come down, which should be a clue to that their immune system is not being as activated from those responses.

The good thing about the complement proteins, are the complement proteins immediately change when they're not reacting to pathogen. Whereas antibodies will stay elevated for many months, and so then that's reliable to determine if the immune responses is improving with any kind of strategies to remove the exposure and to improve the immune system. The complement proteins do have their place, but they're not used for diagnosis, they're used to determine some degree of immune reactivity when someone has already been established to have any kind of mold issues.

Okay. Susan asks, **can you repeat the three DS in the 3D program.**

The three Ds in the 3D program. Let me add to that, something that I've been working on for a very long time is something called immune tolerance. One of the things I found with patients who have autoimmune diseases and have chronic inflammatory issues is there's really this dysfunction that's been published in literature as loss of tolerance or immune tolerance. Then my next question throughout my career is, what is causing people to lose their immune tolerance? How do we establish that?

I came up with that there's really three Ds that are involved with what's published out there. One is to diversify, and diversify really has to do with your microbiome. The more diverse your microbiome is, the healthier your reaction is — to whether to react or not you react to environmental triggers. Diversity comes from eating lots of diverse foods, but your diversity can also change from taking lots of antibiotics, your diversity can also change from sedentary lifestyles. Lots of things impact microbiome diversity, but the goal is to really try to improve your gut diversity as much as possible.

The second D is to downregulate. Downregulate means that when you have someone who has an activated immune response, their immune cells are upregulated. They're overreacting so things like dendritic cells or sample particles or compounds or mycotoxins or biotoxins or dietary proteins, they tend to be overzealous. The goal is to try to calm those down.

Then the other key thing is distinguish. One of the most important parts of tolerance is something called regulatory T cell function, and regulatory T cell function helps to determine what kind of immune response you have in your response with a trigger. The three Ds stand for diversify, distinguish, and downregulate. I've also written articles about this at Dr. K. News if you want learn more about immune tolerance and dietary nutritional approaches to that. Dr. K. News is D-R-K-N-E-W-S.com.

Okay. Then someone's asked, **can you clarify mucopolysaccharides?** I don't know where that came from. Maybe they didn't understand you?

I don't know. It's not mucopolysaccharides, it's **lipopolysaccharides**. Let me clarify that. The question is, can I clarify lipopolysaccharides? Yes. Bacteria in your gut produce compounds too and these compounds are postbiotics and these postbiotics are classified in a group called polysaccharides. There are some polysaccharides that really help our immune function and there are some polysaccharides which really cause inflammation in the body.

For example, there's some research that shows if we have healthy gut bacteria, some of the bacterial species in our gut produce what they call lipopolysaccharide A, LPSA and LPSA calms down inflammation throughout our body. It even has been shown in animal studies to regulate autoimmune flareups and it's one of the benefits of having good bacteria because with good bacteria produce these postbiotics called LPS.

However, there's also what we term in a simplistic model as adverse bacteria in conditions of dysbiosis when someone doesn't have enough fiber in their diet, all they're eating is sugar and unhealthy foods, their microbiome ecology changes and they produce bacteria that produces postbiotics that are actually lipopolysaccharide that cause inflammation. Those polysaccharides that cause inflammation can actually get into our bloodstream, especially when you have intestinal permeability and that's called endotoxemia. There's a lot of research in the immunology literature of endotoxemia from intestinal permeability causing inflammatory reactions all throughout the body, whether it's brain inflammation, cardiovascular inflammation, joint inflammation. There's a lot of that information that's been researched and published now, which is very interesting. Okay.

Okay. Kate, **did you say NAC for increasing glutathione?**

Yes. You can use any N-acetyl cysteine to raise glutathione. Typical dose is around 1500 to 3000 milligrams so those are things that can be effective.

Okay. Forrest, what is the best inflammatory... no, sorry. Okay. Kiara asks, and a lot of people ask this, **if someone has been diagnosed with mold and SIBO and candida and other symptoms, is it necessary to clear them all before treating other things?**

Should you treat the mold first? Honestly, there's no clinical priority when it comes to real clinical scenarios, you've got to determine what's there. I mean, the key thing with mold is if you're getting constantly exposed, that's a real issue. If you're constantly exposed to mycotoxins and you have immune reactions to those and you have antibody elevations, there's mold species and you have mycotoxin levels elevated or complement proteins that are elevated, that's an ongoing trigger for inflammation and chronic disease promotion so then maybe one of the things to be aware of.

I will also warn you that there are a bunch of people that are so-called mold experts, mold doctors and that's great that people specialize in something, but the problem is, when you sort of see some practitioner specialize on something, is that "everything in the world is now mold".

So they just, let's just say, if all you have is a hammer, everything's like a nail and they look at every chronic disease as being mold related. You see the same thing with people that are experts in Lyme disease. The same thing that people that are just focused on leaky gut or whatever the situations are. That's another key thing to be aware of when you're looking into the healthcare system. Chances are if you go to a mold specialist doctor, there's a very high probability that despite your chief complaints, you're going to be diagnosed as mold as your health problem issue. Be aware of that as well. Okay.

Okay. So Deedee asks, she bought your, *Why Isn't My Brain Working* book and she is looking forward to reading it, but it's written 2013. Are there any updates according to new research that you would-

Deedee ask that... Deedee asks, **she read my book, Why Isn't My Brain Working... oh, bought the book, hasn't read yet but are there any updates?** Most of the information, *Why Isn't My Brain Working* is still up to date and accurate. There's over a thousand peer reviewed references for it. The only thing that's not mentioned in that book that I think a lot of research has come out since 2013 is how important intermittent fasting and fasting can be for the brain. More and more research has shown that that's one of the key ways to have a neuroprotective effect and we don't really talk about that in the book.

We also have learned that ketogenic diets, where people go into ketosis also have a very significant impact on brain inflammation. We used to just think it was critical to use for an efficient energy source for seizures but there's been some really good research that shows that actually when your body goes into a ketogenic state, that you produce ketones that actually have an anti-inflammatory effect in the brain and that's really exciting to hear.

The reason why intermittent fasting comes in and it doesn't really matter if it's every other day fasting or 18:6 fasting where you have 18 hours of fasting and six hours of eating or extended fasting, those mechanisms, we have something called autophagy where you clear out debris. I think if there's anything missing from the brain book that a lot of research has shown since that book was published, that would be it. Outside of that, everything else is pretty solid even with new research that's come in and it's still a very valid book to understand relationships that are involved with the brain so that's, *Why Isn't My Brain Working*.

I wrote that book and then that actually led me to develop my first online program, which is called Save Your Brain Program because a lot of people that were pushing the book, they got the book and there was like a huge brick and they're like, "I can't go through all this. My brain is not working." So, that actually what decided, what actually motivated us to create an online program called Save Your Brain. I put together a program where I go into the key concepts of that book over a six week period, each week teaching how to implement different lifestyle strategies in order of importance to really implement some of those concepts in the book. If you're interested in that, that's also on drknews.com. Okay, next question.

Okay. [inaudible 00:54:58] asks, **what do you use for glial toxin testing?**

Oh, I'm not sure what glial toxin testing is, so I really can't comment on that.

How to test for endotoxemia. How to test of TLR4?

Okay, so how to test for endotoxemia and TLR4. TLR4 is a receptor. You can't really test for that, all you can do is measure for endotoxemia. You can measure a thing it's called lipopolysaccharide levels gram-negative lipopolysaccharides that's done through a blood test. In my practice, I use Cyrex Array 2, which measures tight junction proteins, zonulin and occludin. It actually measures the gram-negative lipopolysaccharide that cause activation to the toll-like receptors. That's one of the ways that... that's the way I do it in my office. I just measure Cyrex Array 2, to look at that.

When we look at Cyrex Array 2, if you look at occludin and zonulin, occludin and zonulin are tight junction proteins and if they break down, you start to show abnormal levels on blood with antibodies to those proteins. But those proteins also are found in the lung barrier and in the blood brain barrier and in the gut barrier. So when you see occludin and zonulin abnormalities or tight junction protein breakdowns and you see LPS, it could be from the gut or it could be from the lungs. They're all part of the same mechanism.

Okay. What lab tests can you have your doctor use to confirm mold?

The test we've talked about is just IgG or IgE antibody. If you actually go use the two largest labs in the US are LabCorp and Quest and they both actually have mold species panels for these antibodies. So they're available in a commercial lab test if you're working with your family physician to order them and they're used to using the conventional laboratories that are out there.

Okay. Lee, you are exposed to mold at work, can wearing an N95 mask help?

I'm not sure if a mask will help. I would assume that if you're wearing a mask that you may reduce your exposure to some mycotoxins. But that's just an assumption. I would guess, yes but that's just a guess.

Okay.

A question I see here also from Ree is, **do you see mold being linked with interstitial cystitis?** A lot of interstitial cystitis is actually autoimmune and inflammatory and there's been some people that have chronic interstitial cystitis where just they keep getting the flare ups and they keep being tested for reoccurring bladder infection. That's not a bladder infection, it's actually just interstitial cystitis. There's some research that there's auto antibodies to those target proteins in there that are causing it and mold, like any other trigger that's inflammatory, can activate any autoimmunity.

There's a, I think a large number of women that suffer from chronic interstitial cystitis and they don't really know that it's probably autoimmune, that they're having autoimmune reactivities to those proteins. Like tropomyosin, which is antibodies to the smooth muscles of the bladder. Then anything... it's like for them, if someone has, for example, auto antibodies to tropomyosin, they get exposed to mold, they can express as their interstitial cystitis flaring up. For someone

else, they may have antibodies to collagen or arthritic peptide and they get exposed to mold, the inflammatory response activates their RA.

That's the key thing about mold too, is that it just, again, adds fuel to the fire because these mycotoxins add to this as well. I also want to... there's a lot of questions here about Dr. Shoemaker's work with Chronic Inflammatory Response Syndrome. I just want to say that he's doing great work with that. He's really looking at its own syndrome that's associated with mold toxicity and I'm just talking about the basic concepts of mold not associated with any specific syndrome or protocol. In his scenario, it's not just about the reaction to mold, but it's just the inflammatory response that's taking place.

So, just to make that distinction there, but I think he has some great stuff. It's definitely worth looking into if you're looking into mold related issues. The only thing I would just say is, there's some degree of individual uniqueness you need to have when you look at mold exposures and toxicity and sometimes a heavy duty protocol with lots of different drugs and VIP, and those things are I think a little too routine and not enough personalized approaches. Also, I mean there's just... with any model, any syndrome if you look into, you can always find a little bit of things you disagree or don't like with. But for the most part, I think he's helping a lot of people and that's great stuff. More importantly, he's really working on getting some things published and I think he's doing some good stuff out there.

Okay. Rebecca, **there's a correlation between blood brain barrier permeability and gut permeability. Is lung barrier permeability related in the same way?**

The question from Rebecca is that, there's some correlations between gut barrier permeability and blood brain barrier permeability, is there correlation with lung barrier? Well, I will tell you that we actually last year did publish a study in the International Journal of Molecular Science where we looked at people who had gut inflammation and we found that it does cause... gut barrier permeability does cause blood brain barrier or is associated with gut brain barrier permeability — we looked at correlation analysis, we found a high degree correlation. We also did some risk ratio analyses and found that there was a... I don't know, it was an eight to 10 fold increased risk of having blood brain barrier permeability measured by S100B if you have intestinal permeability. It was a study that we did publish, I think we had about 400 subjects in that study.

But there hasn't been any significant research making the correlation between gut and lung. However, they're the same proteins. There's a paper that was published by Fasano where he talked about, I think, something like the title is Zonulin and Chronic Inflammatory Conditions and Autoimmunity and he reviewed the literature of how zonulin is involved with lung barrier permeability and a lot of chronic upper respiratory disorders that break down that barrier as well. I pretty much think if you get exposed to an inflammatory source, your barriers are going to break down. The key difference between the lung barrier and the gut barrier is that when your gut barrier breaks down it's usually more involved with chronic inflammation in the gut and from digested proteins. The lung barrier is definitely more sensitive to environmental air

pollutant compounds. Whether it's mycotoxins or just poor air quality from air pollution, this seems to be that factor.

However, the gut barrier, the lung barrier do communicate through these dendritic cells and different immune cells and once you start to create systemic inflammation, all barriers break down. It's just like the gut barrier breaks, just like the blood brain barrier breaks down, when there's gut inflammation, I would suspect the same thing happens to lungs, but I haven't seen that published anywhere. Anyways. I think we're out of time here. I hope this little talk on mold was useful to you and provided you with some things to think about and thank you guys for joining us. We really do appreciate everyone's involvement and hope to have you join us when we do this again soon. Thank you.

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