



Conscious Life presents

TRAUMA SUPER CONFERENCE

Trauma and the gut – what does testing show us?

Guest: Anastasia Smith

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[00:00:09] Kirsty Cullen

Hi, I'm Kirsty Cullen, CEO at the Optimum Health Clinic, and I'm delighted to join you for the Trauma Super Conference. As a clinic which combines both psychology and nutrition tools at OHC, we're often required to factor the impact of trauma into our clinical considerations as part of a client's health picture.

Our own practitioners at OHC are equipped to support our clients by exploring the functional impact of trauma within the body, including how we might consider the physiological implications and move to address these with both nutrition and psychology tools.

From a nutrition perspective, then, the clinical process can be really effectively supported by the use of functional testing, which allows us to directly identify those functional systems that may have become either depleted or placed under pressure by acute or sustained trauma or traumatic events.

So with this in mind, I am delighted to welcome Anastasia Smith from the medical education team at Genova Diagnostics.

Genova provides precision health testing which allows us as clinical practitioners to assess areas including gut health, nutritional markers, and immune function in order to identify how we might best support the health of our clients.

Anastasia herself is a registered nutritional therapist specializing in nutrition and its role in mental health and neuroscience specifically.

After completing her training at the college of naturopathic medicine, she went on to work for NGO food for the brain and also Brain Bio Centre, focusing on brain health and mental wellbeing.

Anastasia has therefore worked with clients suffering from a wide range of psychiatric conditions, such as depression, generalized anxiety disorder, schizophrenia, and bipolar disorder.

Welcome Anastasia.

[00:02:15] Anastasia Smith

Thank you so much for having me.

Kirsty Cullen

Wonderful. So we're going to dive straight into the gut. The gut is obviously an area in which practitioners see the impact of stress, trauma, and anxiety disorders.

And in fact, the research suggests a strong association between post traumatic stress disorder and IBS and I know that there's other research suggesting links between things such as traumatic childhood events, psychological trauma, physical trauma, mental abuse, and also a combination of adult traumas with both IBS and sort of bowel disorders. Is this your experience from a testing and a clinical perspective?

Anastasia Smith

Yes, absolutely. So I tend to run many different types of tests with clients from a functional medicine perspective, and when it comes, particularly with store testing, we tend to see some similar patterns coming up with that sort of clinical presentation.

Kirsty Cullen

It's my understanding, Anastasia, in PTSD, your body is in fight or flight, and that response is activated by a substance in the brain which is called corticotrophin releasing factor and CRF for short, so we don't have to stumble over it.

So CRF actually increases mucus and water secretion in the colon, which in turn can really impact on gut motility.

And of course, one of the hallmark features of IBS is a change in gut motility, which can kind of present as constipation or diarrhea.

So the research around that proposes that high levels of CRF might actually contribute to the development of IBS in people with post traumatic stress disorder. Is that sort of supported by the research at Genova?

Anastasia Smith

So, yes, this is definitely something that I tend to see at least anecdotally in clinic, tangibly speaking in terms of symptoms, seeing a presentation of anxiety and then consequent postprandial bloating or diarrhea or even a delayed kind of gastric emptying as well.

We can see sort of a wide variety of different symptoms in relation to mood disorders. So, yes, this is absolutely something that I do see quite often.

Kirsty Cullen

I think it's really interesting. I know that there was also a study by the Mayo Clinic which considered the fact that trauma may actually sensitize the brain and the gut.

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And I think in that research, the conclusion was that patients with IBS experience or report trauma at a higher level than patients without IBS. So I thought that that was a really interesting link around gut health as well.

As you know, Anastasia, we've already spoken with Rebecca Edwards at Activated Probiotics on this conference about the impact of trauma on the microbiome or bacterial balance within the gut.

What other changes do you tend to see in terms of general gut physiology as the consequence of trauma? And how might that present in terms of gastrointestinal symptoms?

Anastasia Smith

So, one of the things that I frequently see is a general lack of or insufficiency in gastric secretions.

So one of the markers that we typically look at, at least in the GI effect store profile, is pancreatic elastase, which is a marker of exocrine pancreatic function.

And it is a representation of also other digestive enzymes like amylase, trypsin, lipase. So it gives you an overall insight into someone's capacity to actually break down foods and absorb the nutrients in their foods.

And the output of pancreatic elastase is often impacted by someone's nervous system and particularly chronic stress. So in relation to trauma, that is quite a significant link because what we tend to see in trauma is a chronic fight or flight response, but also freeze.

And so we tend to see that this chronic fight or flight response can have an impact on the production of pancreatic elastase. So therefore, as a result of that, you tend to see issues like maldigestion and malabsorption, and then also a compounding impact on other gastric secretions.

So things like HCL production, stomach acid and bile production. We also tend to see an impact on those sorts of secretions as well as a result of that.

Kirsty Cullen

And therefore, presumably an array of digestive style symptoms in clinic. And that's what sort of we're going to see and hear explained by our clients.

Anastasia Smith

Yeah, exactly.

Kirsty Cullen

So now, of course, working with Genova Diagnostics, as you do, one of the benefits of functional testing is that we can utilize the testing to look at these markers specifically.

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And you've kindly supplied us with some example test results for us to discuss today, which will really help us to see a visual representation of how trauma, stress and anxiety might impact on physiological and functional markers in the gut.

Shall we have a look at some of those and you can guide our viewers in terms of what they're seeing and why gut testing might be helpful in the context of trauma work with their own nutritional therapist or as sort of practitioners themselves.

So let's start by talking about the markers you just mentioned and digestive function specifically. Can you point us towards what we're looking at here on this test result?

Anastasia Smith

Yes, so I mentioned pancreatic elastase which is sort of the gold standard marker of measuring pancreatic digestive enzyme output. So that's one of the key things.

And you'll see that in this particular test result, this patient has low levels of pancreatic elastase and that can, as I said, be impacted a lot by the nervous system and by being in this chronic fight or flight response as well as freeze response.

Additionally, that can also be impacted by thyroid conditions like hypothyroid as well. So we also have to take into consideration other driving factors of low pancreatic elastase, but the nervous system has a big impact on those secretions.

So as a result of low pancreatic elastase because these sorts of secretions, they have bacteriostatic properties, which means that they actually prevent the overgrowth and the colonization of bacteria in the small intestine.

We tend to see that occurring, we tend to see this overgrowth picture occurring as a result of a suppression of gastric secretions, particularly the condition that a lot of people know about called SIBO, which is the acronym for small intestine bacterial overgrowth. So that's one of the sorts of impacts that that can have as a result of low pancreatic elastase.

In this particular test result as well, you'll see that fats are also a little bit high. So you've got the fecal fats there, we've got the various lipid analytes that make up the total fecal fat.

And with this particular patient the triglycerides are particularly elevated. And triglycerides, they must be exposed to bile acids or bile salts to be emulsified and broken down so that they are able to be passively then absorbed through the gut wall.

And this indicates having triglyceride, high triglyceride, that this particular patient may have had an issue at that particular time or potentially over a long period of time with bile salt insufficiency.

So not only has she got low pancreatic elastase, but also potentially also low bile flow, bile salt insufficiency in the small intestine.

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And that in itself can also lead to that SIBO picture as well as many other things. Other symptoms can also include things like nausea when we come to issues like fat maldigestion and concurrently with that bacterial overgrowth.

Kirsty Cullen

So essentially what we're seeing is a domino effect from just two of those particular analytes of potential domino effects and of course the beauty of these test results is that knowing those two markers, we can then offer very specific clinical support as a practitioner, I'm assuming.

Anastasia Smith

Yeah, exactly. And I should probably add that in addition to those two markers, in that particular section of looking at digestion and absorption, we've also got products of protein breakdown.

And whilst in this particular result, this patient didn't have an issue with that, that's another marker that can also give you an insight into issues with absorbing and digesting nutrients and can also give you an insight into a potential SIBO picture as well.

So what that marker particularly represents is these byproducts of bacterial fermentation of protein in the colon.

And because proteins are normally absorbed in the upper GI tract, in the stomach and in the small intestine, we can assume that if someone has products of protein breakdown, high products of protein breakdown, that they may be malabsorbing their proteins in the upper GI tract.

So then we're looking at could their HCL also be low as a result of that, which is their stomach acid? And that is the third gastric secretion in that picture of looking at the enzymes, the bile, and then you've got the HCL. So that can give you another insight into a suspicion of SIBO also occurring.

Kirsty Cullen

And just to put these results into the context of our discussions, what are sort of the presenting factors for this particular client?

Anastasia Smith

Yeah, sure. So with this particular client, heavy sort of postprandial bloating. So with foods after foods having quite a situation, with a swelling of her belly, her nausea, constipation as well, although we can often see diarrhea as part of that picture.

And in relation to the mental health side of things as well, depression was part of this picture. So when we think about, the brain obviously has this key impact on the gut and the gastric secretions, because of the fact that the nervous system is dysregulated.

We may also start thinking about, could this person be malabsorbing nutrients that are important for brain health and mental wellbeing.

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So proteins are really essential, fats are essential, fat soluble nutrients like vitamin D and vitamin A are also very essential for brain health and mental health. So that's the sort of the things I'm already starting to think about when I see a result like that.

Kirsty Cullen

But I also wanted to discuss Dysbiosis or microbial imbalance, because the research tells us that early life trauma might actually promote changes in the composition of the gut bacteria, which consequently might increase the risk of actually developing PTSD, sort of via various inflammatory pathways.

And there's also evidence which identifies Dysbiosis as a possible contributing factor for neurocognitive and mental health disorders such as PTSD, depression and anxiety.

And I think it's also really important to say at this point that there is this bidirectional relationship between the gut and the brain.

So the gut microbiome has an important role to play in mental health and really Dysbiosis can influence both our stress and anxiety behaviors and also the central nervous system directly.

So it will be really interesting to have a look at the test examples here and for you just to explain how we're seeing evidence of Dysbiosis.

Anastasia Smith

Yeah, sure and it's interesting what you're saying about this bidirectional communication because we know that, and this is also shown in research that when there is increased levels of circulating catecholamines like epinephrine, that there is also an upregulation in opportunistic organisms.

And so with this particular test result, that is quite clear. We tend to see an increase in certain organisms that may be gas producing, such as odoribacter species or prevotella, for example.

We tend to see a down regulation in beneficial organisms such as bifidobacterium, which is part of the actinobacteria phyla group, as well as other organisms like Akkermancia species, which many people know as the darling of the microbiome, with its really important roles in maintaining intestinal integrity and preventing permeability.

So, yeah, there are absolutely some changes that we can see in composition and altering of the ecology of the microbiome.

Kirsty Cullen

Yeah, that's really interesting and I know the beauty of page five on this report is that it kind of breaks down the balance of those commensals.

Do you want to talk us through some of the specific bacteria that we might expect to see either elevated or depleted when we're looking at cases of trauma?

[00:16:08] Anastasia Smith

Yeah, so as you can see on this particular page, page five, which is the PCR headcount of the commensals, we separate the different organisms into different phyla groups and we're looking at the most researched phyla groups.

So you've got at the top the bacteroidetes phyla group, and then you've got the firmicutes and so forth. And in terms of the type of changes that we can see often in the case of mental health and conditions like depression, anxiety, et cetera, is this increase in organisms that produce things like hydrogen and hydrogen sulfide.

So for example, we have the *Desulfovibrio piger*, which is one of the proteobacteria phylum organisms, and that can, that in itself can lead to symptoms such as altered bowel habits.

So as I mentioned before, the constipation of diarrhea, but particularly sulfurous wind, so that's one of the key signs of having hydrogen sulfide dysbiosis.

And then in addition to that, we also tend to see other organisms which I've mentioned already. So things like the *Odoribacter* species being elevated, *Prevotella* species being elevated, and concurrently, we see lower levels of beneficial organisms.

So I already mentioned the *Bifidobacteria* species and the *akkermansia* species, but also other species like *Faecalibacterium prausnitzii* and *Lactobacillus* species, which you'll find in the Firmicutes phyla group.

So these are the organisms that we know have a beneficial impact on the gut. They can produce things like butyrate, the short chain fatty acid that we know has a really important role in providing fuel for colonic cells.

It helps to down regulate inflammatory responses, it plays an important role in the gut brain axis as well and protects things like the blood brain barrier.

And as well in addition to the properties like producing butyrate these organisms are essential for regulating our immune response, our intestinal immunity and immune resilience.

So it's really essential to have these organisms present in healthy levels to prevent this sort of overcrowding of the opportunistic organisms or organisms that can have, are considered commensal but once overgrown, they can start to exert certain types of functions and lead to those sorts of symptoms that are related to IBS.

Kirsty Cullen

I mean, in terms of clinical approaches, this is key information to have. And I think it's always important to say that we have to look at the whole microbiome in terms of a garden and how we improve balance generally.

But actually some of the more specific bacteria we can use very specific foods to help support, can't we?

[00:19:09] Anastasia Smith

Yes, absolutely. So with, for example, the Firmicutes phyla group and the Akkermansia species, which is under the Verrucomicrobia phylum.

We tend to see that they flourish on plant fibers and polyphenol rich foods, so increasing and diversifying your plant fiber intake can be a very strategic and useful approach to improve the flourishing of those organisms.

With Akkermansia specifically, we know that pomegranate can increase Akkermansia species as well as other polyphenol rich foods, aronia berry, for example, which is found in some supplements. Inulin rich foods as well, which you often find things like Jerusalem artichokes.

So there are some very key sort of strategies that you could employ to improve the growth of those specific organisms and because of that growth, you tend to see the shift towards the beneficial and a shift away from those opportunistic organisms.

Of course that very much depends on the patient and their clinical picture because if SIBO, for example, is part of the picture and they have this overgrowth in the small intestine, then certain plant fibers are going to potentially trigger symptoms for them before you've got that situation under control.

So whilst we don't want to avoid those plant fibers for long periods of time, it might, in at least an initial part of treatment, not be the best approach because it can lead to a lot of bloating because inevitably these fibers, they are also highly fermentable in some vegetables, for example.

Kirsty Cullen

Superb. I just want to return to the research for a moment Anastasia because I know that there was some fascinating research from Stellenbosch University which compared the microbiome of people with post traumatic stress disorder and trauma exposed clients against healthy controls.

And although they confirmed and identified that there were indeed differences between the trauma group relative to kind of the overall diversity of the microbiome when compared with healthy controls, they also found specific classes of bacteria that were impacted in the trauma group.

And I noticed on this particular set of test results in the relative commensal abundance section that this was beautifully illustrated. I wonder if you could talk us through that.

Anastasia Smith

So the relative abundance chart that you're seeing there is one of the ways that we compare, again, abundance to the healthy cohort, but this time specifically we're looking at each of the phyla groups in relation to abundance.

And the colored bars moving across the page, they represent the patient and then of course, you have the healthy cohort range.

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And so with this particular patient who had trauma and who also had symptoms of depression, we're seeing there that the Actinobacteria phyla group, which contains the Bifidobacteria species, is under abundant in addition to the Verrucomicrobia phyla group, which is actually below detectable level, so it's not even there present.

And that's the type of, often the type of composition that tends to come up with those that have mood disorders, who have been exposed to trauma of some kind or various traumas over their lives and this is mimicked by the research that you've seen.

Kirsty Cullen

So another area that I wanted to consider was some research suggesting that childhood trauma or stress related psychopathology might be associated with changes in Secretory IGA in the gut.

Firstly, Anastasia, could you just explain for us what Secretory IGA is and why it's so important?

Anastasia Smith

Yeah, absolutely. So Secretory IGA is produced by our mucosa, our mucosal barrier and think of it as our first line defense against invasions of pathogens.

And so what it does essentially is it protects the mucosal barrier from those pathogenic invasions and so it's really essential that someone is able to produce a Secretory IGA adequately to be able to neutralize those pathogens and prevent invasion into the epithelia.

So with this particular test result we are seeing an elevation, which is something that we expect to see when someone has a presence of opportunistic organisms.

However, it is inflammation. It does suggest inflammation and so therefore we're thinking about could there be some inflammatory processes occurring in the mucosal barrier? Could that also give you an insight into potential issues with intestinal permeability?

And it's important to look at the organisms that are present that could potentially be driving that elevation of Secretory IGA and with this particular test result we're looking at *Klebsiella oxytoca*, which is a gram negative bacteria and it is regarded as a commensal.

However, when it tends to overgrow, it starts to express its virulence factors. And we know that with *Klebsiella*, for example, it can produce biofilm, it can produce LPS, so cytotoxins, and they in themselves can be disruptive to the gut barrier.

So that's essential. We're looking at the underlying drivers of depression, for example, because we know that when there is a high level of intestinal permeability, then there could also be an insult on the gut. Sorry, on the blood brain barrier, which can also become permeable and therefore lead to inflammatory processes in the brain, which is one of the sort of underlying drivers of depression and a perpetuation of depression.

So that's an interesting insight with this particular picture there, with an elevation of the Secretory IGA, but we also see an issue of the opposite also occurring.

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So we do want to see this sort of response to any opportunistic organisms, but in some test results, we also see that whilst someone might have a high level of growth of opportunistic organisms, they are not able to mount that Secretory IGA response.

And that's often I find, seen in PTSD pictures when there is this sort of really lengthy chronic stress over a long period of time, financial hardship, for example, as well, various traumas in someone's life.

And so they become depleted and there's this loss of resilience, this loss of immune resilience. And Secretory IGA is really integral in the maintenance of that intestinal barrier and intestinal homeostasis.

And it can really influence intestinal microbiota as well. It helps to down regulate pro-inflammatory responses or pathways that actually lead to the uptake of pathogens in the gut mucosa as well as allergenic antigens.

And so this can also lead to a loss of tolerance to proteins in our foods. So we start to react to foods as well. And we also start to see an up regulation in mast cell degranulation as well, so that can also lead to histamine intolerances because of the fact that mast cells release histamine.

And so in one of these tests that I've also shared, this particular client also had chronic hives. So that was an interesting thing to see that playing out.

So there are various, various ways that stress and an ongoing stress can impact our production of immunoglobulins like Secretory IGA and our immune response.

Kirsty Cullen

Fantastic. So, Anastasia, that leads beautifully into the next topic of conversation from Secretory IGA and Dysbiosis, both relevant to the topic of increased intestinal permeability.

Just for those listening who don't know, could you explain what that is first?

Anastasia Smith

Yes, sure. So intestinal permeability relates to a breakdown in the gut barrier, basically.

So in our gut we have a layer, or I guess an intricate layer of various tissues that line our intestinal wall. And they are made up of these tight cell junctions that are normally tightly regulated and they might loosen, but then in a healthy situation, they will tighten up again.

There are those that under sort of chronic stress situations and trauma, as we've been talking about, that can lead to a loss in this sort of being able to bounce back and regulate and so those tight style junctions can become a little bit loose.

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And in that situation, what can end up happening is that the contents of our bowels, which includes allergenic proteins, it includes bacteria and their cytotoxins, they can leak into our systemic circulation, translocate through our gut barrier and leak into our circulation and then start to cause issues.

Our immune system starts to react to them, essentially and that can lead to issues such as inflammation, I guess is the sort of fundamental basis of intestinal permeability.

Kirsty Cullen

And of course, the research suggests that inflammatory responses that are associated with PTSD and depression might actually impact on the balance of the gut, gut microbiome and in turn the health and integrity of the gut wall.

And obviously we could also consider, as you say, that stress has the ability to increase intestinal permeability as well. So alongside the Secretory IGA marker, as we've just discussed, what are the markers on the GIFX test might we look at to try and assess the picture of gut permeability for our clients?

Anastasia Smith

Yes, we've spoken about Secretory IGA. There are also other inflammation markers in the immunology section. So we also test for carportectin, which is a neutrophilic marker of inflammation.

And we also test for Eosinophil Protein X, which is an IgE mediated marker of inflammation. Whilst none of the test and markers in the test can conclusively say that someone has intestinal permeability, we know that overall, when there is a picture of inflammation occurring, that that can lead to a higher risk for permeability to occur and a higher risk for this regulating function of the tight cells to come back together again is lost.

So those are the markers there. We tend to see the EPX and Calprotectin high in the context of inflammatory bowel disease, so we don't tend to see those high outside of those clinical diagnoses.

And so it's very rare that we do see those elevated, but they can also contribute to that sort of suspicion of permeability if they are elevated.

And then we're looking at, as I mentioned before, the organisms that have grown out in culture and their properties. So do they produce LPS? Are they histamine producing organisms? Are they able to form biofilms?

And those sorts of elements, those virulence factors can also have a negative impact on gut barrier function. So also looking at that and then lastly, we can also look at two things actually.

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We can also look at a high level of phospholipids in the fecal fat total. So we've got the various lipid analytes in the fecal fats and the phospholipids, it's an interesting marker because the fecal pool of phospholipids is unlikely to come from diet and it's more likely to come from shed epithelial cells, intestinal epithelial cells, as well as bile.

And so when they are elevated in relation to other things going on, such as Secretory IGA, the presence of potential opportunistic organisms, that can also give you an insight or potential insight into mucosal barrier dysfunction.

So a high mucosal cell turnover and shed epithelial cells will contribute to the level of phospholipid. So that's another sort of subtle marker that can give you insight into potential intestinal permeability occurring.

And then the last thing that I wanted to mention was this low Akkermansia species. So the Akkermansia which I mentioned is considered the darling of the microbiome is also really important for regulating our intestinal integrity.

So it prevents permeability and so when we see very low levels of Akkermansia, which is quite common, we can also assume in relation to the other markers that there could be this loss of integrity in the gut barrier.

Kirsty Cullen

Fascinating and I'm really conscious what we're hearing there is a lot of technical terms which will be music to the ears of practitioners listening to us today.

I think from a client perspective, I want to reassure you that this is merely an overview of the many different ways that your practitioner can use these tests to help you to consider how they might help support your gut function as a part of your bigger health focus areas.

Anastasia Smith

Yeah, no, absolutely. I know there's a lot of terminology and technical speak, but it all really boils down to some key changes and we've already spoken about some of them.

And that's increasing the diversity of plant fibers so that you're providing your gut bacteria with the nourishment that it needs to proliferate and grow, so that's the beneficial organisms.

And of course, what that also means is avoiding foods that we know have a negative impact on beneficial organisms, so that's foods that are high in sugar, processed ingredients, et cetera.

But then we can also look at supporting gastric secretions and that really has to do with regulating a nervous system. So of course, we cannot pretend that just by taking supplements we're going to fix ourselves.

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We need to attend to our stress and regulate our nervous system so that we're able to give our organs a chance to produce those gastric secretions.

But then we can also offer that therapeutic support of botanical agents that will help to stimulate those secretions, like bitters, for example, that are going to stimulate the bitter receptors and get the bile flowing and the pancreatic enzymes flowing as well, the HCL flowing.

Some practitioners use enzymes, digestive enzymes, to support the patient in at least that initial phase of reducing symptoms and helping to manage symptoms as they start working on that nervous system regulation.

And then all of the really important nutrients for gut barrier function and maintaining gut barrier function and supporting intestinal immunity. So fat soluble nutrients that we've already mentioned, like vitamin A and vitamin D, zinc carnosine, for example.

There are also other amino acids, things like glutamine that we know can impact or can have an important role in the health of our gut barrier. And there are various other things. I don't know how in depth you'd like me to go.

Kirsty Cullen

I think that's a superb overview and a really nice summary and introduction to some of the things that a qualified practitioner might be able to support you with.

So I mean, Anastasia, thank you so much for joining us. It's been such an interesting introduction to why we should consider gut health in the context of trauma and mental health and how do we go about that with the help of testing.

So if people want to find out more about Genova diagnostics, where can we direct them to?

Anastasia Smith

Yeah, so Genova has a website, it's www.gdx.net and the page on this particular test you'll find very easily. It's one of the most popular tests that Genova offers, so you'll find it very easily on the website.

And what's great is that on the test page on the website there are various support materials, the support guide, which is a really in depth guide as to giving some explanations around each of those biomarkers and what they can indicate when they are too high or too low.

And also some information around some of the opportunistic organisms that can be shown up in culture, the commensal organisms, the research that's currently on them, their properties, and also parasitic organisms as well, because we also include that in the GIFX store profile.

We have the microscopic evaluation as well as the PCR evaluation of parasites. So lots of really important information on there and there's also a learning library as well with a library of webinars

that the team in the US have put together. If you want to find out more about the validity of the tests and how to apply them in practice.

[00:37:27] Kirsty Cullen

Fantastic. So research based clinical practice is of course at the center of what we love to do and of course, if people would like to link up with the Optimum Health Clinic for nutrition support, then you can contact us via our website www.theoptimumhealthclinic.com.

Anastasia, a huge thanks once again for joining us today.

Anastasia Smith

It's my pleasure, thank you for inviting me.