Dr. Jill Carnahan - **00:00**

Hey everybody. Welcome to Resiliency Radio, your go to podcast for the most cutting edge insights integrative and functional medicine. I'm your host, Dr. Jill, and with each episode we dive into the heart of healing and personal transformation. Join me as I interview thought leaders and medical experts and as in today's episode, an environmental toxicity expert on the new and dangerous microplastics and what you can do about it. You will want to stay tuned and not miss this episode because there's actually some very practical ways in which you can decrease your risk. You won't believe the amount of plastic that has been found in the brains of those with dementia and how there may be a correlation with the plastic's exposure and things like cardiovascular disease, things we did not see 10 and 20 years ago. So stay tuned.

Dr. Jill Carnahan - **00:46**

You're going to learn all that and more from my expert, Lynn Patrick, who's been on the show before. But before I introduce her, I just want to mention if you are looking for a doctor, my clinic, Flatiron Functional medicine in Louisville, Colorado is accepting new patients. You can call 303-993-7910 to schedule a free consult with one of our providers to see if you'd be a good fit. Also, we're going to talk today about some of the solutions and one of them is plasma exchange we now offer in our clinic Plasma Exchange through MD Lifespan. If you want to know more you can just go to my website jill carnahan.com under services. Click the tab on the menu and go down to MD Lifespan and click that button. It'll take you directly to a page that'll link you to Provider.

Dr. Jill Carnahan - **01:31**

If you want to schedule a free consult to know more about Is that a good fit for you? Because I feel like as our toxic load increases, plasma exchange is one of the most important things we can know about or have access to. One of the reasons that I have it in my own clinic. Okay, so let's get to our show and introduce our guest expert, Dr. Lynn Patrick. Dr. Lynn Patrick is a naturopathic physician with nearly 40 years of clinical experience. She is a published author in peer reviewed medical journals, a former contributing editor of Alternative Medicine Review, and a contributor to Clinical Environmental Medicine and the Sensitive Patients healing guide by Dr. Neil Nathan.

Dr. Jill Carnahan - **02:08**

She speaks internationally on environmental medicine and currently serves as faculty for the Metabolic Medicine Institute Fellowship in collaboration with the George Washington University School of Medicine and Health Scientists. She is past president of national association of Environmental Medicine and serves on the board of NAEM and the American association of environmental experts. She is a friend, a colleague and an expert. And I know you're going to enjoy this episode, so let's jump in. Dr. Lynn Patrick, you and I go way back and it's so fun to have a colleague and friend and someone I respect so much in the world of environmental toxicity, like literally, I don't know if there's anyone else I respect as much as you. We've just had so many levels of friendship and collaboration and working on conferences.

Dr. Jill Carnahan - **02:53**

Today though, we're going to talk about something that people have maybe heard in the news. And there's been little blips here and there. But you and I are finding that this topic of microplastics is so much more big than we

ever thought. It's so much more profoundly affecting us than we ever thought. And I want to dive deep because you always bring the great science. Maybe just start with a framework. If someone hasn't heard about what are microplastics, why should we be concerned about them?

Dr. Lynn Patrick - **03:18**

Well, I'm getting ready to do a talk to a physician's group on microplastics. So I've been diving deeper and deeper into subterranean levels of microplastic research and my mind is really blown. Like I've, I read some of the research, but I didn't dive deeply. And now I have to share with you that I, I really. This is probably the most important internal human pollutant that we're dealing with. Even worse than per pfas, you know, the forever chemicals.

Dr. Jill Carnahan - **03:51**

Yeah.

Dr. Lynn Patrick - **03:53**

Which they're not separate from, by the way. So I wanted to, just to give us kind of a 30,000 foot view, I wanted to share graphic that helps us understand what's going on with microplastics. So this is from my talk and this is just to help us understand not only what's out there, but what's in here. And can we measure what's in here? Because that's a big question. Right. Is there's lots of companies that are saying microplastic testing, it's, you've got to do it. You've got to find out how microplastics are in your blood. And so I'm going to talk about that and whether I think that's actually worth it. But we measure microplastics based on how big they are. Right. And so you and I are used to millimeters. Everybody kind of understands. Well, a millimeter, it's very tiny.

Dr. Lynn Patrick - **04:53**

You know, it's a fraction of a Centimeter. But we're going to go all the way down into nanometers and as you can see here, have to move something out of the way. Microplastics start right around a millimeter. A millimeter is about a pencil tip, if you've got a sharp pencil. Right. That's a millimeter, very small. But we have to go all the way down to micrometers. So you can see here that a micrometer, there's a thousand micrometers in a millimeter and there's a thousand nanometers in a micrometer. So a thousand. A thousand. A thousand. Divide by that. So we're all the way down to the size of a SARS CoV2 virus, which you can't see.

Dr. Jill Carnahan - **05:46**

Yeah, right.

Dr. Lynn Patrick - **05:47**

You can't even see a particle of smoke, honestly. And that's 100 to 700 micrometers. So 90% of all of the microplastics in our bodies, in our food and in our water are nanoplastics. And these nanoplastics are, you can see right here, a nanoplastic is a micrometer and smaller. And the problem was that we couldn't even measure them until two years ago. We didn't even have the technology to see how big or how little a microplastic really is. So we didn't even know that the majority of microplastics are these nanoplastics. The reason this is important is because. I'll just show the next slide.

Dr. Lynn Patrick - **06:36**

These micro and nanoplastics can get into our bloodstream from our lungs, they can get into our organs from our bloodstream, and they can get across barriers they're not supposed to cross, like the blood brain barrier, the placental barrier, they easily cross the gut barrier. And so what we're getting, we talked a little bit about this just before we got started is we are getting this influx of millions, literally of these particles that our body doesn't know how to expunge. Right. They don't know how to get rid of them. And so we are accumulating them. And there's good evidence from decident humans, you know.

Dr. Jill Carnahan - **07:22**

Yeah.

Dr. Lynn Patrick - **07:23**

People who've passed that there's a significant almost 5, 50% increase in the microplastics in our brain just in the last. I think it's about six or seven or eight years. It's. Wow.

Dr. Jill Carnahan - **07:39**

Oh my goodness. And I've been saying, and you've been saying this exponential increase of rise in environmental toxic load, we know it's true. We can document, but we haven't been talking about Microplastics that long and it is at exponentially increasing in our exposures.

Dr. Lynn Patrick - **07:53**

Yeah. You know, it's interesting because I think it now that it's a common, I don't know, not a household word, people don't know about nanoplastics, they sure know about microplastics. But the word is getting out in the popular media that we have a teaspoon of microplastics. And really they're nanoplastics in our brain tissue. And for some reason people are really upset about this. And I think there's some innate understanding that they're just not these inert polymers. Right. It's not just a little blob sitting around. And that's the understanding that I've come to from really looking at the literature, is that microplastics are Trojan horses.

Dr. Jill Carnahan - **08:36**

Clearly.

Dr. Lynn Patrick - **08:37**

Truly. And the Trojan horse, believe it or not, Jill, is about 900 different toxicants. There's actually a website you can go to put together by a bunch of brilliant European scientists where you can look up all of the constituents. I actually think I have a slide on that here. It's really remarkable. What we're finding is that this, here's the website, it's called the packaging form, right. And here are all of the toxicants, kind of on the left hand side, but not the far left that you can look up. You can actually search for a toxicant in plastic like arsenic or cadmium or lead or mercury or lead sulfate or lead salt, and you can see whether or not they're in food packaging plastic and whether or not they're added on purpose.

Dr. Lynn Patrick - **09:34**

And what was fascinating to me, I spent a lot of time on this website is that things like, oh, DDT taken out of commerce in the 70s, it's in microplastics and it's not there on purpose, but it's there. There are a lot of pesticides in microplastics. So one of them you're familiar with, it's called a pyrethroid pesticide or a permethrin pesticide. And these are the pesticides that are used on pests. They're used to kill mosquitoes and other pests. And the thing about pyrethroid pesticides is that their allergen sensitizers, right, people get sprayed with pesticides when they're on an airplane and they're leaving a country.

Dr. Lynn Patrick - **10:21**

There's actually some global laws about this where they have to get sprayed with these pyrethroids before the plane can take off and they become sensitized so that anytime they then in the future come in contact with these sensitizers, they can have a pretty severe allergic reaction. Anything from asthma to severe hives to their throat closing, you know, and this. So these are there on purpose. See the little circles? They're added. Right, right. So I was.

Dr. Jill Carnahan - **10:56**

Two thoughts really quickly. And I just wanted to mention because of practical. So two things. First of all, people go all the time to Europe and other countries where there are more laws about food quality, food supply. And you and I both know there's a very big difference in reactiv to those same things, like maybe a gluten antigen in a foreign country because it's not tied to this toxic load. So that's one I've also heard of. These all pores that come from Europe, they're, you know, 17, 21, 25, and they come and work in California, they're eating organic California food. All of a sudden they stop cycling because they're so unused to the toxicity in the American diet, you know, so there's that. And then just the other day, woman walked and said, I said, how are you doing?

Dr. Jill Carnahan - **11:36**

She said, well, it was kind of a tough weekend. My husband, 57, has mild asthma. He ate a meal at a friend's house. Perfectly normal organic food. We took him, I was driving him to the emergency room. He's like, I can't breathe. He had anaphylactic reaction. She said, I thought he was going to die. She said, I'm going at 100 miles an hour. The emergency room's five minutes away. And he gets admitted he had a severe anaphylactic reaction to who knows what. And it was food he had always eaten before, organic, gluten free, no issues. But it reminds me. Exactly. I'm sure there was some sort of sensitizer in there that. And we're seeing cases like, I'm sure you are too, all the time now I'm seeing new cases of very severe reactions that we never had before.

Dr. Lynn Patrick - **12:18**

Yes. And so remember, these are food packaging materials. They could be packaging water.

Dr. Jill Carnahan - **12:25**

Yeah.

Dr. Lynn Patrick - **12:25**

They could be packaging tea, they could be packaging any number of things that could be USDA organic. Right. And so we know just from the research on the beverage container packaging that these microplastics degrade off into the tea or the water or the soda or the juice or whatever. So in a way our exposure is. We're not protected.

Dr. Jill Carnahan - **12:56**

Right.

Dr. Lynn Patrick - **12:56**

Sadly by the USD organic labeling. If there's a food packaging material like this, like a plastic that's Really a trojan horse. And the other toxicants that you know, we're not, we don't have time to go through all 900 of them. But the other toxicants that are really critical are bisphenol A. Right. Bisphenol A is a huge endocrine disruptor. Causes obesity and diabetes and a number of other things tied to all cause mortality. 50% increase in all cause mortality if you have a highest quartiles. So you know, the highest 25% of urine bisphenol levels, it's in plastics. Right. But it gets into our water and our food. And so these trojan horse chemicals really are the reason that microplastics are now tied to inflammatory bowel disease, colorectal cancer, dementia, cardiovascular disease, risk of dying.

Dr. Lynn Patrick - **14:00**

That was the amazing study, was the Italian study where they at carotid arterial plaquing. And they found out, this study blew my mind that those that had the demonstrable microplastics in the arterial plaque were four times more likely to die of an event. And the mind blowing thing I thought, you know, control group, no microplastics in their carotid arteries. Microplastics, contaminated group. I thought, wow, what's the difference? How do you end up with microplastics in your carotid arteries? Right. Didn't they.

Dr. Jill Carnahan - **14:35**

Exactly.

Dr. Lynn Patrick - **14:36**

These guys, like.

Dr. Jill Carnahan - **14:37**

Yeah. What do you do but exposures. What. Yeah.

Dr. Lynn Patrick - **14:40**

The group that had no microplastics and they literally had none were older than the younger men. This was all males that had the visible microplastic. So was it because they. We think, you know, the older you live, the more

you bio concentrate. But it's. I think it's the contact with bottled water. Right. We didn't used to drink bottled water. It was. It's a relatively new thing. And so we have to start looking at those kinds of behaviors. So I think we're at this point, you and I just talked about this where avoidance is not voluntary anymore. Yeah. It's critical for all of us to do everything that we need to do to avoid microplastics. So I don't know if you want to talk about that now or we can go on to more of the studies.

Dr. Lynn Patrick - **15:36**

But I think that one literally the presence of the microplastics in the carotid arterial plaque, the thickening the gunk inside the carotid arteries literally was significantly related to death from an event. Right. A stroke or a heart attack. And that was, you know, it was interesting. I was looking at some of the. We get these in our Inbox, Medline and Medscape. They're like the People magazine of medicine.

Dr. Jill Carnahan - **16:09**

Exactly one.

Dr. Lynn Patrick - **16:10**

On this study, there was a quote from a cardiologist. Not anyone who was involved, not an author of the study. But the quote was, this is the most horrifying thing I've ever seen. Unquote. You know, People magazine. Yeah, but it's very rare that you hear a cardiologist or any specialist say, this is the most horrifying piece of research I've ever seen.

Dr. Jill Carnahan - **16:34**

That's true, because there's a lot of other things that are happening with a cardiovascular system that you would think would bring up the news. But I agree with you. This is like. And that's why I wanted to have you on, and quickly, because we need to start talking. Let's talk studies and research and then stay tuned because we're going to talk about what you can do about this. Because what I hate to do with environmental toxic load is always bring the doom and gloom, which we know there's a lot of, and it's relevant. But in the end, I promise, guys, if you stay tuned, we're going to give you some practical suggestions of what you can do. But let's. Yeah, let's found it in kind of what is the research about how toxic these things are.

Dr. Jill Carnahan - **17:08**

I did not know about the combination with other chemicals, but that makes perfect sense.

Dr. Lynn Patrick - **17:13**

And then. So the other. Just to put a finer point on that, what we are finding, you'll be interested in this is that microplastics have biofilm. Biofilm. So biofilms we know are communities of organisms. They can be fungal, they can be bacterial, they can be viral. And the biofilm is the protective layer around that community that keeps antibiotics, antifungals, even botanicals from actually getting in there and dealing with an overgrowth of those organisms if they're dangerous. Right. So the research is looking at biofilms in the ocean, but also biofilms in animals. We can't do this research in people. It's just we. We're not there yet. But even animals who are exposed to microplastics through the gut have biofilms. And that's dangerous because those biofilms can be pathogenic organisms. And they found pathogenic organisms living on microplastics and nanoplastics.

Dr. Lynn Patrick - **18:29**

So what happens when these organisms get. They're small enough to get in through the gut and into the systemic circulation and wind up in an artery or a vein or even in an organ in organ tissue. Right. So that's a Concern. The other concern, and a really, also an interesting study, was a study looking at the microplastics in brain tissue. And I think that. Let's see. I think I actually have the picture of that. I think I got rid of it. Where they were looking at. Here we go. They were looking at the microplastics in the brain. And what they found was that in the. These were decidents. These were, you know, people who had passed. And what they found was that there was a significant amount of microplastics in the brains of those who had dementia.

Dr. Jill Carnahan - **19:28**

Hey, just a quick reminder for those of you who are practitioners, I haven't mentioned this very often, but two things. One, at my main website, which is my name, jillcarnahan.com in the upper corner, you can find four practitioners. And if you click that button and want to subscribe to my practitioner only newsletter, there's no selling involved. You just get access to all of my latest research articles, classes, training courses, things like that. So if you're a practitioner or provider and you want to learn more, you can click there and stay in touch with me about future master classes and all of that.

Dr. Jill Carnahan - **20:00**

And that is again in the upper corner for practitioners on my website, jillcarnahan.com also on my website, if you want to know more about Plasma Exchange, which we discuss in this episode, you can click on Services and go down at MD Lifespan and click on that link to schedule a free call with physicians. And finally, if you are looking for a physician, our clinic is accepting new patients. So you can get our phone number on the website or just call 303-993-7910 and schedule a free call with one of our providers. Okay, let's get back to the show. Yeah, I've seen some of that literature and it's. It's scary, babe. It is so true.

Dr. Lynn Patrick - **20:37**

It's significant. It's not like, oh, a little bit more. It's a significant increased amount of microplastics in the br. So that. And that was the study that showed that in the last eight years, because they looked at people who'd passed from 2016 to 2024. So very. This study was just published last year, right? So they found that in that last eight years, the amount of plastics they were finding in the brain increased by 50%.

Dr. Jill Carnahan - **21:15**

Wow.

Dr. Lynn Patrick - **21:16**

100 would be double. 50% would be a half. But that is sign. That's.

Dr. Jill Carnahan - **21:22**

That's so unbelievable. It is unbelievable. And again, you and I have been in this world, environmental toxicity, for decades, Both you and I and to me, this is one of the most astounding and kind of, like the cardiologist said, scary things that we have ever seen. Mm.

Dr. Lynn Patrick - **21:38**

It is. And to see the. And again, you know, the. The criticism always, especially in my field, environmental medicine, is just because you have two things that are correlated, it doesn't mean that the toxin causes the disease. But if you look at the amount of microplastics and nanoplastics, because we can see the nanoplastics now, we have the technology to look at them in the dementia cases. Let me just.

Dr. Jill Carnahan - **22:07**

Yeah. Please look at the share.

Dr. Lynn Patrick - **22:09**

Because it's fast. The picture is always worth a million.

Dr. Jill Carnahan - **22:11**

It is. It really is.

Dr. Lynn Patrick - **22:13**

So this is the study.

Dr. Jill Carnahan - **22:15**

Okay.

Dr. Lynn Patrick - **22:16**

And let's zoom in here.

Dr. Jill Carnahan - **22:19**

Yeah. Beautiful.

Dr. Lynn Patrick - **22:20**

And this. So the normal brain. You can see that the levels in the normal brain are Almost up to 10,000 micrograms per gram of microplastics. The dementia cases were far above what had even been measured in the brains of those who didn't have any dementia. So they had died, as far as we know, with no diagnosis of Alzheimer's or any kind of memory impairment or any kind of dementia. So the thing is that these micro and nanoplastics. MNP stands for micro nanoplastic. Because we always have to define a microplastic by the fact that it can get very tiny.

Dr. Jill Carnahan - **23:12**

Yes.

Dr. Lynn Patrick - **23:13**

And if we can't measure those nanoplastics, we're missing 90% of the microplastics that are there. So we always want to be able to measure the nanoplastics.

Dr. Jill Carnahan - **23:22**

Yeah, that was a fact that I really. You said it earlier, and I want to kind of emphasize it, that 90% is these really tiny. Because when I think about them, I think pieces of credit card or pieces of plastic of the body, I can invisibly see. Right. But 90%, you're saying 90% are completely invisible to the naked eye.

Dr. Lynn Patrick - **23:38**

The size of the SARS CoV2 virus.

Dr. Jill Carnahan - **23:40**

Crazy sense, because. And another little analogy, I would always talk about mold and mycotoxins. You know, that's my thing. And when I would try to describe the reason why inhalation is more dangerous than ingestion, it's because this inhalation has no ability to filter that alveoli to the blood. And it's the same kind of thing with these microplastics.

Dr. Lynn Patrick - **24:03**

Absolutely.

Dr. Jill Carnahan - **24:03**

They go immediately into the blood, and then any membrane is too small to filter because we have natural physiological filters like the blood. And what you're saying is all of our natural filters are no match for the microplastics and the nanoplastics like a virus.

Dr. Lynn Patrick - **24:16**

I mean, think of the SARS CoV2 virus, right? It easily got into the systemic circulation from the lungs where it was respired. It's the, it's a perfect analogy because it's the same size.

Dr. Jill Carnahan - **24:28**

Yes, yes.

Dr. Lynn Patrick - **24:29**

So I think the other interesting research is looking in mic at microplastics in the guts of people with inflammatory bowel disease.

Dr. Jill Carnahan - **24:39**

Wow. Wow. And okay, so let's comment on that because what I'm seeing clinically and the research is showing this. We used to re 20 plus years ago when I graduated from medical school one, you would see 20s, 30s, 40s, but you would not see teens and even younger, like even in the single digits, children, young, almost babies being diagnosed. And I'm talking, you know, 5, 6, 7, 8, 9. And nowadays we are seeing epidemic proportions of very young children. And part of the question is why are these young children being diagnosed with a disease that used to be in 20s and 30s and above? And I think you hit the nail on the head as to partially why.

Dr. Lynn Patrick - **25:16**

Well, you know, we've got a lot of toxins that can contribute to Crohn's disease specifically. But I think the fact that they found in these multiple biopsies, they found significantly higher levels in the guts, in the intestinal tracts of those diagnosed with inflammatory bowel disease. Now, again, relation is not causation, but it is suspicious. And we have to be extremely mindful of those Trojan horses, right? We're talking about antibiotics, we're talking about pesticides specifically that wreak havoc with the gut microbiome. Bisphenol A has been shown to alter the microbiome severely, like denude the micro, the gut wall. So we know that bisphenol A, polychlorinated biphenols, nobody knows what those are, but they're a serious toxicant in our world. They're also in microplastics and they also have been shown to cause inflammation of the gut lining. Right?

Dr. Lynn Patrick - **26:30**

So we can't think of them as these little inert polymers. They're literally very dangerous Trojan horses. So that's a concern. There's also a serious concern in multiple papers in the literature about increased risk for colorectal cancer because of the inflammatory event effect of these microplastics in the intestinal tract. So these are serious articles in the gastrointestinal literature, right, in the GI journals saying, you know, microplastics found to be serious potential cause of colorectal cancer. We know the colorectal cancer incidence is going up higher and higher in younger people. It's not really going up in those over 50.

Dr. Jill Carnahan - **27:17**

Yeah.

Dr. Lynn Patrick - **27:17**

But it's significantly rising in younger people. And by young, we mean, you know, 40s.

Dr. Jill Carnahan - **27:24**

Exactly.

Dr. Lynn Patrick - **27:25**

30S and 40s. And so we have to think of that as a potential contributor if not causative agent. Right. Because of what we know about what's in microplastics. I think it's also really important to understand that. Well, there's a lot of questions in the media right now about whether or not people should measure their levels of microplastics. So there's one lab called Arrow Labs that I think is aligned with a Dutch lab that actually can measure down to that 20 nanometer level, which is very low. There have been a bunch of journalists that have gotten their microplastics levels measured. They're in the millions because many of these were journalists who were in war zones and only had access to bottled water for months and months at a time. Right.

Dr. Lynn Patrick - **28:24**

And so when I read those articles and think about the relationship of one, how that information affects your limbic system, you know, it's not going to be good. But second, that we've all been exposed historically because these are foreign materials that our body does not know what to do with. It's not like, you know, even to some degree, we're able to get rid of mold.

Dr. Jill Carnahan - **28:52**

Yeah, well, you know what, let's go there because I think those who listen, you know, they've heard you and I both talk before and me a lot about. But biotransformation, that's our body's ability to take something toxic and transform it into excretable product. Our body can't biotransform plastics. But do you want to give just a two minute lecture on why this is so different from an organic chemical or substance that's lipid soluble that can be transformed and excreted in the urine or stool? Because that's really the heart of the problem here is this does not fit into our detox system of what we.

Dr. Lynn Patrick - **29:23**

This would be interesting because I'm thinking on the fly. I haven't thought that much. But the difference between a plastic particle and any other toxicant is, like I said, it's an amalgam. It's an amalgamation. A combination of 900 different toxins that have been melted together. Literally. That's how you make a plastic. Right. Is lots of heat. You take these coal derivatives and gas derivatives, you know, we call them solvents like benzene. You Melt them down. You make plastic out of them. Yeah, but you have to add metals like tin and antimony. We see very high levels of tin and antimony in our patients urine now. And were very. Just befuddled.

Dr. Jill Carnahan - **30:12**

Like, where is it coming from?

Dr. Lynn Patrick - **30:15**

I think now because I have learned that you can't make polyethylene, polyvinyl chloride without antimony. You can't. It's impossible.

Dr. Jill Carnahan - **30:26**

Okay, Lynn, this isn't a hobby, because I have seen so many patients with these bizarre levels of metals, and I'm like, where is this coming from? So I think we're on to something as far as I agree with you, but I didn't even understand that correlation of plastic combined with toxic chemicals and tin.

Dr. Lynn Patrick - **30:42**

Yeah, we've seen high levels of tin. It's very neurotoxic. You can't make plastic without tin. So you melt all this stuff

together, literally. And then just because it break, it does break down for a variety of reasons, into little microscopic Trojan horses. These go into your body and your body has no idea how to deal with them, so they make it inside of your cells. So we found these microplast in the cell membrane and the inside of the cells of the liver. Hepatocytes, the renal cells, the kidney cells, the brain. In the glial cells. We found them, you know, the protectors of the brain, so to speak. So we found them inside of the cells.

Dr. Lynn Patrick - **31:30**

Now, usually when we have an infectious organism or even like, you know, let's say a metal, let's make it real simple, a metal in the cell, the immune system goes, okay, I've seen this. The volcanoes a hundred thousand years ago, we've seen this. We know what to do with it. And so there are mechanisms for the immune system. They're called macrophages, to surround these foreign invaders and kick them out, literally. So there's a whole process for elimination to the lymphatic system. Our immune system can't do that. And there's literally cellular research on this showing in a cell culture that the cell cannot excrete the microplastic. It stays hidden in what's called the lysosome. Lysosomes are these little cells that are supposed to spit enzymes at things and kill them, right, and break them up.

Dr. Lynn Patrick - **32:29**

Free radicals, you know, all these things we use as ammunition to break these up. But that doesn't happen with the micro and the nanoplast stuck. And they accumulate. And that's why there's that increase, 50% increase in the microplastics and nanoplastics that were found in the brain biopsies in the last eight years. Right. So were talking just before we got on about, we have to get really creative here. I've seen a lot of articles in the media that say, you know, you want to be a billionaire, figure out how to get microplastics out of the human body. Which. Which probably is true. So I get in my inbox every single day the answer to microplastic pollution. And it's usually a combination of probiotics. Not well thought out, I have to say, because they don't always live well together.

Dr. Lynn Patrick - **33:26**

Sometimes they eat each other up in the bottle and you're buying a worthless bottle of probiotics. But the idea is, and the studies show that there are specific probiotics in the gu. Can bind to and eliminate microplastics.

Dr. Jill Carnahan - **33:43**

Amazing, right?

Dr. Lynn Patrick - **33:44**

So they do. We haven't gotten good human studies yet. So these are mostly animal studies, mouse and rat studies that actually show that just like they can bind to heavy metals. Probiotics. Specific ones. And they're very specific. I have not seen them in the, you know, ads for that. How to get rid of microplastics probiotics, because I think they're expensive, but they can bind and eliminate. But here's the question. What happens to all the ones that are left behind in your lysosomes of your brain and your kidneys and your penis and your ovaries and your testicles and your placental barrier and your fetus? You know, how do we get those out? So we don't have. Right now, today, January 2026, we don't have answer, but I think there are answers for that.

Dr. Jill Carnahan - **34:41**

I do, too. And I'm going to go also, too. Like, so people out there like, okay, this is scary. And it is. Even you and I talking, it's like, okay, what do we do? Let's talk about avoidance is a tiny piece. It's not the whole answer. But what are obviously plastic water bottles, but where would you. What would be the top five things you tell people to really try to put in place to these. And then I want to talk about total plasma exchange, because you and I have some experience on that.

Dr. Lynn Patrick - **35:04**

We do, we do. And there's research, there's data published on that. So I think that we have to rethink where our beverages come from. You know, a lot of the beverages that we drink, there was just a study released looking at mineral waters, and even the ones in glass had high levels of microplastics. And Nanoplastics in them. Because a lot of those waters originate from a hose. I mean I call it hose water because it's a good analogy. Right. Like, like you don't want to drink out of a hose. Hoses are toxic, made out of plastic and.

Dr. Jill Carnahan - **35:42**

Right. Rubber.

Dr. Lynn Patrick - **35:44**

And a lot of those, what those waters, even though they're nicely carbonated, they come out of a hose. So we really have to just get used to. Oh, I'm going to carry around my little thermos and I'm going to drink water that's filtered and I actually have. I'll send it to you. I did some research for this talk that I'm giving looking at the actual filters. You know there are some pour through filters so you don't have to spend.

Dr. Jill Carnahan - **36:11**

Yeah.

Dr. Lynn Patrick - **36:12**

Thousand dollars that are certified to get rid of micro and nanoplastics and they're not expensive. So there are easy ways to filter your water for everybody. You know, even if you're renting and you don't want to put a reverse osmosis under your sink, you can buy one.

Dr. Jill Carnahan - **36:28**

I would agree. I'm in a condo and people ask me all the time. I do not have an R neurosystem but my bath water, my. I obviously don't drink anything but filter but I have a good probably 30 filter that actually filters microplastics and an expensive one too. But you don't have to spend a lot of money to filter it.

Dr. Lynn Patrick - **36:43**

Absolutely not. So the, and fortunately for us, the NSF stands for National Sanitation foundation but it's actually a non profit actually certifies companies, they do the testing, the company tests and they test to get rid of micro and nanoplastics and we can trust that. So there are good sources of information that actually you can trust. So I think filtration of anything that goes in your mouth is important. Now what about tea and soda and beer and wine? Beer does have microplastics in it. It's the tubing in the breweries. I'm sorry but they're there. So you may want to think about limiting your beer intake. But clearly far and away the highest source of micro nanoplastics is tap water and bottled water.

Dr. Jill Carnahan - **37:35**

Yeah.

Dr. Lynn Patrick - **37:36**

So I put those together. Bottled water has outrageously high levels of micro and nanoplastics in it. So we really have to stop drinking out of plastic. And sadly that's going to include beverages that are in plastic bottles. So that would be tea and soda and anything else that's liquid that comes in a soft Plastic bottle, that soft plastic degrades into the beverage.

Dr. Jill Carnahan - **38:04**

Yeah.

Dr. Lynn Patrick - **38:05**

And that's been tested. So I think the other important area, and this is some research that just came out, I think last year, maybe 2024, is the. The plastic that teabags are made out of.

Dr. Jill Carnahan - **38:19**

Yes.

Dr. Lynn Patrick - **38:20**

So tea bags, they look like they're paper, but they're really not. They're a polystyrene fiber. And the amount of microplastic particles in a hot cup of tea with one of those tea bags is significantly higher than if you were drinking bottled water.

Dr. Jill Carnahan - **38:40**

Wow.

Dr. Lynn Patrick - **38:41**

It's probably the number. Literally, I should revise what I say. It's the number one source of microplastics in terms of the amount of microplastics in that cup of tea. Luckily, there are tea companies that do not use microplastics. They use paper, you know, recycled paper, organic paper. And I have those listed in my slide set, too, so I can send you those. There is just a piece of information. There's a plastic called poly lactate that tea companies are using that is supposed to be a green plastic. It's made from a plant fiber, but it's polymerized in a way that it probably acts more like a microplastic or a nanoplastic. So we have to be a little.

Dr. Jill Carnahan - **39:31**

Careful about these kind of like the BPA free bottles. Right. They're just another form of plastic.

Dr. Lynn Patrick - **39:36**

Yeah.

Dr. Jill Carnahan - **39:37**

I like to say any sort of plastic is. Doesn't matter. BPA free or not, you're still, you know, getting microplastics.

Dr. Lynn Patrick - **39:43**

Right. You're going to get diabetes from bps just like you will from bpa. That's a study published actually in people who they followed for nine years.

Dr. Jill Carnahan - **39:52**

Right, right. I think talking. Or last, I want to be sure and get in the total plasma exchange because I think this is going to be. But tell me, I mean, you have some personal experience and you know a lot about this. And I'll just frame it with. What I realized in the last year was I do detox. That's my world. Right. And I realized, oh, my golastics, there's no binder. There's no. And you explained so well because it's in the lysosomes, it's in the tissues, and our body doesn't know what to do with it. And it's also combined. And so our old ways of detox are not enough for this new world of toxicity. So tell us, maybe just frame what is total plasma exchange? And then why might that be part of the solution for this issue?

Dr. Lynn Patrick - **40:30**

Right. So there are a lot of different kinds of ways of cleaning plasma that we've been doing for 50, 60 years. Right.

Dr. Jill Carnahan - **40:38**

This is not new. That's the other thing. It's not at all forever for Guillain Barre and autoimmunity. And many big hospitals have these machines. So they.

Dr. Lynn Patrick - **40:45**

This is not high levels of blood fats, cholesterol. Yeah. So this technology has just never been applied for this purpose before. But what's astounding to me, and I have a whole file of articles on this, is when we look at what comes out of the plasma when we put it through a filter or we just remove it, is high levels of pesticides and solvents and metals. Those are the three things that I've seen in the actual lab reports. But I think there are other things like microplastics. There was one study where they literally looked at the. That was a filtration plasma phoresis. So your plasma goes through a filter and then comes back into your body. And they looked at the microplastics in the filter itself before they put the blood through. And then they looked at which people wanted to know. Right.

Dr. Lynn Patrick - **41:39**

I don't want to have my plasma go through plastic and then come back into my body. There were no demonstrable detectable levels of plastic. Then they put the blood through the plasma and then they flushed the filter with saline and they. That's called an elouet. And they tested the Elliot and lo and behold there were significant levels of. I don't want to misspeak. So I want to tell you exactly what it was. It was polyurethane and polyamide.

Dr. Jill Carnahan - **42:15**

Okay.

Dr. Lynn Patrick - **42:16**

So they, you know, they were literally looking for specific plastics.

Dr. Jill Carnahan - **42:21**

Now.

Dr. Lynn Patrick - **42:25**

I have also seen people who've used this procedure to treat. Treat diseases like MCAs, who have gone into remission with one treatment.

Dr. Jill Carnahan - **42:38**

Yeah.

Dr. Lynn Patrick - **42:39**

So how does that happen? Are we removing the toxins that are causing the inflammation? I think we are. So, you know, I've been studying this like you. I think I started studying it around the turn of the century. You know, 202001 was when I did my training, my year long training. And, and this is the most positive thing I've ever seen in terms of literally decreasing the body burden and getting the body to be able to start detoxifying by itself. That's the amazing thing, is that our body burden is so overwhelming to our immune system and our nervous system and everything else that we can't do what our bodies have known is possible 100 years ago, 50 years ago, 30 years ago. So I actually have undergone what's called double filtration plasma phoresis.

Dr. Lynn Patrick - **43:39**

And I had a bunch of blood work done before and after was very recent. And I'm just getting my Elliot results I think next week. So I'll be able to come back on and show you some very scary stuff.

Dr. Jill Carnahan - **43:52**

Oh my goodness. And I'm gonna do the same. I have so many patients asking me because we offered in our clinic. Have you done it? I haven't due to some other things. But it's gonna happen and I can't wait to show. Maybe I'll actually do videos or show the results. I think it's so worth people knowing.

Dr. Lynn Patrick - **44:04**

So here's what you have the ability to do. I'll just say this. If they're physicians listening, the laboratory in Switzerland I use laboratory has the ability to look in the plasma because you're going to be donating plasma for a whole variety of solvents. Parent compounds we can't test for here in the states. Pesticides, we can't test for the parent compounds of these pesticides here in the states. And metals. The metals I'm not so worried about. I think the urine testing is fine for us, but it's the actual looking at what's coming out that is, that's it. Right? That's what we want to know.

Dr. Jill Carnahan - **44:45**

And I could visually seen it because again in my class I had walked down the hall and looking. I mean it's really

gross looking because you see 2, 3, 4, 5. Every time it gets more clear and more clear. So like I visually seen. There is something going on in that first one. It's, it's gross and it gets clearer and clearer over time.

Dr. Lynn Patrick - **45:04**

I saw my plasma. It looked very. Yes. How can I. Burnt sienna. It was still, you know, it was a dark brown.

Dr. Jill Carnahan - **45:13**

Yeah.

Dr. Lynn Patrick - **45:14**

But I grew up in a super fun site, so you know, it's.

Dr. Jill Carnahan - **45:17**

I know. And I have farm. I can't, I can't wait to see what comes out. I'm going to test that so that I can share in the future. So stay tuned. I'll be sharing real time results on that.

Dr. Lynn Patrick - **45:24**

And then you and I, I'll send you the lab rack. And the pricing structure is not bad.

Dr. Jill Carnahan - **45:29**

Okay.

Dr. Lynn Patrick - **45:30**

It's not prohibitive. So yeah.

Dr. Jill Carnahan - **45:33**

Oh my goodness, this is so fun. We could go on. You and I could talk for hours. And I hope at least if you're listening out there, you have a little intro and you're not just Full of fear because there are things filtration, as Dr. Lynn said, getting rid of plastic. I'm even feeling a little guilty because I love my San Pellegrino and I like the glass bottles and mostly use them, but they're still contaminated and I still use the plastic Pellegrino and I'm gonna just not do that anymore.

Dr. Lynn Patrick - **46:01**

Yeah, you can do that. That's easy.

Dr. Jill Carnahan - **46:03**

Yeah, exactly. Easy.

Dr. Lynn Patrick - **46:04**

Within, within. It's like, yeah, we have control over so much.

Dr. Jill Carnahan - **46:07**

Absolutely. And that's why I like that you brought some solutions. You are always up to some amazing things. Is there anything you'd like to share with our listeners as far as where to find you or anything that you're.

Dr. Lynn Patrick - **46:18**

Sure, sure, sure. So I have a company called EM and our mission is to change medicine. So we are teaching what we call the new toxicology, which is what you and I talked about today and training physicians and basically healthcare providers how to start looking at their patients body burdens and assessing and treating that instead of pretending that it doesn't matter, which is kind of what medicine does.

Dr. Lynn Patrick - **46:48**

We also, and I know I've talked to you through these terrible events, but when East Palestine Ohio happened and that combustion event happened and there was a complete and total lack of any public health guidance whatsoever, my business partner and I, who's also a doc, got really frustrated and so we created some courses for people to teach them the basics of what do you do in a, a chemical disaster, you know, what are the basic things and what should you have on hand before a wildfire exactly comes to your area?

Dr. Jill Carnahan - **47:27**

You and I talked about that a few years ago and it's been so powerful because I think people have been. Well, Lynn, you are always at work bringing incredible knowledge to the world. And I know this was no different today. And I'll be sure if you're listening anything related to Dr. Patrick, I'll be sure and link up to her site in the show Notes and wherever you're listening here. But thank you for your work. Thanks for continuing to be a information to the world on toxicants and environmental.

Dr. Lynn Patrick - **47:53**

Toxicity and you and I will be continuing to share our body burdens with the world.

Dr. Jill Carnahan - **47:58**

Right, exactly.

Dr. Lynn Patrick - **48:00**

We're learning.

Dr. Jill Carnahan - **48:01**

Yeah. And what's interesting is you and I probably eat and do a lot of clean things like I think I get the top 10%. But even so it's the proof that you can't completely avoid this like we would like to.

Dr. Lynn Patrick - **48:13**

Well, it's the unavoidables but also the historical exposures that we had when were young.

Dr. Jill Carnahan - **48:20**

Right, were younger.

Dr. Lynn Patrick - **48:22**

Thank you again.

Dr. Jill Carnahan - **48:22**

I appreciate you so much. A friend, colleague and all the brilliance you bring.

Dr. Lynn Patrick - **48:27**

Absolutely. It's always a joy.

Dr. Jill Carnahan - **48:30**

Hey everybody, wasn't that a fabulous interview with Dr. Lynn Patrick? She has been on the show before and she always brings incredible insights and knowledge. I love her incredibly critical scientific brain and researching these topics and bringing us practical information and diving deep. Hopefully you took away that there are some things we can do and that is avoiding plastic water bottles and also the fact that we can have something like plasma exchange. Now if you don't know we mentioned this, I'll link it in the show notes. In my clinic at Flatiron Function Medicine we now offer plasma exchange through MD lifespan, so be sure and visit my website jillcarnahan.com under services. You can link to that and get a free call with a physician.

Dr. Jill Carnahan - **49:11**

Anyway, if you guys have not yet subscribed, please click the subscribe button and the bell to be notified of future

episodes and I will see you again next week with a brand new episode of Resiliency Radio. Until then, take care.