



**Please note: Our transcripts are automatically created and may contain errors or omissions.**

Hi, everyone. We are going to talk about BPA and plastics today and the impact it has on autoimmunity. I'll try to give you some major concepts, share with you a PowerPoint that I have with a couple of videos, a couple of illustrations here to help you understand some of these concepts. And then what I'm going to do is I'm going to take questions and answers, and hopefully I can clarify some of the things, if you are having any questions related to how chemicals impact autoimmunity and specifically how plastics impact autoimmunity as well. So let me share with you a PowerPoint. Let me get out of here. Okay.

There we go. Okay. So today's topic's on BPA and plastic. Many people that have autoimmunity, one of the things that tend to happen is they tend to focus on foods, and the focus on foods really takes away from the impact that chemicals and environmental issues have [inaudible 00:01:29]. And for most part, when people think of environmental chemicals that impact autoimmunity, what they're really thinking about are things like heavy metals, and mercury, and lead, and they're really forgetting everyday household chemicals that could have an impact on autoimmunity, especially BPA.

So drinking out of a bottled water may not always be the best idea, because when you drink out of a bottled water, you're getting some degree of BPA in it. Now, the longer the water bottle has been exposed to heat, and the more acidic the solution is in the water bottle, the more likely that you're going to get higher amounts of BPA. For example, if you had a plastic bottle always stored in your trunk, and your car gets pretty hot all the time, you're getting a lot of BPA breached into that bottled water. And sometimes you can actually taste the BPA, the BPA does have a flavor, so you can almost taste that plastic, just like sometimes when people drink out of hose, they can taste the plastic. So if you're tasting plastic, you're getting a lot of BPA exposure, which is not the best thing to do if you're trying to calm down your autoimmunity or just improve your overall health.

So the other thing to know when you're looking at BPA is that when you're looking at the solution that's in it, so for example, if you put vinegar in a plastic bottle, and then you put something that's, like alkaline water, higher pH in a plastic bottle, the vinegar is going to cause greater breakdown of the plastics, and then lead to BPA being in the vinegar at a higher solution, so when you use the vinegar, you're going to have higher amounts of BPA. So if you're using anything that's acidic, and just so you know, soda is very acidic. As a matter of fact, Mountain Dew, and most soda is more acidic than vinegar, you just can't taste the acidity because they put so much sugar in there.

But if you see, for example, a Mountain Dew bottle that's been in someone's trunk, and then all the BPA's been breached in there because of the heat, and also because of the acidity of the soda, there's a lot of BPA compounds in that solution. So you really want



to be careful drinking out of plastic compounds, and if you're dealing with autoimmunity you could be like, "Well, I've cut down gluten and dairy and [inaudible 00:03:41] paleo, I'm doing all these things and still not getting better," one of the issues is you may really actually have some autoimmune responses.

The other key issue is that drinking through coffee lids is going to be a very effective way for BPA to get into your system. So the plastic lids all have BPA, plastics and other chemicals on them, and when you drink coffee, the heat will release BPA and BPA vapors into your system. So it's a good idea to just take off the lid altogether to avoid that BPA exposure. So if you're having your Starbucks or cup of coffee or use a lid every single morning, you're basically putting in a significant amount of BPA into your system.

And then also microwaving or heating foods is also really, really bad idea. Because you're going to get a lot of BPA breach into your system as the sausages, in this example, are heated up, all that BPA vapor from the plastic lid and from the tray itself are going to leach into the food, and then you're going to ingest that and you're going to get high amounts of BPA exposure. So those are the key ways people get BPA. The other way people get BPA is they get BPA from receipts, as a matter of fact, ink and all receipts have BPA in them, so if you're constantly handling with those types of receipts, you're going to get BPA in through your skin.

So just through plastic bottles, how food is prepared, how food is heated, coffee lids, and touching receipts, it allows the person to get a high amount of BPA exposure. And then over recent years, they started to make BPA substitutes, and the reason they've done that is because there's been really clear evidence that BPA's not something that's healthy for us to be exposed to. The only problem is that we live in a world where we need to use plastics. So the key issue is you may not be able to completely avoid total BPA exposure, but if you have an autoimmune disease, one of the things we talk about in our, we have a course called the autoimmune puzzle, what we talk about is reducing your chemical load. And if you reduce your chemical load, means you're trying to, to try to reduce a significant portion of the chemical exposure, even though it's going to be impossible to get rid of all exposures. But reducing your chemical load exposure if you have an autoimmune disease or if you have chronic illness or inflammation, infertility, endocrine imbalances, is always a good idea, because these chemicals impact the endocrine system and the immune system, which I'll show you in a little bit.

But because of the overwhelming evidence and the Congressional hearings that showed that BPA may be harmful, and have risk to humans, and because of the bad press that led to, then they started to make BPA-free products. But BPA-free products are things like bisphenol S, BPS, or BPF, and if you look at the structure, here you can see A, this is bisphenol A, and you can see these rings, the aromatic rings here, the hydrocarbons, and if you look at this one here, this is bisphenol S, instead of bisphenol



A, and this one is BPF, or bisphenol F. And they still have the same structure where you can see in the very bottom here in these rings, these little H-groups, the hydroxyl groups that really have issues. And these compounds now are being shown to even be more inflammatory, more immune-reactive, more of an endocrine disruptor than BPA itself. So these are, even though you may read the word BPA-free, realize it's just a different version of bisphenol. It's BPS and BPF, and it's not like you're really getting away with using anything that's BPA-free if it's a plastic. If it's a plastic, it's going to have these bisphenols in there, so that's something to be aware of.

And plastics, for the most part, aren't always bad. But if you heat them, and if they're heated or there's acidic solutions in there, then you're going to get a lot of exposure into your system that way. Now, I'm going to share with you a paper that I published in the Journal of Autoimmune Disease, and it was just, I went through the literature and tried to review all the different known mechanisms of how BPA has been shown in scientific papers to really trigger the immune system and autoimmunity, and this is a little complex, technical, it's really meant for a scientific community, but I'm going to try to simplify these things to make it easier to understand. And this was the summary, by the time I went through and reviewed the literature and everything published on BPA and its impact on the immune system for this publication, I made this diagram. And this diagram seems like lots of things are going on, and we don't need to get into the technical terms of it, but you should see that there were lots of things going on.

Each one of these arrows is indicating that there is an immune stimulating pathway that's known about bisphenol, and these immune stimulating pathways may have some type of trigger and influence on autoimmune diseases. So you can see, there's not just one mechanism, there's multiple mechanisms that are involved.

And then, if you take a look at some of these individual mechanisms, let me share with you a few things. So when you get exposed to bisphenol A or BPA, your body can clear it out, and it clears it out through the liver, and you see the word hepatic phase one, hepatic phase two, those are pathways where chemicals can be metabolized out of the body.

Not all chemicals can be metabolized out of the body, like heavy metals can't be metabolized through these liver pathways, phase one, phase two, out of the body. But certain things like bisphenol A or formaldehydes or isocyanates, types of chemicals we typically get exposed to on an everyday basis can be metabolized out of our body through these liver, they call biotransformation pathways or detox pathways. So if our body has the ability to metabolize these, then the BPA gets metabolized, and it's eliminated in our urine, sweat, and feces, and everything's great.

But it needs glutathione to do that, it needs antioxidants, it needs sulfur. So a diet really high in sulfur amino acids and a diet really rich in flavonoids, that provides lots of precursors and compounds to support glutathione production, B vitamins, those things



are important to really have the substrates that you need to clear out these pathways. And also, if people become really depleted of glutathione, from like a chronic inflammatory condition, or exposure to environmental toxins or compounds that deplete antioxidants, they may not have an efficient phase one, phase two pathway to clear out these bisphenol compounds, so they can end up with this chemical compound triggering all these different immune pathways that I just showed you earlier.

So we're going to get exposure, it's not always about exposure, although we want to reduce your chemical load. The other part of it is you really want to optimize your body's ability to metabolize glutathione. Now, glutathione can be metabolized by ... I'm sorry. BPA can be metabolized by glutathione, and in that case, if you want to raise your glutathione levels, studies have shown taking N-acetylcysteine is very effective in raising your glutathione levels. Milk thistles, the herb botanical compound has been found to increase glutathione levels and support these phase one, phase two pathways.

So sometimes when people have a lot of chemical load, one of the clinical strategies in a functional medicine model is to try to optimize their glutathione outputs and see if we can help support the substrates they need to really help their body get rid of the BPA that's in their system.

And then what we also know is that bisphenol A itself, although it's cleared out by the liver, that the compound itself has very inflammatory reactions in the liver, and can really activate what are called free radical productions in the liver once it gets exposed to them. So if the liver isn't efficient in detoxifying or clearing out BPAs, they tend to trigger an immune response in the liver itself, the different immune, we'll call hepatocytes, that then produce free radicals that tend to increase in circulation, that have been found to trigger autoimmune diseases.

Here's another study, another mechanism and several papers that have shown that BPA can actually also have impacts on the endocrine system, and people that have BPA exposure tend to have their prolactin levels go up, and when their prolactin levels go up, it's not so significant where they notice, for example, discharge of milk from their nipples, which is what prolactin does, but it goes up in a slightly normal, above the mean of a functional range of prolactin, not in a pathological range, but that slight elevation of prolactin has been shown to impact the immune system and B cells and what are called cytokines or immune proteins that then trigger autoimmune reactivity. And then bisphenol A is also known as an endocrine disrupter, because bisphenol A has a structure very similar to estrogen, and it can actually bind to estrogen receptors. And when BPA binds to estrogen receptors, that's been shown to trigger a series of different individual, independent pathways that are known to flare up the autoimmune response.

And here you can see a different illustration of a cellular messenger pathway called AMP pathways, where it also shows to trigger autoimmune responses. And plastics that



contain BPA have been shown that plastics directly also, in addition to binding to estrogen receptors, directly bind to receptors on T cells, and T cells are immune cells, and they switch them into an inflammatory state called Th17, which then promotes autoimmunity, which is the worst thing you want when you have an autoimmune disease. And then BPA also has been shown to bind and activate bacteria, these would be trans-LPS, things from intestinal permeability that get into the system and amplify the immune reactive response that's there, which, again, promotes autoimmunity.

This is another mechanism where chemicals like BPA can trigger the immune system. And this is actually, this mechanism here was actually the basis of my PhD work that I did on tetrabromobisphenol A, or fire retardants that have a bisphenol compound. But plastic compounds can bind to our own protein, and when they bind to proteins, the most common protein they bind to is a protein in our blood called [inaudible 00:14:08] serum albumin, so it's just a protein we have in our blood to help with our what's called osmotic pressure, the pressure in our blood vessels.

But BPA can bind to this protein, and when it binds to this protein, this protein now becomes like a new protein, they call it a new antigen. So the immune system now thinks this is like pathogen, something new, and then these pathogens have immune reactions against them, and antibodies get formed against these, and then these antibodies can trigger potential immune responses. And this is kind of like a summary of all these things, so if you kind of take a big picture and simplifying the science between how BPAs impact autoimmune disease, it really has far-reaching effects. It directly impacts the immune cells, it impacts endocrine receptors at the pituitary, the brain level, it impacts the estrogen receptors. Then [inaudible 00:14:53] inflammatory messengers, it binds to proteins, becomes new protein triggers, and impacts the liver and the production of free radicals, depletes your antioxidant levels. So these are all reasons why if you have chronic inflammation, autoimmunity, you really need to make a conscious effort to avoid plastics. Just like if you have autoimmunity, if you made a conscious effort to avoid gluten, you really want to make sure [inaudible 00:15:15] these.

Now, just to share with you a couple other studies that I published related to plastics, I published a paper in the journal *Toxics* where I was able to show that people that have the antibodies for immune reactivity to plastics also had a higher rate of developing Parkinson's disease through a chemical reaction, it's pretty complex. And I also published a paper showing the relationship between people that react to BPA and antibodies to the brain, called myelin oligodendrocytic glycoprotein and myelin basic protein, and in that study, you can see the data we have. So we found a very strong, what's called linear relationship. So as people's BPA immune reactions increased, their antibody production to their brain increased. And this is pretty significant, the way this line just goes up vertically. So as one goes up the other one goes up, and these associations have been published.



Now, addition to plastics triggering immune response and promoting autoimmunity, plastics and BPA are known as obesogens, and obesogens are environmental chemicals that increase a person to gain body weight and have a hard time losing body weight. And what chemicals like BPA do, or phthalates, which are also in plastics, is they actually have been shown to increase the amount of fat cells that a person has, and they do that in a nature ... Because if you can't clear out your chemicals, your chemicals have to store in some tissues. They store in our bone marrow, in our bone, and they also store in body fat.

So that's one of the things that tends to happen, is when there's all this chemical load, fat cells go up, that becomes a storage place for these chemicals, and then these can change what are called set points and increase obesity, and these obesogens are a very well-studied area of environmental compounds. And they've done studies with mice where they took two mice, one was fed and exposed to BPA, one wasn't, over a period of time. And they could say with the same caloric intake, that it causes significant change in their body composition, and this is where these obesogen mechanisms came in, and then again, just like with everything, there's lots of complex pathways of how these obesogens promote fat structure. But they basically disrupt how your body regulates calories, and it disrupts the microbiome, and bacteria mechanisms in the gut that control how we use calories. And there are links between increased body inflammation with obesity and increased autoimmune activity with obesity as well.

So the role of plastics as an obesogen is another way that these compounds have been shown to impact, and they basically enlarge fat cells, in numerous studies. And then other studies have shown, for example, BPA, when it gets into thyroid glands itself causes inflammation. This could be a bad idea if you have, for example, Hashimoto's, that bisphenol A compounds actually come in and activate thyrocytes, which are thyroid cells, to really create this inflammatory response, and I'm sure this may occur with other autoimmune tissues as well.

So, the slides I showed you, some of the slides I showed you with the BPA are really part of a program we have called Autoimmune: Solving the Puzzle, when we talk about more chemicals and strategies to reduce your chemical load. So if you have interest in learning more about that, you can always check out this course, and you can just go to Dr. K News, and this course is launching in the later part of May 2021, so if you can sign up for the waiting list, you'll get some discounts and other things that are involved with it. But there's lots of little steps that you need to know about if you have autoimmunity, and which chemicals really impact with autoimmunity and how to reduce your load with them, and what kind of things you need to do to optimize your body, clearing them.

And autoimmunity isn't just about removing a food protein or gluten or doing heavy metal [inaudible 00:19:34] or taking a supplement. It's complex, it involves many layers, and this is what I try to put together in a course for you. Well, what I want to do now is I



just want to take questions, for anyone who's got any, and then we can go from there. Okay, let me end my screen share. Okay. So my darling wife's going to help me with some questions here, related to plastics. Now, people ask, what are substitutes? Let me start with that. So some of the best substitutes would be using like a glass or metal or ceramic cup, so for example, this is my coffee cup, it's just made out of metal. There's no breach, you just put hot coffee in here, and I just drink through this, and this is a good way to have coffee without drinking through a lid in the mornings.

You can also get ceramic and glass food storage containers, those are all helpful. I got to hand it to my wife, she's been great getting our house BPA-free, or reduce your BPA load as much as possible. Okay, questions?

Yeah. [Ilius 00:20:53] is asking, **"What is your lifestyle routine with supplements for you, for your family, what do you recommend for not just BPA, but overall general lifestyle health?"**

I think in general when you're looking at taking supplements and [inaudible 00:21:08], every person's going to have a cost-benefit analysis of what they want to spend money on and how much they want to take, right? So that's number one. So that's one of the things you have to consider. And then the other things is if you have any risk factors in your family for certain things, or you're at risk for certain ... Maybe you work around chemicals, maybe you have to support yourself that way, maybe you're athlete, you train really aggressively.

But I can tell you in our family, we start every morning with taking resveratrol, turmeric, glutathione, as just general antioxidants. Then take fish oils, and then take a multivitamin. And that's a baseline. Then over time we may try-

[crosstalk 00:21:52].

We might try different types of things to make it work, but those are the things that, our baseline for our family. Okay, next question.

**Yeah. Is BPA some sort of paraben?**

No, parabens and BPA are different. They're different chemicals, different chemical structures, but parabens also have impact on autoimmune disease, and parabens are really high in various cosmetics. So you definitely want to try to reduce your paraben dose as well. Okay?

Okay. Here we go. **Does BPA in a food container bind with food whether or not the container is heated or not?**

Yeah, so BPA will need to be released, either in a gas form or a liquid form to combine with food. So heat is really one of the key mechanisms. So for example, technically if you have something in a plastic bottle or a plastic bag that's not heated, you're not



going to have very much BPA released into it. So heat is really the key factor, and also the pH of whatever is in the container. If the compound is acidic, like if you put tomatoes in a plastic bag, even though they may be in a refrigerator, the acidity, the tomato juice leaks in, it's going to release some BPA vapors, and then you're going to get into your food.

So technically, if it's cold and alkaline as a compound, you're not going to get as much. Now, sometimes like I'll be stuck at an airport or somewhere and I don't have a BPA-free water option. So my first thing I look for is at least, I try to get alkaline water, because at least the pH of that is alkaline, so it's not going to have as much leakage of it. But sometimes you don't have that available either and you just have to do what you got to do. You're not going to always be able to avoid BPA 100%. But what you want to do is just try to reduce your daily dose of it.

Right, okay. **So storing in plastic containers in the fridge is okay, then. Is it just heat?**

Well, again, storing it in plastic containers is better. If you can't just get ... you really should convert to ceramic, glass, or metal. And [crosstalk 00:24:22]-

They're everywhere, the glass containers are everywhere now, they really are.

But we do live in California.

We do live in Southern California, right.

So it's a bit different.

Well, and we did ours probably about six, seven years ago when you freaked me out about plastics, so I changed our entire house over. And it's not ...

There's plenty of BPA-free, BPA-substitute compounds on Amazon. Just make sure, stay away from BPA-free plastic, because there's still bisphenols are in there, and bisphenols are really the problem. Whether it's A, F, or S, doesn't really matter. But the point is, yes, if you have food and it's colder and it's not being exposed to heat or an acidic compound, then you're not going to have as much exposure.

**How long does it take for BPA to leave the body?**

So BPA can be eliminated out of the body really quickly, very rapidly. So if you get exposed to it and your liver biotransformation pathways are working, you can get rid of it within 24 hours. Now, there's a load, you can get a huge BPA load, and some studies with animals show that if they get a certain exposure of BPA, and they measure it, and then they measure the amount in urine over the next few days, they don't get 100% of it released in the urine. Some of the BPA will always bind to proteins, stick to our tissue, and have an impact on our system as well. So even though we can clear BPA, there's still a load in the tissues that happens when we get exposed. So you can't just optimize



your liver pathways and assume that you're going to get rid of it, it's a combination of reducing your load, and then making sure that your biotransformation pathways, your detox pathways, your glutathione status, your antioxidant load is healthy.

**Okay, a question from previously, I'm going to paraphrase it, because I didn't write it down. A lady is saying her husband was tested for BPA, and he has high levels. What's the most effective way to get it out of his system?**

So if you've had exposure to BPA that's high, you're not alone, epidemiological studies have shown 90% of the US population has very high levels of BPA in their urine. So there's different ways to do this. The first thing you should probably do, and this is how I apply in a clinical setting in my practice. First thing is don't take any supplements or don't do anything, just reduce your load and see if you can get it down. Because that's really the most important part of it. So you really want to first reduce your intake.

There was a study that was published at the Harvard School of Public Health, and they showed, when they gave people in the study a requirement to have two canned tomato soups today, and by the way, canned foods have BPA in them, and they wanted to see what happens to their levels of BPA by consuming two tomato soups out of a can each day, and their levels went up dramatically. So once they stopped, the levels went down. And again, BPA gets cleared very quickly. So if you have high levels in the urine, the first thing to do is try to reduce your load. So in addition to drinking out of plastic bottles and using plastic straws, and drinking through a coffee lid, and heating up food in plastics, canned food is high in BPA. Paper plates are coated with BPA. So you want to see if you can reduce the load and see if the numbers go down.

And then, the key thing is if you're trying to optimize the body's ability to clear BPA, the typical things that are used are N-acetylcysteine, which is a very inexpensive supplement you get at the health food store that raises the glutathione levels, helps support those liver pathways, the substrate. Milk thistle, those are the two easiest, cheapest and easily-found compounds. N-acetylcysteine and milk thistle as a botanical, and they both help support those biotransformation pathways.

Okay. [Ayla 00:28:15] is asking, **"What is BPA?"**

What is BPA?

Mm-hmm (affirmative).

Bisphenol A is a chemical with two hydrocarbon rings and a hydroxyl compound in each ring that can bind to different receptors, it's just a chemical.

Okay, Elaine answers, "It's a toxic chemical of plastic [crosstalk 00:28:32]-"

Yeah.

Maybe say the name, BPA. What does that stand for?



Oh, BPA is bisphenol A.

Bisphenol A, yes, okay. Carol's asking, **"Can glutathione be used repeatedly, or for only a short period of time?"**

Well, taking glutathione or N-acetylcysteine can be taken on an ongoing basis, it's not going to stop your own body's production of antioxidants, and it's a good idea to consume them. Now, cysteine and sulfur is really found in healthy foods, when you look at things like asparagus and garlic and onions, those are foods that really high in N-acetylcysteine, cysteine, and it's not like your body shuts down when you get exposed to those. Those are precursors that help you make antioxidants. Basically glutathione is a tri-peptide amino acid, so you can, you're not going to shut down anything in your body taking different amino acids. N-acetylcysteine is also an amino acid which helps make glutathione. So you're not going to shut down any of your body's systems by taking glutathione support, or precursors like N-acetylcysteine at any time.

**[inaudible 00:29:39] question, but do you have any thoughts on how to move BPA, BPA-free chemicals, out of the more difficult areas of the body that it may be stored, like in the brain, if it makes it up there?**

Yeah, you guys, once chemicals get into tissues like brain, they're not going out. And studies have shown even when the [inaudible 00:29:56] tips things, they don't go out. That's the thing, there's a point you have to reduce your load. We also talk about in the autoimmune course, Autoimmunity: Solving the Puzzle course, the concepts, initially reducing your load and supporting biotransformation, you really want to make sure your barriers are healthy. So your blood-brain barrier should be healthy, your gut barrier should be healthy, because if you don't, you [inaudible 00:30:15] decrease exposure to your tissues from environmental compounds. So yeah, that's the unfortunate thing.

Now, we all have certain degree of chemicals in our bodies, in our tissues, and if you look at mummies or archeological sites where they find bone and remnants of any kind of human protein or tissue, there's always chemicals in them. So our body has the ability to have some degrees of chemicals and still stay healthy, and stores it away into our tissues. But over a period of time, there is a load, and if your load exceeds your antioxidant abilities, and if your load exceeds your body's ability to eliminate them, that's when it can create health problems and oxidative stress.

Now, if you have autoimmunity, you're really, really susceptible to this, more so than the average person, because if you can't clear out chemicals like BPA very well, or your load is much more than your body can clear out, then they can trigger all those autoimmune pathways that we went over earlier.

Okay. **What are some of the symptoms of being exposed, or having too much BPA?**



There are no symptoms associated with being exposed to BPA, that's the problem. It's just there. With most toxic chemicals, it's an issue over time with slow inflammation, slow oxidative stress. So it's just, let's say you get BPA exposure ... Well, let me put it this way. When we look at humans, as we get older, we all start to have our antioxidant productions go down, right? When you're younger, you have greater production of antioxidants. Antioxidants protect your tissues, they help you recover, they reduce inflammation. So just by age alone being the only variable, as we get older, our antioxidant producing systems become less efficient, okay?

**[crosstalk 00:31:59] the protecting system, [inaudible 00:32:01].**

The protecting system, right-

Right.

... from our environmental chemicals, and so forth. What happens is, some people is they have, let's say, higher exposures of BPA, they really deplete their antioxidant systems. So now their workout recovery is much worse than before, like it might take them three days to recover from a workout than before. And they could blame it on aging, and aging is part of it, but one of the variables that makes you feel aged and tired and unable to recover and inflamed is really because of antioxidant depletion.

So there's no direct symptoms of toxic chemicals like BPA that you have, but overall it can contribute to making your antioxidant systems less efficient. And when your antioxidant systems go down, you also have greater risk for heart disease, and neurodegenerative diseases, and so forth. Okay.

**Okay, so what is, then, the best way to keep your healthy barriers? Like if you don't have symptoms for that stuff-**

We'll have to do a different talk about keeping healthy barriers, it's just, it's way beyond today's topic. And then we got to distinguish blood-brain barrier versus gut barrier versus lung barrier. In the Autoimmunity: Solving the Puzzle course, we do go into that in much more detail, and much more detail than we could ever do on a Facebook talk. So again, you might want to check out that program if you're interested in it. Okay.

**Okay. So, someone's asking then, if you're just touching BPA, it's not bad. If it's in your plumbing, should you get filters to, like if your plumbing has maybe plastic tubing and stuff, should you get like a Berkey filter to remove all the stuff, or if you get a water filter?**

Yeah, that's a good point. You definitely want to use a filter to reduce your chemical tox flow to some degree. But listen, you're going to get some exposure no matter what. That's the thing. And again, the human body's designed to get some exposure. You just want to make sure that you can always reduce your load best you can. Getting some trivial amounts of plastic through plastic pipe is different than the amount of plastic



you're going to get heating up food in a microwave, and the amount of BPA you're going to load yourself with drinking through an entire coffee through a coffee lid.

**Right, okay. So apparently, white plastic dental restorations contain BPA. How do you mitigate exposure if they're installed in your body?**

Yeah, that's the thing. Some of the things are going to be in your body. You have to look at improving your antioxidant levels, you have to improve your biotransformation, you have to improve your barrier systems. That's all you can do, to some degree. So there's only so many things you can do when we say reduce your chemical load, you can't reduce all of it. So you have to be realistic, and what's there is the way it is. There's no way around-

You change the things you can.

You change the things you can, and you-

Yeah, you don't microwave in a plastic container, stuff like that.

**So if you have an implant that has some BPA in there, you definitely want to make sure you don't add any more BPA to your system, and you definitely want to make sure your glutathione, antioxidant systems are healthy as possible, right?**

Right.

And especially if you have an autoimmune disease.

Right, okay. So then, this is technical. Maria's asking, **"What is the relationship between genetic bad liver for detox of estrogens, and BPA equivocal on Cyrex 11 and broken brain barrier?"** Does that make sense?

I don't understand the question, but let me try to break it apart. So we all have some genetic issues with how we metabolize certain chemicals, and that's called a genotype. So when they did the human genome project, and they mapped out the DNA of the human species, the thing that they identified is that many people have what are called single nucleotide polymorphisms, so their genes are a little bit different for different functions, and these weren't genetic defects, they were just variations in genes. And the liver was one of the areas these biotransformation, these pathways where we clear chemicals was very, very different from one person to the next person, and so forth, which means that some of us may have greater susceptibility to BPA exposure, because we don't have efficiency in these pathways that clear it out of our body, and some people have very, very efficient pathways to clear this out, so getting exposed to them doesn't even really cause any issues with them. And this is an area that is ongoing research, and they're really focusing a lot of attention and money into this type of research, because they also know that this impacts how people react to medications, how we process chemicals, whether it's toxic chemicals or chemicals in medication, can



be different from one person to the next, and the whole field is called pharmacogenomics where they study this.

So when you look at your genome, you could have a greater susceptibility to BPA. We don't have all those testings commercially available, there are some labs that check for certain genotypes for how your liver detoxifies, but it's a very small list. But in reality, there's some gene uniquenesses, in combination with environmental exposures, that cause people to have different diseases develop and different reactions to chemical exposures.

**Okay. So I was fighting with Zoom, so you might have talked about this, but people are asking, so then can you trust products that say BPA-free?**

No, you cannot trust products that say BPA-free.

Why is that?

If it's still plastic.

If it's plastic.

So you have to actually touch it and make sure it's glass, ceramic, or metal.

Right, okay. So when it's BPA-free, there are still other chemicals-

If it looks like plastic and it still says BPA-free, there's still bisphenols in there.

**Okay. They might have missed that. So, what is the best way to test for total body burden BPA in an effort to, like if you're trying to monitor your progress.**

Yeah, so the best way to measure [inaudible 00:37:57] BPA, and the most commonly used and most research published on it is going to be urinary BPA. So they collect urine samples and they measure how much BPA's in there. Now, there's also BPA chemical reactivity, where people see how BPA binds to proteins, and then they make antibodies against proteins. So labs can measure chemical reactivity to that, but the most commonly used measurement in studies worldwide has always been urinary BPA, and lots of labs offer that.

**Right, okay. Can you please say again supplements you recommend generally to raise antioxidant levels, generally?**

Well, so when you look at raising antioxidant levels, you can do it in various ways. So the most effective way to actually raise your antioxidant levels is actually exercise. That'd be more powerful than any supplement. So when you exercise, you actually produce some free radicals, or inflammation reactions as you run or lift weights and tear some muscle, whatever you do. And then that is part of it, but then there's a reflux response where your immune system makes a high degree of antioxidants and turns on the antioxidant enzyme-producing systems in your body, and then you have this flood of



antioxidants that lasts for many, many, many, many hours after your workout. And for people who regularly work out, they have an antioxidant production that's more efficient.

Now, there's an exception to this. There are people that get into what's called metabolic overtraining where they just don't recover and they don't rest, and their antioxidant levels are really depleted, because it's just too much for their body to handle. But in general, if you just go for a causal workout, or work out regularly throughout the week, you're going to increase your antioxidants. And if you're sedentary, you're not. So number one way to raise your antioxidants is just through physical exercise.

And then the other things are, you can actually consume foods that have antioxidants, then work on your body's antioxidants, and those are basically foods that are high in flavonoids. And the easiest way to remember that is colorful food. So beets, really high in antioxidants, right, grapes, really high in antioxidants. Usually the skin of grapes is much higher in antioxidants. Orange is high in antioxidants, orange peel, even more. But apple, apple skin, very high in antioxidants. So fruits and vegetables, especially colorful ones, are very, very high in antioxidants, so those are flavonoids, so you can get your antioxidants in that way. And then you can take supplements of those, if you want a high degree of them. Like you can take pomegranate extract, and just have a high degree of antioxidants delivered to your system, for example. You can take resveratrol or turmeric as a supplement, which are flavonoids from food concentrated in to really increase your lead.

And then for things like glutathione, you can take things that help make it, precursors, like N-acetylcysteine, and then there's botanicals, like milk thistle, which helps turn on enzymes to make them. So I would say the combination of really raising your antioxidant load if you're dealing with a lot of chemicals would be get some exercise in, to the point you're not overtraining and you can recover from your workouts without any issues. Eat a lot of colorful fruit, take extracts of different fruits, like resveratrol, turmeric, pomegranate, and then take things like N-acetylcysteine or milk thistle if you even want more support, especially for BPA support clearance.

**Okay, there's a couple questions about consuming wild sardines that come in cans, tuna, they're commonly, unfortunately, cooked in the can, so heat is involved.**

Yeah.

And they appear to be lined in something, most of these cans, right?

Yep.

**Even though the packaging says BPA-free. Are those still okay?**

No, they're going to have some exposure. And again, you're not going to be able to get rid of everything, but if, for example, your BPA levels on a test were really, really high



and you're trying to reduce your amounts, maybe you cut down on how often you have that.

Right.

You shouldn't totally avoid it, because that's not realistic in today's world, unless you're really, really sick, and you're extremely reactive to BPA, then it might be necessary to take those steps. But it also, it's not just BPA that's releasing from the coating of the can, it's also aluminum, so a lot of those compounds have high amounts of aluminum in there.

Okay, so Maria's asking, **"So then this genetic bad liver you were talking about, could that be a reason for the gut not to heal?"**

Yeah, absolutely. I mean, you could have different genetic uniquenesses, biotransformation that can impact your gut. But the thing is that these genetic mechanisms are not ... There's different types of gene mutations, there's called type one, type two, type three, and there's gene mutations that are very serious, where someone will have a genetic disorder that you can visibly, for example, see, right? And then there's genetic snips that are very subtle and mild, and they have some influence, but they don't completely, it's not black or white. So all the ones really with biotransformation, pretty much not black and white. So it wouldn't be the only factor. Like you can't say, "My gut's not healing because my liver biotransformation [inaudible 00:43:23] not efficient." That won't be enough to just cause that. It would have to be that plus many other variables, because these uniquenesses in liver clearance pathways are not these severe gene mutations, they're just uniquenesses, and they're more or less efficient with certain pathways.

Okay. **Does the MTHFR mutation complicate removal of this class of chemicals?**

No. MTHFR is methylenetetrahydrofolate reductase, it's a gene uniqueness that 20, 25% of the population have, and it's involved with transferring methyl groups, and the transfer of methyl groups, which are like one carbon group, so it's called methylation, and that has nothing to do with clearance of BPA. It has an important role with other chemicals, but not BPA. BPA is through sulfation pathways and glutathione conjugation, so has nothing to do with ... So if you have a methylation snip, that's not going to impact your BPA.

Okay. Let's see. **So can people with fatty liver take supplements to raise glutathione and flavonoids, in addition to exercise and diet?**

Yeah, I mean, if you have fatty liver, there's a lot of good research saying you should take antioxidants and things like N-acetylcysteine and exercise, and control your blood sugar, and those are all very supportive in the literature to do. So yeah, you should definitely do that. So fatty liver doesn't mean your liver pathways don't work, it just



means the inflammation has been so severe that some of your fat cells called hepatocytes have been infiltrated with actual fat. But it still works, you can still do everything.

**Okay, people are giving recommendations about how to get good water osmosis, like use glass containers.**

Yep.

Glass, metal ...

Mm-hmm (affirmative).

Ceramic.

Yep.

As opposed to plastic.

Yeah, exactly.

Yeah. It's just a matter of, be prepared with it, coming with it.

Well, I'm going to say this. If you have autoimmune disease, you have to, there's, again, we're going to talk, I think next week we're going to talk about this in more detail, but you got to make some efforts in how to improve the expression of your disease, right? So one of the ones would be how to change your diet, so your diet's not as inflammatory, and you avoid foods you may be reacting to, and that's part of it. The part that gets ignored that's really important is reducing your chemical load, and reducing your chemical load isn't just taking a supplement, and it's not just getting sessions with chelation therapy or something. Reducing your chemical load is looking in your household, seeing what's around, seeing what you're getting exposed to, making those connections, and removing them. We chose BPA because it's the one that's easy to identify where it's at, it's basically plastics, and there's so many strong links from an immunological perspective to triggering autoimmunity inflammation that it's definitely one you need to look into.

Okay, it's funny, because some people are just saying, **"Well, then can't we just take a glutathione supplement and be done with it?"** Well, not really.

Not really. And again, that's where you want to look at ... And again, you might have a pathway where you can clear these out very, very effectively, and that's great, and some people may not. So it's not like the end of the world, "Oh my God, BPA's going to ruin my health, ruin everything for everyone," but if you have an autoimmune disease, it is much more of a serious issue than you may think, because it directly has an immune-stimulating effect. And if you have conditions where hormones are impacted, like infertility, or a thyroid disorder, or some kind of estrogen imbalance issue, BPA's a big



issue, because BPA can bind to thyroid and estrogen receptor sites, because of its molecular structure. That's why they call it an endocrine disrupting chemical. So BPA would be much more of a concern for you for those conditions, autoimmunity, infertility, estrogen-related disorders, and so forth.

**Okay, and people are saying, so then should we look at laundry soap, dishwashing soap, hand soap?**

Yeah.

Yeah.

These chemicals, this would be, now you're mentioning parabens and so forth. Yeah, those are all part of it. So look at reducing your chemical load.

Right.

Again, in the Autoimmunity: Solving the Puzzle, this is a program that's several hours, and we have workbooks and information, we walk through the steps to teach you these concepts. As a person seeing what's out there in the world of autoimmunity, it's too much emphasis on just food, and not enough on chemicals. And when it comes to chemicals, people don't know what to do. Just like, "How do I reduce my chemical load? Do I have to work on cosmetics, do I have to work on soaps, do I have to do those things?" Yes, you have to do, but so you need some direction. Filters, air filters, water filters, how you store your food, how you heat your food, things you put on your skin and face, they all impact your chemical load.

Right. And it's almost just a matter of reading ingredients a lot of times. If you're buying the soap anyway, choose the soap that's less, uses less ... that are paraben-free, or deodorants, those kinds of things. And those little changes actually help, they make a big difference of your overall load.

Yep.

All right.

Mm-hmm (affirmative).

**Okay, people are saying can you do a talk on MTHFR mutation?**

Yeah, we can do a talk on MTHFR. The problem with it is, the next ... So we're launching our autoimmune course in May, so the next few topics we have are really focused on autoimmunity, and really to get people interested in our program. So the next few months, we're just going to be focusing on different things related to autoimmunity in general.

Okay, I like this question. **Is flaxseed a hormone disruptor?**



No, flaxseed is not a hormone disruptor. Flaxseed is a selective estrogen receptor modulator. That's what it's actually classified as, SERM. And what that means is that there are some compounds like flaxseed and different things like phytoestrogens that you may hear the term, and these compounds can bind to estrogen receptors, but they tend to have a balancing effect, different than BPA as an endocrine receptor. So things like flax, for example, have the ability to, first of all, help the body clear out chemicals through ... fiber's important for those pathways as well, but things like flax have different phytochemicals that can modulate the expression of estrogen receptors. So if you have too much estrogen, it shuts the message down, and if you don't have as much, it tends to amplify the receptor. So it has a balancing, sensitizing effect, and this is so apparent that they actually term this in the biochemistry world as selective estrogen receptor modulator, SERM. So that's different than BPA, which is not an SERM. BPA is a direct endocrine receptor. It promotes inflammation, it competes with actual hormones, doesn't have the same effects.

Okay. That might ... Let's see. Be it. Any other final thoughts you want to give? Oh, we should have Zoom fixed for the next time. Sorry, it's just been so crazy with the Zoom.

Yeah, sorry for the breakup in our Facebook and interview. We kind of piece these together at the end, and if you go to our site, you can see these videos and so forth. But also, don't forget, all of our articles and things are at Dr. K News, [drknews.com](http://drknews.com), and then our programs, like the Autoimmunity: Solving the Puzzle's on Dr. K News, and also if you want to be notified of all our talks, make sure you're following us on Facebook and Instagram, and we have lots of things to share. Thank you all for joining me today, and I hope you got something useful for your time. Thank you.