Introduction to Environmental Toxicants

Welcome to this episode of the PCOS SOS Summit. I'm your host, Dr. Felice Gersh. I am thrilled to have as my guest for this episode a longtime friend of mine and an amazing doctor.

You're going to hear so much information. This is an amazing conversation that we're going to have with Dr. Lyn Patrick, a knowledgeable in the extreme naturopathic doctor on the effects on all aspects of health of environmental toxicants.

Welcome, Lyn Thank you so much for joining me. And we had a little conversation before we even started, so we know the direction we're going and we could go in a thousand directions because there's so much to talk about on this topic.

But I'd like first for you to tell everyone how you got into this field, what you're sort of doing now. And then we're going to get started and deep dove into environmental toxicants and also how they relate to women with PCOS, of course.

Thank you, Dr. Gersh. I am so happy to be here. It's my honor to speak on your summit. This is a crucial topic, and we're going to go into great detail about the wide range of environmental exposures that have an impact on both women and men in terms of reproduction, but also in terms of other health problems.

How did I get into this field? So I've been teaching and researching in the field of environmental health and environmental medicine for a little more than 20 years.

The way I got into it was actually in my practice, I saw a lot of patients who had become sick as a result of multiple mercury amalgam fillings. Actually a good percentage of my practice were dentists.

I've been practicing for 40 years, so I'm dating myself. But back in the day, Dennis were actually taught to roll amalgam fillings in their bare hands without wearing gloves.

And that's dermal exposure, right? It goes right into the hands. So I at least was given a little bit of insight into the effect of metals on the health of these individuals.

And I learned how to get mercury out of the body and people recovered and everybody was happy. Then in the year 2000, I went to a daylong workshop by a doctor named Dr.

Walter Cremin, who had spent the prior 15 years running a clinic where he actually focused on environmental exposures and their effect on health and helping sick people get better by looking for the cause of their illness.

So I sat there in the audience all day long listening to case after case after case, and my mind was just exploding because these were my patients, right?

That I couldn't get better. I didn't know how to get better. And there they were up on the screen in front of me with all of their toxicant levels being shown right.

So patients just like the ones I had treated. I was sitting next to an internist, Dr. Sharon Khalsa from California, and we kept elbowing each other, going, That's my patient.

That's my patient. That's my patient. Right? So at the end of the day, he and I basically ran up to the front of the room. We kind of accosted Dr. Cronin.

We said, you have to teach us everything that you know. And that was the beginning of what became a post-graduate course in environmental medicine. It was called Spirit Med.

And Dr. Cronin taught that from about 2001 until he left the planet. He passed away in 2019. And then I took over that class teaching a year long postgraduate program in environmental medicine.

So between 2001 and 2019, I actually left my family practice and specialized in environmental medicine.

How Dr. Lyn Patrick Entered Environmental Medicine

So we had an actual clinic that was built for and worked with patients who had environmental exposures. So I learned quite a bit. But what I really began to learn is when I started teaching, so I taught with Dr.

Cronin in those early years, 2003 or four, I think I started teaching, focusing on metal toxicology and then expanding into a field called endocrine disruption, as well as looking at the effect of pesticides, solvents and other toxic exposures on the health of everyone.

So that back then, I would say in the eighties, when I first started practicing, it was rare. Right. I'm sure, you know, because you were practicing medicine then to to see someone who was sick because they were exposed to a chemical is very rare.

Today, whether our patients know it or not, chemical and environmental toxic and exposure is common. It's ubiquitous. We are marinated in a sea of what people refer to as toxins, but it's really a kind of a wide ranging class of chemicals.

The problem is they don't know it, right? They're not aware of what's in the food, water and air that we breathe. And so they're affected in a way that is pretty sneaky because there's no knowledge of that exposure.

And so our job as physicians is to actually play detective. We have to test for those chemicals. We have to help our patients find out where they come from, and then we have to help them avoid exposure as well as dealing with what's called a body burden.

Right. Because we accumulate some of these chemicals. The one we're going to talk about today is one of those chemicals. And when we get into it, we'll talk a little bit more about how it gets stored in the body and how we can get it out.

So that, in a nutshell, is kind of my history, at least in the last 23 years of my practice. And what I do now is I teach physicians from all over the world, we have an online program where we take a whole year because that's literally how long it takes.

And we learn about all these chemicals, how people are exposed to them, what kinds of illnesses they get as a result of that exposure, what kinds of signs and symptoms and how we can address those chemicals, avoid contact with them.

First of all, which is not as hard as it might sound, and how to get them out of the body so that people can recover. Well, we are going to delve into a lot of those different facets because they're critical if you're going to be optimally healthy.

It's just an under-recognized, huge, ubiquitous problem for all of humanity at this time. And we have so much in common because I followed in your footsteps, but about a decade later and took Walter Cronin's course and met you.

And I was speaking at his conferences, and that's how we got connected. One of the terrible, ubiquitous, like, everywhere in every one chemicals is what we're going to focus on initially is this phenol, a known as BPA.

And the reason I got interested in it as a one particular toxicant is because that is the one that has had the most focus in terms of women with PCOS, in terms of its exposure in women who are pregnant and then it affecting the fetal development part of the endocrine system like right at the get go and how that impacts on the receptor function, particularly of estrogen, but not just estrogen.

Others like melatonin and testosterone. And then that women who have PCOS, when they've tested them, they seem to carry a higher load of BPA, whether they're exposed to more or perhaps they're not quite as good at eliminating it from the body.

So we're going to touch on that. So BPA is like many other, but this is the one that has had the most research, you know, critically important for the health, reproductive, metabolic health and so on of women with PCOS.

So I'm hoping that you will share some really vital information on this terrible chemical that's and where we find it, what we deal with it, the effects, and then how can we avoid it exactly.

And pertinent to this topic of PCOS and women's reproductive health as well as men's reproductive health, it's hard to talk about this one all without talking about the politics of the chemical industry, because as Dr.

Frederick from Saul, who is a friend of mine, a colleague and probably one of the most well-known, well educated researchers in the field, as he has said, BPA is the poster child for chemical endocrine disruption globally in the world.

Right? Bisphenol A is a high production volume chemical, which means that we produce it or import it and billions of pounds a year. So we make a lot of bisphenol.

It is kind of the underpinning of the new plastics industry, right. We all know and those of us who are old enough know because we watched the movie, Mrs.

Robinson, that plastics were a very big part of our industrial growth back in the fifties and sixties. Right. And kind of shored up what we know today as an incredible industry.

The important thing to remember about this chemical and this involves the story of Dr. Fredric Saul, is that he was the first scientist to do research looking at these endocrine effects with bisphenol at levels 25,000 times lower than any researcher had ever dared try to find an effect.

So what he found is that at extremely low doses and this is true for all endocrine disruptors, right? Very, very low doses, they can act like hormones.

Hormones in our body are active at extremely low levels. So he published some of the first studies and these were in animals, of course, looking at reproductive toxicity at extremely low levels.

Now, remember, 93% of all Americans have detectable levels of bisphenol A in our urine, there's an alphabet soup of bisphenol A, there's F, B, bisphenol be, the small P, personal Z.

There are a lot of different types of this phenols, but A is the one that's most commonly produced. So he basically got on the radar for the American Plastics Society as a result of publishing this research.

He was at the University of Missouri at that time, and I had the great honor of knowing one of his colleagues, Dr. Theo Coburn, who was one of the first researchers to actually identify.

I wrote a book about endocrine disruption and worked with him actually to really help all of us understand this phenomenon that we have created chemicals that work at infinitesimal amounts to affect our bodies, and that leads to what's going on politically with bisphenol but before we talk about that, it's probably important, as you know, to talk about what this will all aid does in the body.

So it is an estrogen mimic, so it affects both males and females in that way. The problem is that it just doesn't affect estrogen. And I know you know, Dr.

Gersh, that bisphenol A damages the pancreatic beta cells in the pancreas. The pancreatic beta cells are those specialized cells that produce and secrete insulin. Right.

And so when we look at levels of bisphenol in the urine and blood in Europe, they measure bisphenol and blood. Here in the United States, we measured in urine, but there's a relationship between how much bisphenol A is in the blood, in the urine and the risk for type two diabetes.

And as you said, this can happen in utero as we're growing in our mothers rooms. We can be affected by bisphenol A.

BPA as a Major Endocrine Disruptor

It does get into cord blood, it does get into the placenta, does get into fetal circulation, and it can actually increase risk for diabetes at that point or later when we're children, adolescents and adults.

And so the research is pretty amazing. I mean, they've done research where they've looked at the blood levels in both men and women, followed them for about nine and a half, ten years, and then looked at who became diabetic and was it related to their body levels of bisphenol.

They looked at different types of this phenols and in fact, yes, it absolute lutely was to the degree that it can double or triple risk for diabetes. Now that is huge right to to have an increased risk for diabetes.

That's two or three times that of someone who does not have levels of bisphenol in their blood. So this kind of research has been published. There are thousands of studies now both in animals and in humans, looking at the effect of this phenols, on diabetes, on obesity, on all kinds of male reproductive problems like infertility, infertility in women, as well as, you know, failure of IVF to take rate, in vitro fertilization.

So higher BPA levels in women who are getting in vitro fertilization, the less likely that IVF is to be successful, obesity, there's some very damning research on obesity and bisphenol IS in terms of levels both in adolescent males and in adults.

Their diabetes chance they cause diabetes or obesity since they cause obesity their reproductive toxicants. So they affect the entire and current system really they don't leave a hormone untouched.

Right. So we have to really look at specially in polycystic ovarian syndrome where there is a direct linear relationship between levels of bisphenol A in the urine and risk for Pecos.

So women with Pecos have higher levels. As you said, we don't know why. Is it because they're exposed to more or because they can't get it out of their bodies?

They're not as good at metabolizing and excreting it. You may know more than I do about this, but in my mind more so much more research needs to be done because we absolutely need to understand why there are higher levels.

We know that people who are exposed to thermal receipts, for example. So I don't have one handy here, but when you go to the grocery store, you get handed a receipt.

That's a thermal receipt. The technology for making thermal receipts necessitates bisphenol S. Now you can substitute personal as a personal a, but it really doesn't matter because the bisphenol is what causes the damage. Dr.

Saul did this brilliant study where he had graduate students who get a lot of this go to a fast food restaurant. They used Purell, which dissolves a little bit of your skin barrier.

And then they grabbed the receipt from the fast food person. They held that receipt in their hand for 20 seconds, then the researchers figured out how fast the bisphenol was absorbed into the arm and it took literally seconds for this animal to be absorbed.

They actually had the graduate students eat french fries with those same fingers and it had a thermal receipt. They figured out if the bisphenol would be transferred from French fingers to French fries to mouth to stomach.

And they were actually able to look in the blood and the urine and figure that out. And what they found out, especially for the women, because we as females put more personal care products on our skin and part of that personal care product constituents are what are called skin softening agents.

So they break down the natural barrier in the skin that allows the bisphenol to be absorbed much more quickly. So the women actually had higher levels quicker than the men did.

So this is just an example of one of the ways that we're exposed to a very significant endocrine disrupting chemical in our daily lives. So fast forward to a researcher named Todd Go, being a brilliant man, honestly, who literally did research in women looking at two groups of women teaching on how to avoid bisphenol A.

And he did this by giving them BPA free makeup, teaching them about avoiding canned food, especially coconut milk, which is really high in bisphenol A, higher the fat content of the inside of the can, the more bisphenol A beverage cans, any aluminum can also line with bisphenol A, so beer cans as well.

Any beverages. He also school them about thermal receipts. So that one group went on a bisphenol A free and probably bisphenol period free lifestyle and diet for several weeks.

And then he had another group of women that he was following with no instruction whatsoever. They just lived their lives. And what he found was that the level of bisphenol A in the urine of the group that was trying to avoid it went down significantly and they gained less weight over that intervening period, which I think was only among the women who were not avoiding bisphenol had a demonstrable weight gain.

Now this was a small study needs to be repeated with a larger group, but it was significant. The findings were significant. And now he's working. He's doing more clinical research, looking at women who are avoiding BPA and seeing if there are any other changes like their blood sugar regulation.

Right. Their insulin levels, their hemoglobin, anyone sees all that stuff. So he's doing wonderful research and we can all learn from his interventions.

Right. And so I've actually corresponded with him. He spoke at my conference and he said, you know, it wasn't that hard really to teach these women how to avoid bisphenol A and all the other phenols.

So those are the important things about avoidance is you really don't have to touch thermal receipts. There's no reason you can bring an envelope or you can not take them.

Since I read his study, I become kind of religious about it and I just bring an envelope and I say, Just throw the receipt in the box or throw it in here.

Not a big deal. Avoiding canned foods. You know, I learned that from Dr. Saul. He has no canned foods in his home. He hasn't eaten out of a can for decades because he's tested the BPA in the canned food and he's seen that significant low level BPA in the canned food.

And sadly, we now have a cultural phenomenon. I've seen it. I've talked to the doctor and refined use my colleague in education about this that many, many people are now drinking canned beverages.

Right. They're all kinds of canned beverages, sparkling waters and teas and things that come in cans. Every single one of those cans is lined with bisphenol A.

There's one company that makes a plant based resin that they line their cans with. It's Eden Foods, but they don't make beverages. They just make, you know, beans, canned beans and things like that.

So there are there are no bisphenol wells in their food. Other companies are following suit. But what you'll see is a little stamp on the can that says BPA free.

And here's where we get into what we call regrettable substitution, substituting bisphenol A with another one of the alphabet soup, bisphenol side B, s s p, b, z.

There's literally a long list of this phenols, and many of those companies will say BPA free, but they'll really be using beeps in their cans. So you don't be fooled by that.

I think you're being very thorough. And I just wanted to make one comment on this panel, A, is that it first appeared on the scene trying to be a pharmaceutical, you know, that it would be marketed as an estrogen.

And that's where people need to know that there are chemicals that are actually pharmaceuticals. And one of the things that also I have read about is that when they measure BPA in pregnant women in the mother and it turns out it actually concentrates in the fetus.

So the fetus can have multiple times the level that the actual mom has when she's pregnant with that fetus. And so, you know, it's just like this toxic poison really goes right into the into the baby, into the fetus.

And, you know, creates havoc in the developing endocrine system. But I thought maybe just as a quick sort of recap what an endocrine disruptors like the definition and and then you know I want you just continue because this is like the most important takeaway is that every woman and then especially women with PCOS or women who have PCOS who are now struggling to get pregnant or they become pregnant, how they can help to lower the risk for their own.

You know, children that they're creating. So we want and and also we're told that people who have children because we know that children are especially vulnerable during, you know, developmental times and puberty times and so on.

So continue. Lynne, I just love all this information that you're getting into. Thank you. That was crucial, you know, your your perspective and your understanding.

So an endocrine disruptor. And again, the Endocrine Society, which is a global group of physicians and researchers and scientists, have actually defined this.

And what they've said is that any substance or chemical and there are some naturally occurring endocrine disruptors, you know, soy isoflavones actually affect hormones.

So they could be thought of as undercurrent disruptors. So it's any substance that interferes with the production of a hormone or the how a hormone travels through the body.

Anything that that alters the way that a hormone binds to a cell and sends a signal to the cell. So it's the entire journey of a hormone, not just the production of what we're doing.

So, for instance, BPA also affects the thyroid. It's not well known, but it is a thyroid disrupter. So it affects how thyroid hormones actually connect to and communicate with every single cell in the body.

So that's a simplistic but perhaps adequate explanation of what an endocrine disrupting chemical is, right. A definition of. So we're thinking about, you know, as you said, melatonin, which is made in the intestinal tract as well as the brain and its ability to act as a hormone is interrupted, maybe in multiple ways.

You know, maybe it's not just one way, maybe it's multiple ways. You know, like I said, 93% of Americans have

detectable significant levels of BPA in their urine.

So that's not meant to upset or scare anyone. It is meant to empower everyone who now knows that BPA is a problem. It is the poster child for chemicals that cause disruption to all hormones.

Really. And I've been reading about BPA for 20 years and I just don't see any hormone that BPA does not affect in the body. I think it is a ubiquitous hormone disrupter, endocrine disruptor.

BPA Exposure, PCOS, and Avoidance Strategies

So we really have to focus on what are we going to do about our exposure and I think the number one thing that we can do and how we can be empowered around this is to avoid exposure.

Now, there are some exposures we can't avoid, like BPA does become airborne. It actually does evaporate out of waste dumps. So, you know, there is some airborne exposure, but the main exposure for us as humans is food, our diet.

We have control over that. We can choose not to drink out of cans or eat out of cans unless we know that they're bisphenol free and we can choose to avoid thermal receipt.

Dermal contact with thermal receipts. Right. That's easy. And we can increase our body's ability to excrete BPA. Now, that's what you mentioned, Dr. Gersh, is that we do metabolize and excrete BPA.

So it goes in through our mouths, in through our skin. We metabolize it and we urinate it away. Our ability to do that is dependent upon having good liver function.

So there's a specific process in the liver that metabolizes certain chemicals. And for BPA, it's called, Kiran, addition plant substances increase the body's ability to grow.

You're on a diet, so do some nutrients. And so we can easily add those, but we call them botanicals. You know, they're plant medicines that have a medicinal effect.

We can increase our intake of those wonderful plants like know simply dandelion root. There are I could probably I have a list of them I could probably go through about 50 different foods that increase glucose.

In addition chlorogenic acid. My favorite botanical found in coffee. One of the reasons coffee's beneficial is because it contains chlorogenic acid. Now you know you don't want to put high fructose corn sirup in other things that makes it does.

That kind of negates the beneficial effect. But there are a multitude of plants and nutrients that improve the body's ability to excrete BPA. We do store it in our fat tissue.

It is what we call lipophilic fat loving. And so it will be stored in the body. Not a lot of it, but there will be some and there are various methodologies for increasing fat turnover like intermittent fasting is a great one.

Increasing the use of heat like soreness is also been known to increase fat turnover. All of us who are schooled in what we call functional medicine talk about increasing the body's ability to turnover fat.

And Dr. Gersh is an expert in that area, so I'll let her talk about that. But that is one way to decrease the body's burden of this phenols, in addition to avoiding them via our changes in diet and our changes in what we choose to touch.

You know what we choose to have contact with? Since I began my journey in understanding the effects of these environmental toxicants like BPA and its cousins, you know, within that family in our household, we got rid of all the hard plastics involving any touch of food.

We I mean, I just feel horrified that there was a time when I bought microwave plastic where, you know, so of course that is not happening in my home.

The only canned food I ever have is eaten. I do sometimes for emergency when I don't have time to cook. Their. End of their product and you know, they're not a sponsor or anything.

We just know that they are great as far as they can have safe cans. Yeah, I've had conversations with them. I call them up and literally, literally had a conversation with them.

And you know, it's interesting is that they never used bisphenol so in the lining of their cans that everybody what would it be used before we had this phenols we used a plant resin compound to line the the seam of the cans so it wouldn't rust.

And they said we just never switched to this phenols. Fantastic. And you know, if you do good, you don't even know it. That's even better, you know, to stay with the old ways.

That's right. It's like if you think about your great grandmother, she didn't have a life of plastic because it didn't exist. Right. And, you know, in the old days, I would take plastic wrap and wrap all my food in plastic wrap, you know, so, you know, it's a different kind of, you know, you get the phthalates, another conversation.

But the reality is that I know that if I can change and do all these things, getting rid of, like you said, the cash register receipts, if I take them at all, I have like a little baggie.

It's like, put it in the bag. An envelope. A paper envelope. Sounds better, right? And so you're not doing that. Even the plastic bag thing. And so it can definitely be part of your new way of living is plastic free.

I know no one can live totally plastic free, but you can do a lot, you know, like I look at their like water bottles, right? So there's so many people walk around with water bottles and they're all plastic.

So now you can get glass and stainless steel. You know, there are other options because the manufacturers know that there's a whole category of people who have learned about the this phenols and they're trying to do everything to avoid that.

So this is definitely doable. When I think back that my oldest child was getting a bottle that now I know I didn't know anything at the time was BPA in the plastic bottle, you know, and then you'd heated up with, you know, hot pot formula would go into this plastic, oh, my gosh I don't know how many years ago they they prohibited that one, but I don't know they still have plastic bottles.

So it's probably just a cousin now, a different physical. It's yeah, that was some legislation that I think affected many children's toys, but definitely affected bottles.

You know, I was just reading an article that was a conversation between Dr. Ramsdell and Susan Nagle, who I know you know, is his protege, amazing professor of obstetrics and gynecology.

And she said, you know, we have tested the nipples and they do have small amounts of BPA. So I think for some moms, they don't have an alternative. You know, for moms that are not able to breastfeed or choose not to breastfeed, they don't have an alternative.

But what they can do as soon as their babies are able to eat solid food is to give them high nutrient plant foods, you know, to help them eliminate that BPA from their body.

So I think it is impossible to completely avoid BPA. But think about this. So the study that Dr. Hagopian did was just with, you know, they weren't Ph. D.

students. They weren't doctors. You know, his group, his patient group in this study were just regular folks who

knew nothing about BPA. But he educated them and they made a decision to enter the study to be in the intervention group, and they were able to avoid BPA so significantly that they some of them dropped their levels down to undetectable in their urine just by doing the things that he asked.

So it's absolutely possible to do that. And that remember, those were the two groups of women. The women who avoided BPA did not have demonstrable weight gain over the period of study.

The women who did not avoid BPA had a significant, demonstrable increase in their weight over the period of the study. So it's you know, that matters to me as someone who's reading that study, there's a difference.

That difference probably goes beyond just weight to other parts of their physiology, you know, to their endocrine system, you know, to improve the health of their endocrine system as a whole.

So I think that where we are right at this moment and this is a conversation you and I were having before we went into the recording, is that at this very moment, moment, literally this week, Dr.

Gersh and I are signing on to an article, an editorial statement with many other researchers and doctors to this statement is going to the European Union was in the process of deciding whether they're going to follow the guidance of this organization called FSA, FSA.

It's not exactly like the FDA, but, you know, it's kind of a it's a regulatory body. So they have recommended to the European Union, the Commission, to lower the allowable levels of Bisphenol A 20,000 times based on their complete review of all of the research.

This is the first time that EFSA has not been kind of owned by the chemical industry. There's a whole story behind that, but it's now a more fair, unbiased body, and they really took a look at all the literature and they said clearly allowable levels of BPA are way too high.

They need to be lowered. 20,000 times. So the allowable exposure level or intake level is called total daily intake. So through food, water needs to be lowered 20,000 times.

If we translate that to the United States of America, that means that we in the United States have be exposed to 5000 times less BPA than we're currently exposed to.

What this would do is to literally wipe BPA off the table in terms of it being a chemical that we use in production, which is what needs to happen. When I first started teaching and I was not educated about BPA, I really didn't understand how toxic it was.

But now that I've had a chance to read all Dr. Research and see, he just published a very, very seminal paper looking at the risk for bladder cancer and kidney cancer in animals who are exposed to BPA at levels that we as humans are exposed to on a daily basis, you know, much lower than if you're trying to poison an animal.

Know, he was just giving these animals the amount that we take in on a daily basis. So it remains to be seen what's going to happen right, because this is kind of political theater, but we're going to do our best to try to get the European Union, the Commission on Health.

I can't remember the exact name to accept the recommendations of the regulatory body and eliminate BPA from commerce. That's what we have to do. Well, absolutely.

We can't poison all the people and the planet itself, you know, in order to just maintain an industry, it can nothing like that can be too big to fail.

You know, when you think about not just the direct poison to humans, but to the environment, to wildlife, that these things don't break down. You know, all the these plastic items and so on that are just like perpetual on planet earth.

And, you know, they leach into the water. It's just not acceptable. Like you said, gets into the air. So it's just time to deal with it. And that's why I'm so proud and honored to be part of this publication, to really take a stand for humanity, really.

So we're going to be and you know, but before we end at the end, because we're not there yet, you know, I want to see how we can maybe help people to become involved, to want to become involved as environmentalist, because everyone who's hearing this should be an environmentalist to care about the environment for ourselves, for our future generations, for our planet.

But talking about the planet, I want to just make a little diversion here, because right now, when we're recording this, which is not exactly the same time, it's going to play, but this is going to happen over and over.

We know this and that is that there are wildfires throughout Canada like spreading, you know, smoke, you know, through a great part of the United States covering areas that never dealt with this sort of thing before.

So maybe you could just tell people what they can do to deal with fire, produce, smoke. And, you know, just because this is so poisonous, you can just say a few words about smoke I can.

For those of you that live on the West Coast, you remember when we had all the wildfires on the West Coast and how terrible the air quality was, and especially in the state of California.

Wildfire Smoke and Air Pollution Protection

But throughout the West, what we have to do is both avoid exposure to the smoke because the smoke is not just soot. Right? The smoke is a group of particles, some of which are so small they're called ultrafine particles invisible to the naked eye.

And these ultrafine particles are breathed into our respiratory tract, but they go beyond the lungs, they get into the bloodstream, and they literally end up being deposited in organs like the brain and the liver.

And there's good evidence for this. A researcher from Mexico City, Dr. Calderon Garcia Duenas, actually has published looking at autopsy results from both infants and children and adolescents.

And she's also looked at some of the brain function in college age humans as a result of exposure to these ultrafine particles. And we can find these ultrafine particles in the brains and some of the organs of infants as a result of their exposure, both in utero and as infants.

And this particularly in Mexico City, which is well known for having the highest level of particulate pollution in the world. Right. That's that's something that the pediatricians I know in Mexico City would prefer that their children's parents take them to another city.

Right. That's because it's so difficult for them to avoid that. So that's the problem. It's not just the soot, it's the level of ultrafine particles. The other issue is that these ultrafine particles, their little carbon particles, are magnetically charged.

So imagine that you've got this little particle as it's wrapped in Velcro and what can stick to that? Velcro is a pesticide, a metal like mercury, which we have in our air as a result of trees burning.

Trees grab onto mercury and store them in their needles. Conifers, you know, trees with needles like pine trees. So this little particle is not just soot.

It's not just carbon. It is a little toxic balm that you that your body is inhaling. Right. That's finding its way into your bloodstream. So avoidance. Let's talk about that.

So when there is a fire and there's smoke, the first rule of toxicology, the first rule of environmental medicine is how

can we actually avoid the exposure?

Well, we're just finishing up a consumer course. You know, we mostly teach doctors, but as a result of is Palestine train derailment and now the fires in Canada, we put together a course for consumers.

And so we're explaining what what a good air filter is. And there are some air filters on the market, very sadly, that are not so good. Right. They don't have enough carbon because we're filtering the air with carbon.

They don't have enough carbon in them to really filter the air. So there are some air filters that are higher end and yes, they're expensive, but unfortunately we live on a planet now where according to the World Health Organization, only 10% of the planet's air is fit to breathe.

Now came out the World Health Organization, the came out with that, I think about three or four months ago. So it's pretty recent. So we have to especially for our children, especially for pregnant moms, we have to take clean air as a priority.

Right. We have to make it a priority. So the HVAC system in most houses have filters in them called Merv filters. MRV is just a rating. So there's a number after it.

It's either ten or 11 or 12 or 13, 14. It goes all the way up to 20. The MERV level of 13 is a really good filtration. Now, I don't want to try to pretend that I'm an expert.

I'm not. But in general, you can get these at Home Depot or Lowe's. They're not expensive. Putting a merv filter in your system and changing it regularly is really important because as you can imagine, when there's a wildfire event, there's smoke in the air, your HVAC system will pull the particulate matter into the filter.

But once the filter gets full, then some of that particular matter is going to get pushed back out into the air. So you want to change your filters regularly.

When we had our wildfire events on the Pacific Coast, we were telling people to change their Merv filters every couple of days, especially if they lived in an area where the level of pollution was pretty high.

So that's one thing is you can get a box of Merv filters and just have them ready to put them in your system. You can investigate portable air filtration technologies.

And again, these are not cheap. The good ones are up around $750 to $1000. If you can't afford that, there is a technology called the Corsi Rosenthal homemade box fan filter technology.

Now, this was invented by some researchers by taking these Merv filters and putting a box fan in the middle and then just taping the MERV filters, they've got one on top and four around the outside of the box fan and literally pulling the air through the Merv filters.

So this was a technology that was created to try to filter viral particles out of the air. Right. The SARS-CoV-2 virus. And it was pretty good at it. The problem with adapting that technology for other exposures, mold or like wildfire smoke, is that these filters get clogged up pretty quickly within a week or so.

And so you have to take that little box fan apart and make a new one. And so there are some doctors that actually use this technology. They say it works great, especially if you've got mold in your air, if you live in an environment that's moldy.

And I think it is absolutely better than nothing, clearly better than nothing, but it gives one a false sense of security because in order to really do a good job of protecting the inhabitants of the house that Corsi Rosenthal filter would have to literally be changed every few days as opposed to a portable air filtration unit.

That literally would be fine for weeks to months because of the amount of carbon in the filter, which is the filtration

media. So that is step a avoidance, right?

So using a high end merv filter in your unit of 13 or above and again not in fact expert. So the strength of your system, in other words, your furnace and your air conditioning will determine how high a merv filter you can use.

They go all the way up into the twenties and Merv 17 are great if your system can handle them. So you'll have to do your homework and figure that out.

Portable Air Filters. My mentor, Dr. Crehan, used to say that they're not voluntary technology anymore for those of us that either have respiratory problems or we have environmental exposures, we're trying to stay healthy.

And I kind of pooh poohed it honestly. And then I started reading the research, looking at interventions that have been published, placing these portable air filtration units in homes with children who have asthma, and seeing incredible improvements in their asthma, as well as looking at the effect of air pollution on pregnant women.

Right. So we know that that's another growing, growing choice for children in the rooms of their moms are right at the top of the vulnerable ability scale.

Right. In terms of vulnerable humans, you know, that's the life stage at which we are most vulnerable is when we're developing in the womb. So then there's a part two and part two is about nutritional support.

So there have actually been studies looking at giving and this is a long list, so I'm not going to go through the whole thing. But giving either people who have respiratory problems and are exposed to air pollution just through the natural course of their life, or there actually is research looking at exposing people to certain amounts of air pollution in what's called the pollution chamber.

So this chamber is something that you actually sit in. They can type in a certain amount of PM 2.5, which is just a measure of particles, a certain type of particles, and they can measure how your cardiovasc, your system, how your heart responds to that exposure.

And the way that your heart responds is reflective of the toxicity of the pollution and how it's going to damage your nervous system. It's called heart rate variability.

So research has shown that simple interventions like B vitamins, simple pennies a day actually minimize the damage of air pollution. And I'm going to substitute wildfire smoke here because it is the same, you know, because we're it's not just trees that are burning anymore.

It's buildings that are burning. And all of the plastics and the metals that are in the buildings. Right. Are also burning. So, B, vitamins, fish oil, vitamin C, small amounts, no, non megadoses, just 2000 milligrams a day.

Vitamin E, just 800 international units a day. What we would consider a standard daily supplement have been shown to protect the body from damage from that air pollution exposure.

That wildfire smoke exposure. The last one that I'll talk about is a supplement that is becoming kind of a household word and a pseudo cysteine and acetyl cysteine is an amino acid.

It is available over the counter. It's not a prescription drug. And there's good research in humans, not in animals, in humans with any pseudo cysteine, being able to to mitigate or really protect the body from damage, from wildfire smoke exposure and acetyl cysteine is available over the counter.

It comes usually in 600 milligram capsules. A standard daily dose for an adult is three 600 milligram capsules, 1800 milligrams. There are probably at this last time I looked there, about 25,000 studies on Inositol 16 in the PubMed in the medical literature I published studies.

It is probably one of the most protective I want to call them nutrients even though an a system, we don't find it in

food. We have to take it and perform some one of the most protective nutrients from damage to pollutants that we have available to us.

It is also available in pediatric dosing, although I'm not I'm not a pediatrician, so I'm not going to talk about that. But it is available and has been shown to be safe in small doses in children and adolescents as well.

So that's kind of a very short version of the lecture on wildfire smoke and air pollution. But I think I've gotten you know, I've kind of hit the highlights for you.

Well, that was fantastic. And talking about all those nutrients, I mean, they're all potent antioxidants. They work through the critical pathways of every cell to maintain optimal function.

Reduced free radicals and oxidative stress and nasty has been shown to help women with PCOS. Just giving it to every woman with PCOS to help them ovulate.

That's like a wonder supplement really, in terms of what it can do. We could do a whole show just on some of these supplements and probably should because they are so important.

You know, it makes me wonder, just speculate because one of the damaging effects of bisphenol A is oxidative stress. It actually causes oxidative stress in the body.

So it may we don't know. I'm just speculating it may be useful in terms of minimizing damage from this one as well. May Well, it's so safe. And of course, an AC is the treatment for acetaminophen overdose, which is the number one cause of acute liver failure because it can be so toxic.

The difference between a safe and a toxic dose is not very great and unfortunately, inadvertent. Overdosing with acetaminophen is not uncommon. And that's the treatment in IV form.

Resources, Courses, and Closing Remarks

So this is really just the take away just from the last 2 minutes is critical for everyone to go back and listen to this whole thing because, you know, whether it's a fire or air pollution, it's all toxic throughout the body and not just in the lungs.

As you can see, this is like total body wide effect. And your analogy, I could just see it like these little toxic bombs, you know, it's like what a perfect, you know, picture that created and will make everyone want to get the best air filter they can and think about it.

There's no place that you can avoid air pollution, like you said. Where where do you go? Where's that 10%? I do not know. But, you know, in the middle.

It's in the middle of the Pacific Ocean. Oh, well, that's not where you live. So there you go. And this was phenomenal. I mean, we could talk, like we said at the beginning, 4 hours.

And so everyone out there wants to learn more. You mentioned that you have a course. How what what else can they do? How can they follow you and what you're doing?

Okay. So we're just about finished with the course. It will be live by the time you're listening to this. So the the organization is called e m e I Environmental Medicine, Education, International Global.

So EMEI global, that's how you find us on Instagram. That's our Web site dot com. We will have we have a lot of information for physicians because that's what we specialize in teaching.

But This is going to be two courses, one on wildfire exposure and one on chemical disasters as a result of the I don't even know what to call it. The debacle called East Palestine train derailment that everyone needs to

understand went far beyond the limits of East Palestine.

Ohio. So we're going to have short courses with lots of handouts and lots of directions about step wise, what you can do and how to prepare. Because according to the Environmental Protection Agency, a chemical disaster occurs in the United States every other day.

So we decided, you know, as a of this Palestine and the bungled the bungled ment that occurred as a result of that, the poor guidance from all of the agencies involved that we needed to give people guidance.

You know, we are just at a place in our culture right now where we have to have a level of knowledge, a level of education that helps us protect ourselves and be prepared for whatever we may encounter.

And I think it's you know, it's not rocket science. It's very basic. But we wanted to give people good recommendations. We're not selling anything. We just wanted to talk about science, good recommendations for masks that are appropriate to protect against wildfire smoke, good recommendations that I talked about in terms of HEPA filtration for their fact how to seal off their house in the event of a chemical disaster.

Simple things like that, information that unfortunately is not being shared by our federal agencies. So EMEI Global is where you'll find us. I think that's best advice everyone I'm going to recommend to all of my patients should get these courses and be prepared.

These are simple, easy, inexpensive ways to basically protect yourself from exposure, from air, from water. And we talked about food as well today. So that's one of the you know, we're going to leave that out.

We'll talk about food as well. But there's a ways to protect yourself from these chemicals. Absolutely. I mean, this is a an issue that unfortunately, the medical schools who are educating the newest doctors coming out are not dealing with properly.

It's just so neglected. And so, you know, we have to fill in the gaps. And I'm a little few steps behind you, Lyn. I am like watching everything you're doing and trying to learn from you and this every one.

Like I said, needs to be aware. The first step in solving a problem is to be aware of the problem, to understand what we're really facing, not to be like you said, like grim and doomsday talk, but rather to that we can take effective actual action, right?

So that we can do something, not just whine and worry, but actually take effective action. That's what it's all about. You know? And I think in my own experience and the experience of many of the doctors that I train and many of my patients, when you do have that knowledge and you are prepared, your stress level actually goes down, not up.

Absolutely. Knowing the enemy is the first step for sure, knowing what you're dealing with and that's what you are doing. Lyn, I cannot thank you from the bottom of my heart for what you're doing to help to improve the health of everyone out there, and particularly my PCOS watchers for this particular episode.

Thank you so very much. It's been my pleasure and my honor and I absolutely am so thankful to be part of this and to be on your team.