Our recording is started, and we are going to get busy here with the third webinar. This is part three of Disease Begins in the Gut 101. As always, I want to encourage those of you who are live to make liberal use of the questions tab on the GoToWebinar Dashboard. For those of you who may be listening to this as a recording, as always, you can make use of the Q and A Bulletin Board on the Course page for Disease Begins in the Gut 101 which you can reference off of your student homepage. It’s a great opportunity for just getting clarity on course content.

And of course, if you have questions about specific case studies, or individual’s kind of nitty-gritty scenarios our wildly successful forum is a wonderful place to take those.

I do encourage you to set aside competing interests, get ready to take lots of notes and let’s get going.

I’m going to start off with just a couple of very brief reminders of some of the key concepts that we have covered in part one and part two of this course so far. And then we’re going to quickly move into other significant ways in which disease begins in the gut. Certainly, one of the most challenging things for us in putting this course together is trying to figure out what to leave out because the truth is that we could easily do an entire Master’s Degree just on the gut, there are people who do that.

And we could easily offer 12 or 15 specific courses, having one whole particular course just on Bio and the Gallbladder for example. Or just on stomach and hydrochloric acid. Instead, this course is really designed to be not so much of a comprehensive, deep dive into the anatomy and physiology of the gut, but rather a brief overview of the anatomy and physiology. And instead, focusing more on what are the ways in which disease can most commonly occur in the gut, and what types of downstream systemic disease or even true chronic disease can that set the stage for? This class is one of the required courses for the IFNC certification program, specifically because we know how foundational it is. So, so often disease elsewhere, whether it is in the heart or the mouth or in the wrist or in the big toe, so often the key root causes key triggers that downstream dynamic, especially if it involves inflammation it can indeed be found in the gut.

So today, we’re going to talk about the magic of bile. Oh my goodness. I feel like I could talk about bile and the gallbladder all day. And I like focusing on it because this is a part of the GI track, that in my experience, is so often taken for granted. So often even well-educated and experienced functional medicine practitioners will put first focus and assessment on other components of the GI tract without
necessarily remembering the critical roles of bile. I want to talk quite a bit about that today. And also, because we have, what I think is factually an epidemic of gallbladder removal.

Now we joke all the time here at the School of Applied Functional Medicine when we're talking about case studies and various venues that clients and patients will often not even share that they have had their gallbladder removed because they have been led to believe that it is an inconsequential event. That it doesn't really matter, as if somehow the gallbladder is just an optional body part.

We're going to talk about what can go wrong and some remedies for what you run into. But I think I'm going to surprise you with some of the types of disease that can result from removal of the gallbladder or sluggish bile flow.

And then we're going to talk today about a very specific type of dysbiosis. Meaning an imbalance in the microbial population in the gut and that is SIBO, small intestinal bacterial overgrowth as it relates to IBS, which is irritable bowel syndrome. I will show you in a moment, so much of IBS is related to some degree of dysbiosis, and very specifically SIBO.

In the Disease Begins in the Gut 202 course, that's when we get much more in depth into the microbial world, and we start talking in particular about pathogens, parasitic infections, fungal or yeast overgrowth, pathogenic bacteria and also doing a deep dive into the varieties of different types of comprehensive stool testing that can be used to assess that.

But for purposes of our level one course here, I really want to focus on the most common dysbiosis dynamic, which is SIBO. We're going to talk about the role of intestinal permeability, things like food sensitivities, lipopolysaccharide, which is implicated in a variety of different downstream inflammatory dynamics. And then, I'm going to talk a bit about the power of probiotics, especially for general purpose use, and then give you some suggestions on targeted use. We cover much more about probiotics in the 202 portion of this course as well when we talk about using very specific probiotics to reestablish microbiome balance and to counter very specific pathogens.

With that introduction, I want to begin with just a few reminders. This slide in particular is extremely key with this topic with regard to disease beginning in the gut because so many of the people that we are supporting as patients or clients are on a daily basis, making lifestyle choices, whether it's a poor diet or an ongoing, highly stressful lifestyle, prioritizing reruns on TV over sleep, self-medicating with all sorts of stimulants and highly refined foods. All these kinds of things can lead people to be inflamed, infected, unrested, stressed.

But those are the same individuals coming to us seeking to feel fantastic. Seeking to get pregnant. Seeking to have beautiful skin. Seeking to have awesome sex drive and libido. Seeking to be relaxed. And indeed, we don't even have to turn to Functional Medicine Science to come to the very logical conclusion that these two things just don't go together. This combination is not natural. In general, the body is very good at helping us to thrive in the environment in which we are asking it to live. And so often, the choices that we are making in our lives on a day over day basis knowingly or not, are leading us into a place where the body feels threatened, feels stressed, lives primarily in a sympathetic dominant type of state where the immune system is more hypervigilant. We're dealing with a lot of inflammation, and the body is just really hoping we survive.
As opposed to the opportunity to improve the quality of our food, improve the duration and quality of our rest and rejuvenation, cultivate joy and mindfulness and strong positive beliefs, remove our exposure to toxicity or fire up and clear our detox pathways, and strongly activate our parasympathetic nervous system most. So that we can indeed, enjoy feeling great. Feeling vital and active and uninflamed and lift and flexible, and yes, having great sex, and feeling very comfortable in our skin. A situation in which our immune system and our nervous system are calm and are generally promoting anti-inflammatory behavior.

I come back to this piece because so often where the badness is happening, if you will, is in the gut. Perhaps in combination with what we’re choosing to put into the gut. And this brings us back, of course to the fact that of when you boil it all down to brass tacks, crap food, toxins and stress are so often at the root of what the people we’re serving are wrestling with, and you don’t have to use various esoteric testing and various interpretation and extensive remedies in order to help people to make major strides in identifying and choosing to make other choices in their life on an ongoing basis. And that’s why what we do in terms of engagement and especially in a coaching modality in some way in our practices is so key.

We've been talking quite a bit about the gathering storm, right? The various stages of increased disease in the gut and how that can lead downstream to all sorts of systemic inflammatory dynamics and even autoimmune disease. We’ve been talking about the many ways in which the disease can initially begin in the gut, and I hope you’re starting to get some good recall of what some of these things are even in terms of aggregate categories.

Things to question: what might be at play in the food, not only in terms of something nutrient poor, but something that looks a little too much like a foreign invader, looks like something dangerous to our immune system, an imbalance in our microbial population. The myriad chemical substances that we slather on our skin, or inhale or swallow that create inflammation or oxidative stress in the body. Or in and of themselves, create another stranger danger type of response from the immune system.

And then of course, malnourishment as we are consuming more and more highly refined and processed foods. And of course, all of these are connected, right? When we think about even how some of these categories affect each other. We’re consuming a lot of calories, and not necessarily a lot of nutrients. And because our digestion is worse these days in large part attributed to stress and poor eating hygiene, we need even more nutrition from our food than we have in the past.

We know malnourishment on various key co-factors impairs our body's ability to detoxify and process and handle inflammation or oxidative stress from the chemicals we’re exposed to. We know that dysbiosis if it is potent enough gives off all sorts of toxins by itself. Simple things, even from lipopolysaccharide, which is nothing but just toxin it’s a bacterial byproduct that just happens to be highly inflammatory to the systemic body. And then we know that the dysbiosis itself can contribute to wear and tear on the gut lining which can promote maldigestion and sustained can promote intestinal permeability.

There’s a lot of interconnectedness here. And I hope that you are starting to really feel in your gut what I mentioned to you at the very beginning of the course, which is if you only master one topic in the world of functional medicine science, this would be it. This is why we have expanded this course to include three webinars and really put an emphasis on making sure you feel confident and competent in working with a rich variety of disease beginning in the gut.
In the second webinar, we introduced the notion of the five R’s and the importance of attending to those in the proper order for a unique individual. We're going to be delving a bit more into that today in terms of some specific scenarios. But the fact that gut healing is very much like peeling an onion, we really have to do it a layer at a time in order to ready the body, prepare the body for the stage that follows. And doing steps too quickly or out of order can often exacerbate some symptoms in the process of healing, or in some cases, totally makes the healing process go awry by bringing in secondary types of dynamics.

Let's dive into our new content here. I want to start talking about bile. And I say lowly bile because I find that bile is a bit like lymph. It's just one of those things that feels sort of ho-hum and boring and yeah, yeah, we need it, but it's probably optional. It's not that important and it's certainly not very interesting, not a very sexy type of part of the body. But I think as we start to understand more and more about it ... the role of bile and the gallbladder we start to see an incredibly rich and unique role in keeping balance, keeping homeostasis in the gut on multiple fronts.

Let's talk a little bit about the anatomy and physiology first, as always. Bile is made in the liver. We typically make approximately two cups of it a day and it is a liquid that is produced in the liver. And then it is actually put down into the bile duct system, and by a pair of cholecystokinins, when we're not actively eating a meal, it is pumped up the cystic duct and bile is stored in the gallbladder.

The gallbladder and the liver are very close to each other, but they are different organs. They are different tissues. But our quality of bile and the constant synthesis of bile is highly dependent on liver health. And the liver having the proper ingredients for the bile recipe that allows the ratios of the ingredients to be kept optimal. Because as we'll discuss in a moment when bile gets to be too thick or has an excess amount of cholesterol in it, then the cholesterol can start to precipitate out and we can start to create sludge, as well as the possibility of gallstones.

Essentially, the liver is making bile and the bile is flowing down the duct. The cystic duct is pumping it back into the gallbladder and then when there is stimulation from further down in the GI tract, specifically from a hormone called which is cholecystokinin which is responding to our food. Cholecystokinin or CCK is particularly stimulated by dietary fat, to a lesser degree dietary protein. But basically when the duodenum starts to see food exiting the stomach and coming through the pyloric sphincter, then Cholecystokinin is basically triggering both the gallbladder and the pancreas to secrete their juices into the duodenum in order to continue digestion.

Now there's an additional hormone that triggers actually the movement of bile along the bile duct, and that's called secretin. And secretin is actually responsible for adding additional water back to the bile, so that hopefully it will flow a little more smoothly as it makes it way down the common bile duct, and it's going to spill into the duodenum quite close to where the pancreas is going to be dumping out its digestive enzymes. We've got a mixing in of bicarbonate. So if you think about it, we've got very acidic stomach juices, very alkaline bicarbonate, slightly alkaline bile as well and then digestive enzymes that are all kind of mixing together right at the top point of the duodenum at the entry point of the small intestine to create a new type of pH because obviously the pH in the stomach needs to be very acidic as we learned in webinar number two, right? In order to allow pepsin, protein digesting enzymes to be very effective.

But as we move into the small intestine, our digestive enzymes need an alkaline environment in which to work most effectively. And bile ... I'll talk more about this in just a moment ... but bile is necessary in
particular in the digestion of fat because it emulsifies fat. In general, fats as you know, like to stick together. If you’ve ever tried to make oil and vinegar salad dressing you know this, right? The fat globules are lyophilic. They don't really want to blend with the vinegar or anything else that is hydrophilic.

And bile is an emulsifier, it helps to break the fat down into smaller and smaller globules which allows the digestive enzymes to more readily get into the triglycerides in order to break them up. To digest them, so that we can actually absorb them into the body to use nutritionally.

What we know ... when there is good, solid bile flow, especially the ability to concentrate bile flow with the gallbladder so that we get more of a concentrated dosing if you will in response to a meal, the presence of bile allows the presence of enzymes to be effective over a wider range of pH. And can help to make up for some of the fluctuations in pH that might happen because of shifts in the microbiome. Because the secretions from our microbes have varying levels of pH, right? For example, various lactobacillus species are acid producing, right? They help to create an acidic environment. That's actually why the presence of a good, strong population of lactobacillus helps to prevent an overgrowth of various candida species because a highly acidic environment is not conducive to any type of surges in fungal overgrowth.

pH control is very important, and if that is a new concept to you, I would encourage you to think about your lawn, if you have a lawn where you live and the difference in soil makeup that allows a lot of grass to grow versus soil makeup that encourages every imaginable type of weed. We know that a more acidic, meaning low mineral type of soil environment literally allows all sorts of weeds to just set up show and grow. And by putting in various minerals, substances in the soil and making the soil more alkaline, it becomes very easy to keep a nice lawn without having to worry too much about weeds because pH controls growth.

Beyond that, you might be surprised to learn that bile is anti-microbial. I give you, as always, a number of different links here. And I really hope you're taking advantage of reviewing a number of these different clinical write-ups and research studies. As you've seen already, I've given you several dozen link references in addition to the research write-ups I've included in the documents section of this course. But in some cases, these are really fascinating further explorations of what is at play in terms of the different aspects of digestive substances such as bile.

But bile has some fairly significant anti-microbial action. It actually degrades lipopolysaccharide. So that's actually part of what allows it to be effective in suppressing microbial overgrowth. And so, the presence of bile, and yet our ability to get an occasional release of very concentrated bile is a key part of what helps us to keep a very balanced and diverse microbiome. And of course, that's going to have a lot to do with preventing dysbiosis and then also preventing intestinal permeability that can so often occur downstream from dysbiosis.

I also want to not lose sight of the fact that by virtue of its role in bringing bile from the liver this is the primary way in which stuff gets from the liver down into the GI tract to be excreted. So bile is the vehicle for toxins, right? Not the least of which is certainly not bilirubin, which is a waste product. Bilirubin is the byproduct of the breakdown of hemoglobin. We are constantly breaking down old red blood cells in order to create new, healthy flexible ones to optimize the body's oxygenation.
And bilirubin is a waste product, a byproduct, that the body has to be able to get rid of. And actually, bilirubin is modified in response to microbes in the gut, and that's the primary thing that gives stool its brown color. If there were no bilirubin metabolized, no bile in the stool, it would actually be a dark white, light gray type of color, which is often the stools that individuals are experiencing when they have gallbladder cancer or pancreatitis or pancreatic cancer, where there's really growth, malabsorption and perhaps complete blockage or disfunction in the bio ducts.

I'm going to talk more as we move along about the concept of lipopolysaccharide, LPS, is a very fancy word. It sounds very scientific, but basically it just means bacterial body parts, right? The outer casing, a membrane of a number of different bacterial species, and it's not just coming from pathogens. It's coming from a wide variety of endemic microbes, things like e-coli for example. This becomes an aggressive problem, when we have intestinal impermeability that allows lipopolysaccharide to get exposed to a larger immune inflammatory response, and to perhaps get into systemic circulation, into the blood supply.

Also, if we have insufficient bile production or sluggish bile flow, so that less of that LPS is broken down, I think you can start to see how that alone can start to create a real perfect storm. Where there's just some sluggishness in the bile and there's a little leaky gut, but they're in combination and it doesn't take very much for that to happen, and this is the type of a perfect storm that can take place and set up a chronic autoimmune dynamic, like psoriasis. We'll talk about that in just a moment.

It may surprise you to learn there's increasing evidence in research over the past few years specifically that bile salts actually act as hormones. Bile salts are reabsorbed through the gut lining. So we don't just find them in the gut. Typically, about 95 percent of bile acids are reabsorbed back into circulation and sent back to the liver. And research has shown that they actually act as hormones in concert with insulin to help regulate lipid synthesis and metabolism in the liver which starts to point to some really interesting types of interconnectedness with regard to insulin resistance, non-alcoholic fatty liver, and possible downstream metabolic syndrome.

And certainly speaks to the fact that the liver is a metabolic organ, but it is also a critical gastrointestinal organ, and is a key interface, a key point of interconnectedness between those two systems.

Another little interesting fact for you, is that individuals who struggle with various types of oxalate build up in the body, whether it be in the form of calcium oxalate kidney stones, or the buildup of oxalate crystals in the body, such as individuals who have vulvodynia or in some cases, fibromyalgia and various types of pain syndromes, can be because of oxalate build up internal to the body. And we need to remember that we bring on board, we can bring on board, quite a bit of oxalate in our food, right? There's phthalic acid in all sorts of different foods, very healthy foods even dark leafy green vegetables and all sorts of plant food. And in a healthy gut, we actually have a strong compliment of bacteria species called oxalobacter, and that's what those microbial friends do, is ferment, break down oxalate acid and render it unable to bind with minerals and create oxalate.

But some individuals, when they have strong dysbiosis in particular just don't have enough oxalobacter, and they're not breaking down the oxalate acid. Well if you combine that with sluggish bile flow, and you end up with mal digested fat in the GI tract, which would be very common from sluggish bile flow, not only can that deprive us of key, healthy nutritional fats and fat-soluble vitamins, but we can also end up with malabsorption of minerals. Because minerals will bind with those mal digested fats and be
flushed out in the stool, and this is another way in which we can be deprived of good nutrition from our foods.

In terms of our recipe, bile is a fluid ... or probably more accurately called slurry. Of course, it is primarily made up of water ... on average, I think about 95 to 97 percent water. It does include cholesterol and other fats, oxalipids, and then bilirubin, which again is coming down and other chemicals and other toxins are going to come around for the ride as well, and then bile salt. The liver actually makes bile acid and then they are conjugated with an amino acid, either glycine or taurine. And research does show that a good balance of glycine and taurine conjugated bile acids, right ... so when we conjugate the bile acids, then we call them bile salt. Ultimately, what's coming into the- being stored in the gallbladder and coming into the GI tract, is the bile salt.

But pointing to the fact that good amino acid availability in the body, relating back to what we meant when we were describing as far as good protein digestion goes in part two of this course, it's key for providing ongoing steady state supply of these other amino acids.

I'm sure you're getting a much richer feel now for the regulatory and oversight type of roles that bile and the gallbladder can provide. It certainly goes way, way beyond the notion of secreting bile so that we can digest our fats.

I know in kicking off those details there, I prompted a lot of questions, so let me come over there and see what I can offer in terms of some support for additional questions. So hopefully that's clear. I just clarified the difference between bile acid and bile salts.

Lactobacillus ... the byproduct of lactobacillus involves an acidic type of environment, right? When we talk an overgrowth of lactobacillus and how people can end up with excessive amounts of right? This can be because of lactobacillus overgrowth, and we're talking about lactobacillus creating an acidic byproduct that locally helps to prevent an environment for becoming over-alkaline inside the gut. And I think there's a lot of confusion about this because the whole concept of alkalinity in the body is a wildly popular-

Alkalinity in the body is a wildly popular topic, which is important to consider, but there's a lot of misnomers and misunderstanding out there. Because each of the compartments in the body has a very specific target pH, and it's not always alkaline.

We need to remember that the stomach wants to be a very, very acidic type of environment. The environment in the duodenum, where we're doing most of our digestion, or I should say the duodenum and the jejunum, where we're doing most of our digestion, needs to be slightly alkaline in order to allow digestive enzymes to be at their most effective.

And as we move further down in the small intestines and down into the colon, we need to keep a real well-honed balance. Because if we get skewed too far in an alkaline environment, it will promote the overgrowth of certain species, in particular, yeast and fungal species. So you want to think about localized pH rather than aggregate concerns.

There's a question here, if someone's essential fatty acid panel is showing low levels of typical dietary fat, then that absolutely can be because of insufficient bile production or bile flow and/or insufficient
pancreatic enzyme output, in particular lipases from the pancreas and to a lesser degree, lipases that are produced in the brush border of the small intestines themselves.

But sometimes it's a multifactorial type of issue as we discussed in the second webinar when there's placebo and there's been wear and tear on the gut lining and there’s a lower cholecystokinin response. Not that there's anything broken, but just because it's been temporarily impaired because of the placebo, we can end up with just suboptimal digestive secretions across the board.

So often what is at play is a combination of not quite enough stomach acid, and not quite enough digestive enzymes, and not quite enough bile. Nothing's broken. It's just that there's some local impairment, which if it's only for a week or two is probably no big deal. But if it becomes chronic, month after month, after year after year, then absolutely you can end up having overt nutrient deficiencies because of that.

I'm going to leave some of those other questions for my team. And we're going to keep going. This is just a little bit of an overview of which variety of things that happen and then the anatomy and physiology of the bile ducts and the gallbladder. There are some unfortunately oh so common things that can go wrong.

As I mentioned earlier, very often people are missing a gallbladder. They've had what's called a cholecystectomy. And they have had their gallbladder removed because it was diseased. They ended up having gallbladder attacks. The existence of likely large gallstones that had built up and caused sludge and an inflammatory response in the gallbladder, that was quite toxic. And the choice was made to remove the gallbladder.

Unfortunately, this is a classic example of intervention way too late because odds are there had been congestion in the liver, congestion in the bile ducts, and the initial buildup of gallstones for many years before a person actually developed gallstones that were actually causing some sort of blockage and perhaps acute inflammation of the gallbladder itself. The gallbladder attack can be incredibly debilitating. In some cases, the gallbladder does need to be removed.

I personally have worked with a handful of clients who have been able to take very aggressive action and save their gallbladder. We'll talk a little bit about that in a moment. But I appreciate that sometimes the disease process is so far gone and people are not willing or not able to make substantial enough lifestyle change quickly enough in order to reverse the process. And I think with the functional medicine lens in front of us, we can be empowered to help people understand way upstream where there might be some dysfunction.

But when people have actually had their gallbladder removed, and this is why I talk about the importance of actually having a question on your intake forms that says something along the lines of have you had any body parts removed? And you put in there, for example teeth, gallbladder, appendix. These are the kinds of things that it doesn't occur to people to mention to you. But courtesy of ox bile, we can purchase supplements in capsules or bile salts that can be taken in the middle of the meal and can restore the action of a concentrated bile release.

Now people have widely varying needs in terms of dosage of a bile salt. And of course a lot of this has to do with the degree to which the upstream issue of sluggish bile has been dealt with. Because of course...
when someone has gallbladder disease and we remove the gallbladder, we did not actually fix anything. We intervened acutely to prevent an acute inflammatory type of dynamic or an acute blockage in the GI tract, but the upstream root cause of disease is in the liver and is still there. And so depending on to what extent someone made lifestyle changes, there can still be dramatic impairment in bile flow.

In other cases, people make real substantial lifestyle changes and they still have ample strong flowing smooth bile action from the liver. And all they need is the opportunity to have a concentrated pulse within a meal. And so my experience is that literally between 50 and 500, sometimes even 1000 or more milligrams per meal is not uncommon. And if people use too much bile acid support, they are going to end up with too fast of a transit time. It will frequently lead to loose stools because basically of hyper digestion.

But we can end up with bile sludge, if you will, which is when I talk about the bile getting thick and sludgy and gunking up in the bile duct, not to mention the gallbladder. This can happen in the same way that you end up with a grease and grime build up in your kitchen, because there is scum. There's byproducts. And in general, bile should have again the perfect ratio of various ingredients, which keeps it smooth flowing. But if there is a dehydration, if there's an excess of cholesterol, insufficient bile salt coming from the liver, in particular insufficient taurine, all of these things can contribute to thick bile that is prone to cholesterol precipitating out. And it's the precipitating out of the cholesterol in particular that starts to form stones.

You can also end up with bilirubin precipitating out, especially if people have various types of disease states that are causing the breakdown of a lot of red blood cells. But way, way more common are cholesterol stones or combination stones that are precipitating out bilirubin and cholesterol. And this shouldn't surprise us, right, because we're dealing with an epidemic of metabolic syndrome, which is promoting excessive levels of cholesterol. So it makes sense that there could be a downstream challenge with that.

Also, I'll share some other references with you in a moment, but fatty liver, insulin resistant metabolic syndrome have all been shown to promote much, much higher or more frequent incidents with regard to sluggish bile flow and gallstones and the requirement for gallbladder removal. And so again, this shouldn't surprise us. This is not the way that modern conventional gastroenterology is typically looking at this. But I think we can't ignore with a functional medicine lens again via the liver, the oh so strong connection between metabolic function and digestive function, and then the downstream effect on the immune system.

What are we looking for when we're thinking about sluggish bile flow? Well certainly in terms of some early stage type of items, you might see floating stools, maybe slightly lighter color stools on a regular basis. This would be classic for individuals who are taking vitamin D supplements. You know they have plentiful magnesium, but their vitamin D level's not going up, which is an indication that it's likely not being absorbed.

Resistant acid reflux, so we spoke in webinar number two about all the different drivers for acid reflux. And when you've addressed some of those, and people just don't seem to be able to get rid of their acid reflux, even with making a lot of changes and having supplemental support and supporting good eating hygiene and stress release and HCL support, all these kinds of things, food sensitivities, and they still have acid reflux. Sluggish bile flow can be one of the drivers for that.
These people are very likely to say that they just don't feel well with fatty foods. Not in the sense of necessarily that it doesn't make them feel good many hours later, but the two or three hours after they eat it, they can feel highly fatigued. They may feel very gassy. They may actually even notice that there's fat in their stool.

In terms of lab work, you can certainly look at things like vitamin D before and after in terms of trying to support that, low levels of triglycerides despite having good ample fat in the diet. But I find the most helpful marker can actually be alkaline phosphatase. Now alkaline phosphatase is an enzyme that is produced in a few different places in the body, but most of it is produced in the liver. So this is not a black and white, always diagnostic marker. So keep in mind that an elevated alkaline phosphatase can mean other things.

But very often, when it is high within the reference range or clinically high, especially when other liver enzymes are not as elevated, it can be an indication that there's congestion in the particular part of the liver where bile is made. And I have had the ... Well the geek in me finds it very interesting and fascinating but my heart really goes out to people when they have come to my practice and we've been able to go back and look at their alkaline phosphatase and literally watch it trend up and up and up over three, four, five and in some cases ten years. But because it was within reference range, it was never mentioned to them that it might be a concern. And you can literally see the trending from 75 to 95 to 110 and then suddenly it's 135, and they're already having gallbladder pain. And so that's the type of thing we can get in front of.

Now, I want to say that in terms of that precipitating out of like cholesterol stones when bile has been sluggish, pretty much all of us have some tiny degree of gallstones. It's really quite common for very small ones to be formed on an ongoing basis and just based on the ebb and flow of life and the health of our body, sometimes we have a few more, sometimes we have a few less. But these are asymptomatic and the body deals with them in the background, and they're not really of concern. The gallbladder is flexible and we're having good bile flow and the natural polyphenols in our diet, citrus in our diet, B vitamins in our diet, these kinds of things all help to over time break down anything that has built up. However, it can get out of control, especially with sustained pressure from a few of the different dysfunctional dynamics I've been mentioning.

I want to talk about remedies. D-limonene and taurine in my experience are particularly powerful for getting rid of sludge. In many people the d-limonene works all by itself, and that would be my first go to recommendation. This is really good research into this as far as actually actively dissolving gallstones, dissolving the sludge that's in the bile duct. And that's because d-limonene is a citrus extract. It's aromatic. When you go and buy countertop cleaner that's supposed to be an excellent grease and grime killer ... Well this makes perfect sense. It's going to get rid of grease and grime in the bile duct as well. It has that some type of emulsifying action. And d-limonene is usually an extract from oranges or lemons.

Your typical citrus oil is not going to get you the same effect. It doesn't have the concentration of the d-limonene. It won't hurt at all. And in fact, certainly including lemon and orange zest in your cooking from organic citrus can be a wonderful way to get some d-limonene. And you can buy d-limonene in liquid form as well and add it to a juice or a smoothie or any type of beverage.

But this is important because again removing the gallbladder doesn't address the upstream issues. It just takes away the victim. And in fact, you probably spoke with someone who's had a cholecystectomy but then has ended up with what's called post cholecystectomy syndrome, which is where there's still small
stones in the bile duct. They’re still struggling because upstream, we’ve got to deal with cleaning the bile duct. We’ve got to deal with what is causing liver dysfunction, whether it’s insufficient D vitamins or flood of toxins or insulin resistance. We know with the functional medicine lens that there are a lot of things that can really pack a wallop on our liver. And our gallbladder and our bile flow are always going to be a byproduct of our liver health.

There are a lot of things that can help us clean out the sludge. Things that support our liver tissue, our liver cell health, hepatocytes like milk thistle and curcumin, phosphatidylcholine ... Most of you I’m sure are familiar with something called lecithin, which is a combination of choline and inositol, is also a good emulsifier for breaking down the sludge. And I mentioned taurine in here twice because I want you to really think about that as a remedy when you need something more aggressive than d-limonene.

We also covered taurine in the cardiovascular because it’s a particular awesome intervention for atrial fibrillation and for weakened heart tissue. That’s another topic for another day.

Something that can be very helpful from a proactive perspective is that polyphenols, which are particularly copious in good quality pressed olive oil help to promote particularly aggressive contraction and emptying of the gallbladder. Well, that’s part of how you prevent rather the buildup of gunk in the gallbladder is by having good, regular contraction of the gallbladder. Artichoke extract works along a couple of different pathways. It actually increases bile synthesis from the liver and also promotes greater contraction from the gallbladder.

And then bitter herbs have been used from millennia in order to promote motility. There’s a question here on gastroparesis. So a lot of gastroparesis is hypothyroid or insufficient stomach acid or dysmotility secondary to dysbiosis. And bitter herbs stimulate peristalsis. And so those can be a really wonderful addition as well.

People may need a more intense regimen for some of these kinds of things, or they may have experienced issues in the past, and they just want to do some low-grade support. One size does not fit all. But I just want you to have some tools that you can work with in terms of supporting these types of clients and patients.

There’s a question here about low alkaline phosphatase. Alkaline phosphatase at 55 or less is usually because the enzyme requires zinc for synthesis. If other liver enzymes like ALT and AST are more moderate, that alkaline phosphatase is low, I would definitely think about zinc, insufficient zinc being an issue, in which case you can’t use alkaline phosphatase as a marker for anything else. Because even if the body wanted to make it can’t because it’s missing zinc as a co-factor for synthesizing the enzyme.

If alkaline phosphatase is low and the other liver enzymes are low, then that is very likely indicative of insufficient vitamin B6. And that can be a real multi whammy in this area of wellness, because we need ample vitamin B6 in order to make taurine. We need good ample B6 in order to methylate. We need good ample B6 in order to make serotonin to promote good motility in the GI tract.

I’m not going to cover gastroparesis in depth, but there's some other things. Definitely there can be issues with vagal, poor tone in the vagus nerve. There's definitely other things that can be involved for sure.
Let’s talk about some of the things that could be of value. And rather than just spelling all these out, I'm showing you pictures of them because I find that feedback from our students is that this is more helpful because they know what they're looking for. So first of all, when I talk about digestive bitters, I give you a couple of examples up here in the upper left-hand corner. This is a company called Urban Moonshine, which makes a variety of different herbal remedies. And they have a nice digestive bitter combination that I find works quite well. And this actually has some d-limonene in it as well. So it's kind of a nice combo. Obviously going to have a bit of a strong flavor. But it can particularly well help individuals who don't swallow pills very well.

Now there is a famous bitter herb blend called Iberogast, which is actually I think from Germany, which is recommended for all sorts of different dysmotility. This would be an excellent formula for gastroparesis. It can help to calm hyper-contraction and cramping and spasming associated with IBS. So just a more multifactorial formula that you might want to consider. So again, these are liquids. They have strong flavor. But it's an option, especially for individuals who don't like pills.

Now in terms of formulas to support the gallbladder specifically, I really like both the Pure Encapsulation and the Integrative Therapeutics formula. Digestion GB from Pure Encapsulations is a mix of ox bile and taurine with a digestive enzyme and a little bit of curcumin. It's really about trying to provide a little bit of extra, I think it's about 200, 250 milligrams of ox bile, but really also trying to help innate bile synthesis in the body.

And then the lipotropic complex from Integrative Therapeutics also includes taurine but it's much more focused on the liver. It includes things like milk thistle and several different herbs that are designed to stimulate the synthesis of bile further upstream in the liver.

Now d-limonene is available from a wide variety of different companies, dozens and dozens of them. The typical dosage is either 500 milligrams, in which case I’d recommend taking two gelcaps together or in the case of Jarrow 1000 milligram little gelcaps. Depending on how sensitive people are to that strong aromatic nature, they may struggle with a little bit of indigestion as a result of that. And so sometimes we have to work on other options. People may need to take it at the end of the meal. They may need to keep it in the refrigerator and take it cold so that it goes down a little better. And the same way that those options might work for someone who has burping from fish oil for example.

Now ox bile itself as a supplement for bile, because ox bile is not about necessarily helping the body to make more bile although there is some evidence that as you put the supplement in and therefore give the GI tract some bile acids to reabsorb and put back in circulation, that there is some extra stimulation to the liver to make more bile, but in the case of people who are missing gallbladders, I really believe that this is a lifelong supplement to the appropriate dosage. You can see you can get it in all sorts of levels. The 125 milligrams, 500 milligrams, I recommend starting with a smaller dosage and ramping up progressively and seeing what's well tolerated.

Correct, my experience is that people who have citrus allergies are not going to well tolerate d-limonene.

In terms of artichoke extract, these are a couple of brands that I often recommend and have seen good efficacy for. It's really exciting when someone adds something like this. And if people want to add whole artichoke to their diet, there's actually more of the stimulatory acids that are doing the good work here.
There's more of that in the leaves of the artichoke and in the heart. People are in the habit of eating whole artichokes. That's really supporting their gallbladder on an ongoing basis. But it is purchasable in a supplement. And it's lovely when people talk about how much more ease they feel in their GI tract, just smoother motility. Their stomach feels flatter. They have less gas, just because digestion is working the way it's supposed to.

Now, Thorne has a few different supplements here that might be helpful. So phosphatidylcholine is a way to get some additional emulsifying action. This will be a good choice for example if someone can't tolerate d-limonene. This could be combined for example with taurine. Thorne has a formula called S.A.T., which is a liver supported formula. SAT, the S stands for silymarin, which is another word for milk thistle. A is for artichoke and T is for turmeric. And so this is a combo liver gallbladder support formula.

And then I talked in the earlier webinar about digestive supplements to support all three key secretions. These two formulas right here provide supplemental hydrochloric acid, supplemental pancreatic enzymes and supplemental ox bile. So it's multifactorial. Particularly good fit for people who have had surgery or trauma to the entire GI tract, maybe recovering from strong inflammatory illness or from maybe a really strong emotional strife, some type of emotional crisis or trauma, grief, and because of that strong sympathetic reaction can do some dramatic impairment.

And then one of my go-tos for people who are actively struggling with gallbladder attacks is Dr. Schulze's Liver Detox Cleanse. This is not for the faint of heart, but I have seen it work multiple times. And it's a five-day detox. In some cases doing it once works. In a few cases I've seen people have to do it two or three times. But it actually is very effective for cleaning out the bile ducts and dissolving the gallstones. So highly recommend that. Again, it's not for the faint of heart. It's pretty intense. But if people are looking to avoid surgery or people are in a lot of pain, that can be a strong motivator.

there's some good questions here and I want to talk about some gotchas that you might encounter. One of the reasons we talk about doing a "cleanse" or an enhanced liver detoxification program from a place of strength is because if the person is dealing with a lot of gallstones, this particular formula is designed for cleaning out the gallbladder, even though it's called liver detox.

But your typical kind of cleanse that would just be providing a lot of sulfur from say allium vegetables and sulfur and other phytoneutrients from cruciferous vegetables and really firing up all of the detox pathways and maybe using some natural chelators like cilantro and chlorella and citrus pectin, that is not a good idea, because what you're doing is you're going to promote a more movement of toxins to the liver, more conjugation of toxins in the liver and then you're putting it through a system that's clogged. That would be like promoting detox in someone who has kidney disease. That doesn't make any sense, because your excretion pathway, your phase III detox pathway is clogged, is blocked. And all you're going to do in that case is probably promote a whole bunch of inflammation.

And we want to make sure when someone is undergoing some targeted detoxification, or even like a one or two-week cleanse, we want to make sure that they're drinking lots of water, that they don't have an inflamed kidney, that they're not constipated, that they have good digestive flow, they have good motility, they have good gallbladder functioning.

If someone doesn't have a gallbladder, they can still do liver detox. I just think it's important to be supporting the bile flow and making sure that the bile coming from the liver is moving smoothly. And if a
person has not done any work to clean out the bile ducts before, maybe they want to do that in advance of starting a liver detox if they have had their gallbladder removed. All right, so just a sample of the way in which you can use some of these types of agents.

A few other considerations. I wanted to come to this page. If a person is doing a cleanse type of thing, they're consuming a lot of polyphenol say from the olive oil. This happens in the cleanse that I run a couple of times in my own clients. And people will say, "I've got a little bit of low grade pain or twitching going on in the area of my gallbladder."

Okay, well what's happening most likely is that they're consuming two or three times as much olive oil as they usually are, which is loaded with polyphenols.

With polyphenols and that's promoting more aggressive emptying of the gall bladder and there's just some discomfort in there because they have some small stones. It's not the end of the world. As long as it's not causing significant pain, but it is a head's up for them that they might want to take a look at why they are having some buildup of gall stones. For that same reason, you would not want to encourage that someone undertake a lot of polyphenol intake when they are having active gall bladder disease. Gall bladder attacks can be miserable, miserable. I've been in the presence of a couple of people who struggle with that. In fact, people again, can have phantom gall bladder pain or post cholecystectomy syndrome because there's still spasm going on in the bile duct. Why even though we took their gall bladder out. Again, we haven't dealt with the root cause. We just got rid of the victim.

I want to talk about some other pearls of interconnectiveness. Gastric bypass surgery impairs bile release as well as digestive enzymes. That is the concept to understand. This is becoming more and more common in the world of morbid obesity, especially secondary to metabolic syndrome. We are breaking, completely busting up, our GI tract and our digestive capabilities. This is why individuals who have had gastric bypass surgery are much more likely to develop kidney stones. That's a key point of interconnectiveness. If we don't have optimal bile flow, we make it much more likely that we're going to have oxalate build-up in the intestine. We absorb excess oxalate into the body much more likely to have a build-up of calcium oxalate stones in the kidney. This is a way in which gall stones and kidney stones can be connected. Very important to think about the concept of oxalate.

They're also related in the sense of we need ample Vitamin B6 in order to make taurine in order to have our bile be nice and perfect in composition. We also need Vitamin B6 to break down oxalate. There's a point of connectiveness there as well. Here is a good one for you that might really surprise you. Estrogens promote hyper secretion of cholesterol into the bile by promoting higher liver uptake of LDL. This is where someone being estrogen-dominant, where progesterone has a countering delayed effect in regard to uptake of lipoprotein. So a person who is estrogen-dominant, especially estrogen-dominant with high estrogen and low progesterone. This can be a way in which we end up with sluggish bile or bile congestion. Well, we know we have epidemics of estrogen-dominance, virtually in response to all the geno estrogens that we take in to our bodies, and also because of stress, which can promote lower levels of progesterone to provide the appropriate countering balance to estrogen. It's fascinating, isn't it, how here we're bringing in the hormonal system with the metabolic system with the digestive system.

It's also true that certain medications cause gall bladder inflammation. There's some interesting studies, they're not fully conclusive. Some show this effect, and some don't, that's individual to your using classic hydrochlorothiazide diuretic medications are much more likely to have gall stones and perhaps need
removal of their gall bladder. It's kind of interesting when you think about the function of the gall bladder to concentrate bile. The diuretics are one purpose promoting greater fluid loss in the body. It makes perfect sense that bile could end up being overly thick.

Then, of course, as always, if a person is very toxic, if a person is dealing with a high exposure to chemical content or a high body burden for toxins, the bile in the bile duct are the carrier for those toxins. If we don't have good emptying of our gall bladder, then we're storing those toxins in the gall bladder. It shouldn't surprise us at all that we end up with that tissue potentially being inflamed and diseased. For the same reason that the colon becomes more vulnerable to disease when we're constipated. That's a lot of trash that we're not taking out. The same type of thing happens in the gall bladder. That's a lot of trash that we may not be properly emptying.

The last stage of interconnectiveness I want to talk about around the gall bladder really has to do with the big picture. Could gall stones development and the epidemic of downstream gall bladder disease that necessitates the removal of this or the choice, the compunction we have to remove this important tissue, could it easily be the result of a perfect storm of dysbiosis, insulin resistance, toxicity, estrogen overload, fatty liver, and suppressed immunity? We know we have all those things. Right? Well, I tried to paint the picture for you about all of these can be connected. Right? We know that our modern diet is creating insulin resistance and generating a lot of oxidative stress. We know that because of that we can end up with a build-up of fatty liver, which would promote poor liver function, promote congestion in the synthesis of bile. We know that toxicity can also easily overwhelm the liver.

What may really surprise you to learn is that there are all sorts of microbial diversity in the gall bladder. For the longest time, it was believed that the gall bladder was a sterile environment because bile is anti-microbial. Bile is not anti-microbial in terms of being anti-septic, killing off all microbes. It has moderate anti-microbial properties, which is designed to help keep microbial balance. It's not acting like a broad-spectrum antibiotic and wiping everything out. It's trying to prevent overgrowth and promote more diversity and balance. Individuals with gall stones have been studied, and they have remarkably consistently more diversity and a larger population of microbes in their gall bladder. An interestingly large percentage of them actually have more microbial diversity in the gall bladder than they do in the intestine. Fascinating to me. There is a dysbiosis component. It is well understood, for example, that individuals who have SIBO are more likely to have gall stones. Well, this makes perfect sense. Right? We can end up with downstream impact in the microbial population that ends up having an impact upstream because we're not promoting as much release of bile in the body.

Individuals with type 2 diabetes are also much more likely to struggle with downstream gall stones or to have experienced a cholecystectomy. Again, this is not surprising, because of the impact of hyperglycemia on the liver and the build-up of triglycerides as a result of that, which can result in fatty liver. I love to see these kinds of comments and pearls in medical journals. It's really a sign of the times. The broadening of conventional medical research to consider more and more functional and connectiveness concepts. This quote here. "This study results highlight the importance of developing a novel prevention strategy to mitigate type 2 diabetes, for improvement of gastrointestinal health." Wow. What a modern concept. Not surprising for us at all in the functional medicine world, but really remarkable and progressive in the conventional medical world.

It's also true that there are certain diabetes management medications that can promote the formation of gall stones. I give you some references on that. In particular, the relatively newer class of GLP-1 medication, these are glucagon-like peptide medications that work in improving insulin sensitivity.
through a substance called incretin that ends up having an effect by slowing gastric emptying. This is a medication, for example, Victoza, is an example of medication of this type. Just something to consider for unique individuals.

Lots and lots of interconnectiveness. Let me just see if there's some other questions here on the gall bladder that I can answer and then we're going to take a little break and we're going to come back and talk about microbes and SIBO.

People can end up with high bilirubin in lab work because of core bile flow, but the more common reason is they end up with a higher level of unconjugated bilirubin because they have Gilbert syndrome. Which is a genetic dynamic that impairs the conjugation of bilirubin with glucuronic acid so that the body can excrete it.

Yes, Michelle, to your point, sometimes people will have a high alkaline phosphatase and no other obvious symptoms. They may not have a deep enough lab work to tell what's going on. They may actually have symptoms that have been for so long part of their norm that it doesn't even occur to them to mention them to you, because they don't feel abnormal.

I don't think there's a magic rule of thumb around combination of cleaning out the bile ducts versus stimulating more bile. My experience is, it kind of has a lot to do with the person's intuition. What I will often do is educate my clients about how these different agents work and see what their thoughts are. I'll let them know we can support the liver, we can work on cleaning out the gunk in the bile ducts, we can work on stimulating the gall bladder to produce more actual bile. Sometimes they will have strong feelings. It may be enough to say now, "You know, now that I think about it, I used to have hepatitis." We should really work the liver. Who knew they had hepatitis until we brought it up. I think these can be really educational and pivotal conversations delving into additional information or the client's intuition in partnership with yours as a practitioner.

Generally speaking, as I showed you a lot of the gall bladder core formulas are multi-factorial. It has a little bit of both. If the only thing that is showing up is an elevated alkaline phosphatase and all the other liver enzymes was great, I will very often just use for a month, once or twice a day, depending on how elevated it is. Sometimes people are not into supplements very much. I want to minimize them and then maybe check labs again and see what's happening. Sometimes people love supplements and their intuition is to do a whole bunch of them at once. Other times, people want to do a little bit, then check the labs again. Other people are interested in getting labs. We have to meet people where they are.

Yes, Jennifer, thank you for bringing up your comment. I think a lot of our practitioners who have also had their gall bladders removed would share similar wisdom, that the amount of Ox Bile that's optimum is going to vary by meals, depending on the size of the meal, depending on how much fat is included in the meal, and with a little practice, we can develop an intuition about just how much, how many capsules of Ox Bile. I know some people without a gall bladder have a bottle of both the low dose and the high dose. They take one with certain types of meals and a higher dose with other types of meals. Similar to HCL support, depending on meal composition, I think we can develop a good strong intuition about that.

Let's take a five-minute break. I encourage you to stretch your legs. Maybe refresh your beverage. When we come back, we're going to move into talking about irritable bowel syndrome and SIBO.
Alright. Welcome back. Now that we’ve got the juices flowing and as I’m sure you now can understand what I said I the beginning about not so much the lowly gall bladder or the lowly bile, is it? Definitely a key point of intersection in our detoxification, in our metabolic processes, in our hormonal processes, in our digestive processes.

Just to share a couple of the comments that are being made here, keep in mind here that all of our clinical courses are designed to be intense. They are not ever designed for you to get what you need by just listening one time. In fact, my challenge is that you’ll need to listen at least two full times before you don’t feel overwhelmed and then likely a third time in order to really bring the concept in where you’re thinking, "Okay. Yeah. I got it. Alright. Got it now," and you start to really lock in and feel some of the interconnectiveness rather than just understanding it intellectually.

The pace is very much at a rat that requires repetitive review. Let’s all say it together now. Repetition breeds retention. No worries on the first listen. I always encourage our students to just pick up what you can, take notes on the key pearls that jump out at you knowing full well that you're going to get a chance to go back and experience it again. Whether you use the recording or the streaming video or the transcripts or however you prefer to learn the second time through, you’ll be able to pause and take notes more thoroughly, which also just leads to a different type of learning experience.

Let’s go further downstream and come down to the small intestine and talk about irritable bowel syndrome or IBS. I think one of the most important concepts for all of us to understand as a practitioner is that IBS is not a cause. IBS is not a disease. IBS is a symptom. It is a fancy name for a collection of symptoms that are common. Ultimately it can be caused by a whole bunch of things. In the same sense that hypertension is not a disease. It has a diagnosis code, but it's not a root cause of a disease. Hypertension, you and me could have the exact same type of hypertension that has dramatically different root causes and upstream drivers. We may have the exact same medication prescribed to make our hypertension better or to give us relief for our IBS, but just knowing the name for a collection of symptoms does not in any way imply that one knows the root causes or how to address them. Again, this is where functional medicine really shines.

IBS is a symptom. People will always say, "oh, I have IBS." They don't know what they have. They just know that that's what they're experiencing. Indeed, the root causes can be multi-factorial. I'm going to dive now into a deep exploration of SIBO, small intestinal bacterial overgrowth. Before I go there, I just want to say a few words about the fact that an awful lot of IBS is just a combination of poor-eating hygiene; unknown food sensitivities, frequently just one or two, maybe gluten, maybe dairy, maybe soy, maybe citrus; combined with insufficient magnesium. But that trio causes an awful lot of what people would call "their IBS". Again, similar to echoing what I said at the very beginning of the course, focus on the foundational items first, the fundamentals first, because until you fully address them, it's hard to clear out the weeds and really know how much of a residual disease dynamic you're actually going to have.

When people talk about IBS, what they're usually referring to is some sort of abnormality with bowel movements, having to do with frequency or consistency, some type of cramping of spasming along the GI tract, some type of bloating or distention that may also involve passing gas or belching, usually some level of fatigue, and then also a higher incidence of perceived food intolerance. Where people have a general sense for I can't eat that, or that food's not good for me, or I'm just not made to eat that food. I don't digest that food well. I can't eat those kinds of foods. That stuff makes me very gassy. They'll make these kinds of comments. Right? You undoubtedly, you’re seeing people in your practice who struggle
with this type of dynamic and many of you, especially in the functional medicine world, your practice is flooded with people who are wrestling with this type of thing.

I want to talk about small intestine bacterial overgrowth, because in my experience, it is the most common type of dysbiosis that's really debilitating. We talk about bullies on the playground where we use the analogy of a playground, where there's kids of all sorts of different temperaments and personalities and levels of aggressiveness. Just like our microbial microbiomes. Sometimes we end up with localized overgrowth where one species is just getting a little uppity and it is crowding out appropriate diversity from other species. Sometimes there's just low grade dysbiosis that has no notable symptoms whatsoever, but maybe contributing to some low-grade inflammation in the gut that's affecting the rest of the body. Beyond that, once people actually start to experience gastrointestinal disease, the most common microbial dynamic to that is going to be SIBO.

The etiology of SIBO really has to do with having the right bacteria in the wrong place feasting on way too much food. I'll go back to my slide in just a second. I love this picture and I highly recommend that you want to learn about SIBO, this is by far the best clinical write-up I've encountered about SIBO. There have been many and many of them published since then, but I think this is one of the best ones. This is a fabulous diagram to show your patients and clients as you explain to them what is happening with SIBO. Basically, up here in the top, you see a normal distribution of the microbial density. In the bottom one, example B, you see what SIBO looks like. Normally, you can see here with the darker khaki and green color, there is a much denser population of microbes in the colon than there are in the small intestine.

The body helps to regulate this, because the vast majority of digestion and absorption of nutrients is happening in the small intestine, where there are fewer, many, many fewer microbes, where we really experiencing, and if you'll remember your scientific notation here, 10 to the sixth, right? Maybe on the level of millions or tens of millions of microbes, as opposed to down in the colon, you get a much, much greater, hundreds of billions or trillions of microbes. It's just a much denser world. This works well because digestion takes place up here, add but residual water and non-digestible starches and fiber is absorbed up here.

What comes down strange to see this higher density of microbes is it contains a lot less food fodder. The ileocecal sphincter or valve is what separates the bottom part of the small intestines or the ileum from the colon. What can happen is microbes that are supposed to live in the colon can migrate back up into the small intestines. Like they're moving up in town and experience a much, much richer variety of food fodder. They have a microbial extravaganza. The symptoms that people experience from SIBO are as a result of the metabolic byproducts of microbes gone wild and having a feeding frenzy in the small intestines with much higher food fodder levels that they typically never be exposed to in the colon.

What do we have here? We usually have dysfunction of the ileocecal valve. Microbes are able to migrate back up. We have a buildup of gas because gas is a byproduct from microbe digestion. We end up with specific types of gas being given off. It starts to cause dysfunction in the enterocytes that are lining the gut that can create intestinal permeability. They also create higher or lower levels of serotonin synthesis along the intestinal wall. Serotonin is a critical neurotransmitter for promoting motility. If we have excess amount of serotonin, it's going to promote diarrhea. If people have particular overgrowth in their SIBO that's producing a lot of hydrogen, for example, hydrogen is going to stimulate the enterocytes to produce excess serotonin and it's going to promote diarrhea or hyper motility.
However, if the microbes that are feasting in the small intestines are producing more predominately methane as a gas ... Well, methane affects the enterocytes in the lining by slowing down serotonin synthesis and creating a sluggishness in motility, which can promote excess levels of cramping, in particular, as a symptom but also constipation. You can see that the IBS is really a symptom of downstream manifestation of excessive metabolic activity that would be even further exacerbated if people have, for example, bad eating hygiene or insufficient digestive enzymes, or low stomach acids or immunosuppression. All these other things that we've been talking about. That's just going to be icing on the cake for SIBO.

Obviously, we have an opportunity when there is SIBO ... When there is these IBS type of symptoms to support digestion in the short term for sure. At the end of the day, we have go to do two things. We have to deal with the overgrowth. We've have to establish a new microbial order in order to get these guys back down into the colon and get rid of them in the small intestines. We have also got to re-establish natural motility so that these microbes can't migrate back up through the ileocecal valve again.

Let's talk a little bit more about some of the summary points for SIBO. Let's see here. In terms of a diagnosis of IBS, which your patients and clients may have gotten from their primary care physician. Studies show that up to 75% of those who are diagnosed with IBS because they fit the symptom profile excessively test positive for SIBO. As I said before, people can have other simpler, more foundational drivers for IBS type of symptoms. This type of dysbiosis is really quite common.

A test can be done with a triggering sugar, which is often lactulose. It could also be glucose. There's even more esoteric tests that use everything. Basically, it's putting a fermentable sugar, usually in a beverage. Having someone drink it and then do a breath test every half an hour for the following three hours. What that's going to do is be able to track the movement of that sugar further and further down the small intestine and to see at what point is it hitting a feeding frenzy from the microbes that is producing inappropriately large levels of the gas.

I want to show you what typical breath testing looks like. Before I read this page, I want you to remember that SIBO is not about "bad bacteria" or typically pathogenic bacteria. It's not a matter of the immune system having an inflammatory response. This a classic gastrointestinal functional disease. These are good guys being presented with way too much food doing what they normally do. We're suffering because of it. It's just too much of the good thing in the wrong place.

The offenders ... The things that are overgrowing in the small intestines are typical endemic bacteria. E. Coli. Enterococcus. Bacteroidetes. These are things that we expect to find in a human gut. These species in particular, frequently are the culprits in producing excessive levels of hydrogen. They are also microbes that can produce hydrogen sulfide, in particular. That are heavy consumers of sulfur from our foods. These are individuals who have sulfur-smelling breath when they eat these kinds of food. People will say that they just cannot eat onions at all. Absolutely cannot eat them. They get really swollen with gas when they're consuming high sulfur containing foods.

What is usually at play with methane-mediated SIBO where there's high levels of methane is a type of microbe called archaea. They're actually a species unto themselves. They're not bacteria. There are a number of different ones. One of the most commonly assessed ones is something called methanobrevibacter smithii. You can actually see the methane in its name. Not all humans have archaea in their guts. People may have very small amounts of archaea in their gut, which just aren't a problem.
That's just who they are endemically. Again, it's this overgrowth of archaea. The archaea hyper feasting on gases, in this case, and wreaking havoc on us with IBS symptoms.

A person can end up with what's called alternating IBS where they may have a few days, or a week of constipation followed by a few days or a week of diarrhea. That is often because their overgrowth of both of these species. Things like E. Coli are producing too much hydrogen, which the archaea will eat and produce methane. Which provides dysmotility. Which allows the E. Coli to feast even more. It produces lots of hydrogen, which allows archaea to feed and produce more methane and slow motility and fuel an overgrowth. It becomes this really volatile, cyclical type of dysbiosis dynamic.

Let's see. Just to answer a few questions here. Many people with SIBO do not have a lot of pain. Especially if they have just the hydrogen-mediated variety with diarrhea. They may not have a lot of cramping. My experience is that people who have a sympathetic dominance or people who are magnesium deficient or who are hypothyroid often struggle with more of the cramping. That's because they have those other etiologies making them vulnerable to cramps and spasming in the first place.

Let's talk about testing. This is your classic, sort of sample profile here for SIBO testing. This is a hotly debated topic in the functional medicine world because different studies show different levels of correlation between symptoms and the results of testing in terms of the level of IBS symptoms. This makes sense when you think about it because as I just shared, symptoms are going to be more minor or more acute because of a rich variety of things. Not just a microbial overgrowth. As usual, a lot of clinical studies are looking for just one singular factor. One singular etiology to be the smoking gun. To be the thing that's blamed. The functional medicine world we honor the fact that most often states of disease are as a result of a cornucopia of multiple factors. May be more or less intense based on which factors are involved.

This is an example of a lactulose test where an individual drank the Kool-Aid. You see a low-grade response that's fairly consistent for the first hour. Then suddenly, as we would estimate that the lactulose is heading into the midpoint of the jejunum, into the sweet spot of the small intestines, we're getting this spike in gas production. Which really spikes as we move closer to the endpoint of the small intestine. We shouldn't be seeing this if there's not a hyper concentration of microbes in this latter part of the small intestine.

I like the Genova test. It's well laid out. They separate out hydrogen and methane for you, so you can see which one the bigger player is. Just gives you some insight into what is at play. Then of course, we have to deal with it. We can provide rapid relief in terms of digestive support. In terms of antimicrobials. Recurrence of SIBO is incredibly common. This makes sense to us. We have to deal with the root cause. We can't just eradicate the overgrowth and expect everything to go back to normal.

Unfortunately, there are a lot of individuals who are taking antibiotics for SIBO and end up creating a whole other dysbiosis dynamic where they may have yeast overgrowth. They may have a pathogenic overgrowth or a completely different type of dysfunction secondary to the antibiotic. It's one of the reasons why I like to talk about SIBO in these courses because often people will recount a bad bout with IBS. Maybe a course, or two, or three, or 10 of antibiotics. Two months. Six months. 12 months before all sorts of gastrointestinal badness started happening. What we can do to help people to avoid a course of antibiotics can be truly life changing. What I find particularly promising about this testing is that normalization of breath levels correlates very well with symptom improvement. I just think in the testing
world we don't have a good understanding of the fact that multiple factors are going to be at play on how severe the IBS symptoms are.

We know that there are a number of different risk factors for SIBO. This is not even a ... It's quite a laundry list. This isn't even a fully comprehensive list. I will tell you in terms of my experience, one of the most common drivers for SIBO is people who eat by grazing. Which can impair the migrating motor complex. Which is the natural cleansing waves that happen in the gut. They only happen when we're not digesting food. People who maybe have poor blood sugar control ... The way they're managing that is kind of munching all day long. I'm not talking about four small meals where they actually allow three to four hours in between them. I'm talking about every time they're around food, they grab something. Pretty much every hour they're having some kind of little, small food. Well, that may feel like a good band-aid to their poor blood sugar control. However, if they are prone to other issues in the gut and the migrating motor complex is not providing the cleansing waves that sweep downward in order to counter microbes migrating back up into the small intestines, they just become more vulnerable. Eating hygiene and not grazing are particularly important here.

For people who have a history of SIBO, I highly recommend the full, cold turkey four hours in between any type of eating at all. Some people really find that they want to go much longer than that. You'll notice that these are some similar risk factors for SIBO but also for intestinal permeability. I think that's because ... It shows up in the literature because we know that SIBO itself is a major contributing factor to intestinal permeability. When we're having this constant ebbing and flow and build up of excessive gases and microbial by products and debris in the gut, it does put stress on the function of our enterocytes and our protective mucosal lining.

When we think about what is at play in terms of microbes ... I was talking about the hydrogen as a byproduct. That's more specifically associated with diarrhea. In particular things like, enterobacter and E. Coli. The archaea more typically associated with constipation. Then there's a whole class of hydrogen sulfide producers. These are typically not tested for. Although, they could be in terms of detectable sulfur in breath. Breath test it's much harder to get, unfortunately. People know if they have SIBO or not. People know if they have those kinds of symptoms. If you already addressed all of the foundational, low-hanging fruit for them with their IBS and it's still there, then doing a trial antimicrobial to try and address the SIBO I think is a great strategy.

This slide is really just presenting some of the things I've already mentioned. There's a question here about the best ways to address insufficient migrating motor complex waves. I think changing eating habits. Improving eating hygiene and stopping the grazing. Allowing more time in between meals. Supporting digestion so that people feel comfortable eating larger meals less often. The other thing I would point out is that obviously, good migrating motor complex function depends on good motility. We need good adrenal and thyroid function in order to support that. Digestive bitters can also be helpful for stimulating normal motility. The other thing that inhibits the migrating motor complex, even in between meals is when we're in a sympathetic nervous system state. This is where relaxation, mindfulness, breathing can really make a big difference in helping people to come to grips with just how stressful their lives are and how much they may be living in a sympathetic state.

There are a lot of things that we can do to provide triage for IBS symptoms. I've spoken to many of these already in the prior webinar. I'm not going to speak to them. I think they're all pretty self-explanatory. These are things that can be very galvanizing for people around giving them hope that they can finally actually get on top of these symptoms. They don't need to suffer forever. Can really galvanize their
belief in you as a practitioner. Help to increase their faith in the process because getting rid of the microbial imbalance can take a while. This is an example of where we want to try and balance rapid relief that can really help people to feel better with actually addressing the root causes.

There's a few questions here. I mentioned activated charcoal. If you take activated charcoal with a meal, you're going to substantially impair mineral absorption. I think the best time to take activated charcoal is in between meals. It does come in ... Charcoal and actually bentonite clay they both come in capsules or in loose powders. Just depending on what people like.

Let's talk about a diet that can be helpful in healing for SIBO. I'm going to surprise all of you by saying that I don't typically recommend the official "fodmap" diet to my clients. Here's why. It's a big giant list of do's and don'ts that basically don't make sense to people. It's not like a theme. It's not like saying, "Okay. Avoid all grains," where they think, "I can kinda lock that in. I don't need to keep a food list of all grains. I know what a grain is." That feels easier to implement. The whole notion of I'm going to carry around this list that says, out of all the fruits and vegetables these are the 50 I can have and these are the 50 I can't have. There are some people that are really motivated by having that type of how-to guide. There are a lot of people in my practical experience who find that crazy frustrating. They would rather have more restrictive eliminations that are easier to remember and implement.

I call this the "starve them out" diet. I'm not looking to patent some other fancy SIBO diet as so many people are trying to do. This is more what I have found practically actually works because it's sustainable. You can define any kind of optimal diet that you want to but if people can't follow it it's completely useless. Even if it's biochemically accurate. The concept of starve them out is really about focusing on vegetables, clean protein, healthy fats, nuts and seeds, and fruits. Then letting people self-identify which of those doesn't feel good in their body.

Here's the thing. Different cases of SIBO are sensitive to different foods. Some people are not particularly bothered by fructose. Just based on the particular types of microbes that they have thriving in their unique case of SIBO. They may not find that they're particular vulnerable to fruits at all but they're really vulnerable to the high fiber vegetables. They feel fine with fruit. Other people would say, "Wow. Fruit is crazy. I can't have any raw fruit at all but if I cook the fruit, I'm good." I think it's better for us, in my experience, in terms of creating something that is sustainable to work more with people on a one-on-one basis. To use this type of starve 'em out platform as a foundation and then customize it based on what works for them. I do include elimination of gluten and diary in here. Even on top of the notion of no grains because so many people who have SIBO have intestinal permeability. They're not going to get better until they get rid of things that are exacerbating that permeability. This is an addition that really has nothing to do with fodmaps, per se.

I think all the aspects of this ... I'm not going to talk through all of this. I think it's probably self-explanatory. I just want to offer a contrasting thought. If you have had great experience in your practice with the fodmap diet, that's great. I don't need to give you a resource for that. There's a jillion of them online. The specific carbohydrate diet is a version of that as well. There's no lack of resources. No lack of great, free websites you can send your clients and patients to. To get the laundry list of foods. I just find that it can be very hard to even implement, much less sustain.

Let's see. What would be a SIBO safe way to support someone who is rapidly losing weight even with eating tons of fats and proteins? That's a great question. I will say, first of all that very often whether someone is countering SIBO or chronic overgrowth of candida, sometimes we just need to set
expectations by saying, "You're probably going to lose more weight than you want to doing this regimen." It may just be a necessary short-term consequence from an intervention perspective that then we can address with an appropriate maintenance diet. Especially, a wonderful opportunity to highlight the different between a therapeutic intervention versus the sustainable diet that they may follow on the other side.

I think we can work with people the best we can. To your point. Really trying to ... I would be careful about not having excessive protein. I think the healthy fats are where it's at. Understanding that someone may need to use a full-spectrum digestive enzyme. Maybe something that even has bio support in it. Maybe something like the turn capsulations. GB formula that's got lots of lipases in it, in particular, as well as a little ox bile just to make sure that they're actually going to bring that fat on board for calories and nutrition. Rather than just losing it in our stool.

It is quite classic sometimes for some people. They're just going to lose weight. I think that's only alarming to them if it happened and you didn't set expectations for it. It's all about helping people to be comfortable with what might be at play. There's a couple questions here. I recommend a different type of diet. Certainly, similar but it does have a number of different aspects specifically for yeast overgrowth. We talk about that in the Yeast Begins in the Gut 202.

Beyond rapid relief for symptoms. Beyond the diet. We obviously need to deal with the microbe. There are many, many options that will probably work quite well. Here's what I've learned and here is what is taught at the Institute of Functional Medicine and is seen in many different research studies talking about this. I'm going to give you some references in a minute. We need multi-factorial antimicrobials. Ideally, blends that are very multi-factorial. Not just berberine. Not just garlic. Not just thyme. Things that have 10 or 12 or 20 ingredients because we don't have insight typically into the specific resistance of the microbes in a unique person's body to various agents.

If you give somebody berberine, which could be a very potent anti-microbial but they're particular overgrowth of E. Coli is nonresponsive to berberine. Well, you can give 'em all the berberine you want to. It's not going to help. Rather than creating a lot of frustration and trial and error, I highly recommend combining anti-microbials. There's a combination of metagenics or biotics products that I've seen work really effectively. Really using them together at max dose for at least two months. Sometimes three months is really needed. I highly recommend encouraging people, even if they feel, "Wow. This is great. I think all my symptoms are gone. I feel really awesome." Remember, we want to stop the anti-microbials when the lifestyle choices are in place. Not just when the symptoms are better. When the lifestyle choices are in place. When the stress is less. When the sleep is better. When the grazing has stopped. When all of these things are in place upstream to help ensure less of an impetus for recurrence.

You probably like me are likely to get people coming into your practice for the very reason they've had to go for a while and the anti-microbials haven't worked. There are certainly some functional medicine practitioners who would readily recommend using a biofilm buster for every case of SIBO. That may be the case. I don't recommend that because I have not found that it's always necessary. If there is evidence that there's an entrench case, it's already occurred more than once, then I do think using a biofilm buster can be quite helpful.

My favorite product by far for that is a Klaire Labs product called Interfase. It's the regular Interfase, not the Interfase Plus. This can be taken ... It's basically a multi-enzyme formula that includes enzymes that
degrade biofilm. Degrades the mucin structures that microbes use as a framework to set up a house. To create this kind of webbing almost like a spider web. It's basically a thick mucosal layer that they thrive in that protects them. If you break down and start to dissolve the biofilm, it makes them more vulnerable to your own immune systems and also more vulnerable to the anti-microbial agents that you're using.

If it resonates with you to use that right from the beginning, then I recommend getting it started right away first, before you add the anti-microbial. As I said, if you're not getting significant relief even if you are using antimicrobials, I recommend stopping them, using the biofilm buster, and then coming back to it. Now, probiotics ... This is something that I've seen be very effective. In many ways, it's sort of a wild, wild west craziness in the small intestine. The immune system is not really getting involved because everything it's seeing is endemic. It's not like a pathogen where the immune system is really on high alert. I'm sure it is on alert at least to a low degree. Perhaps because of increase of lipopolysaccharide. We may often need a probiotic to basically prime the immune system to provoke a stronger reaction to try and help establish a new world order in the gut.

This is a place where I think soil-based organisms can really shine. In particular, bacillus species. I give you a couple of examples of soil-based organisms that I have recommended in the past. I do want to express caution for individuals who are immunocompromised. Individuals who maybe are experiencing chemotherapy or just recovering from chemo and they have a suppressed white count. Maybe they're taking immunosuppressant drugs. We need to keep in mind that live probiotics are vulnerable to proliferation in an appropriately weak gut. For those individuals, I do not recommend using soil-based organisms. I recommend using more just a full-spectrum endemic human gut probiotic like Ther Biotic Complete. Following the five R's we're not starting the probiotic first. We're starting the anti-microbials first. Really getting them going for a couple of weeks and at least experiencing some remission of symptoms.

Experiencing some remission of symptoms before beginning the probiotic, and then resuming the probiotic you want to start slowly and use a ramp, as I've described here. If you start the probiotic, even a half a cap a day, and it's not well tolerated, stop it, continue the antimicrobials for another week, and then try to add the probiotic in.

Each person is going to require customization. What I'm offering is just sort of a rule of thumb. You're definitely going to have to warn your patients that, we may need to adjust the timing and the dosage, depending on how their unique body responds.

Okay, let's see. Can the interface help with Bio Cleanse for H. Pylori overgrowth? That's a great question, Rebecca. My experiences is that that is not needed, especially once HCL is repleted. Pepsin and HCL do a great job breaking down a biofilm. Once that is added back in that can have some pretty significant effects. I don't think it would hurt, but it may not be necessary.

Interphase Plus I don't generally recommend because it includes a chelator, a heavy metal chelator, and that can bring into play a whole host of other issues on top of the sibo and make someone go from, "I was kind of suffering" to "Now I'm really miserable." To me that's just an example of too much, too fast. We really want to help a person to heal from their sibo first before we think about introducing substances that might mobilize more heavy metals or other toxins.
I want to talk about the downstream effects for this, and there's a number of questions here about other probiotics, I'm going to get to those in just a minute. The lights for sibo, I use Candibactin AR and BR together. Full strength. Otherwise when you're using them separately, Candibactin AR has antibacterials that are particularly good as antifungal. Candibactin BR has a mix that's probably better targeted at bacteria, if you're looking to use individual agents. But I really like using them in combo because again that gets us up to that dozen different antimicrobials, specifically for sibo.

But we know sibo increases the likelihood of intestinal permeability, right? We talked about this in our very first webinar, and we covered some of the common drivers for intestinal permeability. And we know that healing the gut lining is key, so if we think about sibo, we've got to try and remove the overgrowth. We may be replacing digestive enzymes, but we want to be repairing the gut lining as we go through the five R's. And these are just some thoughts, we've already talked a little bit about this. Just an echo here of some things that can be helpful for that.

In the case of sibo specifically, I usually recommend use of GI Revive for two months. And once or twice a day, it's going to vary just depending on how much discomfort they have. But again, this is not something that we're typically starting right away. In order to reinforce ... Because it doesn't make sense when there's a raging overgrowth to waste the GI Revive specifically. We want to help the person to really make good use of their supplement and I give you some food ideas here too, if they're not open to supplements. These are some things that can be helpful just for soothing the gut lining.

Now I want to talk about some of the other gut connections that might surprise you. There is a very common co-incident of IBS and fibromyalgia. It's actually diagnosed in up to 81% of those who already have a fibromyalgia diagnosis. And of course, there's some variability, and I think a lot of that has to do with the fact that, comically enough, both IBS and fibromyalgia are fancy names for a collection of symptoms, and the cluster of upstream root causes can be dramatically different. We have a DECIDE clinical course that dives into this more, but root causes of fibromyalgia are very often in the gut. And I found this really fascinating.

I give you a number of study links here if you're passionate about this topic, but one study found that abnormal hydrogen breath tests were found in 100% of the fibromyalgia patients. Hard to argue with that, right? And in 84% of those who had been officially diagnosed with IBS. As I said earlier, the IBS diagnosis can be variable. But what you may find interesting is that in this study, they found that the degree of somatic pain actually correlated quite tightly with the severity of the hydrogen gas collection in the breath test.

And addressing the sibo, studies have shown, can dramatically improve symptoms. Pretty fascinating. A classic example of dis-ease beginning in the gut. I'll leave you to follow up on some of those items if you wish. And there are certainly other items. In the fibromyalgia course, we talk about other contributors like toxicity and mitochondrial dysfunction. But keep in mind, that people who have sibo may discover that a number of their other downstream, non GI symptoms get better once sibo is addressed. And also keep in mind that the downstream intestinal permeability that can happen from sibo, may not any gut symptoms at all.

Another possible connection from the gut and the small intestines ... I love this quote from Dr. Alessio Fasano, one of my heroes with regard to his discoveries and medical publications about the role in gluten and Zonulin and the etiology of autoimmune disease. You said a truth about a leaky gut is kind of like a Las Vegas. What happens in the gut does not stay in the gut. Because we have this enhanced

Disease Begins in the Gut 101 Revisited Part 3: Page 25 | 30
permeability as you can see in the diagram here where that additional permeability can allow an excessive reaction to the immune system in the basement membrane of the small intestines that ends up with us having circulating immune complexes in the blood that can wreak all sorts of havoc. We've spoken before about the immune system in the gut causing systemic inflammations. It can also damage and impair nutrient absorption. And then we also talked about the connection with the blood brain barrier as well.

In particular we know that when there is a strong microbial overgrowth like sibo, a combination of high levels of lipopolysaccharide combined with intestinal permeability that allows the immune system to get hyper-exposed to that lipopolysaccharide and be a big driver of downstream dynamics. This is part of what is at play in fibromyalgia and chronic fatigue. This is what is at play in a huge variety of different muscles, myopathy type dynamics. And interestingly enough, it is also implicated in psoriasis, which has autoimmune roots. There's some really fascinating studies showing that use of bile salt supplementation providing full remission in a number of psoriasis patients and dramatic symptomatic improvement in almost all of them. And again, we need to remember, bile salts have got a number of roles, including the fact that they degrade like a polysaccharide.

There's a question here. Lipopolysaccharide could certainly be involved in eczema because of the autoimmune connection. My experience is that the food sensitivity aspect of eczema is usually pretty huge. It could be to a varying degree, but I've usually seen awesome improvement in eczema by optimizing vitamin D, vitamin A and red blood cell zinc. By healing the gut lining, by elimination fruit and dairy. and if that doesn't do the trick, doing food sensitivity testing to find out what else needs to be addressed. Which is a a great segway, thank you so much.

We have an entire DECIDE clinical core called Demystifying Asthma and Allergy which gets into great detail about where those things come from and how to address them, but I just want to introduce the fact that sometimes intestinal permeability is the gateway to a food sensitivity. Sometimes maldigestion is the gateway to a food sensitivity or a food allergy. Because foods that aren't thoroughly broken down are much more likely to trigger the immune system threshold or seeing a substance as being both strange and of danger, that stranger danger requirement.

We can end up with the immune system basically learning by overexposure to a food, especially in its mal digested state, the body ends up thinking that that food is a foreign invader and then every time you eat it, you are likely to experience some degree of inflammation. Often, it's low grade inflammation that is delayed, it's not going to be experienced until 12 hours later or even as much as one or two days later. Which is why it can be really challenging for people to self-identify with their sensitivities.

These are the most common food sensitivity categories. But keep in mind that for the vast majority of people, GI symptoms are not the hallmark of food sensitivity. Other than acid reflux, my experience is that people are much, much more likely to suffer from things like joint pain or strong fatigue or brain fog or skin issues than they are specifically gastro intestinal distress because of food sensitivity.

In the class, the DECIDE clinical course we talk about various types of testing for food sensitivity. I want to remind everyone that, as we discuss in some of our cases, in the semester program, no type of food sensitivity testing is truly comprehensive or fully accurate. And that's because there are all sorts of pathways by which the immune system can respond negatively to a food or something that it finds strange or danger. There can be IGG antibodies, there can be IGA antibodies, there can be IGE in the
case of true allergies, it can be IGM even. Which is usually reserved for the body to respond to a microbe but sometimes foods look a lot like a microbe.

The body can also have innate immune system responses to a food. Sometimes there's no antibodies involved at all. Sometimes it's just maldigestion or digestive intolerance and then the immune system has a strong reaction to the hyper presence of a food. We can very often learn from a simple structured reintroduction ... Excuse me, an elimination and reintroduction challenge. And so I give you some instructions on that. There is an excellent comprehensive write up on food sensitivity in the Q and A treasure chest that'll give you a whole bunch more information on this. But I just want to introduce it briefly here because if someone has had sibo for a long time, it would behoove you to assume they have intestinal permeability and if they struggle with any systemic inflammation, it is very likely that food sensitivities are involved.

Testing can be something that people really want and are happy to pay for but my experience is also that sometimes testing is just a big downer. Because it doesn't tell people what they want to know. And it leaves them with uncertainty. And there's a wonderful exercise in self-awareness to do a structured elimination diet.

Just briefly here, I just want to explain that pulling some of this together and closing out on this topic, there's a whole bunch of other types of dis-ease in the gut. And as much as you may feel overwhelmed right now, and we've really talked about some powerful, powerful, foundational and oh so common dynamic. There are all sorts of other esoteric examples. Like celiac disease. And when we think about the damage that celiac disease does to the villi that are lining the small intestines where they actually end up getting blunted. Where there's damage to the villi and you can see the degree here that opens up spaces in between the enterocytes and impairs digestion all along the gut lining. This is where individuals who have had celiac disease undiagnosed for a while can end up struggling with malnourishment. Insufficient levels of nutrients for years or for their entire life.

In some cases when people have had celiac disease for many years and they didn't know it, even if their eating 100% gluten free, you're going to end up struggling to have ample iron or ample zinc or ample vitamin B6 for their entire lives. And so targeted supplementation becomes your [inaudible 02:22:54] And so I guess there's plenty of other ways the villi can be damaged. This is ... We talked about non-steroidal anti inflammatories. And strong ongoing dysbiosis. There's a number of ways in which villi can be damaged or the mucosal lining can be damaged. The damage is particularly toxic and pervasive in celiac disease because it's an autoimmune dynamic. The immune system is essentially attacking the gut lining. And I just wanted to show you ... if we take one of these little enterocytes down here, and blow it up ... I wanted to show you when I've been talking about the brush border. The microvilli.

So even when we think about these big villi that are covered with these enterocytes and we want to have good tight junction between these enterocytes, because when there's a little bit of space, that's where we can get extra permeability. But it's this brush border that can end up getting damaged and really impair digestion and absorption. Because we're getting digestive enzymes, not just from our pancreas, but also from this precious brush border.

The gold standard diagnosis of celiac's disease is an actual scoping that would show the damaged villi. So there has to be verifiable blunting of the villi. Which is unfortunate because sometimes people have been having an inflammatory reaction to gluten for quite some time before there's notable, strong, visible example of damage to the villi. We can also test for antibodies and I think increasingly anti-gliadin
IGA combines with what's called endomisio IGA antibodies which specifically shows immune system reaction to rye. So it's not just the gluten in wheat, it's actually the gluten in rye as well. The combination of multiple IGA and IGG antibodies increasingly becoming diagnostic as well. Which I think is smart because we'd really like to catch it when the immune system is freaking out in order to minimize our ... Ideally even prevent substantial villi damage.

Last topic for today is probiotic. And again, I'm just going to talk about some of the general power of probiotics here. There's certainly all sorts of information about targeted probiotic use. And I gave you a link to a couple of websites and there is a document posted in the document section as well which goes into great detail about clinical studies for what microbe has been shown to specifically help what things. Understanding that in some cases we know that a certain micro helps it but we don't have a viable supplement for it. Sometimes it's just a matter of changing up the diet and improving the immune system and getting rid of pathogens or sibo so that the immune system can kick in and restore its own microbial balance.

But when we think about a unique microbial environment, it gets back to that ... it's an ideal sample size of one. Because your microbiome is different from my microbiome. We may both be optimally healthy but our optimal microbiomes may be substantially different in response to our life. Our diet, our stress level, our genetics, our nutrients. And so it's not about saying there's a perfect microbiome and if someone gets off of it in this direction, they need a probiotic or something happens. It's really about trying to be responsive to when a unique person's immune system is not happy with the microbial balance.

We've already spoken, I won't go through this again, we talked about this in the first webinar about a number of different key characteristics of our microbial friends and just how powerful they are. But generally speaking, I want you to know that probiotics have been pretty heavily studied. There's some great references here for a variety of different uses and a few things that you may want to know from a practical viewpoint is that probiotics can be viable or killed. The viable ones are usually refrigerated, although increasingly we're seeing different types of encapsulation that don't require refrigeration.

In terms of the microbes just being dormant. Of course, you still have to make sure that it's not heated, which will definitely kill them. But what I want you to know is that, first of all, in the absence of a person who is severely immunocompromised, probiotics do not move in and set up shop. It's not like they become an endemic part of the human microbiome on an ongoing basis. They very classically, if they are viable, will move in and set up shop and thrive maybe for a week. Or two at most. Their value in terms of calming and rebalancing the immune system that is not about their permanence, it's about their presence.

Every day that we consistently take them, the immune system is basically saying, "Okay, things must be alright, I see the probiotic there. Okay, here they are again so things must be okay. And it's calming and rebalancing and priming the immune system with the presence of endemic, commensal, beneficial bacteria.

Now depending on what else is going on with someone, like if they have sibo and you introduce probiotics too soon or at all, people may have a hard time adjusting. They may introduce too much, too fast. If someone is not using probiotics I don't recommend jumping right in with an 80-zillion formula. That doesn't make any sense. Start with something low and slow like eight billion or ten billion. And help someone to build up if they need more.
For most purposes a good quality multi strain probiotic is usually the best. And they're going to typically include their species there. There are some contraindications though. Certainly, individuals who have histamine intolerance, such as people with asthma should really avoid the species that produce histamine. Things like electrofasilatramnoces and saccharomyces Boulardii have been shown to be particularly helpful or autoimmune types of dynamics. Or strong viewing of GH1 and GH2 where a person may have an under reactive response to microbes that their having a hyper reaction to environmental or allergens or sensitivities for example. Keep in mind that saccharomyces Boulardii is a yeast and when people have a yeast allergy or yeast sensitivity, they should not use saccharomyces Boulardii. Similarly, they're probably going to have a bad reaction to kombucha because there's saccharomyces Boulardii in kombucha. They probably also will not do well with yeast cultured foods such as miso or tempeh.

There is some really interesting study about probiotic use during pregnancy or breastfeeding and I really wanted to include these because I think we don't often think about the importance or possibilities of probiotic in children, especially in infants. But especially with our practices in this day and age where we've got a high antibiotic use in little ones. When people are ... When babies are born C-section they don't get the advantage of starting off in endemic microbiome courtesy of the mother's vaginal microbiome. If a child is born with a C-section, they're initial microbiome is just kind of random stuff they pick up at the hospital. But some really interesting study around that. I want to spend a little time talking about choices for probiotics. Because first of all, for an awful lot of people, daily intake of some small amount of a naturally cultured still viable, meaning it's still raw, fermented foods can be really helpful. People don't need to be consuming bottles of these things, it can just be a couple of tablespoons. Really as a condiment, or even something like kombucha, if they feel good on it, even like a half a cup can be plentiful for someone.

Saccharomyces Boulardii is available on it's own in a variety of different supplements. As I've shared with you before, the ultra flora acute care is my favorite combination of electrofasilatramnoces and saccharomyces Boulardii, so in the absence of a yeast issue, this would be the probiotic that I'm going to use most often for autoimmune disease. Unless it's inflammatory bowel disease. In which case I am a big fan of VSL#3. Which has been shown to be particularly effective for ulcerative colitis. But it does also have to be started low and slow. Udo's is a brand that I just wanted you to be aware of in terms of choosing probiotics for children. They have different probiotic formulas for infants, for young children, for older children and then for teens. Which I think is a great idea in terms of having probiotics at a more representative of the typical microbiome or young people at various ages.

Ultra Flora Women's vaginal is a great formula that is predominately like the bacillus and its good full spectrum lactobacillus. And it is wonderful for women who struggle in particular with common vaginitis. Whether it's a yeast overgrowth or a bacterial overgrowth, this can be a great formula for that or for individuals who may struggle with keeping ample levels of lactobacillus. In general, and I really don't want you to take this on board as a black and white concept, but in general, people who struggle more with constipation, often have a dearth of bifidobacter bacteria, they don't have optimal levels and so a probiotic that's all bifidobacter like the Therbiotic factor 4 can be of value. Versus for people who are struggling with diarrhea, sometimes a heavy lactobacillus formula could be much more beneficial for that.

And then therbiotic complete is by far my favorite full spectrum probiotic. There are many other options, please these are not all of the different options. Just things to consider. Yes, generally speaking
things like sauerkraut and kimchi, or cultures, beets or those kinds of things are lactofermented. There's no use in them.

Just a sample of what's available that you might want to consider. So that's what I have for you today. And with this we are wrapping up this course, which has been a very DECIDE, I think you will agree, beneath the surface. So often the people we’re working with have some small degree of gastrointestinal distress when we think about the gut. But when we look below the surface in the deeper dive with the functional medicine lens, we can find much more impactful true upstream root causes. Not only for GI symptoms but for a whole host of other downstream systemic distress. All sorts of dis-ease. Or even entrenched chronic disease elsewhere in the body.

I want to encourage you to really soak in this material. Soak it up, soak it up review it again, make notes, review it again, make notes, review it again. If you're only going to master one topic, let it be this. And master these concepts before you even think about recommending that someone get a stool test. I really should have put that in big red pen. In a different font on this page. Because so often we out the cart before the horse. And it is an art to learn how to interpret stool tests and if you want to learn how to do that, then I highly recommend Yeast Against the Gut 202. But master this first. And you can work at a very proficient level in supporting the gut. Supporting all sorts of chronic complex disease processes and never use testing. Never use testing at all, much less comprehensive stool testing. Because so often as I think you clearly understand now, the highest impact items are in the fundamentals.

I want to thank you so much for participating, it's really my deep pleasure to teach you and to have you be a part of this process. If you're interested, this is what we cover in Disease Begins in the Gut 202. This course is actually going to be redone from scratch with a new improved version in, I think it's August, don't quote me on that, but I think it's August of this year. And if you choose to participate in the existing version, you will be invited to the new improved version free of charge. No worries. When you join us for any class here at the School of Applied Functional Medicine, if I redo it at any point in the future, you will be invited as my guest to participate in it free of charge. Because I always want you to have access to the latest and greatest insights. And very much what I included in this latest version of this course was a lot of research from the past year or two in particular. It's really a hotbed of scientific investigation. And as we well know, it can take many, many years, decades or key findings. Even conclusive findings in the research world to make it to conventional medical practice.

I really want to honor all of you as practitioners in your investment in keeping your knowledge, keeping your advanced training kindly and live and fresh. So that you’re always using the best of what we understand scientifically and supporting your patients and clients. Alright so I wish you all a good day. Thank you very, very, much. And happy studying.