Are Stool Tests Full of Cr@p? with Kiran Krishnan

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Shivan Sarna: Shivan Sarna here with Kiran Krishnan who is the microbiologist who has brought us so many incredible, incredible pieces of information about the microbiome, Megaspore Probiotic on a whole array of incredible additional products.

He is also on a mission to educate the rest of the world about the microbiome and what to do to help bring it into balance—not just patients (but yes, that too. And that's one of the reasons why he's here), also through his masterclass. He's got a big huge conference that's going to be happening this year in Arizona. I'll give you information about that. But there's a new development. And it is that Microbiome Labs has created a stool test. And he is here, direct to you, to talk about it.

So thanks very much, Kiran. Great to see you, sir.

Kiran Krishnan: Yeah, good to see you as well. I'm excited to do this. And this is actually the first public conversation about the stool test. So, I have to do it first with you.

Shivan Sarna: Thank you! So honored.

Okay! So, I know a lot of people have been anxiously awaiting this. I'm going to tell the Facebook group in another location that I think that they might be in we are live. I hope everyone will get a hold of us. I think they are. But listen, if you guys are watching, and you're thinking, "Ooh, I don't want to miss it," this is automatically being recorded. And so, you'll be able to refer back to it.

Okay! What in the world made you want to do a stool test? And then, we are going to show an example of a report and tell us about what it is that you're so excited about.

Kiran Krishnan: Yeah! So, to be completely honest, I did not want to do a stool test at all. I'm not a big fan of them in general. I I've seen a lot more problems than benefit from stool testing to begin with. I've had just literally hundreds upon hundreds of people sending me their tests, asking me what it means,

freaking out about this one species that seems to be arbitrarily high, what can they do about it? There's no direction. There's no *real* solid information on the test.

And then, when I started really looking into the whole sequencing science, you come to find out that most of the tests on the market are using really antiquated technology for sequencing.

I mean, this is technology that was developed 20 or 25 years ago. So, imagine you're walking around the street and you see somebody on a 20-year old cell phone. Everybody will be laughing at him and wondering what museum they got that cell phone out of.

And it's like any other technology, people are paying good money to get their their microbiome sampled and tested through really old technology.

And as it turns out, that old technology, which is called 16s sequencing, is actually really inaccurate when it comes down to trying to detect bacteria at the species level—or viruses or fungi, no matter what the microorganism is. Trying to detect it down to the species level, it's incredibly inaccurate—to the point where the head of the American Gut Project, Dr. Rob Knight, has come out over a year and a half ago and said that it's not useful to detect bacteria to the species level. There's been published studies showing how inaccurate it can be.

And so, it just started to really bother me that people were spending their hard-earned money, they're looking for direction, they're looking for possible answers to the problems that they're having in these tests that are relatively expensive, that is completely inaccurate.

And that, in itself, made me kind of rally against the whole idea of stool testing to begin with. Four or five years ago, the highest level of technology, which is called *whole genome sequencing*—so it's called *end to end shotgun sequencing* (and I'll explain what each of these things means a little bit more in a second). But the overall picture is that *that* type of sequencing is the type that you need to really get down to the species level. The problem is it's extremely expensive. It costs over a thousand dollars to sequence one sample. And it's just not feasible. It means that a lab is going to sell it to a patient at $3,000. I mean who's going to spend $3000 to get their gut microbiome sequenced, right?

Now, with the advances in technology over the last several years, they've been able to get that down to a much more economical scale. And one of the labs that has been doing a really good job with that is a lab called CosmosID. And I've been working with CosmosID behind the scenes, looking at their sequencing technologies for clinical trials.

[05:02]

Kiran Krishnan: We've done a lot of clinical trials on the microbiome. We are doing a bunch right now. But we've never used microbiome analysis as part of it in a human trial because you can't get accurate data out of it.

And so, we started looking for labs that can really do shotgun sequencing with really accurate analysis and also one that was affordable. And we found that CosmosID has this option for that.

Now, what's important to note about CosmosID is they're one of the global leaders in sequencing technologies. People have never heard of them because they don't have any consumer offering. They work behind the scenes. They work with hospitals and clinics. They're one of the only labs that does sequencing that has FDA approval on sequencing identification for infectious diseases. So, if someone comes in and has a mysterious illness in the hospital, they will send out the samples to a lab like a CosmosID that has FDA approved for their process of how to identify these organisms. And those are life and death situations, right? So they have to take the technology very seriously. Those are the things that made me really interested in them.

So, we started working together and partnering about a year and a half ago. And I really got into their technology to see does this fit the bill. If we're going to do microbiome testing, shouldn't we be doing the best version that is available at the moment?

That's kind of how we came to it. My position has been that it's not worth doing any microbiome testing at all that was on the market. But what I came to consistently finally find out is that people still want to test. And practitioners and doctors still want to test.

And part of that is because the microbiome is so complicated, right? All the issues surrounding it are complicated. People want as many clues as they can get to figure out what was wrong with the system and what they're doing, how does that impact the system. Is it making the microbiome healthier, better, function better? Or is it making things worse?

And not all of that is intuitive. Some of the things that you think are good solutions for your microbiome could actually be detrimental.

And so, people wanted to do testing. So our position was, you know what, we were bold enough to name ourselves MicrobiomeLabs. If there's anybody that should be doing an analysis on the microbiome, it should be us.

And so, we took up the mantle and said, "Okay, if people are going to continue doing testing, let's give them a test that can actually be helpful. Let's use the most up-to-date technology. Let's work with the lab

that is the global leader in this. And let's give them data that they can actually use to shape their lifestyle, their diet, their supplementation. And doctors can use it to get a clue as to how to approach the patient."

So, that's kind of the short version of the story as to why this test exists in the first place. It was an unmet need. And that's kind of what we focus on. We do everything that fills an unmet need.

Shivan Sarna: Okay! Well, I'm surprised to hear you say you didn't want to do it, but now I understand why. And so, let's say somebody is—

What do you want to do next? Do you want me to show the lab report? Do you want to do?

Kiran Krishnan: Well, I do have a slide I want to show. Let me do that. Let's kind of go over and give you an overview of the sequencing. Let me see. I know I can share my…

Shivan Sarna: You just pull and you'll see down there, it says share at the bottom.

Kiran Krishnan: Yeah, let's see. Share screen…

Shivan Sarna: And then, I should be…

Kiran Krishnan: Okay.

Shivan Sarna: It should ask me to approve it. Okay, great. Great!

Kiran Krishnan: Can you see this?

Shivan Sarna: I can!

Kiran Krishnan: Okay! If I go full screen mode, you can still see it, right?

Shivan Sarna: Yup!

Kiran Krishnan: Okay, great!

So, there's a number of things that are different about this test than what people have access to in the marketplace. But there's a couple of things I want to highlight for people so they understand how we took a look at this.

So, I started looking at all of the tests that were available in the market. This was about a year ago. In fact, a couple of our staff members ordered every single tests that was on the market and went through

the testing protocol themselves. So we kind of looked at how each one as to the sample, your stool. We looked at how each one packages it, how you send it in. And then, we got reports back from everything. We kind of went through all the reports to see what was useful within the report and what really wasn't.

For many of them, the sequencing part was completely not usable because the information is really not actionable. So we saw a big issue there.

[10:00]

Kiran Krishnan: So, these are the things that we started to find as the predominant issues that we wanted to correct. The first thing is that whole genome sequencing. And that's really important to note.

So, when they explained the difference between 16s sequencing and whole genome sequencing, imagine you've got a bacteria…

Shivan Sarna: Kiran, I'll just interrupt you. Be sure to explain what sequencing is within all of that.

Kiran Krishnan: Oh, sure, okay. So the idea of sequencing is reading DNA or RNA code. So all of our genetics are based on a DNA code. We could take your cells from your skin or the inside part of your mouth, and we could sequence it and know your exact human genome. We can match people that way and figure out what your code is.

The same way, bacteria have a code as well. Their DNA determines which type of bacteria they are. So you can look in the entire bacteria's DNA and say, "This specifically is *Bacillus subtilis* variety *natto.* All of that information is there in the DNA code.

Now, the way sequencing has been done before—which is what most of the tests on the market currently use—is that 16s sequencing. So what that is *is* there are these six regions within a bacteria's DNA that codes for ribosomal RNA.

Now, that in itself gets confusing. But just think about each bacteria has this six codes within their two million or so DNA pairs. You've got this genome that has two million DNA base pairs. And then, within that, you've got these six regions that, together, are unique to that particular bacteria. And I'll give you analogies of all these so it's easier to understand.

Now, what we're doing in 16s sequencing is we're trying to identify the bacteria by finding the six regions and saying that, "Oh, we found this six regions. This must be this particular bacteria."

Now, the problem with that is you may never find all six regions. A lot of these reports are giving you a call on which bacteria is present in your system by finding two out of the six or three out of the six, and then they're taking a guess on the rest of it.

In addition, numerous bacteria may share a few similar sequences. So it becomes hard to tell whether this sequence structure is one particular bacteria or is it being shared by numerous bacteria to specifically identify one group.

Now, let me give you an analogy for all this so this actually becomes more digestible. Think of identifying a person. Look at Shivan. You all know exactly what she looks like if you look at her as a whole.

Now, imagine I did a close-up picture of the tip of her nose, a close-up picture of a part of her shoulder, a close-up picture of her kneecaps and a close-up picture of one of her toes, and another close-up picture of the back of her head.

And then, I sent you these pictures and I said, "Identify this person."

Now, what are your chances of figuring out that that actually is Shivan?

It's tough because the tips of many people's nose look the same! Shivan has a look on her own when you look at her in high definition collectively. But the very tip of her nose looks very similar to probably lots of tips of noses.

The same thing with the small portion of her shoulder or the back of her head. You can say, "Hey, it's someone with dark hair," but it doesn't necessarily mean it's Shivan.

So, you can narrow it down. It's definitely not a blonde. It's definitely not a redhead. It's definitely not somebody with white hair. It's somebody with dark hair. So you've narrowed it down, but you can't tell that that's exactly her.

So, that's kind of what's been going on. You're giving this very specific snippets of DNA from these organisms. And then, they've got an algorithm that's making a guess as to what organism that is.

And that is really problematic, especially when you want to get down to the species level.

Now, with those pictures of Shivan, you might be able to tell from just the back of the head, the way the shoulder is, the way the nose is that it's a woman and not a man. So you can delineate that. You can go, "I am 98% sure it's a woman." And you're probably right. But which woman it is, how old she is, what race she is, what ethnicity… all of those things are going to be really wild guesses.

And so, that's the same thing with bacteria. Because you can pick up one or two of those snippets, you might be able to tell the general category of what type of bacteria that is. But getting down to the species level is going to be very hard and typically very inaccurate.

So, that's what we're finding.

Now, whole genome sequencing is we identify a bacteria only if you read the entire genome of the bacteria. You're reading the entire code. If the entire code is there, then it's unmistakable that it is that bacteria. So the analogy there is sending you a high definition picture of Shivan as an entire person. Then it's unmistakable who that is. You're not going to mistake it for somebody else—a beautiful actress maybe. But outside of that, you know that it's Shivan.

[15:16]

Kiran Krishnan: So, that's the analogy there, is that we're taking snippets where we might be able to pull out some detail and make a guess versus a high definition, unmistakable image of who that is. It's the same thing with bacteria.

So, that's really important to understand, the differences between whole genome sequencing and 16s.

If whole genome sequencing could not be made affordable, we would never do this test. We would never launch a 16s test. To us, that does not have the utility.

Now, the other problem that we found is how some of these things were sampled. So, when you look at stool, the bacteria in stool is not homogenous which means that you don't have the same distribution and relative abundance of bacteria in every part of the stool. So the stool is a three dimensional object. The surface of the stool has different bacteria than the inner part of the stool and perhaps in the bottom part of the stool. You could take any different area of the stool and you might get slightly different distribution of bacteria.

So, many of the tests that we went through had us swiping the top of the stool or taking a little spoonful. They send you these tiny, little spoons, taking a little spoonful of the top of the stool. Some of them even just have you swab your toilet paper—which is really problematic because the issue there is, when you wipe, you're picking up a whole bunch of skin cells, human skin cells as well.

So when you sample and swipe that toilet paper, you're picking up human DNA. And that's one of the biggest drivers of inaccuracies in DNA sampling, contamination with other species' DNA. So now you're

sending in a sample that has some of your microbiome's DNA, but it also has a whole bunch of your own DNA.

That's one of the advantages of doing stool, fresh stool, that is dropped into a device rather than sampling your rear end or toilet paper—is you're picking up very little human DNA as a contaminant.

So, looking at all that, we said, "Okay, what we really need is a *coring* system," meaning if you have a three-dimensional stool, we need to be able to get a sample going all the way through and back up. And as we're coring, we need as much surface area as possible to pick up as much DNA as we can by going through the sample.

So, that's why we developed this thing called the *high contact coring system.* It's a brush type system that you would use. You would core through the sample, and you would bring it out. There's hundreds and hundreds of bristles on the brush and it picks up the maximum amount of DNA and samples from your stool sample. So that was another advancement that we wanted to make.

Now, the other thing was the microbiome mapping. Mapping is really important in that we need to understand where we are in terms of the general properties of our microbiome compared to a really strong sample of US healthy population.

One of the advantages that CosmosID has was they had data on hundreds of thousands of stool samples. And they can delineate like, "These are stool samples of people with Crohn's. These are people with diabetes. These are all of the healthy population."

And so, what we want to do is provide you some mapping to see what aspect of your microbiome is totally off from where the general US healthy population is because this will then give you a clue as to what the most important thing is to work on for your microbiome (because there's lots of things that you're going to have to work on when it comes to fixing your microbiome). We wanted to be able to prioritize it, so any of the things that mapped way off the chart from hundreds of thousands of US healthy population samples are the things that you need to give priority to in order to repair.

Then the last thing is functional reporting. Giving you a list of just all the species that are found in your microbiome sample means really nothing. What we wanted to do was focus on what functions your microbiome seems to have the capability to perform, what functions and what *dysfunctions* it has the capability to perform.

Really, at the end of the day, your outcomes—your symptoms, your conditions—are based on the types of functions and dysfunctions your microbiome performs. And many of those functions and dysfunctions

are not based on a single species that are found in your microbiome. Many of them are based on groupings of bacteria that conduct those particular functions.

So, we wanted to give you a full functional mapping based on everything that's known now—and that will keep changing as we go along because we're learning more about the microbiome. But we wanted to give you a full functionality because that will really tie back to the symptoms you're having, to the problems that you're facing, the foods that you've tried, the supplements that you've tried, in the lifestyle changes that you've tried. It really kind of gives you an understanding of the functionality of your microbiome.

[20:19] [00:20:19]

Kiran Krishnan: So, these four things are extremely important in really getting the most accurate data, maximizing the amount of capture, and then understanding where you fit compared to a healthy US population, and what functionalities your microbiome performs and doesn't perform.

So, that is the general outline. I hope that made sense, Shivan. Are there any questions you think about that in particular?

Shivan Sarna: Yeah, we have questions of course. Hey Summer. Hey Pam.

So Pam says: "Can you tell if it's a pathogenic amount of bacteria or yeast or just if it's present?" So the pathogenic cut-off?

Kiran Krishnan: Yeah. So, this is important. When we look at the sample report, I'll show you one section of it that looks at something called your *pathobiome*.

Your pathobiome really gives you an idea of what the relative abundance are of various pathogens compared to the rest of the microbiome. And that's important. It compares you by providing an index which has a statistical calculation in it compared to the typical healthy population. That, in itself, will give you an idea of "are pathogens really a problem in your microbiome or not?"

Just seeing the presence of a pathogen or two or three or 50 doesn't necessarily mean that they're a problem because it's completely normal to have a variety of pathogens in your microbiome.

So, one of the problems I've had with the previous tests is they'll show you these pathogens and give you this +2 or +3, they tell you something is high or something is low, without any real statistical analysis of the entire pathobiome index compared to the rest of your commensals *and* compared to the US healthy

population because then what people became fixated on is they see one pathogen at what these test would call “high,” and then they’re fixated on “How do I get that down?”

So, in most cases, you may not need to do anything about pathogens. But you won’t know that until you look at your pathobiome index.

So, that’s one of the things we could show. Again, we could show that on the report.

Shivan Sarna: Yeah! So, because everybody, even healthy people, have *E. coli,* right?

Kiran Krishnan: Yeah.

Shivan Sarna: So, we don’t want to get overly focused on “Oh, my gosh! It’s in there.”

Some people do fine with parasites—not me, I understand it sounds insane. But some people have found a symbiotic peaceful relationship and are totally healthy. They do a stool test, and they have parasites. Other people are suffering terribly. You do a stool test, there are no parasites.

It’s so individualized. No one likes to hear that it’s individualized. And yet it’s the ultimate individuality. It’s your microbiome DNA.

Kiran Krishnan: It is! And so, the only way to look at it is looking at the statistical index of your pathobiome load relative to your commensal bacteria, and then also relative to the pathobiome load of your average, healthy American. That is the only way to look at it to see if a pathogen really a problem for my microbiome.

Shivan Sarna: Okay! Great question, Pam. So, we have a couple of questions. And then, I’m going to pull up—do you have the report or you want me to pull up the report (because I have one too).

Kiran Krishnan: I do have the reports, so I could pull it up.

Shivan Sarna: Okay, great. So, I just saw you, Pam.

So Sonja: “In the earlier part of the video, he talked about why stool tests are unreliable. And for those…”

So, this is a SIBO group, so it’s appropriate that Pam is asking: “For those with SIBO, how will this aid in managing?”

Kiran Krishnan: Yeah! Here's the big thing with SIBO. It's not really going to tell you much about what's in your small bowel. That would be over-reaching. And the technology really doesn't do that. But it will tell you how messed up your large bowel might be and where the significant issues are.

Shivan Sarna: It's not funny. I'm sorry I'm laughing.

Kiran Krishnan: And the thing is… so much of SIBO is driven by just overall microbiome dysfunction. I've done talks on this group specifically saying that we really focus on what's over-growing in the small intestine without really looking at all of the other dysfunctions that are associated with SIBO. And one of the big ones is leaky gut. And you'll be able to tell are you producing too much ammonia, for example; and is your SIBO diet, now consisting of high levels of proteins because you're not eating fermentable carbohydrates, then if you have high ammonia producers in your microbiome, you're converting so much of that protein to ammonia. And that's going to continue to stress your liver. And when that continues to stress your liver, you produce less bile. And when you produce less bile, you become more susceptible to SIBO.

[25:30]

Kiran Krishnan: So, there's lots of connections to how the rest of your bowel functions or what the rest of your microbiome looks like to the symptomatic condition of SIBO.

Shivan Sarna: And big picture—which is obviously what we're talking about here. But I'm glad we talked about that aspect of it. I'm literally doing a summit in September called *The Microbiome Rescue Summit: From SOS to Rescue* because it's not just about the gut—obviously, everyone here knows this—it's about your mental health. It's about your hormones. It's about your entire well-being, right?

Kiran Krishnan: Yeah!

Shivan Sarna: So, SIBO patients, we're so tunnel-visioned, I get it. That's why I started SIBO SOS, because I couldn't think of anything else to do. Even though I had a full-time career, I was obsessed with it. And so, this is beyond just SIBO as to why anyone would want to know what's going on with their microbiome.

So, we do have…

Kiran Krishnan: Yeah, it's your overall health. The thing I say about it is, even when you have SIBO, it's very easy to get focused on the small bowel and what's going on there. But what's worse than SIBO? Colon cancer!

Shivan Sarna: Yeah, thank you.

Kiran Krishnan: So, we can't ignore these other things when we become very focused on that one component. So it's really important to keep looking at your overall health, absolutely.

Shivan Sarna: One thousand percent! I'm sure everyone would agree with you.

But I think it's really important because a lot of people who are new to SIBO don't even know the difference between their large intestine and their small intestine and what that means—which is totally fine because we all started somewhere. And so, I'm so glad we're making these refinements in knowledge.

Okay! Let's see the report. Let's see the report.

Kiran Krishnan: Okay! Let me share my screen again. Let me pull that up. Okay!

Shivan Sarna: Somebody is asking if you are saying that the reason why you made this was consumer demand…

Remember, he didn't want to make it. He made it only when he found the technology that was worthy to supply to the consumers. They're just wondering if you would do this yourself. The answer is obviously—not obviously—is yes because this is about overall health.

Kiran Krishnan: Absolutely! In fact, I've never done a stool test before, not even out of just sheer curiosity because I know it's just going to come back with a bunch of nonsense.

And so for me, I have always been curious as to what some of the characteristics of my microbiome are. But I haven't found a test that I felt was adequate to test that… until now. So this would be my first time doing it. I don't have my report back, but I have done it. And I'm looking forward to seeing what the report looks like.

So, can you see this now, Shivan?

Shivan Sarna: Yes, I can see it. They can see it, yup.

Kiran Krishnan: And if I scroll like this and move it? If I scroll and move it, you could see it. Okay, great!

Shivan Sarna: There's a little bit of a delay. So I just want to make sure—yup, it does move, yup.

Kiran Krishnan: So, it's important to note that we do call this a *functional microbiome analysis*. So it's important that we are really focusing on the functions and dysfunctions within your microbiome—not just who is present in terms of bacteria, but what type of functions are being conducted and not conducted within your microbiome.

And then, also, how do you map compared to the rest of the US healthy population? So that's an important distinction.

Now, the first part, the very first page, gives you general characteristics of your microbiome mapped and indexed to US healthy population. The first one is we actually created this thing called *My Microbiome Index.* So this actually gives you kind of an overall score of the health and functionality of your microbiome, accounting for a bunch of features and characteristics.

The features and characteristics, I'll get into details moving forward. But this just gives you kind of an overall "Okay, how messed up is my microbiome? Do I put a lot of focus on repairing the microbiome? Or you know what? My microbiome is actually doing okay. And perhaps I need to focus on other parts of my healing."

So, this will give you an overall score. The higher the index, the overall healthier the microbiome. If you're done here on the red or the maroon, then focusing on improving particular features of your microbiome becomes really important.

[30:10]

Kiran Krishnan: So, what are some of the features that have gone into this analysis?

So, the first part is something called alpha- and beta-diversity. Let me know when it scrolls and people can see what I'm talking about.

Shivan Sarna: It's coming. It's coming. If you're on Zoom, it's coming. Go ahead and just talk as if it's normal. It'll catch up.

Kiran Krishnan: Okay! So, alpha-diversity reflects something I talked a lot about in basically every webinar, every presentation I do everywhere. And that is the one thing that we find consistently across the board when it comes to determining the health of the microbiome, is the diversity of your microbiome. And that is measured by an index that accounts for two variables. The first one is the richness in the number of bacteria and microbes in your microbiome. The more rich, the better—meaning the more species you have, the better.

And then, number two is the uniformity of the species. So you could have 800 different species in your microbiome. But 50 of them are really high. The other 750 are at such low levels and are not really functional. You still don't have good diversity within your microbiome.

So, it's important to note that diversity within the microbiome is dictated by how uniform the population distribution is, and also how many microbes there are.

And the more diverse your microbiome, the more resilient it is, the more functions it performs, the longer you will (based on studies that correlate aging with the health and diversity of the microbiome), the less degree of sensitivities you have, less risks for all kinds of chronic illness.

And that part is called *alpha diversity*.

So, it's really important to start with the understanding that my microbiome is diverse or not diverse. That, in itself, would be the first actionable step one would take if their microbiome index is low and it's being driven by low alpha diversity. Again, it's how diverse is your microbiome sample.

Now, at the bottom, we provide instructions. If your diversity is low, how do you increase your alpha diversity? We have a lot of that throughout the report. Everything we test has an actionable component to it. For the most part, there may be a couple of things in there we threw in just as fun information to know. But for the most part, everything is actionable. And we provide all of the diet, lifestyle and supplement recommendations that has and have shown to have an impact in that factor. So that's alpha diversity.

Beta diversity is how your microbiome differs from the rest of the healthy US population. So, this scatter plot is a plot of where thousands of microbiomes would plot, like in terms of the composition of the microbiome. If your sample is somewhere right in the middle or clustering where a lot of the samples are, then your beta diversity is pretty good. That means that your microbiome is relatively similar in terms of composition—not at the species level, but the phylum level and some of the other functionalities—to most US healthy populations.

Now, if it's way out here somewhere, then it means you've got issues that have dragged your microbiome composition far away from where the US healthy population is. So, in that case, you would want to look at even more dramatic things. Fecal transplants might make sense at that point if other things you've tried aren't really working.

So, what's important about the beta diversity is kind of get an idea of where you plot compared to other US population. If you're way off, again, it means that there's something really driving your microbiome

composition completely outside of the typical population. We have to dig deeper into the test to figure out what that is.

And again, some of those things can be addressed by diet, lifestyle, supplementation; or if it's really off, then the extreme measures of things like fecal transplant and so on.

Shivan Sarna: Kiran, before you go on, I just want to say one thing, you guys. Fecal transplants, you just said it, it's on the other end of the extreme spectrum. There are supplements. You can find out how to ferment your food from Summer Bock. There's so many things!

We hear fecal transplant, and what happens is—and I've just watched it and witnessed it so I'm just disclaiming it. Don't panic because you've said those words. I love you. We're with you. I thought, "Oh, I'm going to go to the Bahamas and get a fecal transplant." I talked to someone about it. I went through the whole nine yards. And so I understand. But know that there are a lot of things that you can do.

It's not for everybody obviously. And there are all kinds of ramifications. Also, you can check out Mark Davis online. He's also a fecal microbiota transplant expert.

Okay, carry on. Thank you.

[35:14]

Kiran Krishnan: Yeah, that's important to know. That's the extreme of where we would go, right? And personally, I wouldn't get a fecal transplant… unless I was at the very end of it. If I had *C. diff* infection that wasn't responding to anything, I've had months of bloody diarrhea, and I'm on death's doorstep, then I'd probably get one. But there are a thousand other things you can try.

But this will give you an idea of how far off you are and how extreme you have to be in terms of bringing back your microbiome towards this region right here. And all of this is testable, meaning that you can start working towards improving these things, and then take another look in three months and see have you made a move. Has your sample started to cluster closer to where the US healthy population is? Is your diversity index improving? Is your overall microbiome index improving? So you can actually measure and benchmark these things. It's really important.

The other general area is your resistome. Your resistome is basically the antibiotic resistance and other problematic genes that are found within the microbiome. You want to have relatively low levels of resistome. You don't want to have it too high. And it explains that in the report as well. That gives you an

overall view of “okay, how problematic are some of the species or some of the DNA within my microbiome?” And that gives you kind of an antibiotic resistance cluster.

Now, studies have shown that people who are susceptible to chronic infections and so on tend to have higher levels of antibiotic resistant genes within the microbiome. So it just gives you an index to kind of understand, okay, where are you versus the healthy population.

Now, let me scroll down to the part we had talked about, the *pathobiome*. It’s important to know the [00:37:20] is not a diagnostic test. So if you feel you have an infection in your gut, go to your doctor or go to a hospital, get cultures done. Get other ways of testing it done. This is really to understand the personality and the functionality of your microbiome. But what it will give you is this *pathobiome index*.

And remember, as I’ve mentioned, it is not unusual at all to have pathogens, even having *numerous* pathogens in your microbiome. They are not causing a problem unless the index is really high. So, if your pathobiome index is way out here, you’re an 8 to 10, that means compared to the healthy population, your pathogen load tends to be overtly high.

And if that’s the case, then you may consider working with a health professional to go, “Okay, maybe we need to find ways for bringing down the pathobiome.” That may be using competitive bacteria like the spores, for examples. The spores work quite well in competing with potential pathogens. It may be shifts in diet. It may be using antimicrobials.

So, it really depends on where your pathobiome is and the conversation that you might have with your health practitioner about it. But we provide some ideas and some recommendations as well.

Now, that gives you the overall index. In the next couple of pages, we actually go and look at the specific pathogens that have been picked up in your sample. And we highlight any of them that are out of range that you typically see in a healthy population.

So, for example, campylobacter, the healthy range that you find in most individuals will be denoted here. It will tell you what your samples range is. And then, it will give you ideas like, if you tend to be high, here are some nutritional things to pay attention to, here are some lifestyle things to pay attention to, and here are some supplements that can help if it happens to be high.

And we go through the same thing with a number of important pathogens—*H. pylori, C. diff,* a variety of *E. coli, Salmonella enterica,* vibrio, candida, blastocystis… so a number of them. Each one of them, we go through and explain what it is. We go through the nutrition, the lifestyle changes, and then supplements that could help if it happens to be out of range.

So, that is the next three or four parts of the microbiome. And I don't know if this page has shown up yet or if it's still scrolling. But at the end, we do look at some viral load as well. So we look at some of the common, latent viruses, things like adenovirus, norovirus—both of these tend to infect the gut long-term in a lot of people. *Cytomegalovirus* and *Eipstein-Barr* can be real persistent infections in people for the long-term.

[40:17]

Kiran Krishnan: In this particular sample report, we don't have the recommendations yet put in, but there will be. By the time you get your test back, there will be both nutritional lifestyle and supplement recommendations if these tend to be outside of what the normal, healthy range is within the US healthy population.

So, that gives you an idea of are there dysfunctional microbes or viruses that are driving your symptomology. And if they're really high, we would encourage you to get together with a health practitioner and talk to them and see about what approach you need to take.

If it's somewhat high, meaning in the high-normal area, there are some things you can focus on yourself that are in the report recommendations. And if it's normal, then the pathogens is probably not at the crux of what's driving your issue or condition and it's not necessarily something you need to focus on at the moment.

But again, this is not a diagnostic tool. So if you suspect you have an infection, using this as a way to diagnose it, it's not set up for that. So if you suspect you have an infection—you got food poisoning, you've been traveling in the Amazon, wherever you might have been—I would go and see a doctor and get that tested specifically.

Shivan Sarna: It's a tool. It's a tool. It's an amazing tool. Walk into your doctor's office with it. Oh, my gosh! Walk into your nutritionist's office with it, right?

Kiran Krishnan: Mm-hmmm… absolutely!

So then the next part is we're starting to look more into the functionality of your microbiome. And part of the functionality of the microbiome has been the identification of ratios of different groups of bacteria within the microbiome.

So, this one is one that a lot of people have talked about, the firmicutes-bacteroidetes ratio. There's a lot of implications on metabolic health. The increased firmicutes-bacteroidetes ratio, meaning a larger number, a higher amount of firmicutes, has been associated with obesity. There were general

associations with incidence of pathological and chronic inflammation with different aspects of this ratio. All of that is explained there.

We talk about how certain lifestyles can impact this ratio. And then, if the ratio is outside of the healthy normal based on those 100,000-something samples, you can do things here based on the nutrition, lifestyle recommendation to modulate that ratio.

And all of these things can absolutely be modulated.

The other one is the proteobacteria-actinobacteria ratio. That has implications for people with metabolic disease, cancers and obesity. So these chronic conditions are ones that you're concerned about. This ratio is something important to pay attention to. And then, of course, if the ratio is off (outside of the healthy range), then here are some recommendations as well.

So, looking at some of the impact of these ratios kind of gives you an understanding of "okay, if I'm totally right in line, then this is not really affecting me in any major way." Same thing with prevotella bacteroidetes. This again has a lot of implications with metabolic disease. It has protein, animal fats implications, like dietary implications with intake of high protein or high animal fat levels. And it changes the prevalence of certain groups of these bacteria. And that has potential outcomes for your overall health.

My dog is really excited about this particular one. Let me shut the door.

Okay! So, those are the most important known ratios within the microbiome that actually have an implication on health outcomes. So that's why we look at those.

Now, there are other ratios, but there really isn't much science behind how they actually impact health outcomes, what symptomologies they're associated with and so on. So, we didn't really focus on those. We're really looking at things that has been pretty well-established to have an impact on health outcomes.

So, those are the ratios. These are the big, general groups of bacteria and where they are in reference to one another, and then what implications those have, and then of course what you can do about it as well.

Now, we get more into the specific functionality within the microbiome. So we talked about biologically important bacteria in my gut. And this is where some of the function and dysfunction of your microbiome really comes into the picture.

The first one, for example, is ammonia-producing bacteria. We look at the number of bacteria relative to the rest of your microbiome who have been known to produce ammonia. They convert proteins and carbohydrates into ammonia preferentially over other post-biotics.

[45:18]

Kiran Krishnan: Now, these are really important because ammonia is a major source of stress in your microbiome, and then also in your liver, and then ultimately, in the blood system as well. Because it changes the pH, it creates toxicity. It creates liver distress.

And so, what we talk about here is if your ammonia production is high and ammonia clearing is low, here are some nutritional guidelines and some supplements to follow because you may have high ammonia-producing bacteria, but at the same time, you've got high ammonia-clearing bacteria. Then your net ammonia gain is very small to nothing. But if you have high ammonia-producing bacteria and low ammonia-clearing bacteria, then you've got a problem with ammonia in your system.

Now, one of the things that's interesting with this is taking in more protein, more amino acids, if you're high ammonia-producing and low clearing, actually is detrimental to your system in general—your liver health, the rest of your microbiome, the health of your large bowel, the pathogenicity within your blood. All of these things have an impact—your brain health. All of those things are impacted by the number of ammonia-producing bacteria and if you're taking in higher levels of protein.

So, although many people assume a high protein diet is a good thing, for people with high ammonia-producing bacteria, it's actually not. It can actually be quite toxigenic. You wouldn't really know that until you had an analysis like this done. So that's one of the functions.

Shivan Sarna: One other thing… [00:46:56] is doing that DNA Summit right now. and she talks about ammonia-clearing n your pathways. So there's a bacteria that can help clear the ammonia, but also your pathways for those of you who've had your DNA analyzed or are thinking about it. I just wanted to throw that out there.

Kiran Krishnan: Yeah! And then, the other one is the *estrobolome*. The estrobolome is really important especially for women. It's a network or a constellation of bacteria whose job it is to metabolize estrogen. People who tend to have low levels of estrobolome tend to have estrogen-dominant conditions like PCOS and are at a higher risk for estrogen-dominant cancers and so on. And then, you've got high levels of betaglucuronidase activity which is implicated for certain types of pathogens within the system.

And so, we go through what ur estrobolome levels are that have been picked up, how you can improve your estrobolome, and what the implications are of this particular constellation of bacteria.

I don't think anyone is testing the estrobolome right now. And there's lots and lots of issues and questions people have about hormone balancing, especially women, with estrogen balancing. This will give you a lot of clue into what's going on within your microbiome with regards to estrogen.

Sulfate-reducing is really important. So sulfate-reducing is a group of bacteria that will actually reduce sulfate into hydrogen sulfide. Sulfate comes in through your diet in many types of foods. And having a balance in sulfate is really important. But a lot of people will tend to have high level of sulfate-reducing bacteria.

Now, for those people, eating foods that have high sulfate in them can be really problematic. And many of these things are foods that we would assume to be very healthy, things like seafood and eggs and apricots and peaches and onions and garlic and cabbage. These are all foods that tend to be high in sulfates and sulfur—sulfates in general. And then, if you have high levels of sulfate-reducing bacteria, these particular microbes are converting that sulfate that's coming into the food into hydrogen sulfide which is toxigenic and inflammatory to your large bowel.

And it's also clearly and closely associated with irritable bowel syndrome, small intestinal bacterial overgrowth and different forms of IBD, inflammatory bowel disease, irritable bowel syndrome and so on.

So, this is really important because you might think, okay, eating some clean fish, eating some eggs, eating some spinach, some asparagus, some bok choy, broccoli, those are all really good, healthy foods. There's nothing wrong with the food themselves. But if your microbiome has gone through a shift where you have really high sulfate-reducing bacteria, then these seemingly healthy foods could be quite toxigenic to your system.

And you may be frustrated because you might have changed your diet, you might have added in some of these seemingly healthy foods, and you're not getting better, or your symptoms might even be getting worse. This might be a clue as to why that may be.

[50:12]

Kiran Krishnan: That's why these kind of functionalities are really important because we really need to understand how the choices that we make can impact the results that happen within the system. And you only know that when you understand the types of microbes that are prevalent in the system.

That's the same thing with methane producers. Methane producers will utilize substrates and convert them to methane much more dominantly than other bacteria. There are certain nutrition that can actually negate that. For example, some people are low sulfate reducers, but high methane producers. And often, they go opposite to one another. And so, one of the ways of actually reducing methane production is to increase sulfate reducers and vice versa. So, this report kind of give you an idea of where you stand in in that comparison. And then, what are some of the things you can do for diet and supplementation and even lifestyle to balance those two out.

Now, there are a number of other functionalities. I'll show you a list of them. But this is the 1.0 version of the report. The other functionalities aren't quite ready. But what's important to know is that, when you send in your sample now and get it tested, you'll get this report. But when the other functionalities are ready, they're going to rerun your sample, the one you already sent in (you don't have to do another test), and then send you an updated report with the updated data too.

Some of the other things we wanted to look at is functional keystone species. So these microbes are considered to be keystone because as a singular organism, they play a very important role in maintaining not only a healthy microbiome, but the overall health of the individual.

And we've talked a lot about a lot of these in a lot of talks. So, we wanted to be able to measure it for people to tell them where they are with their important keystone species. So, *Akkermansia muciniphila, Faecalibacterium prausnitzii, Ruminococcus bromii, Ruminococcus flavefaciens…* there's a number of identified keystone strains.

We talked about what their function is, like in this case, cellulase degrader, [00:52:27] and butyrate producer for Roseburia. And then, again, if their keystone strains is low, then we give you both nutritional and supplemental recommendations for how to increase the growth of those particular keystone species.

Bifidobacterium longum is important because it's an acetate producer. Acetate is really important in maintaining low pathobiomes. And also, it's really important for the liver, for the brain, changes to the skin and so on. So, all of these keystone strains play an important role. It's really important to know where you stand with regards to the keystone strains within the microbiome.

Then these are the other functionalities that will show up in the 2.0 version of the test… saccharolytic fermenters versus proteolytic fermenters. This is important because you would assume that eating a high carbohydrate or a high resistant starch or fiber diet is a good thing. Well, it's not necessarily a good thing if you tend to have high proteolytic fermenters because they will convert the carbohydrates and the

resistant starches to ammonia and other gases; saccharolytic fermenters will convert it to short chain fatty acids.

So, understanding where you are in that spectrum is really important to modulate your dietary intake.

Vitamin, mineral and digestive enzyme producers within the gut;

Histamine production—a lot of people have histamine intolerance and issues around histamines. This will give you a clue as to the level of histamine production within your microbiome;

Indole production is also important because that balances out histamine. And so, if your indole production is low, and your histamine is high, how do you rebalance those functionalities, you'll get that information as well;

Hydrogen sulfide, then some really important neurotransmitters—serotonin, tryptophan, GABA production. Do you have adequate microbes that produce these really important neurotransmitters, the vast majority of which have to come from your gut. That gives you a clue as to some of the digestive symptoms, the overall inflammatory symptoms, and then of course all the cognitive symptoms you might be dealing with as well;

Acetylcarnitine, l-carnitine production, secondary bile salts… all of these things are really important known functions within your microbiome that directly correlate with risk for certain conditions and/or symptomology association with specific conditions. So those are really important to know and understand and, again, speak to the functional aspect of your microbiome.

And again, for everything, we will be providing actionable steps if the prevalence of these is off and is off from normal, healthy levels.

So, that gives you the overall functionality of your microbiome.

[55:14]

Kiran Krishnan: Now, the next few pages gives you a different way of visualizing where you are compared to US healthy population. This is just overall composition at the phylum level. Phylum are the biggest groupings of bacteria. It's all color-coded so you could see how dissimilar or similar your color coding is from the US healthy population. This, again, looks at percentile levels of certain groups of bacteria compared to US healthy population.

A lot of these is what was reflected in the very first page to give you your whole microbiome index. This is just another way of visualizing it. So it gives you that additional information to look at. It gives your doctor additional information to look at as well.

And then, the next parts of that goes into a little bit more detail. These are all, again, where you map compared to a healthy population.

And then, one of the things we're throwing in is just kind of unique species that are found in your sample that aren't typically found in a US healthy population—some of these might be completely really rare species that may not have been found in any of the samples except for yours. And then, you can always google these and kind of look and see what they're up to. But that's one of the things we want to throw in there.

How relevant is it to your health and overall wellness? Maybe not. But it's just one of those interesting things that we wanted to throw in.

So, that gives you an overview of the kind of information you'll be getting in the report. It's important to map your overall principals and functions of your microbiome to where the healthy population is. It's really important to understand where your pathobiome is. It's important to understand the various aspects of diversity, the resistant genes and so on. Then you get to the importance of the keystone strains for the first time… you'll be able to see where you map with regards to the amount of keystone strains in your microbiome.

And here's one of the things that research shows, that loads of chronic issues can be helped just by increasing one or two keystone strains within the microbiome. So that's how powerful they are.

Shivan Sarna: Can you explain what a keystone strain is? And then, I have a slew of questions for you.

Kiran Krishnan: Yeah! So, keystone species are basically species that tend to either a) play a significant role in maintaining the rest of the microbiome and/or b) have direct correlation to implications of health and wellness in the host.

For examples, *Akkermansia muciniphila* is inversely correlated to everything under the metabolic syndrome spectrum—so diabetes, cardiovascular disease, dementia, polycystic ovarian syndrome, hypogonadism (which is low testosterone in men). All of these things are inversely correlated to the amount of akkermansia you have within your system—meaning the lower the akkermansia, the more susceptible you are to those conditions… which means that akkermansia protects against those conditions.

The same thing with *Faecalibacterium prausnitzii.* It's a keystone strain that has been shown to protect against inflammatory bowel disease and other inflammatory conditions within the bowel. The higher faecalibacterium you have, the less risk you have for inflammation in the bowel.

So, these keystone species are so important that, on their own, they can be a complete solution to a health issue. And you wouldn't know where you stood with the keystone species until you do a test like this and you go, "You know what? A lot of my problems may be coming from having really low levels of *Faecalibacterium prausnitzii*. Everything else seems to be okay, but faecalibacterium seems to really low, that's what I'm going to focus on first."

One of the problems I see in functional medicine in general especially with the microbiome is people do too many things at once. You're throwing in lots of things into the system at once. You don't really know what's actually working. You're not going about it in a step-wise manner. This also kind of helps identify, "Okay, here are the priorities that you should be looking at. These are the things that are way off. And those should be the things that you're focusing on right off the bat."

Shivan Sarna: I've got a couple of very specific questions for you. One is from our dear friend, Summer Bock, who is an expert in fermented foods. If you ever want to know what to do to make fermented food, go find Summer Bock on the web and Facebook.

She says: "Which bacteria eats acetone? I see a lot of clients with high acetone and low bifidobacterium."

Kiran Krishnan: Mm-hmmm… so acetone or acetate? Is it acetone?

Shivan Sarna: Acetone is nail polish. That's my filter, sorry. She says acetone too, but we mean acetate.

Kiran Krishnan: Acetate, okay.

[01:00:07]

Kiran Krishnan: So, lots of the butyrate producers will consume acetate and convert it to butyrate—for example, faecalibacterium is one of them, ruminococcus is another one, subtilis can as well. Acetate is really important. It needs to be produced. As I've mentioned earlier, it has a function in the liver. It functions in the brain to some degree. You find acetate in the blood.

Acetate also is a good antimicrobial and actually keeps low levels of pathogens in the system. But then when you have butyrate producers, what they do is they start consuming the acetate and converting it to butyrate which, ultimately, is the thing that controls metabolism and so on.

So, some of the keystone strains that are identified as butyrate producers, most of them will metabolize acetate.

Shivan Sarna: Okay. Is this available in the UK?

Kiran Krishnan: Not yet. We're trying to figure out how to make it available in the UK. We're just looking at some of the regulatory things, and then also the shipping of the sample back. We're hoping that it will be by mid-year.

Shivan Sarna: Okay. And the rest of Europe? So right now—let me rephrase that—is it only available in the US?

Kiran Krishnan: Yes, exactly. So the next regions that we're looking at would be Canada and the rest of the Europe (including the UK), and then New Zealand and Australia as well.

Shivan Sarna: Great! And then, also, that 2.0, that extra set of markers that you were talking about that would be available to people even if they're just doing it now. And then, when the second [01:01:43] is created, and you can run the test through, when is that happening?

Kiran Krishnan: So, we're hoping that the 2.0 version of the report will come out some time in the next two months, two to three months. So you can get all these data now. And then, when that data is available, it'll just be automatically sent to you. And then, you can look through that and kind of get more clues from that.

But you could start your programs and figure out what you want to do therapeutically just based on this data here. And then, when you get that information, it'll give you even more clues as to what may be dysfunctional in the microbiome.

Shivan Sarna: Very cool! So Alex from your team has sent me a video to share with everyone about how to order. And one of the things he said was—you actually don't get it sent to you guys. You go to the portal and download the information. So I just want to be clear with you about that.

You can order the test online. This is a favor that Kiran is doing for SIBO SOS. If you go through my patient direct using code SIBOSOS, you can order directly. We're the first. Otherwise, you are going to your practitioner—which of course I always recommend and suggest. Maybe you don't have a practitioner right now, you can download the results, take it to a practitioner as a great starting point of a conversation. You don't have practitioners, go to the SIBO SOS Facebook group, there are tons of people in there who can help you with their own personal referrals.

Shivan Sarna: Yeah.

Kiran Krishnan: And the cost is $399. If you're not on our email list already, then definitely go to SIBOSOS.com and opt in. Fill out the little form. You'll get a free SIBO cookbook, and we will email you this information with the little video that Alex just sent me about how to order and this video (but it'll also be in the video section here in Facebook) and the patient code.

It's an elegant, simple way to order. But there are a couple of little things that I'm afraid might trip you up. So you do want to watch that little, quick video beforehand.

And how long does it take to get results, Kiran?

Kiran Krishnan: So, at the moment, it's going to be about four to five weeks I believe. And we are working hard to push that down to three. Three would be amazing, but it's about four to five weeks right now.

Shivan Sarna: Yeah, okay. What else? Let's see…

So, somebody did have a question about Candida just as we're sort of wrapping up. Does it cover different Candida strains?

Kiran Krishnan: It'll pick up whatever different Candida that you have in your system, yes.

Shivan Sarna: Okay, okay. It's not available in the UK yet, Jeanette. But it's coming. It's coming. They're hoping within the next what? Six months to a year.

Kiran Krishnan: Yeah, by mid-year, we want to have it available there.

Shivan Sarna: Okay, great. Okay.

Let's see… somebody just asked a really great question. And I wanted to answer with you.

[01:05:01]

Shivan Sarna: They're saying: "When changing diversity in the gut,"—hey Roberta! "When changing diversity in the gut, should we even be concerned if it feeds the SIBO bacteria?" I have a comment about that. And Kiran, I want to know your comment about that. That's where you really have to work with your practitioner. You have to figure out the order in which you're going to treat things. And that's why they said don't stay on the low FODMAP diet long-term, because you lose that food for the diversity.

So, it's a really insightful question, Roberta. I think it's such a personal decision. And it has to do with where you are on this SIBO Recovery Roadmap, where you are in your process.

What do you have to say about that?

Kiran Krishnan: Yeah, I totally agree, 100%. I mean, we know that diversity is paramount to health and overall health. So it depends on where you are in terms of like "I want to fix this SIBO problem right now" versus "I'm looking at my overall health as well." And so, where you are in that spectrum will determine what approach you take. And that's a conversation you have with your health practitioner to figure that out.

Shivan Sarna: You are amazing, sir. We so appreciate you. Thank you so much.

Kiran Krishnan: Thank you! Yeah, it's been a pleasure. I'm very excited for people to really get to know their microbiome by doing this test. I'm excited to get to know my microbiome for the first time as well with this particular test. I'm excited for people to try it and see. It's going to really provide people some really interesting direction. And that was the intention here when we started looking at the problems for most of the tests available in the market.

So, thank you for this opportunity to talk to your audience about it. It's an exciting year for us, to look at this.

Oh, and then by the way, we're also using the test in a couple of clinical trials that we're doing right now. So, we'll have actual clinical data supporting the functionality test as well.

Shivan Sarna: So Kathy is asking (and so is Marianne): "Do you need to stop taking any supplements or medications before doing it? And for how long?" because I think we're used to do.

Shivan Sarna: You don't. To me, that doesn't make any sense at all because I want to know what your microbiome is like now—including all the stuff you're doing. And so, when you stop doing all these stuff you're doing, and your microbiome starts to change, what's the value of knowing what that looks like versus what it actually looks like and functions like when you're doing your diets and your probiotics and all of that stuff.

So yeah, you don't have to stop doing anything. I wouldn't go and do like a colon hydrotherapy the day before you do it. Make sure it's things that are part of your normal routine.

Shivan Sarna: I think that's such a good point and a really powerful way to wrap. I've talked to a lot of people, and the questions always happen—and I've talked to you about this. It's like: "Do you have to be

on a probiotic long-term? Do you have to take one every day?" And somebody—I can't remember who, but somebody really smart said, "Well, every day, you would've been going out to the yard or the garden and picking your potatoes and your carrots. So every day, you're inoculating your microbiome." You're not re-seeding your microbiome with a supplement or things like that, or fermented food even; you're constantly feeding it and fertilizing it, right?

Kiran Krishnan: Yup, yup. Exactly!

Shivan Sarna: Okay.

Kiran Krishnan: And we need to know what your microbiome looks like at that moment and all the functionality associated with it at that moment. And what you're taking as a supplement, what you're eating, all that has an impact.

So yes, you don't have to stop anything. You don't have to get off of anything for weeks on end to test your microbiome.

Shivan Sarna: Okay! Alright, if somebody has a question—and by the way, everyone, if you're on our mailing list, we're going to send this recording out. We'll send you the link. I'll post it here. I'll post Alex's (from Kiran's team) video about how to order. And I already posted the link. Be sure to use code SIBOSOS.

The question I have is: "If they have specific questions, can they call the phone number at Microbiome Labs, the customer service?"

Kiran Krishnan: Mm-hmmm… yeah, absolutely. Please do.

We'll try to address a lot of general questions through email FAQs and so on. We're also developing this clinical support team that includes some practitioners and doctors as well to try to help people understand the implications of the test as well.

But in general, we wanted the test to be as self-explanatory as possible. So every section of the test is explained. The implications are explained and so on.

But of course, call us if you have any questions. No problem there.

Shivan Sarna: Okay. And guys, there are some other videos of Kiran in the Facebook video section which are answering some of the other questions that you've been asking here.

[01:10:04]

Shivan Sarna: And Marianne, there are recommendations that he puts in the report. So be sure to watch this over again guys. And a lot of your questions will be covered.

Thank you so much! Have a beautiful day.

Kiran Krishnan: Thank you. You too!

Shivan Sarna: Take care everybody. Thank you. We'll talk soon.

Kiran Krishnan: Bye bye.

Shivan Sarna: Okay, bye bye.

So Kiran has just signed off. I just wanted to say thanks, everybody, for being here. If you are stumbling upon this out of context of our SIBO SOS community, do find out more about it at SIBOSOS.com.

And if you are watching this and, you're not part of the Facebook community, do come to Facebook even if you don't do anything else on Facebook (put those privacy settings on), come and be a part of the community. And the Facebook group is SIBO SOS community. I think it has the words "virtual summit" in there someplace.

This is such a great group of truly helpful people that are super smart and learning together and figuring it out together with the help of each other. And even if it's just an attagirl or an attaboy, or if it's actually some questions patient-to-patient, we do have some practitioners swinging through their frequently.

We also have a *huge* video section where I've talked to so many of these experts. So please, those are all free going to the video section of the Facebook group.

And if you're not on our mailing list yet, for those of you on Facebook, you definitely want to get on our mailing list. You can do that by going to www.SIBOSOS.com because we have some very exciting things coming for you throughout the rest of the year.

If you're a practitioner, you definitely want to get on this list. We're going to post how Dr. Siebecker is launching her SIBO Pro Course to help practitioners know how to treat people with SIBO. It's fantastic! We did the beta semester… rave reviews. We're launching it again.

On January 25th, Dr. Allison Siebecker is going to be doing two webinars—one for patients, one for practitioners—about the three blind spots that she sees practitioners as well as patients continually doing in practice.

So, if you're a practitioner, come to the practitioner one; if you're a patient, come to the patient one.

Simultaneously, we're also going to be re-launching our course called SIBO Recovery Roadmap that Dr. Siebecker and I created to help people do just that—navigate your way through SIBO.

It's for patients. A lot of practitioners have taken it. It was prior to her developing the Pro Course. But this is a course that will take you step by step through all the studies, all the questions to ask your doctors. It's exactly what I wish I've had when I first got diagnosed with SIBO—which is exactly why it was created.

So, watch for that in the Facebook group and in your email. And I will send you all this information about it, about Kiran's test within hopefully the next 24 hours.

And Christy, we love you too. Ramona, we love you too. Marianne… hey , love you! God bless you. Kathy, to Jackie, glad you were here. Pam, neighbor, glad to have you here. Glosia, thank you also for being here. Roberta… great, great questions. Teresa, love you. Jeanette, great to have you.

So thanks everybody very, very much. I know, Dharmesh, it's always great to have you here. And I love that you guys are answering each other's questions too.

Glenn, Summer of course, my dear friend, Tiffany, Sonia, Emma, Caitlin, more Pam, more Roberta. Eric Hamilton, we love you, man! And Cheryl and Carlene…

You guys, always double check all the time because I'm not great with time zones (as you may or may not have figured out from coming to my sessions in the Facebook group. I do tend to get the time zones wrong).

Donna, thanks for being here and everything you do.

Okay! Love you guys! Talk to you later. Thanks. Bye!

[01:15:10]