



Advanced Clinical Focus: Detoxification and Biotransformation Transcript – Class 4 Part 1

0:00

Alright, you made it to the final class! We have covered a huge amount of information, really set up the classes to get to this point today where we're actually going to talk about how to assess toxicity, and most importantly, how to clinically detoxify. So we've talked about where toxins come from, we looked at that in depth, and then we got into the five channels of elimination, our exits from inside of the body to outside of the body. And then we got into liver detoxification in quite some detail, looking at all the different pathways, looking at Phase I, Phase II, the cytochrome P450 enzymes in Phase I, and the different conjugation pathways in Phase II, and also looked at how in the middle there, we can have these intermediates, that might actually cause more damage than the original toxin itself. So we need strategies, we need ways to improve this process, we need ways to protect ourselves from the free radicals, and we need to be able to put it all together. So that's what we're going to do in the final class.

1:09

We're going to start by looking at total toxic load. Assessing this, how do we figure out where people actually are on this continuum of toxicity? So we know from what we've seen so far in this course, that everyone has some level of toxicity, everyone has some sort of toxic burden. But we want to do a couple things. First, we want to assess where they may be on that continuum. Are they really toxic to begin with or are they pretty clean, per se? Are these toxins causing issues in their body or are they able to clear them out fast enough and efficiently enough that they're not causing any symptoms? And second, we want to be able to track progress. So by doing detoxification with these clients, are we actually seeing an improvement in symptoms and changes over a period of time. And there are a number of ways we can look at this.

1:09

But first, let's look at some of the common factors associated with toxicity. Typically, people who are overweight are going to have more of a toxic burden. We're going to look at in more detail this idea of something called obesogens, these signaling molecules that actually increase fat production in the body. And also, a lot of these toxins are fat-soluble, so our body wants to store them in the fat and it's a way of protecting ourselves. We also see a lot of toxicity with diabetes. And I've mentioned earlier that persistent organic pollutants, POPs are actually a much higher risk for Type II diabetes than diet and lifestyle, which is just astounding. Gallstones tell us that the liver is backed up and that that bile is becoming thicker and more sludge year. So it's not being thinned out properly, possibly by phospholipids and other detoxifying agents. A history of alcohol use, we know alcohol has ethanol in it, and that's a toxin to the liver and the body. Psoriasis, a skin issue. Steroid, estrogen birth control pill use, and really, those are the more common ones, but really any drug use is going to point us in the



direction of possible toxicity. Exposures to various chemicals, history of viral hepatitis, et cetera, et cetera, et cetera, this list could go on and on and on. Pretty much any condition that someone has, can be traced back or connected to some sort of toxicity, or might have a toxic element involved. Now, that's not to say that when I work with a client, the first thing I do with someone is always detoxification, although it's always at the back of my head. And there are easier ways to detoxify, and what I mean by that sometimes it's not like a full detoxification program. Sometimes it's just eliminating gluten, and that's a form of detoxification. We'll talk more about that in a little bit.

4:26

Now, just to remind you of what's actually happening in our society with exposure to all these chemicals, look at all these different pesticides and where we see the red checkmark. That's where we have really solid evidence that these things cause these specific health issues. So we have brain and nervous system impacts happening with insecticides, childhood cancers. A lot of people ask why are children getting cancer? Why are babies getting cancer? And again, it's this interaction of various environmental factors. What's the mother being exposed to? What was the father being exposed to that might affect the genome in the sperm? What is that baby being exposed to in utero? What does that baby being exposed to right when they're born? There are all these various factors, birth defects, reproductive and development issues, metabolic effects, and immune disorders. Asthma has just skyrocketed, and we can even see some increases in specific conditions over the years. Developmental disabilities, ADHD is on the rise. There's at least one kid in every classroom with Attention Deficit Hyperactivity Disorder. Kids are supposed to be full of energy and, and excited, but when it becomes dysfunctional, that's a problem. Autism, a lot of the talk about autism is sort of this black and white discussion. But we have to understand that these kids with autism are like the canaries in the coal mine. Everyone is being exposed to many of these things that these kids who develop autism are being exposed to, it's just that they're a lot more sensitive. We saw that when we looked at liver detoxification, we saw how there can be huge variances from person to person in their detoxification capacity. So these kids that can't handle certain toxins, maybe it's mercury, maybe it's a vaccination, maybe it's pesticides, maybe it's a combination of all of that, get nervous system effects. Childhood cancers, I mentioned. Diabetes; Type II diabetes used to be called adult onset diabetes. Children to not get Type II diabetes, and that's why it was called that, but now, it's happening earlier and earlier. And obesity, of course. So these things are all on the rise, a lot of them related to chemical use, and the chemicals that are entering our environment.

7:16

So where do we start with this assessment? We have a number of fantastic tools that we could use to assess what's going on in the body and where the person is at on that slope of health. We're going to look at each one of these in great detail. First of all, we want to do a comprehensive history, looking at clinical, occupational and environmental possible hazards. If someone is working in a



mine, or used to work in a mine, or is a dental hygienist, or works in radiology, these are all things we want to take into account, or someone grew up on a conventional farm, and they sprayed a lot of pesticides there, things like that, we want to take this into account. And we have a couple really great questionnaires that we can use to sort of assess where that load is coming from and also to assess progress. We can do a nutritional assessment and we could also do various lab tests that will really give us some great information. So two questionnaires that you can use that are really fantastic as assessment tools, is the toxin exposure questionnaire, and this really gives us a great idea of what they might be exposed to. I really like this questionnaire, not just to see where they're at in terms of what they're being exposed to, but also to spark some thoughts in their mind as to 'hmm, forced air heat might not be the best thing', or 'visible mold might not be such a good thing for my health'. A lot of these people see these things or are exposed to them, it might cross their mind that it might be bad, but they might not really take it seriously. I mean, how many of us have seen mold in a bathroom. So these are things that we're not just assessing, but we can also bring awareness to our clients in terms of what these things might be doing to their body. I love it because when I get to the toxin exposure questionnaire as part of my intake, which I've modified somewhat, people start to think. You can see the wheels turning, 'oh, maybe using makeup and Teflon pans and non-natural laundry detergent and fabric softener isn't so good'. You know why we keep asking people these questions, so it's a wonderful tool for those reasons.

9:57

The second tool I really love to use is the medical symptoms questionnaire or the MSQ for short, and this looks at how the body is actually handling these toxins. Are there symptoms present? The toxin exposure questionnaire looks at what the person might be exposed to and then the MSQ looks at how they might be affected in the body. And I really love this one, because you can give it to your client, every single time you see them months apart, or even weeks apart to see if symptoms improve, and you actually get a solid concrete number, which is nice. This is a bit of a guide to show you what the numbers might mean. If someone's 30 and under on the MSQ, they probably don't have serious health issues, they might have a higher ability to detoxify things, they might not have as much of a total load of toxicity on their body. But as we start to get above 70, we see that people have a much higher toxic load, most likely, they probably don't live as healthy a diet and lifestyle, they've fallen further down the slope of health, and we can get sort of two conclusions from this. One, they might be further down the slope of health, as I mentioned, but also, we might need to go slower with these clients and with these people. We may need to start the detoxification process at a much slower rate. Detoxification and biotransformation is about effective release and processing of these chemicals and sometimes that has to be done over a longer period of time. It's more like a marathon rather than a sprint when we're dealing with detoxification. We can't detoxify in the day, we can't detoxify in three days, even seven days sometimes isn't enough time. With some



people could take months, even years to fully get some of these toxins out of the body.

12:05

So we've got those two questionnaires, really great tools. Also, I like to look at their food, mood, sleep and activity journal. This gives me a really great amount of information on what might be coming into their body, what might be coming into their mind, and how they're processing things through. So by looking at their diet in detail, I could see how much processed foods are in there, how many conventional foods are in there, what types of foods, if they're eating fish, I could see is it tuna or is it sardines? It's very different implications with both. I can see how their mood is throughout the day, I could see how much sleep they're getting. Remember, sleep is the most rejuvenating activity anyone can do on the planet. The hormonal and physiological effects of sleep, if we could put that in a little pill and be the top selling supplement or drug in the world. Sleep is essential for healing and repair. And also, activity, the exercise factor? Are they doing too much exercise? Are they not doing enough exercise? Are they doing the right exercise for them? So the food, sleep, activity journal also gives me a really great picture as to their diet and lifestyle and we can use that as a tool to make changes. I like to make a lot of notes on their food journal and highlight things and point out things that may or may not be good. I don't just focus on what's bad about their diet, I also like to point out, 'well, you're doing this good, and you're doing this great. Let's keep that in. And let's modify this other stuff.'

13:41

So some key questions that you might want to ask your client as well in regards to their diet diary. Now, just as an aside, I always go through their diet diary with them, because if they write bread down, there are like 100 different types of bread. I want to know if it's a gluten free whole bread, or if it's like Wonder Bread, white bread, fluffy stuff, you know, very different types of foods, very different implications there. So some key dietary questions are first, do you regularly consume fast food packaged foods, or sugar, flour snacks? So you're not just going to get completely depleted foods from these things which is consistent with the standard American diet, but you're also going to get a lot of chemicals. Packages leach chemicals, those cardboard things that people microwave are lined with Bisphenol A, and that gets leached into the food. Cans often that Bisphenol A and get leached into the food. In fast food restaurants. I can't even imagine what they cook with; oils that haven't been changed, surfaces that are Teflon and non-stick, so we get a whole bunch of implications just from this question alone. Second, do you consume fish on a regular basis and what kind? Our oceans have a high amount of toxins in them and fish just really swim in it and eat other fish or other plants that have these toxins as part of them as well. So we want to know how often they eat it and what kind. A tuna, which is like the size of my desk, versus a sardine, which is about that big, have very different amounts of toxins because that Tuna has bioaccumulation, it's had to eat a lot of the smaller fish, a lot of the sardines, and those toxins build up exponentially up the food chain. I remember I once had a client who was eating



fish five days a week for 20 years. And when she came to me, she had mercury and lead toxicity, surprise, surprise, and that was the root cause. I mean, it was a pretty, pretty obvious cause and effect as to what was causing her issues. I remember she started to get memory lapses, couldn't concentrate on work and had all these mental issues, and that's how she got in tune that she might want to get that checked out. Do you regularly eat non organic foods? When I look at someone's dietary, and I see animal products, the first thing I ask is 'are these organic are these conventional?' Of course, an organic, for example, steak versus a conventional steak are two completely different foods, they look the same. But if we looked at their profile in terms of their fatty acid content and in terms of what's actually in them in terms of toxins, they'd be completely different on paper. Do you consume a diet high in conventional animal products? So we want to look at organic versus non-organic for all foods, but we also want to focus in on animal products. If I'm getting anyone to change from conventional to an organic based diet, the first thing I address is animal foods because of that bio-accumulation. You can eat a salad with X amount of toxins, or you can eat a steak, which ate tons of that grass and that salad, which bioaccumulated a lot of those toxins. We want to really get a good idea of what's coming into their body.

17:22

So we have the questionnaires, we have the food diary and the food questions. And then we can get into some more specific testing through lab testing. Some of it has more specificity, some of its a little bit more general pointing to the fact that there might be a global problem happening or something that we might want to look into. A good place to start is always a CBC. And we can find various things there like leukopenia, where we have decreased number of leukocytes, pancytopenia, where we have lower white blood cells, lower red blood cells, and sometimes lower platelets, and even anemia where we have just lower blood count and those can be due to toxins. Now, something to remember with these blood tests is that they don't always give us the exact answer. So they point in a certain direction. There are other reasons why we might get leukopenia or anemia, but, again, we're building up the evidence. So we take this in context with looking at their diet diary as well, looking at their symptoms, and even looking at those questionnaires. We can also do a renal panel, we know that the kidneys are a critical channel of detoxification and our urinary tract as a channel of elimination, so we want to make sure those kidneys are working really well and that there's no damage there. Remember, they clear a lot of the water-soluble toxins that the liver conjugates in Phase II liver detoxification.

19:06

Here's some really great studies to point to showing certain toxins at toxic levels in people and what types of blood results might ensue as a result. So with benzene toxicity, we might see leukopenia, anemia, and pancytopenia. With arsenic toxicity we might see leukopenia and peripheral neuropathy. It's interesting a lot of these toxins, first of all they're fat-soluble, and our nervous system is made up mostly a fat, so a lot of the times people experience nervous system issues; also, what I explained to you about that client who got mercury



and lead toxicity. Strontium, we might see leukopenia or thrombocytopenia. Hexavalent chromium, remember that's the toxin that the people in that movie with Julia Roberts, the name is escaping me right now, but I'm sure he'll look it up, oh, Erin Brockovich. It was actually based on a true story where a chemical plant was dumping, I believe it was hexavalent chromium, into the water system, and everyone in the town was getting cancer. So leukocytosis and leukopenia. And there are a lot more. When we can't find a specific root cause for some abnormal blood result, and those levels are out of range, we might want to consider toxicity as a factor.

20:51

We can also look at liver enzymes. So these are various liver enzymes that are working in the liver cells. And if we look at each one in a bit more detail, we can sort of see some of their functions. So ALT works with protein metabolism and it's almost exclusively found in the liver, which is interesting because the ALT, these enzymes, are locked in the liver cells in the hepatocytes; they're doing their work in the hepatocytes, so they shouldn't really be in the blood at any high level. When those hepatocytes get damaged, they open up and they leak out whatever's in their cytoplasm, including these enzymes, ALT. Then they end up in the bloodstream and that's essentially what you're measuring when you measure the blood and see liver enzymes elevated. You're measuring to see how many of those cells have been damaged and how much liver damage there is. What we need to understand is by the time we get to that point, down the slope of health where things are showing up in the blood, and we can diagnose it, it has been going on for a long period of time. So liver enzymes are an indication that something's been going on for a while, unless someone has acute toxicity. So we could look at ALT. AST is found primarily in the liver and some of the muscles. ALP is nonspecific, it's found in the liver, bone, intestines and placenta. LD is nonspecific, it's found in the liver, red blood cells, cardiac and skeletal muscle tissue. And GGT has a very important function in glutathione metabolism. So we get a little bit more information here depending on the functions of this specific liver enzymes. ALT, AST, and LD rise with liver damage. ALP, GGT and bilirubin sometimes rise when bile flow is slow or blocks, so that's all going to backup back into the bloodstream. ALP isolated increases are usually from liver damage, and GGT is elevated with liver disease and possible POP exposure. So there's quite a bit of evidence showing that GGT gets elevated when there's an extra load of persistent organic pollutants. Sometimes when I think that there might be toxicity in someone from these types of toxins, I'll request GGT from their doctor.

23:33

Some other standard blood tests that can be taken are bilirubin, which may be elevated in people with bile flow obstruction. Bilirubin is in the bloodstream; it gets detoxified by the liver and it's that yellow pigment. So when the bile duct gets blocked, or bile flow is very slow, people can get back up a bilirubin and they might get jaundice, or it might show up in high levels in the bloodstream. Also, going back to liver detoxification Phase II, I want to remind you that



glucuronidation is important for bilirubin detoxification, and those with Gilbert's syndrome are going to have a slower detoxification and bilirubin and we can see that in a blood test as well. Albumin and total protein often fall with liver damage or disease. Albumin is a protein and total proteins are important and produced by the liver, so if the liver is losing function and not doing what it needs to properly, these things we see end up being in lower levels in the bloodstream. Prothrombin time, INR is just a different name for it, rise in people with severe liver disease when the liver fails to make sufficient clotting factors. So these are proteins that are very important for clotting and this test helps to measure how quick the clotting occurs. Elevated PT and INR may have other causes other than liver disease. So a bit of a differential diagnosis there. It can be related to the liver, but might be something else as well. We have to consider these different options. And these are just some normal values for you to have so you can run your tests by these numbers just to make sure people are in what we might call the normal range. This is put out by the Mayo Clinic, so pretty reliable. If someone's falling out of this range, they've already gone quite far down the slope of health.

25:39

And then we have a whole other world of what we might call functional lab testing. This is really a whole other course in itself, we can go into great detail. But we can start to look at how the whole body is functioning as a whole. These are some tests you can do to measure how the detoxification process is happening, how quick it is, what the metabolites are, what the total toxic load is, and each one will offer something slightly different. So we could look at different tissues like hair, blood, urine, and stool to see possibly what the heavy metal burden is on the body. So we'll put minerals into our hair, but we'll also put toxic metals into the hair. So if we take a sample of the hair, it tells us a little bit about what was going on maybe within the last few months. Blood is more of a moment in time, so if I eat a huge piece of tuna, which is loaded with mercury, and then I get my blood drawn, it might show that I have really high mercury levels. So it tells us a moment in time, but it doesn't really tell us about the body burden.

26:51

One of the gold standard tests for looking at total body burden of heavy metals, looks at urine, and it challenges the body with a chelating agent. So the individual consumes a chelating agent, usually DMPS, that pulls out toxins from the tissues, they pee it out, and then it's measured how many toxins are there, or how high the heavy metals are in the urine, and that's one of the gold standard tests for looking at heavy metal body burden in the body. We could also look at stool. But we also want to consider things like gut health. We know that that's the first pass of many toxins; the bacteria, the microbiome in the gut is very important, the integrity of that gut barrier so toxins don't leak into the bloodstream is very important. We can look at something like the lactulose mannitol test, which looks at gut permeability. There is some more advanced testing, known as zonulin and occludin testing, which looks at how leaky the gut



might be as well. We could also do a comprehensive stool analysis to see if there are good bacteria, if there's bad bacteria, if there's fungus, parasites, molds, yeasts, which, again, they can create toxins in the body. That would be a form of endogenous toxins or endotoxemia. We can see sometimes with certain testing what the enzyme beta glucuronidation is doing. Is it at higher levels? Is it at lower levels? So that might also be valuable. And then we can even look at genetic testing to see how well someone can methylate, for example. Do they have any genetic mutations that might affect their detoxification processes? So there are a lot of great additional labs out there. They're not always essential, they're sometimes helpful, but we can tell a lot from all the other things we were discussing and going through as well. So a lot of great tools to use to really assess what's going on in the body.

29:03

Now, here's a bit of a schematic to help us understand the whole picture of possibly assessing and then treating our clients, and we've got a number of tools at our disposal. This is a bit of a summary. We've got our intake and medical history and some questionnaires, which really looks at environmental exposures and what might be the known exposures. We can ask a lot of questions, we can do that toxic exposure questionnaire as well to see how many different sources of toxins are coming into the body, and we can see where that person is at on that side. We can also look at the effect of a lot of these toxins by doing physical exams if you're qualified to do that, various labs, and questionnaires like the MSQ, the multiple symptoms questionnaire, and sort of figure out what the patient's sensitivity level is. Are there toxicity signs and symptoms? Are they presenting with actual symptoms? Do they have nutritional deficiencies? What is their detoxification and elimination capacity like? So these two branches to help determine toxicity. And then some key factors are firstly nutritional and assimilation. So we know that the detoxification pathways are extremely nutrient dependent and, in today's class, we're really going to dive deep into that.

30:40

But assimilation is also important. It's not just a matter of what you consume. But it's a matter of what you break down and digest and absorb and then assimilate into your body. So how is the whole digestive tract? We also want to look at possible ways someone is being damaged by those toxins. We talked about the five ways that toxins are going to affect the body, that are going to cause their damage. And sometimes we can see which ones are in action in our specific client that we're working with. So is it endocrine disruption? Are they being bombarded by Bisphenol A, and that's causing hormonal fluctuations? Or is it more of oxidative stress where they don't have the free radicals? Or they don't have the oxidant antioxidants present to quench those free radicals? Very different mechanisms, but things we want to take into account. What's the body burden? Of course, we have a lot of ways we can look at that. And is there genetic susceptibility? As I mentioned on the last slide, are they able to detox properly? Taking all of this into account, we can review the findings and put together an intervention program. Now, we don't have to do all of this, but



the more information we have, the better it's going to be and the more precise we're going to be with our recommendations. And then, of course, the best clinical outcome from that will ensue, hopefully.

32:14

So as a summary, we want to look at the current evidence, a lot of what I've just given you here in this course. We want to take into account the patient's story; people aren't just information on paper, they have a story, they have their own specific slope of health or timeline, and we want to put those two together to really get a personalized protocol. I've seen hundreds and hundreds of clients, but I've never given two protocols that are the exact same. Even detoxification protocols; never two protocols that are the exact same. Sure, there are a lot of similarities, like, I might eliminate gluten, I might eliminate dairy and some other toxic foods and maybe use the detoxification diet, but I've always catered it to that specific person to match their diet, lifestyle and history. So we're going to move on and really dive into clinical detoxification.