Heather Fougnier: This is Heather Fougnier welcoming you to Body Ecology's Detoxification Training. This is our sixth class, our first bonus class. Today we have Dr. Leonard Smith who is going to reveal medical secrets and myths about detoxification. We're going to learn the inside scoop on what happens when you're exposed to toxins, and the latest methods for detoxifying safely and naturally.

Just a little background on Dr. Leonard Smith, he's a renowned gastrointestinal, vascular and general surgeon, as well as an expert in the use of nutrition and natural supplementation. As a surgeon, Dr. Smith has first hand experience of the problems associated with faulty digestion, and the surgical necessities they can cause.

For the past 20 years, Dr. Smith has investigated many holistic medical programs, including nutrition, exercise, chelation, stress management, and the relevance of mental and spiritual attitudes in healing. Acknowledging the effectiveness of whole organic foods and nutritional supplementation, Dr. Smith strives to stay on the leading edge of research and breakthroughs in the field of functional nutrition.

Today, it's my pleasure to welcome, Donna Gates, and Dr. Leonard Smith to today's class. Welcome Donna. Welcome Leonard.

Dr. Leonard Smith: Thank you, Heather.

Donna Gates: Yeah. It's great to be here. I'm thrilled that Leonard's on because he's that rare combination, I think of a doctor who has a great heart, and an amazing understanding of nutrition and natural health. So, people are in for a treat today.

Heather Fougnier: Absolutely. Leonard, one of the things that we wanted to get started with is to really get an understanding of the medical reasons why people get so toxic. I think a lot of these reasons will surprise people, because I know that you do advising for the University of Miami's medical department. You've seen that not all doctors are even aware of these things. Can you talk to us a little bit about that, and zero in on what happens in the body when toxins are overloaded?

Dr. Leonard Smith: Well, I would start out by saying, I think, everybody is clearly exposed to more and more toxins as time goes by. Without getting into the gruesome details, there's millions of pounds and tons of toxins from everything from fertilizers to chemical processing to

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waste materials, even toxins from volcanos, one thing and the other. So, yes, we constantly are exposed to them.

We get them through the skin. We certainly get them through breathing. We get it through the liquids we drink and the food we eat. In addition, because we don't eat necessarily the best food all the time, we actually create more toxins from the food we eat and how they interact with the bacteria in our body, in particular in our intestinal tract. But, I think the reason mainstream medicine doesn't really embrace this is that mainstream medicine, particularly in the United States and Europe are very much geared towards symptom management.

So, until people have very clearcut symptoms, they frequently aren't really taken very seriously. A lot of the constitutional symptoms people have that are becoming toxic are fatigue and muscle aches and pains and difficulty sleeping, and difficulty with elimination, mood disorders of one _____ or the other. A lot of sort of constitutional or generalized symptoms that doctors generally, don't have the time, nor the expertise to really deal with.

I would say that toxins – a good analogy would be sort of like termites in a house. You know you periodically have your house inspected and they might find a couple. It doesn't mean anything bad's going to happen to your house, but it's a warning that you need to do something about it. If you don't, little by little, you get a critical mass of toxicity and then you do have serious problems. From my experience, I don't think cardiovascular disease, neurological degenerative disease, cancer, or almost any significant illness doesn't have, at least a significant part of its baseline cause, is due to cumulative toxicity.

Heather Fougnier: That's really helpful to know, Leonard, because I think that the first thing people are looking for is to be diagnosed with something. Toxins often get overlooked in that.

Can you talk about the process of detoxification, when you think about the organs of detox and what's happening in the process of detoxification?

Dr. Leonard Smith: Okay. Well, I think first of all I'd like to mention the point is there's many different types of toxins. A lot of people are aware mercury and lead and cadmium and arsenic. Those are called toxic minerals. Some people call them heavy metals, which I think is a little bit of an archaic name. They're toxic minerals – are what they are. We can get those for sure from everything from mercury

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burning – coal burning power plants, which put out a lot of mercury. I guess we could call them mercury burning. That's a very common source of mercury.

Actually, volcano is a large source of mercury. Unfortunately, eating too much fish, particularly the larger, predatory fish, like tuna and marlin, swordfish, king mackerel, shark, things like that are very high in mercury. That mercury just comes from the ocean's floor. It's a natural out-gassing from the ocean. The algae pick it up. Then the small fish take the mercury from there, right on up the food chain. Of course, now there's considerable data that really supports the fact that using mercury in fillings creates a fairly significant body burden of mercury.

So, you've got the toxic minerals. Possibly, even more concerning, I think at this point is the fact we have so many fat soluble toxins, ranging from things like TCBs and bisphenyl A and phthalates and dioxin and benzine, xylene, all these different chemicals.

There's a company out there that I would like to certainly mention. It's called The Environmental Workgroup. Their website is ewg.org. Every person they've measured the blood level and have anywhere from 10 to 100 of these types of fat soluble toxins in their body. That's a little disconcerting. It appears that maybe we do for long periods of time have detoxification pathways that handle these reasonable well. I'll talk about that in just a minute.

Certainly, the whole toxic burden is something people need to be aware of and basically, eat organic. Drink pure filtered water. Start using products in their house for cleaning and on their clothes and everything that is toxin free. I think that's the first step.

So, what does our body do with these toxins? That's what you were asking me. Basically, let's just review quickly the fact that we have many organs of detoxification starting with the lungs, the skin, the GI tract, the urinary tract, the liver. To some degree, you could even say the prostate and the breast are organs of detoxification, because the material can come out of those organs as well.

In short, virtually every cell of the body has within it, detoxification pathways. It's obviously necessary, because whenever anything is taken up into a cell, part of it is used for the cell's benefit. Part of it creates waste of metabolism, even if it's

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just carbon dioxide. But, there's many other metabolic molecules as a part of the metabolism that need to get out of the cells.

Basically, each of the organs in our body do try their best to get the toxins out. That area I'd like to concentrate on that I would say right off the top, this probably applies for most of the cells in the body. The area that's been studied the most in terms of detoxification is the liver and the intestines. They both have within them what's called enzymes that help to take the toxins and basically, restructure them, so they can get them out of the liver.

So, we'll talk about the liver first. You've got what's called Phase 1 and Phase 2 detoxification pathways. Phase 1 – and these are just a bunch of chemical names, but it's basically, hydration, oxidation, halogenation. There's just several simple biochemical pathways where either a hydrogen and oxygen, or hydroxyl group or something is put on a molecule that's coming to the liver that needs to get out of the liver.

Once it does that, then it actually is picked up by a whole other network called the Phase 2 detoxification enzymes. These are truly enzymes like – there's amino acid conjugation, glucuronidation. There's sulfation. There's at least six different ones, acetylation. These are just biochemical terms, but basically all it's saying, is they're taking that molecule that had already been treated by Phase 1.

Now, they're hooking something else onto it, so that it can be excreted in the bile. So, that's the next step is now, sitting in the liver cells waiting to be excreted in the bile. If you have a really healthy liver, that process happens fairly normally. These toxins then get in the bile and are carried into the small intestine and then into the colon and then out through the bowel movement.

Now what can happen though, is some of these toxins can actually get reabsorbed in the intestine and go back to the liver and create sort of like a cycle of going around from the intestine to the liver and back in the intestine. There's actually a medical name for that called enropatic recirculation. A little of that's good, but too much of it isn't good. Of course, one of the ways you keep things moving is make sure you have really good bowel movements and good elimination.

Basically, there's lots of nutrients. It's really neat to see the biochemistry of these pathways because they've got it down to taking things like beta-caotene, Vitamin C, Vitamin E, coenzyme

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Q10, selenium, zinc. Minerals like copper and manganese in smaller amounts, as well as certain amino acids like acetylcysteine, and bathyamine, torine, and glycine, glutamine. These are all the amino acids that really help Phase 1 and Phase 2 do their job.

There are plenty of places we will be able to help people find where to get the products they need to do this. There are many, many companies that sell these products. Basically, you get a pretty good chance of covering a bit of it just getting a good multiple vitamin, mineral.

Then let's look at the intestine, because the intestine does the exact same thing. We're talking about small intestine and part of the large intestine. Actually, the toxins that are coming through out food, the intestinal lining cells have this Phase 1 and Phase 2 process where they package these toxins, so that they can then be either taken back to the liver and passed back out to the bile or directly excreted back out into the lumen of the intestine.

A lot of people aren't aware of the fact the intestine actually, has a third pathway and some people call it Phase 3. It's a very interesting thing. It just involves a glycoprotein called – I don't know why they call it this, but it's called antiporter, a-n-t-i-p-o-r-t-e-r. The antiporter system in the small intestine will actually take toxins that have gotten into the intestinal lining cells and pump them back out into the gut lumen again, so as to slow down the speed with which these toxins are getting in the cell.

This antiporter or Phase 3 is actually found in the tip of the little villi in the – you know the intestinal lining is – if you spread it out it's the size of a basketball court and it's all of these. Villi, just like looking at seaweed in the water that has the ability to move and it's very dynamic and vital. The very tips of all these little villi are loaded with these antiporter molecules. They're also loaded with those cytochrome P450 enzymes like the 3A4 which is such a good detoxifying enzyme, is right there on the tips.

Our intestinal lining will actually pick up toxins, will transport it right back to the surface where these enzymes, as well as the brush border enzymes will try to do something to that toxin. We are constantly in a state of moving toxins from inside the cells to outside the cells, then trying to eliminate them through sweat, and urination, and elimination, through the lungs and the bowels.

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Donna Gates: Leonard, will you talk just a second about how easy it is to destroy those – the brush border and the villi? Many people for example – people that are sensitive to gluten --

Dr. Leonard Smith: Oh, yeah --

Donna Gates: (Crosstalk) that the – just talk a little bit about how the villi are damaged.

Dr. Leonard Smith: Oh, yeah. Well, you mentioned two things and you mentioned gluten specifically. I just want to say it's really critical for anybody that's having either neurologic symptoms ranging from migraines to possibly depression, OCD, anything, probably should be checked for gluten. It has a severe effect on the gut lining in terms of creating an immunologic war going on in the gut lining. We used to think – they used to call it – it's has so many names, it's ridiculous, siliac disease, siliac spru.

It is just the history of trying to figure out what was really going on, but now fortunately, I think they just call it gluten sensitivity, which means any grains that contain gluten which are principally wheat and barley and rye. But, I'm sure there's other grains *(crosstalk)* – of course now, we're finding out that even rye and barley have other molecules in them that are similar to gluten that tend to do the same thing.

The bottom line is if you are genetically predisposed and there's certain genotypes that are predisposed to gluten sensitivity – we'll just stick with that one, if you're – it's like DQ8 and DQ2, but there's a whole series of other genetic possibilities. The bottom line is if you're having trouble with digestion, it's really worth looking at the blood enzymes – not enzymes, the blood for antigliadin and antibodies and antitranslutamina antibodies.

The fact is they may not be in the blood before they're in the saliva or in the bowel movements. This is like brand new stuff. There's a website out there called enterolab.com that's actually looking at the bowel movement for antigliadin and antibodies. Those are the antibodies to gluten, because the fraction of gluten – gluten is just a polypeptide chain, which is a string of amino acids. It does get partly chopped up by our enzymes, but if you don't have enough of them then this gliae infraction which I think is like 31 or 33 amino acid peptide chain will create antigliadin and antibodies. Then those antibodies do cross react with other things, but they also cause a lot of inflammation in the gut lining itself.

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If people are sensitive to gluten or wheat, they really need to probably go on a gluten-free diet for sure, maybe indefinitely or at least for two or three months. I do believe there's a subset of people by the way that probably have some sensitivity and then they get over it. By and large, if you've got antigliadin and antibodies, you should assume that you probably will have it whenever you introduce wheat or gluten containing products in your diet.

What happens as Donna was mentioning was this brush border along the surface of the small bowel are enzymes that help right from the beginning to digest and break down food. If you've got a bacterial imbalance in your gut where you've got bacteria growing in there that are somewhat pathogenic or disease causing, and if you don't have enough of the right beneficial bacteria in there, that will cause what I would liken to a mild sunburn of the intestinal lining. If you look at it microscopically that's about what it looks like.

It's a similar mechanism. If you stay out in the sun too long, just the energy of the sun will burn the skin. Your skin becomes more permeable, more painful. Well, if you've got either food sensitivities or well documented food allergies which are more serious than a sensitivity or if you've got bacterial or microbial imbalances because it isn't just bacteria. It could be virus. It can be fungi and parasites. If you've got this imbalance and you knocked your brush border enzymes down and you're inflaming the surface of the bowel that's what affectionately known as leaky gut syndrome or dysbiosis.

There's a very simple test to see whether you have that problem. You actually drink a combination of lactulose and mannitol which are two sugars. Then they actually collect your urine. By looking at the ratio of lactulose to mannitol they can see if you've got an increase in leakiness of your gut or an increase in intestinal permeability like the L over M ratio should be like .03 or less. It happens very commonly with all kinds of foods that people eat, will cause an increase in their intestinal permeability. It doesn't necessarily mean it's going to cause a major problem, but it certainly can, depending on what you eat and how reactive your immunity is.

Donna Gates: I wanted to add something to that. You know we have a product called Whole Grain Biotic. It's a fermented liquid. It's made with wheat and rye, but oats, barley, and _____. People would look at that think, well I'm gluten intolerant. I can't have this. What

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this product – what this liquid is really made from are these grains pulled together from the field. Then this generation of bacteria, are isolated off these grains. They happen to be grain loving bacteria. So, they're very effective at digesting gluten, for example. What we have done for quite some time now is encourage people to actually drink a couple of times a day, about three ounces of this Whole Grain Biotic.

Then after several weeks, a month or so, they no longer have that sensitivity to gluten because they've now introduced a lot of gluten loving bacteria, grain loving bacteria to the digestive tract, because that's where we like determine – I mean one of the reasons people are so gluten intolerant today is they lack this healthy interact with system with these great bacteria and then --

I'm the perfect *(audio)* myself, because I used to be terribly sensitive to any type of gluten. Now could have it if I wanted to. I still don't. I'm not a – you know we don't *(audio)* oncology. We're not into bread. We prefer people go more onto the kerone and ____, buckwheat and emeratz, as the grain like seeds and stay away from flour products for the most part. If you're out in a restaurant, at a special time when you just feel like having a little bread, if you have this gluten loving bacteria inside of you, you'll digest them. I think the big one – one of the biggest reasons we have so much enzymes today is we simply lack this healthy interactive system today.

Dr. Leonard Smith: Well, I would definitely agree with that. I think that anybody that has issues with their intestines or actually the truth is it can be anything from chronic fatigue to fibromyalgia to psoriasis or atopic dermatitis or all kinds of symptoms. One of the classic tests that we do believe in doing for that is food sensitivity testing, looking for the IGG for antibodies. People will not uncommonly have like two plus or three plus of wheat and eggs and berry and soy and corn frequently because a lot of those are most commonly eaten.

I think it's even becoming more acceptable in mainstream allergy and immunology that to do elimination diet or rotational diet – well, you do two things. One on a rotational diet, whatever you eat on Day One, you don't eat again until Day Four. You stay on that for a while. It sort of calms your intestinal immunity in general. The ones that you're two, three, and four plus to, you avoid those for at least one, preferably two or three months. Then reintroduce them in very small amounts. You may develop a tolerance to it again. That may go for quite a while until you sort of forget about it and start eating too much. Then you've got the problem again.

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So, it's similar to the way they do desensitization for like feathers, and mold, and cat hair and what not by injecting small amounts in the skin until your body becomes tolerant again. The whole key is to develop an immune system that's tolerant and balanced, that's fully vigilant, fully awake, ready to do what it needs to do, but not attack everything that comes across the barrier. That's where the tolerance part or the flexible intelligent part of the immune system comes in that I think is so critical.

Heather Fougnier: Leonard, I think what's so interesting about this discussion and Donna, the idea of how bacteria can help us heal as well, is that while a lot of body ecology followers know this about food, because of the connection between food and our health, there are still a lot of people who get a symptom or instead of thinking about well, what am I eating? Might I be intolerant to something are running off to the doctor and maybe even taking drugs and still continuing to eat those foods that are creating the symptoms.

Dr. Leonard Smith: Right.

Heather Fougnier: I think it's also interesting what you said about people with migraines, OCD, or depression that while many people can sort of bridge to the fact that eczema or some other type of body symptom might be caused by the food they're eating, still a lot of people are just getting to grasp this fact that our mental states and our emotional states can be caused by the food that we're eating. So, I appreciate that you brought that up today. I think it's going to help a lot of people start thinking about all of the symptoms they're having, not just the physical symptoms.

One of the things that I wanted to ask is that – one of the things I love about all of the articles that you've written for body ecology is that talk so much about the natural aspect of how we can heal. You have a whole system of practices that you've talked about being sort of, what you would consider best practice for detoxification. Can you talk about what those are, and why they're so important?

Dr. Leonard Smith: Okay. I'll be glad to. I think I'd like to start off though, it's like everything is a spectrum. If you've got significant toxification in your body, then it's probably worth looking at finding a practitioner that can help you with this. There's several places I can mention later where I think you can find people like that.

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To do basic challenge tests either orally or intravenously with chelating agents just to find out how much lead or cadmium or mercury or arsenic or aluminum, things like that that are in your body, because if they're in there – and depending on what you've got along with it, if you're fairly healthy and you're just finding it as an incidental finding, I think you can do a very natural approach possibly with some oral chelating agents from time to time. If you're fairly far along in terms of any significant illness, I think it's probably important to go ahead and try to get the levels of the toxins down.

Intravenous EDTA chelation has been shown to be very beneficial for lead and cadmium and many other toxins. A lot of people aren't aware of it, but iron can be a toxin. A lot of people have very high iron levels and if they do, the EDTA chelation is good for that. The oral chelation generally is direction more towards DMSA and DMPS which are just the acronyms for a couple of molecules that are prescriptions. So, is EDTA – all of this now you have to have prescriptions for.

You can take either DMSA or DMPS orally like three days a week and then skip two weeks and then do it again. Or, other people do just very low doses. There's many different protocols and we don't have the time to go into that, but I do think it's worth investigating if you've got a significant toxic load of these toxic minerals. You're not going to know that actually, unless you get a challenge test.

You could do just a red blood cell test and it may show them there. If they're there, it's pretty likely you probably have them in your fat storage or muscles and throughout your body. If you do a challenge test, you'll see possibly numbers that are quite a bit higher and that's not to be alarming. It's just to point out that when you put these chelators in the body, they're like magnets. They pull it out of storage areas. We still don't know what damage they do sitting in storage areas are. I do think, though it's worth getting the levels down either with IV or oral chelation.

I do think there's a lot of natural things to add to that. For those that don't feel like they want to see a practitioner or do the chelation route that way, you actually can do a lot of things. I mean infrared sauna is a very valuable tool. The sauna actually heats up the body. The infrared penetrates the skin about a centimeter and it seems to pull out more toxins possibly than the conventional radiant saunas. Although, some people argue that there isn't much difference.

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The comfort difference is enough to have people try the infrared because you typically don't go over a 140°, 150° at the max, Fahrenheit. Whereas the radiant saunas that you see in a lot of gyms, they get up to 160°, 170°. Everything is a question of balance. Too much heat, too long, can be actually injurious, I think.

With infrared sauna, I would generally recommend people start out with 10 to 20 minutes and work up to an hour. But probably, every 15 to 20 minutes, maybe hop out of it and hop in the shower and cool down for a minute, and then get back in. I've had patients actually lower their mercury levels just be doing the sauna and changing their diet. So, I know that it works.

Along with infrared sauna, having impeccable bowel function I think is absolutely critical. So, colon hydrotherapy, I think is another tool for detoxification that can be very valuable, I think both from the point of view of removing toxins. Also, I think colon hydrotherapy actually does some how or other, stimulate your colon's normal peristolic response, so that it contracts better for several days, sometimes weeks after a colon hydrotherapy treatment.

I think a lot of people have no idea how much retained fecal matter they have until they do a colon hydrotherapy. I do believe that that's – it's proportional to what you're eating. If you're on a high fiber diet with really adequate hydration and exercise, you should have fairly large eliminations. That is a major part of detoxifying, because we know that the bacteria in the gut actually absorb a lot of the toxins that are in our diet, certainly the mercury, lead, cadmium, arsenic, things like that. It's quite possible they're absorbing the fat soluble toxins as well.

Since we know that at least 80 percent of the bowel movement is bacteria, by getting them out frequently, that's just one major way to get toxins out of the body. I think they've now shown too that everything from massage to acupuncture to shiatsu, working on points of the body actually do some cell signaling right from the surface of the skin that affects the cells and whole networks of cells throughout the body to help the detoxification process. Just like using dry, natural bristle brushes to brush the body has been shown to help move toxins.

Certainly, certain practices, I think yoga is certainly one of them because doing the various _____ you can actually feel the

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different areas of your body tighten up. A lot of the tightness in our body – please don't shoot the messenger, but they are due to molecules that are stuck in the tissues. They can range from toxins like the fat soluble toxins or the heavy metal toxins. Or it can be things that are called "AGES" which are advanced glycosylation end products or proteins that have sugars attached to them that the body has trouble getting out of the body.

That's why cooked food is still always a little bit of an issue. Although, as Donna and I have discussed many times, I think it's up to the individual. If you're in a very cold climate, I don't think people would do as well on a completely raw diet. The fact – and it depends on what kind of cooking you're doing too.

I don't think all cooking creates these advanced glycosylation products, but certainly cooking meat with saturated fat and using sugars like basting ham with sugar, like coated meats. Those are typical age – the acronym is AGES. Again, it stands for advanced glycosylation end product. Whenever protein, fat, and sugar are stuck together, it's a problem for the body. So, it will eventually break it down or it'll store it somewhere.

I think the more you move your body, the more you break things like that up, and then of course, exercise, itself, is probably one of the best detoxification practices anybody can do. I do recommend doing a combination of both aerobic which can be anything from cycling to low impact elliptical cross-training machines that are gym to tread mills to swimming, something that gets your heart rate in a training heart range which is typically about 80 percent.

The way to find your training heart range is you take 220 minus your age and multiply by 70 and by 80 percent. That will give you a range like from 112 to 128 where you should keep your heartbeat while you're training. Now, that's for just plain aerobic training. I think a few times a week to do that is very good.

A lot of people now are pointing out that doing more of an anaerobic exercise which is pushing hard for shorter periods of time has been shown to release growth hormone and testosterone better. But, I wouldn't do that unless you were working your way up to it. You can do that biking or swimming or on an elliptical cross-trainer where you go slow and then take a minute and you go faster and then slow back down. But, gradually, increase it to the point that within your own training range.

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If you're older and if you're not used to exercising you really definitely ought to get a professional trainer, because there are doctors now that even write exercise prescriptions. Certainly, if you've had any problems with your heart or anything like that, it'd be very smart to get monitored or get a stress test before starting an exercise program. Obviously we need both to work out our muscles through resistance training and we need some combination of running at a training pace and then having sprints between that to make you – to stimulate more of your hormones.

A combination of that with either tai chi or yoga, I think is probably, at the end of the day, one of the most significant things you can do is exercise. We certainly know that you can increase the amount of stem cells that are released from your bone marrow and your blood go up six to seven-fold just from exercising.

I've come to believe that the reason that people exercise tend to be healthy is because they're mobilizing toxins. They're sweating them out. They're breathing them out. The extra prostaglandins actually help stimulate colonic activity. So, people that exercise tend to have better bowel movements. You stay well hydrated. So, you eliminate a lot of toxins like that.

Donna Gates: I'd like to add to something that you – back up a little bit and talk about food preparation, Leonard, because that's what we specialize in, is food. One of the things that we get in body ecology is that you – proteins for example, they either need to be eaten raw or rare, like the Japanese eat raw fish, fresh sashimi, that's easier to digest – rare, maybe something just seared. Most of the time, we'd like for people to do very slow cooking at low temperatures, so that they don't get those event _____ end products.

You know chicken for example. I will never buy chicken out and you know even like a place like Whole Foods where they have these lovely great smelling rotisserie chickens because they're always cooked to death.

Dr. Leonard Smith: Right.

Donna Gates: It's too hard to digest. The right way to cook chicken is keep it at a very low temperature, around say, 275 even. It doesn't take that much longer to cook your chicken at a low temperature, but it cooks slower – a little bit slower. At the slower temperature, it's much, much more tender and juicy that way.

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Then you – another mistake people make is they wait until the meat or the chicken, for example is completely cooked, and then they take it out of the oven. Where there's so much heat in the meat itself, that you should actually remove the chicken when it's just very, very light, mildly pink, but it's *(audio)* rest. Then the resting takes it the rest of the way.

There are little tips like that – the way we proceed – prepare food, when you're taking a raw food for example, raw vegetables and fermenting it makes it so much more digestible. It has all the benefits of a wonderful microflora. The preparation of food is critical. I think that's another area where we shine in helping people get on the right track. I just wanted to throw that in to --

Dr. Leonard Smith: I would completely agree with that. I think that we all – apparently the number is something like 25 tons of the food is what we – the average GI tract for the human being is exposed to 25 tons of food over a lifetime. It's certainly the largest load of potential antigens and toxins of any other part of the body by weight. Certainly, if we don't prepare the food right, we're creating a toxic environment right from the beginning.

Of course, that's why I'm here with you on the phone today, because I really do believe what you're doing with the food is so critical. People just don't even know until they've tried something different. The fact is we get away with so much for so long, that we don't really realize what it is that's hurting us. When you actually do go to a more plant-based diet and then handle the animal products the way you're referring to, I think people really do feel that they're getting better.

I just can't tell you the number of people I've seen that, just get off of all of the trans fats and partially hydrogenated fats and all the processed foods. I mean, most people just don't get it that processed foods – I don't care what they are, even if they're organic, they're still processed. It's something foreign to your immune system.

They've actually shown now that the cells of our body have receptors on them that literally can determine whether this food – it's one of three categories. It's either well received, it's sort of neutral, or it's negatively perceived as something that's not good.

They fit on the receptors of the cells. Protein kinases take it into the side of the cell which then other molecule messengers take it to the nucleus. Then the nucleus of the cell either then does through

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transcription translation sends out messages to make proteins to help digest good food or make proteins to start fighting and calling the immune system into a high alert because something is coming in there that doesn't belong there.

As this goes on in all of us every single day, but it's cumulative. You're talking about you know we have 10 trillion cells. So, it takes quite a while for people sometimes to really realize that what they're eating is really poisoning them. That might be the simplest form of detoxification we can do is just really, work on eating the right food.

Then on top of that eating less of the right food, I mean I think I would be remiss if I didn't point out one of the best detoxification pathways of all is eating about 30 percent less than you think you want because that is the only thing that's actually be proven to prolong life is caloric restriction. However, it's not just caloric restriction.

It's the optimum nutrition. If you do restrict calories you've got to be really sure that you're eating a wide variety of vegetables, seeds and nuts, sprouted grains, sprouted legumes or cooked the right way, some balance of all that. That's why people need to really I think study your diet more, Donna. I think you do have the missing link between being a raw foodist and somebody that's on a standard American diet.

I think there's no question people who get on a raw food diet – it's tremendously detoxifying. They get better for periods of time. Then depending on their constitution and their genetic makeup, they may do well on that or they may stop doing so well. The point is we as a human culture have known for thousands of years appropriate ways to prepare food that involve cooking, whether it's marinating, steaming, lightly boiling, using crock pots, whatever. That's your part of it, not mine. That's the key is to make sure the food we eat is of high quality, but then don't overeat either.

Donna Gates: I know I'd like to put a plug in here for the book that you and I are doing that will be out this year. It's called *Baby Boomer Diet*, *Body Ecology Baby Boomer Diet*. You were talking about calorie restriction. We, I think do an excellent job explaining what that really means, how to do it right, how to live much longer.

One of the things I wanted to throw in here too, is that we – you know a lot of times we go along just fine. We feel great and have plenty of energy. Then all of a sudden we stop feeling good.

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We're going through a detoxification or period of cleansing. That's natural because the body's designed to cleanse.

One of the things that I'm trying to get people to be tuned into is when their body is going through this detoxification stage which always happens, rather by this gift – this ability to push toxins out is a gift that we've been given to keep our bodies clean. When we go into a detoxification stage, we should be assisting our body.

One of the things that we recommend then is that to eat more of a very clean, vegetarian, raw diet, lots of fermented foods, lots of fermented liquids. You know fresh vegetables and salads and maybe a little bit of maybe one, you know cooked vegetable meal, maybe some chimer, some *(audio)* chimer. Things – very, if people feel like they're weak without animal protein, we say don't eat the animal protein, but just take a broth or take something like a meso soup with – you can make meso soup with tons of stuff by just putting a piece of combu in water and simmering that.

If you want to go one more step, you can add some shitake mushrooms to it. Simmer that. One more step, if you don't want it to be vegetarian is to put it into dried fish flakes. Simmer that for about 20 minutes together and then strain out those fish flakes, the combu and the shitake mushrooms _____. It's wonderful, nourishing, strengthening stuff.

When you're going through a cleanse you've got to still provide your body with lots of energy. That's one thing I've kind of repeated over and over and over again through this whole workshop, Leonard, is that we first and foremost have to create energy --

Dr. Leonard Smith: Right *(crosstalk)*, I totally agree --

Donna Gates: *(Crosstalk)* most of *(audio)* – yeah. So, you've got to keep yourself strong while you're cleansing. Sometimes you could get too weak *(crosstalk)* --

Dr. Leonard Smith: Oh, absolutely, and I *(crosstalk)* --

Donna Gates: *(Crosstalk/audio)*

Dr. Leonard Smith: That's why I think another product, assuming people aren't sensitive to it is undenatured whey, because whey contains a lot of the sulfur containing amino acids which are exactly the ones that are involved in the Phase 2 detoxification of the small bowel, of

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the liver, in fact, of all the cells of the body. Yes. You need adequate protein while you're detoxing, otherwise, you can even get sicker from it. You can certainly do that by a combination of whey protein or rice and P protein. There's different kinds of protein powders that you can do *(crosstalk)* --

Donna Gates: And also *(audio)* grasses --

Dr. Leonard Smith: Right.

Donna Gates: Like we have a vitality super green, which is our – just a green power, but it's giving a lot of protein from that. Plus, you can be bringing out a whey protein shortly that's fermented whey proteins, then, usually, sending people to One Green Mom to get the whey – undenatured whey. There's so much whey on the market today --

Dr. Leonard Smith: Right.

Donna Gates: It's not very good quality. You mentioned undenatured. That's exactly – and I try to stress too, is you want the protein to be intact. You don't want it to be undenatured or destroyed basically. Would you talk about the effect of sleeping? You know that people are not sleeping today. I see that all the time. I think it's partly because we are so toxic and certainly, because we're under stress. There's tremendous toxins produced by the body.

I've talked earlier about toxins coming in from the outside. But, toxins that our own body produces from inside, those endogenous toxins that come from lack of sleep, which makes us feel stressed out. We don't handle stuff well, and we don't sleep well. Then of course, stress itself produces tremendous amount of toxins in the body. I think we should just talk about that a little bit.

Dr. Leonard Smith: Okay. Well, that's one of my favorite topics is talking about sleep because it's – I definitely think it's the missing ingredient for most people, whether it's whether you're doing a detox or not. Basically, I think what happens is we just basically have gotten way to busy between cell phones and TVs and computers and what not. We have a fair amount of electromagnetic stress from these things.

One of the things that can happen – and this is sort of the gut/brain connection. If you – and I do want to point out in this before we get off the phone. If we have 10 trillion cells, it's pretty well accepted now, we have 100 trillion bacteria, viruses, fungi,

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parasites, whatever – call them microbes, 100 trillion microbes in our intestinal tract.

So, there's ten times more of them than there are us. Now, we know just the latest thing from last week, we've got over 1,000 different bacteria on our skin. They're different in the armpit than they are on the front of your forearm or the front of your thigh. We are a super organism, I mean, if you stop and think about it. That's why the whole body ecology approach is so critical is to manage these organisms. If you manage the ones on the inside, I don't think you need to worry much about the ones on the outside.

Here we go with the sleep. If you've got some kind of a dysbiosis, leaky gut, some sort of gut issue and you've got enough information going on in your gut to up regulate production of these inflammatory markers that are called cytokines. They've got interesting names. They're called interleukins, like interleukin 1 and 2, and TNF alpha, and interferon, gamma.

But, these are all like the police running around with at least the siren on and a yellow light, if not a red light. They're signaling to the body that there's inflammation going on. If you've got that going on, those cytokines cross the blood brain barrier. They go right – and of course, the brain makes their own cytokines, but these inflammatory cytokines in the brain will up regulate the production of cortisol as well because of the inflammation.

Somewhere between the cortisol and the inflammatory cytokines, the tryptophan that's in our diet, that's an essential amino acid, that's a precursor for making melatonin, will not get converted to five-hydroxy tryptophan which that converts to serotonin and that converts to melatonin. If you've got enough inflammation going on in your body, you can just forget about making melatonin. If you don't make enough melatonin, then you're certainly not going to sleep well.

If you've got optimum melatonin level's you'll actually have several episodes of REM sleep throughout the night. You cycle – everything is pulsing. You go to deep sleep which is Delta. It's like 0 to 4 cycles a minute. Your brain's totally still and quiet, but you'll pop out of that into REM sleep which is rapid eye movement sleep. It's this popping back and forth that actually has to do with the thalamus and the hypothalamus releasing the pre-hormones that regulate everything from thyroid to adrenal to sex hormones.

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So, you think about it, if you're not pulsing your REM sleep at night, you're not balancing your hormones. Not only that, you're not sleeping either. If you don't sleep, you will become sort of sympathetically overdriven. You get up the next day and that's when you find out, you're having to drink too much coffee to stay awake. You're falling asleep at work and one thing or the other. I think it's critical that we learn a lot of the basic things to do for healthy sleep.

There's a great book out there called *Lights Out*, by a guy named Bent Formbee. He's a Ph.D. in molecular biology and biochemistry, both. The lady that does the book with him is named T. S. Lylee, and she's a cultural anthropologist. They've looked at sort of the history of the human race, particularly in higher latitudes where there is a winter, where people actually almost appear to be hibernating like bears do in the sense that we're very active in the summer.

We get the sunlight. We get the Vitamin D. We eat more fruit and gain weight, in the sense that, we're just outdoors more and more active. Then in the fall and the winter, we sort of retreat inside. Basically, it's almost like hibernating. The bottom line of all this is that you – that's what we used to do. Today, though it's very different because the lights are always on and there's always sugar there, you know in the form of carbohydrates.

They feel it's the combination of these two things that really are disrupting our sleep cycle. So, they have many things in that book that suggest how to optimize sleep. One of which is to wear a sleep mask. A lot of people don't do that, but just simply covering your eyes can help.

They've actually shown that it's good to be in a dark room. If you need a flashlight or something, get a very weak one to follow your way to the bathroom if you need it. Just getting up to go to the bathroom and having light hit your retina can shut off the melatonin and that's the end of the sleep right there.

They've actually shown that if they've got somebody completely covered up and put a flashlight on their leg, just the light of a flashlight on the leg, they can watch the blood melatonin level drop. These are people that have IV catheters in them and they're measuring constant melatonin levels.

Donna Gates: Simple little interjection here is that, if you don't sleep well, you don't have enough energy during the day, either, you're grabbing

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some to bring your energy level up or you're just exhausted all day long and you don't have enough energy, you can't cleanse --

Dr. Leonard Smith: Right --

Donna Gates: *(Crosstalk)* basic --

Dr. Leonard Smith: It's true. The other thing that – about the sleep and I always liked it when I can bring in an article from something like the Journal of American Medical Association, because they're very mainstream, conservative medicine. But, them, like all the other journals, is starting to look more and more into the healthy biology, physiology literature and putting papers in their journals like that.

So, December 24, 2008, the *Journal of American Medical Association*, has an article saying that for every hour under eight hours of sleep we get a night, we're more likely to be calcifying our coronary arteries. Well, look at how serious of a problem it is for people having heart attacks and strokes and one thing or the other. Part of that is you know atherosclerosis. It's hardening of the arteries which is calcium in the arteries. They say, if you sleep less than eight hours a night – if you increase your sleep by one hour, you could decrease the likelihood of calcifying your coronaries by 33 percent.

With that in mind, I think people need to be very serious about sleeping. Some of the other tips is just to actually try to get bright sunlight in the middle of the say maybe 30 minutes. If you can – if you're in a place where you can get more skin exposure, you're probably going to get a higher level of Vitamin D. That's a whole other topic. We could talk about that all day long. Vitamin D is probably responsible for at least 1 to 2,000 genes that have to do with inflammation and immunity. So, optimizing your Vitamin D level is another critical part to any detoxification program.

Donna Gates: Leonard, give everybody some simple suggestions – more suggestions on what they can do if they're in a – got bad habits. I know I – you and I at times have both been up late at night sharing research articles back and forth and look at the clock and it's late. It's so easy to get sucked into your computer, checking your email, that light getting into your eyes is a really bad thing, keeping you *(audio)*. Then after that, I can't go to sleep for another hour or two because I'm wired.

I think absolutely, this is something I try to do when I can is after dinner, especially in the wintertime, I literally turn the lights down

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really low and even sometimes put candlelights on. I've noticed when you do that – and this is great too for children – for families who have children in the house, if you put candlelight on – don't put on the TV, and you just sit around and play a board game or something. The kids are – sleep – get sleepy so early. An hour later, the parents are sleepy. Everybody can start getting to bed – those first few hours before midnight, are the really important ones to try to capture --

Dr. Leonard Smith: Right.

Donna Gates: But, what else would you – pops into your mind about – I mean, how do you go about taking melatonin. I'm more of a gob of 5-HTP person, because I like – I believe that sometimes we're so much on overdrive that you have to take gabba, as a _____ transmitter, an amino acid, but you know our transmitter – brain chemical. It's calming. 5-HTP converts into serotonin and into melatonin.

I often prefer that as a first choice over actually, taking melatonin. Then when I travel and I change – you know as I go from the east coast to the west coast or over to Japan or Australia or something, I definitely take melatonin with me for those major change --

Dr. Leonard Smith: Well, I personally think it's better to make it – make melatonin, rather than take it if you can. That's what I was about to allude to with the bright sunlight. Not only with the bright sunlight are you more likely to make Vitamin D, but it actually resets your pineal gland to – it's almost like loading it because it's making no melatonin in bright sunlight.

Everything is a question of balance. So, the bright sunlight shuts that down so completely that then after sunset if you are doing candlelight or soft light, it will help. It'll actually help the production of melatonin, being in the bright sun during the middle of the day. I thought that was an interesting fact. The people in that *Lights Out* book also mentioned that, wearing rose-colored glasses or I think even sunglasses, if you're on a computer at night or watching TV might be a good idea.

Our retina of our eyes, are from our genetic code, which are tens of thousands of years old. We've had TVs and computers for maybe 50 years. You stop and think about it just the light that we're feeding our eyes has a lot to do with our inability to sleep. Yeah. I definitely agree with the candles or soft lights in the evening as one way to do it.

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Even if you do all that, some people still have trouble sleeping. You're right. Some combination of either 5-HTP gabba or melatonin does work. The bottom line is people need to sleep even if you have to take a prescription like Ambien or Restoril. I don't recommend that. But, if you have to, it's that important to get back to sleep.

So, much of sleeping is habit. The habit is *(crosstalk)*, you've got to plan at least an hour before you go to bed to lying down. If you're going to read something, actually to just sit and meditate would be the best thing to do, just watch your breath go in and out and be very still. Or, if you read do it by soft light until you fall asleep. Try to go to bed pretty much the same time every night. Don't watch TV in the room you go to sleep in. There's a lot of just simple practical facts that can help sleep.

Then of course, some people get to sleep, but don't stay asleep. A lot of this is because the inflammation in the body creating pain or tightness. I tell people if they wake up, if you need to take another 5-HTP, another gabba or another melatonin, but get to sleep. Then just be aware of the fact if you're not able to sleep throughout the night, you probably do have elevated cortisol and/or elevated inflammation.

Welcome to the human race, because I think most of us do. I know I do at times, sometimes more than, others. The key is to make sure you sleep. I think that's really critical. Tryptophan can be useful, but there's some pretty significant data showing that if you take tryptophan and you've got enough inflammation going on in your body, the tryptophan will actually be diverted to what's called the kynurenine pathway, which is just another metabolic pathway and will end up making clinolate.

Clinolate actually opens these NMDA receptors in the brain that are so sensitive to glutamate. It will cause excitation of the brain. So, you can actually have it backfire taking just tryptophan. The nice thing about the 5-hydroxy tryptophan it's past that blockage area. I think that's a fairly reasonable sleep alternative.

Melatonin though, is hard to beat. It's the most powerful antioxidant made by our body. We're learning more about it all the time. I mean, I've recently found that, believe it or not, the intestinal tract makes 500 times more melatonin than your brain does. It has a lot to do with keeping the esophagus, the stomach, the duodenum un-inflamed. It's going to be considered even more

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of a treatment for everything from gird to gastritis and other problems.

So, I think you're right, Donna. Sleep is critical. It needs to be where you just get in a pattern of doing it the right way. If you have to, particularly if you're over 60 just plan to take something to sleep. I would say a significant percentage of the population does.

Donna Gates: But you know something in this second class that we did, I mentioned about the times of the year when the body naturally goes into cleansing detoxification mode and that's where the spring and the summer. The fall is more of a storing, gathering. Then the winter is the quiet restful gathering. Winter we're trying to be very quiet and still, so we can gather energy so that we can be active in spring and the summer.

These – we are creatures of nature. We – and one of the things you said that I love and hope that people really got is that getting out in the morning, in the sunlight, walking, moving, that's what we always did as people have done that for that thousands of years. They had to get up and milk the cows and whatever, go to work and get outside and be closer to nature.

None – we live so isolated from that today that this is one of the reasons that – I mean, that's the first step I would try is to get up. Get out in the sunlight early in the morning when the sun is not so bright. Move your body and walk. Then you'll find yourself naturally being more tired and thus *(audio)* sleeping better *(crosstalk)* --

Dr. Leonard Smith: Right.

Donna Gates: At night too. Then, and going to these other things. I see children being put on melatonin and there's just something inside of me that cringes when – if you have to do that for a short period of time, but I just – I just have some concerns about that. When these same children might just be fine getting with sunlight on their skin and *(crosstalk)* --

Dr. Leonard Smith: Now that *(crosstalk)* --

Donna Gates: *(Crosstalk)*

Dr. Leonard Smith: A lot more exercise. I think that's *(crosstalk)* a --

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Donna Gates: *(Crosstalk)* surprising --

Dr. Leonard Smith: We were meant to exercise. It amazes me that people can sleep without exercising. I know I don't sleep very well unless I exercise because I tend to have more energy than I guess I need for the most part. I certainly see it *(crosstalk)* in children --

Donna Gates: (*Crosstalk)* day --

Dr. Leonard Smith: Pardon me --

Donna Gates: Your blood type A and *(crosstalk)* and again, I am too, by the way. So, many – eight out of ten of the autistic children that we work with are blood type A. I think that from the research done in Japan on blood type and personality, because that's a predominant – blood type A is the predominant blood type in Japan. So, they know a lot about the A's. A's can be – have trouble turning their minds off at night and resting and getting into that deep sleep.

You know I think you actually do have to put value sleep and say this is such an important thing. I'm going to start preparing for it. I'm not going to be taking phone calls after a certain time. I'm going to move into – take a hot bath. That's one thing the Japanese have always done is have these wonderful hot baths that make you very sleepy and put you in a very deep sleep.

But you know I know that that's our biggest problem today is cutting down on the stress. We can't – this whole workshop is on detoxification. The toxins that we're being bombarded with really can't come out unless we – we can't protect ourselves from them unless we do these sort of simple basic things that are cheap. They cost nothing. Just basically – it's just lifestyle changes.

Dr. Leonard Smith: Right. Well, I think also in terms of – I meant to mention it earlier. But if you're taking a sauna or a steam bath which I'm not as fond of – but I guess they're okay, or even a hot shower, to actually – there's some significant data that suggests that you alternate the hot shower with getting into cooler water – it doesn't have to be freezing cold, but by alternating from hot, cold, hot, cold, two or three cycles during a session, you actually are causing your autonomic nervous system to become more flexible. It goes from more sympathetic when you're cold, more parasympathetic when you're warmer. There's something about doing that that rebalances autonomic nervous system.

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I really think that a lot of toxicity issues are due to our needle being stuck in the sympathetic zone. It goes from total overdrive to minimal or moderate overdrive. It never goes back into the state of real stillness and rest.

Then of course, that's one of the things exercise does. Exercise takes you into profound, sympathetic overdrive. Then in the rest cycle you really do rest because – well, one reason is exercise releases something called Interleukin 6. That, the muscles cause the body to release more Interleukin 6, which is sort of a paradox because it's an inflammatory cytokine, but it actually shuts down the ones that are more inflammatory for 10 or 12 hours.

So, if you don't over exercise, the right amount of exercise is possibly one of the best antiinflammatory, autonomic balancing things we can do. That's why it's good to do a variety of exercise and not just be stuck with just running or something like that.

Donna Gates: *(Crosstalk)* and some people listening to this call actually will have trouble or thinking, but I don't any energy. I don't feel like exercising. I think that that's where working on the thyroid, working on the adrenal, get your energy up, is so important. So many people today do have underactive hypothyroid, that's autoimmune thyroid condition. That has to be addressed as well.

Heather Fougnier: So, Leonard, we've gotten a lot of questions about water. Can you talk to us about how important hydration is when it comes to detoxification?

Dr. Leonard Smith: Well, it's not just important with detoxification. It's important for survival. I don't think humans can go past about seven days without totally dying without water. But I do think people stay chronically dehydrated because – particularly, as we get older our thirst receptors lose their sensitivity. People think they're not thirsty and yet, if you look at their total body water they are dehydrated.

I've heard many numbers. I think, as a general guideline of one number, half of your body weight in ounces of water is a pretty good one. That translates into somewhere between two and four quarts of water a day for most human beings. Smaller people and older people maybe two quarts is enough.

Everybody's an experiment of one. They need to work with it. If you're – obviously, if you're in a humid climate where you don't lose as much through your skin, maybe that's different than if you

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live in Arizona or somewhere where you're really in a dry climate. You may need to even drink more water.

What I tell people is in terms of quantity, you drink enough to make sure that you have several good episodes of passing urine a day. It ought to be fairly dilute. I mean if it's – if you're drinking enough water that you're going ever hour and it's perfectly clear, you're probably over drinking water. On the other hand, if you only go once or twice a day and it's very dark, you're clearly not drinking enough water.

That's just a guideline. Obviously, exercising, you need to drink water. If you drink any caffeine, whether it's from tea or coffee that – or drink alcohol, both of those shut off arginine vasopressin which is a hormone that actually causes your body to lose water. Any caffeine, any alcohol, let that be a real reminder, I need to drink probably another pint or even a quart of water to make up for the free water I've lost because of drinking those things.

I think it needs to be very well filtered, certainly for chlorine, fluorine and others. You could make a whole discussion on water filtration, but that's not the purpose today here, but filtered water's good. It's way better than even bottled water, or the whole problem with Diphenol A and different other things I'm sure are in plastic bottles.

That being said it's better to drink water out of a plastic bottle than it is to drink a Coke out of a glass bottle or something. Water is critical. I do think it's important to add – you could either alkalinize water from an alkaline water machine, but, and I think that's good. But, I think equally good in some ways is to just get really in the habit of using organic lemons, chopping up organic lemons, and putting them in water. Then you can sweeten it with stevio or leconto or something that will make like a lemonade.

Just have – just sip it throughout the day. It turns out that potassium citrate that's in lemon is a very good alkalinizers for the body. It adds a lot of potassium to the body. I think the problem with being dehydrated and being on an animal-based diet, too much protein is what – it's amino acid. I'm not saying you shouldn't have some, but too much – you know I'm talking about people that really eat a lot of meat and don't drink much water are really dehydrated and acidic as well.

We now know that if you stay too acidic in the blood and in the urine, you literally lose magnesium, potassium, and calcium, your

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principle minerals and quite possibly other minerals are lost in the urine. You become minerally depleted. I do think that the idea of replacing it with some sort of alkalinization – of course, eating a vegetable diet, a very high plant-based diet is very high in water, so you may not need to drink quite as much water with that.

I think we should detox and be thinking detoxification everyday. If you're actually doing a special week or two where you are doing a lot more of the detoxification protocols, even more water would be suggested.

Donna Gates: I always encourage people to have two big glasses of water in the morning when they wake up before they do anything else. You can take supplements at the same time. We wake up dehydrated. We wake up acidic. So, that tells you right there what the body needs. It needs the things that go into the body in the morning should be alkalizing the body, so that means minerals. Then if we're dehydrated, obviously we need to be taking things into the body that are *(crosstalk)* --

Dr. Leonard Smith: Right.

Donna Gates: *(Crosstalk)* that have fluids in them, like water and green drinks and green smoothie, and even we use juice here, acid fruits like blueberries and grapefruit, and strawberries, pomegranate juice with – you know oftentimes, I'll have people take a very sour juice like pomegranate juice or cranberry juice. Put it – a little bit of that in a juice glass with some – one of the probiotic liquids. Then that's a great juice in the morning.

All the things we recommend in the fruit part of the day have a lot of water in them because that's just what the body needs. It needs alkalizing and hydrating when we first wake up.

Dr. Leonard Smith: Thank you for adding that, because I think the timing is important. That's exactly right, because your metabolic processes going on during the night will – even if you're – even let's say if you're really on a high alkaline diet, you're not supposed to be alkaline all the time. The one time it's perfectly reasonable to be acidic is when you first wake up because a lot of metabolism of protein goes on during the night. It creates a lot of our acid residue that ends up in the urine.

I think one of the problems of America and the world at large is, what do we start the morning with? It's either, tea or coffee. I'm not knocking those, but you're already putting something in there

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that's going to cause you to lose more water. If you do that, just remember you've got to drink more water with it. That's an absolute must or you will be chronically dehydrated.

Heather Fougnier: That's important to know. You know, Donna, you mentioned getting up in the morning and hydrating, and also taking your supplements. We have gotten questions on what kind of supplementation. We've talked a lot about the idea that having whole food supplements is really important which is really what a lot of the body ecology – all of the body ecology supplements are about is it's whole foods.

Donna talked earlier about undenatured whey, and also you touched on Vitamin D, Leonard. Can we talk a little bit more about the supplements you think are most important for people to take?

Dr. Leonard Smith: Sure. I personally think that a multivitamin with antioxidants and minerals and trace minerals and all the B vitamins is a very valuable thing to do. I don't know that you need to do it every single day. I think it depends on how many other things you're doing. A lot of this is just about using good common sense. If you're traveling and you're not sleeping well, and you're in and out of airplanes and you're around lots of people, and you're not eating the way you normally do, then I – that's when I would be more prone to taking more supplements, just to make sure that you're not getting depleted in something.

There's all kinds of data now, really supporting the value of a good antioxidant, high in B vitamins, minerals, and trace minerals as a product to take every day or most every day. Now along with that *(crosstalk)*, I definitely recommend probiotics. I don't know that – I guess we'd call it a supplement, but again, I think that's not the best. I think taking probiotics and cultured foods is the best. If you're only going to take one cultured food, it's better than probiotics. If you can't take the cultured food because you're traveling, by all means take probiotics.

Actually, some extra C and E might be good because I'm not sure anybody really gets enough Vitamin C in most multiple vitamins. You might say, well, gee, do we really need that much C? Well, Vitamin C literally recharges glutathiam. Glutathiam is one of the – probably the most important detoxification molecule in the human body.

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If you're exposed to toxins – like, if you live in the city and you're not able to do all the things we're talking about here, you can just assume you've got a lot of toxins coming through. So, extra Vitamin C is very good for helping recharge glutathiam and many other pathways of the body working optimally.

I think Vitamin E is excellent, but you don't just want alpha decalferal. It needs to be a balance like a gamma decalferal is very important, then beta and delta decalferal as well. There are products that have mixed decalferals just like we have mixed garatanoids. The body actually prefers a symphony of small amounts of things rather than just one huge amount of anything. A multiple vitamin, extra C and E, probiotics and Vitamin D, I think is critical.

If you're over 60, you may not be making enough, so you do need to take it. It's probably the closest thing to – if there is such a thing as a magic bullet in health, Vitamin D is pretty close to it. We're finding free living senior citizens – people over their 70s that are not in nursing homes, anywhere from 50 to 100 percent of them have been tested are quite low in Vitamin D. Vitamin D, again, controls over 1,000 genes that have to do with inflammation, and immunity.

Look – what happens as we get older, we have more autoimmune diseases. Vitamin D apparently appears to really help that problem. It helps lower the instance of neurodegenerative diseases like Alzheimer's and Parkinson's and senile dementia. It helps prevent cardiovascular disease and strokes. It helps prevent all the – almost all cancers that have been looked at. It even helps prevent and reverse things like Crohn's disease and _____ colitis.

I think we've proven in the last decade the model for all problems with humans foundationally stem from inflammation. One of the major ways to control inflammation is making sure you have enough Vitamin D. The test you want to get, if you're going to do it is called the "25 hydroxy Vitamin D." If you're it out, it would just be 25, the numbers 2-5, and then O-H, Vitamin D. That can be done at many different labs. I personally think Lab Corp is still one of the better labs for doing it.

The bottom line is it needs to be over 30 nanograms per milliliter. The top end is up to 150 milligrams per – nanograms per milliliter. There's a huge range. Most of the top doctors at Harvard and different places now that are looking at it, think the optimum range

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is between 60 and 70 nanograms per milliliter, which is twice what is considered low/normal.

Most people – even supplementing come in at low/normal. We're talking people may have to take 5 to 10,000 units a day. If you're doing that, you really do need to every two months recheck it and make sure where you're at. Now, if you're younger and you're getting in the sun, you will make 10 to 20,000 units a day. As you get older, you don't make it as well, and then you really do need to take it. So, I think it's something that's going to be more and more important. I've never seen so many papers about anything as I have about Vitamin D, come out in the last three or four years.

Let me think if there's anything else on top of that. Those are – in terms of supplements, that's sort of the basic ones. I mean there's all sorts of other supplements you take like for detoxification, specifically. Like, if you're doing a spring detox, you really would want to take glutathiam.

You want to take glutathiam precursors. We mentioned that because most of those have to do with that liver detox thing. That would be glutamine, and acetylcysteine, and glycine. Matter of fact, those are the three amino acids that make glutathiam which is the potent, natural chelating agent of the human body, is glutathiam. Another thing to take while you're detoxing that would make sense too, is arlopoic acid, because arlopoic acid also is a very powerful regenerator, recharger of glutathiam. If you take those amino acids, glutamine and acetylcysteine, and glycine, you will make it.

When it comes to glutathiam – and I say take it as a supplement, because a lot of people say well, gee, it gets broken down. Well, it doesn't get broken down in the intestinal lining. We already have established the intestinal lining is a major part of our detoxification program. So, the glutathiam that you take as a supplement is actually helping the intestinal lining.

We do need to take it – make it as well, as take it. The way you make it is with glutamine, glycine, and acetylcysteine and the mineral selenium. In terms of how much you would take – you can take like a gram or two of glutamine, NAC, and acetylcysteine and glycine, particularly if you're doing like a two-week or one-month major detox. I think those would be things to take to keep from getting the side effects.

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I do want to caution people because if you do a significant – if you go from not exercising, not sleeping well, too much caffeine, too much alcohol, working too hard, too much stress, and here it's March or April and you decide well, it's time for a big detox program, you're looking at getting very uncomfortable. You will end up with everything from muscle aches to liver pain to possible rashes and just systemically not feeling good because if you release toxins too fast and the liver can't handle them, you will get side effects from detoxification.

Donna Gates: And you need to go to the colon therapist or get *(crosstalk)* --

Dr. Leonard Smith: Right --

Donna Gates: *(Crosstalk)* enema bucket and have *(crosstalk)* --

Dr. Leonard Smith: That too, exactly.

Donna Gates: *(Crosstalk)* too.

Dr. Leonard Smith: Yeah.

Donna Gates: I just wanted to add to the – you know so many people have said to me that I really buy all these supplements. I spend a fortune on them. Then I find I don't take them because there's something about you know swallowing 30 or 50 pills a day that just isn't appealing to us. There's so many things on the diet that do supply the nutrients that we need. I'm not saying don't supplement, but I'm definitely saying just you know from food and so Vitamin C as you mentioned.

We have – the diet is very rich in Vitamin C which are great in the cultured vegetables, cabbage is a good source of Vitamin C. You ferment it and it becomes hundreds of times richer in Vitamin C and also would the microflora then for making the B vitamins that are so important. So, there's just so many different things that we're taking care of because we're a probiotic diet, that other diets just never addressed before. I think people really prefer to take – ideally would like to get their nutrients from delicious tasting foods.

Dr. Leonard Smith: No, I agree. I think it's an individual case. I think people need to try just – they certainly can just try diet. If they feel like they're doing fine with that, that's fine. I know when we do a lot of testing we sometimes find like on the organics urine test, we find all sort of defects in metabolism because people don't have enough

B vitamins, certainly don't have enough antioxidants. Their neurotransmitters and amino acids are out of whack. They get better – they get better than they thought they could get when they do add some of the _____. So, that's sort of more the *(crosstalk)* --

Donna Gates: Oh, I totally agree *(crosstalk)* --

Dr. Leonard Smith: *(Crosstalk)* to it. But --

Donna Gates: *(Crosstalk)*, I just want – I just want people to know that they don't have to stay on supplements forever. They are supplemental and they can help correct the deficiency. But, being on the diet is really critical. I honestly feel for years and years of – you know not that it's not a great relationship _____ myself, but people still do not understand the power of foods to heal.

I'm not so sure, we've really had healing foods up until now, but I think that the _____, by putting together this system of healing that we have here, we have more information, new information than people have had before. We certainly can use foods to heal more. You know we have that _____ now that we've never had before.

I just want people to know, yes, supplement. There's some great supplements out there, but they are expensive. The supplements aren't going to do their job. The food is a critical too. Particularly, a food that's correcting digestion, always nurturing the digestive tract, that's what we always try to do, is nurture the digestive tract as well.

Heather Fougnier: Donna, and Leonard, I think what you're saying is really important because people, especially right now, we have gotten a lot of questions on how can I do this, and also save money? I think the key here – what both of you just said is there can be testing done to find out where people are needing to have supplementation. So, Leonard, you mentioned the Vitamin D testing. Could you talk about testing people could get if they wanted to see how their vitamin levels were and things like that?

Dr. Leonard Smith: Well, there's many different tests. Probably, the one that I tend to prefer – it comes from either Genova Diagnostics, which is G-D-X.net or Metametrix.com, which is m-e-t-a-m-e-t-r-i-x.com, that you do have to a healthcare practitioner order the test for you. It's called an "organics urine test." They're looking at organic acids

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which are acids that are made secondary to all the metabolism that's going on.

When you look at the downstream metabolites, you can actually see, is the fuel you're feeding the body optimum or not? It's just like a car. You know if you look at the oil and the exhaust out of a race car and they do look at that, by looking at what's not burnt the right way, they find ways to enrich the fuel so that you get better performance.

Well, they look at about 40 different metabolites when they're looking at the urine. It can actually be – the beauty of this, it can be a first morning urine so it doesn't have to be a 24-hour collection. It looks at everything from antioxidants to B vitamin metabolism to neurotransmitters to basic metabolism. It actually looks at all of the substrates in the Creb cycle.

You know the Creb cycle is where we actually take the food we eat and reduce part of it down to pyruvate which goes into the Creb cycle to make – combined with oxygen to make ATP, which is the energy that makes us run. Well, they can look at every one of those downstream metabolites and get a pretty good idea if you've got a shortage of one thing or the other. It's surprising. A lot of people do that actually feel pretty good.

Now, that's fine tuning. I'm not saying everybody needs that. Matter of fact, most people if you just did what Donna was recommending in terms of exercise and diet and sleep and elimination, and sauna and colon hydrotherapy, things like that, you're fine.

If you're a world class athlete wanting to do better, or at the other end of the spectrum if you have got a serious illness and you're really wanting to find out what you can do naturally along with whatever you'd be doing with your traditional doctor, well then you want to know about your cell metabolism. You want to know about what you're B vitamins are doing. You want to know if you're neurotransmitters are balanced.

You want to know what your antioxidant status is and that same urine you can look at detoxification. It gives all sorts of molecules in the urine to let you know how you're handling toxins. Finally, it even lets you know if the bacteria in your gut are balanced or not by looking at the bacterial metabolites that actually get in the blood and end up in the urine.

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I think that it's a very good test. For those that – it's not cheap, it's the neighborhood of $300.00 or something like that. But, to do that once or twice a year for people that really are wanting more information about where they're at and what they need to do, of course, one of the nice things these companies do is they actually come out with a nutrient supplementation program that they have figured out right to the milligram amounts that you need for the – to match the abnormality of the lab test.

Now, again, it's not perfect. There is no perfect way to do this. I think if you're going to really be serious about detoxification, it'd be worth looking into one of those tests.

Donna Gates: Well, you said that they're expensive. I think $300.00 to get back that kind of information is a bargain. Again, the principle of uniqueness which is one of our seven principles, you can't – you've got to know what's going on in your body at that moment in time to be able to make wise decisions. These tests are essential for giving you that information.

Dr. Leonard Smith: Yeah.

Donna Gates: To me that looks like a bargain.

Dr. Leonard Smith: Yeah. One last thing I'd like to comment on is I think, each decade we live things change. The older you get, the more you need to be careful about what you're eating and what you're doing to get the result you want, because they have actually shown that osteoporosis or osteopenia, thinning of the bones or loss of bone and sarcopenia which is loss of muscle, both of those have to do with chronic, low grade, metabolic acidosis, which comes again, from dehydration, and from not eating a balanced diet. You may end up with too much food that isn't being well digested.

We didn't even mention digestive enzymes. I think they become more and more critical the older you get, particularly, with cooked food. Uncooked food has its own enzymes in it. Cooked food, you probably would be wise to take – you know we were talking about supplements again. I think good digestive enzyme supplements – the older you get the less your pancreas and brush border enzymes are going to work for you. The more you need to take things like enzymes.

Another thing I just found the other day *(crosstalk)*, is supplementing with amino acids – but not just any amino acids, essential amino acids. We know – and I did mention supplements

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and another really big important thing is the EPA and DHA which typically, come from fish oil.

I'm pleased to say there are companies out there now that are beginning to make EPA and DHA from algae, so that we won't need to completely constantly deplete our fish supplies of the world. The EPA and DHA are Omega 3 or essential fats, just like Omega 6 is an essential fat.

You know eating seeds and nuts – and you don't need to eat a lot of them, but a handful a day probably are plenty. You will get some balance of 6 – Omega 6 and Omega 3 which are both essential fats. Most people because of using salad dressings and what not end up with way too much 6 relative to 3. The only way to get 3, again, is either, through fish oil or now, algae oils that have DHA.

We've had that for quite a while, but now we're just about coming out with the one for EPA. Or, eating flaxseeds or chia seeds, both of which are quite high in alphalinolinic acid which is actually the essential fat, but it converts down to EPA and DHA. Again, it only converts down if you've got the right amount of minerals and the right balance of enzymes in your body *(crosstalk)* --

Donna Gates: I want to add to this *(crosstalk)* – that's these seeds have to be prepared properly too, because they're nuts. They just _____ if you just pick up a nut or seed. You have to soak it to remove that enzyme inhibitor as well. So, we always stress you know look at a food and see, do we have to do something to this food to make it work in the human body? Nuts, seeds, grains, and so on, definitely have to be soaked.

Dr. Leonard Smith: Or, also, particularly, with flaxseeds it's good to put them in a coffee grinder and totally turn it into a powder. If you do it, you need to eat it right then, because you've liberated the Omega 3. Chia seeds on the other hand, can be put in any water-based liquid, whether it's juice of some sort, vegetable or some sort of a dilute fruit juice and they will absorb 15 times their weight in the liquid. So, that's a very nice way to get ALA, alphalytic acid is through chia seeds. That's another source.

One other thing I wanted to point out and particularly, for vegetarians and people that are eating more of a plant-based diet, and I sort of alluded to it a little earlier, is essential amino acids – I keep finding more and more articles. Here's one I just found yesterday from the Clinical – *Journal of Clinical Endocrinology*

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and Metabolism from May 2009, how is that for recent? It's out of University of Texas.

They actually took elderly women – were their target group. They gave them about 15 – 7 ½ grams of essential amino acids twice a day for three months and showed that they had an increase in their lean body mass. They had improved fractional synthesis of muscle protein. The one repetition maximal muscle strength was increased. Their IGF 1 which is a marker for growth hormone was increased.

So, isn't that interesting? Again, the key word there is "essential." So understand, essential amino acids, you don't make them. There's no way your body's going to make them. So, you must take them. That being said, most protein containing foods, particularly meet and eggs have all of the essential amino acids in it. Vegetable foods, some are low on lycine. A lot of them are low on lycine. Most of them are very high in arginine. But, some combination of animal products and grains and legumes, you should get the amino acids you want.

But it might well be in this particular group, maybe they're not digesting or absorbing it all so well, because they actually recommended taking the essential amino acids between meals, twice a day. They showed significant benefits by it. So, I *(crosstalk)* --

Donna Gates: *(Crosstalk)*

Dr. Leonard Smith: *(Crosstalk)*, I'm not proposing that everybody become big super supplementers. But, I really do think that depending on each individual and your circumstance, a multiple vitamin, fish oil, Vitamin D, certainly probiotics, possibly even essentially amino acids taken as a supplement from time to time could be beneficial. Again, I'm not sure that you couldn't do fine if you really could – if you would stick really to the program that we outlined earlier. That's not always *(crosstalk)* --

Donna Gates: You know, I want to add too, that Teamline has all these essential amino acids. It's also for people that don't get – you know don't want to get all their amino acids from animal protein. Teamline is great. We are also about to bring out a phenomenal protein powder for just this purpose because I've realized how protein malnourished people are.

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I do think we need to be supplementing – digesting the protein we do eat, supplementing with other forms of protein, something like our Vitality Super Green with a fermented _____ grasses, and algae. You know these types of things are other sources of vegetarian protein. So, I don't think we can get all of our protein from animal sources. I know you agree with that.

Again, to make a plug for our new book, we have a great chapter on protein. It was one of the most difficult chapters for us to write because talking about protein is like you know talking about religion or politics.

You shouldn't even discuss it with people because they're so emotional about – the vegetarians believe absolutely you have to be a vegetarian. Everybody should be a vegetarian. The meat eaters, who can't be vegetarians, don't feel good unless they eat some animal protein, feel guilty and are very adamant about your high protein diet.

I think we have a great answer in this chapter. We really go over all this and come up with a solution. But, protein powders like this are wonderful. We do have this available. We're about to bring out a great fermented protein powder our self. But, I developed specifically because people need more protein.

Dr. Leonard Smith: I agree. I think it's not just the protein. It's what it comes from. So, you're hitting it right on the head. I think that's next huge step in human nutrition is to get more high quality plant protein. Possibly find ways to ferment it to even further make it easier because again, if we're talking about the baby boomers going into their senior years, it's so obvious that seniors just are not digesting their food. They're probably not even getting the right sources of protein.

Donna Gates: I used to think it was one of those things that – and of course, all the literature says as you get older we don't digest. But, you know from all the autistic children that we work with, they don't digest their food either. I don't think anybody's digesting food well anymore. They lack the center echo system and maybe they don't – you know our *(audio)* doesn't necessarily need to take supplemental enzymes, but it doesn't hurt.

We just – we open them up and sprinkle them on this child's food. It looks to me, from where I sit – it looks like every age group benefits from digesting their food better and needs enzymes or predigested foods.

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Dr. Leonard Smith: Right --

Donna Gates: *(Crosstalk)* we have so much of on the diet.

Heather Fougnier: Well, Donna and Leonard, we have covered so much incredible information today. I thought what we might do to wrap it up is so many of the things we covered have to do with the fact that our lifestyles in these days are so busy, and so full of stress, and that all is going to end up affecting the thyroid and adrenals. Can we talk a little bit about the importance of energy in the thyroid, adrenals to wrap up today's class?

Dr. Leonard Smith: Oh, sure. Well, they go together and they need to be considered like the left and the right hand. You know there's lots of ways to look at it. One of the simple things people go online and look up Wilson's Syndrome, because there's a large group of people that have what is considered low thyroid, but don't have any test. The standard tests don't show it.

Basically, what happens is that your thyroid gland makes thyroid hormone. It takes tyrosine, which is the amino acid that can come from anything from meat to fish to eggs to nuts and grains. It will take tyrosine into the thyroid gland. Then it takes iodine from our diet into the thyroid gland. It puts the iodine on the tyrosine.

A lot of people aren't aware of this, but all in the world T3 is, is one tyrosine amino acid with three iodines hanging off of it. T4 is four iodines. All that's happening in the thyroid is, it's taking in the iodine and the tyrosine and hooking them together. That being said, the thyroid is susceptible to having a lot of toxins get in it that can affect that in a lot of different ways.

Let's say you are making your thyroid hormone okay. So, then out of the thyroid gland into the blood, goes the T4 which is tri-iodothyronine, and the T4 which is the tetra-iodothyronine. So, T3, T4 go throughout the body, go into all the cells of the body.

Now the other thing we measure and look at from a testing perspective is something called thyroid-stimulating hormone that's actually released from the pituitary. Now, if your thyroid isn't making enough T3 and T4, your TSH or thyroid-stimulating hormone will go up high which means it's trying to whip the thyroid, sending the message more, more, more.

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What we'll find is that some people will have a low body temperature, low energy, and their TSH will be normal. Their T3 and T4 will be normal. So, that's where most doctors would say well, you don't really have a thyroid problem. It's all in your head. Well, I think there's enough data out there and it's even in Harrison's *Textbook of Internal Medicine*, that there's a condition called "peripheral under-conversion hypothyroidism."

Now that's a mouthful, and I'll explain it very quickly. Again, T4 and T3, when they leave the thyroid, they go to almost every cell of the body. They go in the cell. So, outside of the thyroid – everything outside of the thyroid is peripheral to the thyroid, right. So, we're talking about a leg muscle or a pancreas cell. It's got its thyroid hormone in there.

Well, if T4 doesn't convert to T3, it's not – it's being under-converted. T3 is the most active, of the two. T3 actually swims into the nucleus of the cell and regulates the production of the mitochondrial protein, so that you will make more mitochondria, so you'll make more energy.

If T4 doesn't convert to T3, you won't have enough T3 to cause the cells to continually make up and regenerate your mitochondria. So, you have a brownout of energy. You feel it. You feel tired. People walk around with a basal temperature of 96. It should be closer to 98 or 98.6.

So, what causes T4 not to go to T3? You want to know one of the biggest ones, is cortisol, too much cortisol from too much stress. So, just think about how stressed out people are. How high their cortisol levels are. So, cortisol will block T4 from going into T3. One way to heal the thyroid is to chill out and get out of your stressful lifestyle.

Another big thing though is selenium. The mineral selenium – it's critical for making T4 go to T3. If you don't have enough selenium, it won't do it either. There's an enzyme called deiodinase enzyme, because it's, all it's doing. It's taking iodine off of T4 to make it T3. So, it's the deiodinase enzyme. That enzyme will not work with too low of – too low of selenium. I've also heard too low of zinc, as well as too high of cortisol.

Well, again, we're back to the heavy metal issue where we started with the mercury. Mercury will literally cause the total body zinc and selenium level to be significantly lowered. So, I think that people that have chronic low thyroid should probably be checked

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for lead and cadmium and mercury because that could be one of the reasons their selenium and zinc are low.

But, those are two minerals that a lot of people could stand to supplement with and particularly, people that are more of a vegetarian diet as zinc can be very low. So, I think – and it's partly because the zinc is – unless the zinc monomithiamine, it's not well absorbed and particularly on the high fiber diet.

But that, being said, I wouldn't stop eating vegetables. I would supplement with zinc. Or, again, if you chose to see a holistic practitioner, they could do a red blood cell zinc and selenium levels and let you know whether your tissue levels of zinc are adequate or not. That's just one form of low thyroid.

Another thing that happens to thyroid and you're going to see the same thing happening to the adrenal. Is these auto – that we've already mentioned it in the pancreas is if you've got leaky gut, an increased intestinal permeability and you up regulate your gut associated lymphoid tissue called, galt – we didn't mention that earlier. But, something like 70 to 80 percent of your entire immune system sits right there, next to your intestinal lining monitoring for these tons of food that come in over the decades that we're alive.

So, if your immune system of your gut gets up regulated, again, through antigen mimicry, it could actually make antibodies to your thyroid. So, anybody with a thyroid problem should be looking at what are called thyroid autoantibodies – thyroid globulin antibody and TPO, thyroid peroxidase antibodies. If you've these autoantibodies in your blood that's why people get thyroiditis, whether it's Hashimoto's or somebody else's name.

Autoimmune thyroiditis is way more common than we thought it was because so many people's intestinal tract is so messed up, that along with the stress causing inability to convert the enzyme. So, those are a couple of major issues for the thyroid.

It's very similar for the adrenal. The adrenal can get worn out because if we stay stressed out – if you think about the adrenal, the adrenal medulla literally makes epinephrine and norepinephrine which are very important molecules to give us energy and joy in life, and everything else. They're also the ones that push us and get us to drive harder and harder to get things done. Whether it's under the stress of exercise or the stress of working and being late

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with a project, we tend to put out too much epinephrine, norepinephrine.

That's the beginning of the stress response. Then the adrenals from the cortex, the outside of the adrenal then releases cortisol in order to kind of cool and slow things down. So, it's a dynamic balance between epinephrine, norepinephrine, and cortisol all the time. As you keep over driving, you basically wear the – you can wear the adrenal gland down to the point that it just won't make the cortisol. Then you've got – then you've got to actually go back and supplement with like a low dose prednisone, 2 ½ milligrams, or 5 milligrams.

People are – people that are stressed out, are either stressed out on the upper cycle which means they've got way too much cortisol. Or they're on the downswing, they've already worn their adrenals down and now they need to supplement with prednisone. Some people – I've actually tried with some people just to give them a small dose and people actually feel way better for a while, but that's not the long-term answer. The answer is to rebuild the adrenals through the right diet and the right supplements. Actually the diet *(crosstalk)* – pardon me --

Donna Gates: Yeah. I was going to throw in a little tip here too.

Dr. Leonard Smith: Yeah, go ahead.

Donna Gates: You had mentioned tyrosine. It's such an important amino acid – and for the thyroid, but it's also the amino acid, that's necessary for producing norepinephrine in the adrenals. I'm very – I find many, many people feel so much better when they take a product like our Ocean Current Extract which is for the thyroid with tyrosine. Then again, the tyrosine is good for the adrenals, but we get into this habit really of being so stressed out for so long that you just can't break it.

Dr. Leonard Smith: Right.

Donna Gates: So, something like the gabba and the 5-HTP either, you know you have to find your individual amount on that. But maybe taking one tablet of 500 milligrams of 5-HTP at bedtime and 750 milligrams or so at bedtime of the gabba can put the – can help the adrenals relax and sort of resuscitate them so that they're not constantly just sort of stuck in the fight or flight mode.

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So, I've been having success with people with that lately. You know you can say to people stop being stressed out and show – you know like me for example. It takes me four or five days if I'm on a vacation to kind of unwind because I'm so busy all the time. But so little things like little supplements – here we are back to supplements being valuable – like this can be really, really valuable for helping you get out of that habit that you're in --

Dr. Leonard Smith: Right.

Donna Gates: *(Crosstalk)* break this bad habit *(crosstalk)*.

Dr. Leonard Smith: Yeah. Well, thank you for reminding me, because I meant to go beyond the tyrosine. This again, connects literally between the thyroid and the adrenal, but what's really happening in the adrenal is thenalamine gets converted to tyrosine and then the tyrosine actually gets converted to dopamine. Then dopamine gets converted to norepinephrine. Then that gets converted to epinephrine.

You know, here we go with the supplements again. Guess what. To go from thenalamine to tyrosine you definitely need B6, B3, B12, Vitamin C, folate, all those B vitamins, and iron. Now, look at the number of women that end up being iron deficient because they're vegetarian. They're runners. They are menstruating every month. Then they get totally worn out and part of the reason is I think they – you could actually look at some of those people – you can.

This is another thing that the organics urine test looks at it – it looks at the downstream metabolites. If you're phenylamine level is low, although most people get enough in their diet, but some people don't. If you don't, then you need to supplement with it. But, there's something called "homovanilate" which is the metabolite of phenylamine. If it's low in the urine, it means you're just not getting enough of it in your diet for whatever the reason.

Then you can look at the other end of it, the norepinephrine and epinephrine, _____, it's called vanilmandilate. The vanilmandilate, VMA for short, is low it means your norepinephrine and epinephrine is low. That happens. Some people get so burned out they have no energy. But, here's another good one. You need Vitamin C and copper to convert dopamine to norepinephrine. Then you need esdentalmethyanine, _____ to covert norepinephrine to epinephrine.

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So, all along the path – it's amazing – the more I look at the biochemistry, it's amazing we do as well as we do. Being a little off is not that big of a deal. If you get the test and you're a little bit off, they'll basically, recommend only increasing this, lower that a little. But some people actually get way off and these are the people that are really – need, I think to do testing to figure out where they're at with that.

You know, you can really rebuild both your thyroid and your adrenals through the right nutrition, stress reduction, certainly with the essential fats, the essential amino acids, and everything back in balance. You can rebuild it. That's the beautiful part about this is it's not like you're done forever.

Heather Fougnier: Excellent. Well, that is so helpful to know. Thank you, Leonard. I want to thank you. I also, want to thank you, Donna. I want to thank everyone here for joining us on this sixth class in our detoxification training series.

Next week we're going to cover what you always wanted to know about colon cleansing, but were afraid to ask. In this informative class, certified colon hydrotherapist and certified ecology coach, Pam Craig will explain how and why to detoxify with various forms of colon cleansing, like colon enemas, colombas, and colon hydrotherapy. This is a great class to get your most pressing questions answered and learn how to administer your own home enemas for regular detox.

To pick up your class recordings and transcripts, scroll down to the bottom of your page and you'll see the dates when they'll be available. Remember, at the bottom of your page, you can ask Donna Gates questions for the next class.

We appreciate your questions and the time you're taking to learn how to look and feel your best. See you next week.

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