How to Detox Microplastics From Your Brain Transcript

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Introduction to Microplastics and Brain Health

Hello and welcome to the Reversing Alzheimer's Summit. We have a very special interview today with Doctor Miles Nichols. If you've been following along, you know that one of the subsets of root cause that Doctor Burke has identified is chemical toxins, and that could be a range of different toxins.

But ultimately, there are lots of things that are in the body that shouldn't be in the body, that can create havoc with the body and particularly with the brain.

And we wanted to bring in a topic that, if you haven't heard about it already, is going to be like probably one of the nice, important topics over the next five years, and that is microplastics.

And ultimately, you know, we have been swimming in a sea of plastic and for the last 50 years and ultimately, we are just starting to see the externalities of that.

As you know, these very small pieces of plastic, you know, pile up in our body, in our brain and cause havoc and and we're very excited to tap Doctor Miles Nichols here because he has been researching this and he has been working on ways to remove these microplastics and is like really ahead of the game.

And so this is a great honor to have you here on the summit. So welcome Miles and great to have you here. Thanks, James. Looking forward to discussing and sharing what I've found in the research.

And I love this topic. It's so important. People I think, are going to be really surprised and sometimes shocked at some of the info that's out there.

Well, why don't we just start at the beginning, like, tell us the moment that you realize what a big deal this was and how you realized that this is kind of what needed to happen and what your advocacy, you need to really focus on this.

Because my understanding and having known you for a decade, you know, you've helped a lot of people with different things. You become an expert in different areas, particularly with things like bio toxins.

And now you're really focused on this, this issue. Why does it have your full attention? Well, for a long time we'd been testing people for a variety of talks accumulation, and it's been no surprise that plastics are an issue and that chemicals in plastics like this, phenols and other things have properties that disrupt the hormones and do a lot of damage to different parts of the body.

So that's been no surprise. And for a long time it's been the recommendations of reducing exposure. But what really got me in, we were writing a blog article and doing some research, and I found this study that was looking at these people who had cardiovascular issues, atherosclerosis.

So they were having plaque build up in form, and there was a procedure to scrape plaque off the carotid artery. And someone decided along the way, let's do a study and let's send this plaque off to the lab, and let's see how much of this plaque contains microplastics.

And the study showed that there was no surprise microplastics and a lot of the plaque for a lot of the people.

Why Microplastics Became a Major Concern

But what was surprising is that if you looked at people who would have appeared to have the same risk the cardiovascular disease and incidence, based on their plaque levels, that the ones who had more, significantly,

more microplastics in the plaque had significantly more actual events, actual actual heart attacks, and cardio events, which to me it was a little bit different, a little bit different than saying, okay, these can impact your hormones, these can impact different things.

It was actually saying, okay, the biggest thing that we talk about in medicine and in research is a risk for heart attacks. We can have a very different risk if microplastics are present or not present at different levels.

And that made me realize that maybe this is actually a little bit bigger than I thought. And then I started finding study after study after study after study after study.

That made me realize this is actually, a heck of a lot bigger than I thought. And it's unfortunately not. It's starting to get talked about more, and it's actually hitting mainstream more, which is great.

And I think there's ripe information for that's not commonly talked about that people need to understand, especially in relation to the brain. And that's where we'll focus today.

Yeah. Let's talk about that today. And I just want to share actually a story from my own experience of like an intuitive moment that I had. So, you know, 15 years ago, I was a sales rep and the sales manager that I had, you know, where to keep a big 24 pack of bottled water in the back of his car.

And, you know, we learned that he lived in Atlanta. So basically, most of the time it's like unbelievably hot in the car. Right? And I could just remember, like one time getting out of the car and, you know, he said, hey, do you want some water?

And I said, yeah, they gave you the water. And I opened it. I took a little swig and just intuitively, I knew that something in this was poisonous. Like there something was telling me, like, do not drink this water.

And it was just like an early sign to me that, like, clearly, you know, if you have plastic and it warms up, it's more likely to leach into the water, and water is sitting in that bottle and you don't know where it's been before you bought it, and then now you know where it is.

And so like, I just, that was like an early sign to me that, like, I was able to intuit something about what was happening. And now here we are. This much later is no surprise that this is coming out as a as a thing.

Yeah, James, that that brings me back to college days. And actually I was grew up in Tucson, Arizona, and I started college there where it's hot, really hot in the summer.

And I remember just having it. I was playing ultimate Frisbee. I played ultimate in college. And so we had these jugs, big plastic jugs, gallon jug of water.

So we're drinking a lot with sweating and running around and playing intensely. And I just remember the, the heat, you know, over 100 degrees during the day and these plastic jugs sitting out in the sun.

And, you know, I think that I wish I had known what I know now then what damage did did we all do to ourselves in that situation? You know, and then, of course, we're sweating and moving around in polyester jerseys and it's just funny what we do when we don't know.

So what are the, like major ways in which we acquire microplastics. Like, what are that. If you had to look at the sort of different causes it's bottled water, the main one or that other key ones that we should be thinking about as we think about how to moderate our environment.

Yeah. And I want to emphasize the importance of, of the brain, which we'll get to, I'm sure the exposures are I mean, the bottled water people think of.

And yes, of course, bottled water, weirdly tap water to, you know, tap water. The even in the US, even in places

that are actually, you would think might pay more attention to filtration and sanitation.

Actually, we see very high levels of microplastics. And what I remember coming looking at this study and it had pictures and these pictures were just incredible to see us tap water.

Common Exposure Sources and Everyday Risks

And it was a magnified picture of these plastic strands colored, you know, colored strands of plastic, and then these particles of plastic. And when we talk about plastics, we have to talk about microplastics and nano plastics.

Microplastics are quite small. Nano plastics are even smaller. So different particles of plastic can look differently. But the I mean, they were comparing different countries and it was not much better in the US.

In fact, U. S. was worse than many other countries in very a lot of countries are very bad with even tap water. So bottles unfortunately aren't the only way to get plastics.

You're going to get a lot. And because it's in the tap water, that means every product, even if bottled in glass, you'd think. And I would have thought, oh, let's go buy you know, our sparkling water and glass and we're good.

But unfortunately, if it's what's the source water. And is the source water already high in microplastics? And there have been some labs that have done some tests on some of the products that are bottled in glass.

And unfortunately, you you can't rely on that. So it's less than it's it's bottles. That's a big thing to consider. Even tap water is a big thing to consider.

The biggest exposures really are water and food. And where a person lives are going to be the three biggest variables. And there are a bunch of other sources as well.

Tell me about getting like, I, I feel like, you know, I can't order like Asian food with the styrofoam without thinking about it. What, what is sort of some of the other classics that you think should be, should be on our radar as things to like hot avoid?

And is the heat a big component? Yeah, heat plus plastic is not a good recipe. And fermentation or acidity plus plastic is not a good recipe. So those two things you can think of together is problematic.

And that's the biggest, probably one that a lot of people do and is coffee, for example, or tea and coffee cups. Often, even though they look like maybe they're made from some kind of paper.

Often there's a plastic mining on the inside and then those, those caps, of course, flimsy plastic caps, and then all the steam coming up against those cats are going to leach plastic and, and the studies show significant increases in microplastics from that heat plus plastic and then cans aluminum cans.

You think oh aluminum. That's metal well lined with plastic generally. Then you think of something acidic like tomatoes in that can now you have acidity plus plastic lining.

And that's likely to leach. Any products that are fermented are going to be more acidic. So anything like yogurts and fermented vegetables and meats in plastic are going to be leaching a little bit more.

And unfortunately, some of these things are just hard to avoid, and you're just not going to be able to avoid everything. You can avoid microwaving in plastic.

The popcorn bags are really bad because if the popcorn bags are horrible, so microwaving popcorn in those bags is definitely one to avoid getting coffee out.

Trying to bring something kind of a stainless steel container with you is a great way to do that. If nothing else. If you

can't avoid the cup, at least don't put that lid on.

There is, you know, one thing that's actionable and easy for people to do. So filtering water, looking at the elements of heap of plastic, looking in the elements of acidity plus plastic are going to go a long way and help people to to reduce exposure quite a bit.

Also. Yeah, those are really great practical tips. So let's just talk a little bit about the brain. Like why is the brain particularly susceptible to this?

How does the plastic go from like through the alimentary canal and like get into the brain in the first place. And then when it gets there, what does it do?

Well, one of the body's biggest and strongest defenses against brain problems is the blood brain barrier. And the blood brain barrier is this protective filtration that's preventing bacteria and organisms and infections and chemicals and toxins and so forth from getting into the brain.

Unfortunately, it has been shown that microplastics actually are able to cross the blood brain barrier. And because they're small enough to get through some of them, micro and nano plastics, and there's been evidence that's very clear that have shown that there's accumulation.

And in even the most important parts of the brain, things like the hippocampal, the hippocampus is where memories are stored, and the prefrontal cortex, where it's about learning and and cognition.

The memory centers, the learning centers, the emotional centers. We do see accumulation of microplastics. So that blood brain barrier, while it's very, very strong defense, unfortunately, it's not defending against microplastics.

Microplastics and nano plastics are making their way through. And there are human studies confirming this is not just animal studies. So, for example, we see that there's one human study showing accumulation of microplastics in the brain have increased dramatically when we compare back to 2016.

This study is looking at just just this past year, 2024. And there were samples of of brains on autopsy that were tested, and there were about 50% more microplastics in brains, on average, that were autopsied in 2024 as compared to just eight years prior.

How Microplastics Reach the Brain

In 2016, 50% more. And the accumulation they were testing the liver, they were testing the kidneys and they were testing the brains. Now, all of the livers, the kidneys and the brains that they autopsied had microplastics.

So it's just ubiquitous. Everyone has them in their organs. But the difference was with the brains and and this is just I mean, this is one of the things that got me also really interested in microplastics is that the accumulation in the brains was actually substantially more.

You think blood brain barrier is going to be protective and we're going to see less accumulation in the brain. Actually, it was more than in other organs and not a little bit more than in other organs.

It was 10 to 20 times more microplastics accumulated in the brain as compared to the liver and the kidneys. And so that they, they did, you know, over 90 autopsies and the 12 of the 91 or so that they did were individuals that died with dementia, including Alzheimer's disease and those brains as compared to the brains of those who did not die with the mentor.

Alzheimer's had ten times more microplastic by weight, as compared to those without dementia, which is, you know, already 10 to 20 times more in the brain than in the liver, kidneys, and with dementia ten times more than without dementia.

So to me, that's opens the question of if, on average, those who have dementia, including Alzheimer's, have at least ten times the microplastic accumulation in the brain, especially regions like the hippocampus and the prefrontal cortex, the hippocampus, relating to memory, then to what degree?

And this is an unanswered question, but to what degree do the micro nano plastics contribute to the actual disease process? We know there's a correlation.

We know there are mechanisms of action, and we can discuss those if you'd like that. That would suggest that micro nano plastics may play a role. And it's now the question is to what degree does it play the role versus other things.

Yeah. Well let's talk about the mechanisms of action and then let's get into solutions. Because ultimately, you know, I think everyone is coming to the summit for is to try and find ways to reduce that future risk support, you know, people who might be starting to get some of those first symptoms.

And we'll get into that. So yeah, let's talk a little bit about the mechanism. And then we'll get into go deeper from that. Yeah you might say well why why should I care if microplastics are lost in the brain.

Are they just, you know, they're are they passive, you know, or are they doing something problematic? And the answer to that question is there's good evidence that suggests that microplastics actually do contribute to inflammation and that the brain responds, responds to the presence of these microplastics by increasing inflammatory what are called cytokines, cytokines or inflammatory proteins, things like TNF alpha, IL six or interleukin six, which have been linked with chronic inflammation.

A lot of studies have shown that people who are exposed to. So there's a whole bunch of studies that that inject endotoxins directly into the bloodstream and see a rise in IL six and TNF alpha inflammatory markers.

And people feel horrible. And what we know about the brain is that neuro inflammation, inflammation in the brain is absolutely connected. In research with depression, mental health concerns, cognitive decline and a variety of other issues that people have not uncommon.

And so anything, anything that will increase neuroinflammation may put people at greater risk for cognitive decline and may contribute to mental health concerns, memory concerns, learning concerns, brain fog, fatigue, and a variety of other things.

So I think this is there are enough mechanisms to say that it is very likely that some of the inflammatory byproducts associated with the brain's response to the presence of microplastics in the brain are likely to contribute to neuroinflammation and microglial activation, and this is the defense mechanism of the brain trying to do something about it.

But yet the result is damage. Yeah, that makes a lot of sense. And all the way through the summit, you're going to hear about brain inflammation as a primary driver of cognitive decline.

And mental health. And so I appreciate you bringing that up. And I think that's critical. And you will get lots of other great resources throughout the summer on reducing, brain inflammation and actually even some of the promising medication that is in the pipeline, the mechanism of action is reducing inflammation.

But, you know, much like a GLP, you know, you can take that in the short term and it can do the job. But ultimately, like the long term solutions to many of these things are about setting up a life that will create lower brain inflammation and doing that healthily.

And we're going to have lots of good stuff on that throughout there throughout the week. So let's get into some of the strategies, particularly for micro practice.

Myles, what I know now that you've been working with patients and seeing it, it seems to me what you said earlier

that there's like higher concentrations in the brain than the liver and kidneys.

Inflammation, Cognitive Decline, and Dementia Links

Like it makes sense to me because the liver and kidneys are there, sort of like there's constant flow through those organs. Right. And, you know, the brain is maybe not in as much flow.

It's sort of like an end point as about as like a through fair. But I'm just wondering if that makes sense to you. And then ultimately, like, what are some of the strategies that you've seen for detoxing.

Yeah. Well there's detoxing and there's exposure reduction. And these are two of the biggest variables to consider. And I mean my unfortunately my my mom's brother had Alzheimer's and passed with that.

And the last ten years were really, really hard. And so I know it runs in my family. So I've tested my own genetics. I've looked at my body. I have one copy of E4, luckily the other copy is E2.

I'm monitoring markers. We you know, we're looking at these blood markers that relate to early onset things like, beta amyloid, 40 to 40 ratio tau protein or a filament light chain.

There's some good markers that are helpful in screening. And when it comes to micro-plastics specifically, there's been urinary tests for a while, but have shown some of the chemical byproducts like this phenols and bpas and things like that can be tested in the urine.

That's one proxy to understand the load in a person. However, it's not perfect. There's more recently a blood tests that are looking at microplastic levels in the blood.

So we're seeing testing come along. It's early days, but we're seeing it come along. And as it comes along and gets better, well will actually be able to say more about what can reduce the accumulation.

I'll say what what mechanistically seems like it will, and hopefully I'll be able to say in the future what has shown to. And so just to to recap, back to exposure in water, I just want to emphasize water is just so important.

You know, tap water alone, tap water alone can have up to 1.2 million microplastics annually. That that people are exposed to. And if if people are drinking bottled water, that can increase an extra 90,000 microplastic particles.

And in some of the research so, so certainly bottled is one thing to, to to to think about and that that drinking water range, you know, a couple hundred thousand to 1.2 million particles per year is significant.

And then food is super significant as well. Estimates are somewhere between 488,000 and 577,000 particles per year from food. So as you can see, foods lower on average than drinking water, but still quite significant air is actually significant as well.

You can breathe it in. Unfortunately, their estimates are between 200 and 10,002.51 million particles per year from air. And interestingly, indoor air is more than outdoor air.

And I'll repeat that in there. Indoor air is a greater exposure to micro nano plastics and outdoor air, but the estimates are for outdoor air about 46,000 to 210,000.

And for indoor air, 160,000 to 2.3 million particles annually. So clean air, clean water, clean food are going to be huge. Fruits are an exposure. Vegetables are an exposure.

Fish is an exposure. Salt is an exposure salt. There's there's found a microplastic free salt recently which is fantastic. And, it's not a huge exposure 5000 to 7000 particles per year.

So if someone's, you know, trying to make the highest level change, salt isn't the thing to worry about. But, but it's

on the list for sure. And the of the foods where fruits are actually fairly significant.

448,460 2000 per year. So, so so that's a pretty significant, finding for fruits. So consider food, air, water to be the big three, the biggest three.

And to really utilize filtration to utilize filtration well is hard because nano plastics by definition are extremely small, which means you need very good filtration.

So on water, reverse osmosis filtration will do it. Some other filters will do it. And a lot of filters won't. Britta in your, your fridge, just. Sorry. It's not going to do it.

Reducing Exposure and Supporting Detoxification

So it's made out of plastic. Yeah, yeah, yeah. So, you know, and and people ask, oh, well, what about my reverse osmosis filter that has, you know, the plastic membrane.

Well yeah. It's not going to be perfect. You're going to get a little bit. You're going to pick up a little plastic, but you're going to get rid of almost all of it.

So you're going to get rid of almost all of it. Pick up a little. You'll be much better off. You know, maybe someday someone will develop an all stainless steel, you know, kind of solution there.

But you're going to go a long way from clean air, clean water, clean food. Those are the three biggies to to really pay attention to and know the principle of heat plus plastic, the principle of acidity plus plastic.

And that's going to go a long way. And so for indoor air filters that are have high grade Hepa filters, like 13 filters are going to be really great. And to to do that in the home.

And then for the indoor air and, and there are car filters as well car Hepa filters to to help when driving around for doing a lot of travel. So those are things to consider.

And for food really paying attention as best you can to choosing foods that are going to be lower in exposure when it comes to detoxification and getting rid of accumulation.

We can talk a little bit about that. Again, we don't have specific data. And the question people ask is are these forever? Once you accumulate, are they accumulated forever?

If it's in the brain, can you get it out? Is a big question that people ask, and I wish I could answer that question definitively from research. I can't, but what I can say is, I can say that mechanistically.

If we look at some ways in which the body is able to, and the data from which the body is able to excrete toxins through the urine, through the sweat, through other mechanisms, it would seem reasonable that there is the capacity to get rid of at least some of the microplastic accumulation in the plastic accumulation, and there are some things that may be helpful with that.

I'll pause there and then we can dive deeper into that. Yeah. Well, let's just take a minute just to wrap up with that Myles. Because you know, obviously in other series we've had people talk about, you know the the importance of sleep.

And that's really when the brain is being cleaned. Right. And the Glimt flow and that kind of thing. So are there ways that you can support healthy detoxification of the brain, even if it's just like your intuition based on helping people detox over time?

Because ultimately, you know, in the same way that like, you probably could have intuited a lot of this before. And I think I just shared some of the ways in which I have.

So I don't think we need to wait forever, you know, for a specific, you know, what can you do ahead of time now that is like, you know, taking advantage of the precautionary principle and, you know, some, some recommendations that you might have for, removal, from the brain.

Yeah. So first I will say reduction of exposure may allow the body to naturally excrete more than there's accumulation or at least change that ratio of how much people are accumulating versus excreting.

The detoxification pathways in the body can get quite complex. There's phase one and phase two liver detoxification. There's the liver putting certain fat soluble toxins into the bile and that bile going into the intestines and then getting recycled.

So some of that toxin just recycles and doesn't go out unless people are taking things like binders to bind some of the bile and get it out with the stool.

There's also the kidneys that are excreting some of the toxins through urine. And then there's sweating through things like sauna to excrete toxins. That way there is evidence that certain toxins come out of the skin, like metals will come out of the skin.

There's some chemicals and some plastics may come out of the skin, but there's not great evidence. I don't think that's the probably the primary way to detoxify plastics.

And we don't know from research yet, but my suspicion is that that sun is great for general health for a lot of reasons, but it may not be the best way to excrete microplastics, probably mechanistically based on phase one.

Phase two liver detoxification based on the cellular transport, because we have to get toxins out of the cell too. And there are transport proteins that transport toxins out of the cells.

And then there are cell membranes and some toxins can incorporate into the cell membranes, is that if we look at some membrane turnover, the cell membranes are made up of of fats and lipids.

And these are really important, especially in the brain, that things like fast acetal choline may be important for helping to incorporate new fats in the cell membranes, so that the cell membranes can push out some of the other fats that were in those cell membranes.

And then the body may be able to the liver may be able to sequester some of that into bile, and especially together with some upregulation of phase one, phase two liver detoxification, as well as bile formation and flow and binding and getting rid of bile compounds like sulforaphane is a great one from cruciferous vegetables, and that one it appears to upregulate multiple detoxification pathways and may be significant.

So something like Colleen Sulforaphane would be to there may be some utility of butyrate. Butyrate has some fat exchange as well. And alpha lipoic acid or R lipoic acid is a compound that we know has some relationship with metals and detoxification of metals.

And it may also contribute and help. And it crosses the blood brain barrier.

Hope, Testing, and Where to Learn More

While we don't know yet for microplastics, we we're considering things like sulforaphane, alpha lipoic or R lipoic acid, phosphates, choline and butyrate being some of the initial compounds to really consider in relation to, detoxification of micro nano plastics that has reduced exposure and some of the testing to see if things are reducing in the blood or in the urine are our best strategies.

Right now for microplastics. Myles, your wealth of information is be super helpful. I'm really grateful to share this information on this. Yeah, I don't think we've had anything about this kind of topic in years gone by.

And I appreciate your stepping into leadership on this and, excited to, hopefully see you get a lot of traction with talking about it because it seems like this is a mission critical, part of environmental medicine.

And I'm grateful that you're leading on this. And thanks, everyone, for tuning in to the Reversing Alzheimer's Summit. We got amazing talks today that are really just focused in on all of the ways in which chemical toxins and bio toxins can affect cognitive decline.

I mean, you can hear my story, my father and his journey and how Doctor Berg was able to identify the root cause of his rapid cognitive decline without ever having to see him from across the world.

So there's there's tools that are tools like that and other areas where we talking about specific toxins. But this has been up to Miles Nichols. Doc, what's the best way for people to get in touch with you if they're interested in learning more?

Right. Before I share that, I want to share one. Just hope for people is, is that while we don't know from a mechanistic, data based perspective about reduction of the accumulation by toxins, I can say what we do know from a database perspective is doing MRI of the brain with eye analysis and looking at the volume of the hippocampus, the memory center, and other brain regions.

We do see with treatment and in research, increase in the gray matter, the volume of things like the hippocampus memory center. So we know something's working and there's hope.

And so please do seek help when it comes to how to best find me. Medicine with heart.com is the best place. Clinic name is medicine with heart and we have a blog with lots of free info.

That's pretty. I spent a long time, a lot of time, energy and resources researching and writing. A fantastic content. So if I were you for nothing else, go for the blog and check that out.

If you're interested in finding more about the clinic and other things I'm up to, that's the best place. As well. Is medicine with heart.com miles, thanks so much for being part of the, summit.

This being doctor Miles Nichols will be talking all about microplastics and nano plastics. Thanks so much for tuning in. And we'll see you next to the next session.

Thanks, everyone.