THE FATIGUE SUPER CONFERENCE

The microbiome revolution

Guest: Dr Raphael Kellman

Alex: Welcome to The Fatigue Super Conference and for this conversation I'm really excited to be talking to Dr Raphael Kellman. Dr Kellman is a graduate of Albert Einstein College of Medicine, he's pioneered a groundbreaking new branch of medicine and healing seamlessly integrating holistic and functional medicine with his visionary understanding of bacteria, the world and nature, the root of who we are and its connection to health.

Founder of Microbiome Medicine Dr Kellman is recognised internationally as a leader in the field of microbiome medicine and lectures frequently on the topic. He is also the best selling author of several books including 'The Microbiome Breakthrough' and 'The Microbiome Diet', which was the first book to delve into the importance of the microbiome.

As Medical Director of the Kellman Center in New York City Dr Kellman treats patients using his microbiome centred approach to medicine and the Kellman Center specializes in thyroid disorders, gastro concerns, Chronic Fatigue, Fibromyalgia, Autism, Anxiety, Lyme Disease, cancer treatments, infertility, weight treatment and unexplained malaise i.e. you guys do a lot of fantastic work.

So we're going to get today Dr Kellman your work on the microbiome, which I'm particularly excited about as someone who spent many, many years with digestive issues and I personally suffered from Chronic Fatigue about 23 years ago I think I was first ill. It was back in the day where there was nothing like the understanding that there is these days around the microbiome, particularly through people such as yourself who have been involved with this understanding.

I'd like to maybe just start off a little bit with a bit about you and what got you into this work. How did you end up becoming a specialist in microbiome, what was the fascination?

Dr Kellman: Yeah well you know I studied philosophy and science in college, in University, so you know you get to see the bigger picture and then you become more and more interested in the bigger picture, so it was with bacteria. So I of course I knew their profound role that they play regarding life on earth, without bacteria there would be no life on earth. We would just have rocks we would not have plants, we wouldn't have algae, we wouldn't have fish, we wouldn't have reptiles, we wouldn't have sea creatures, we wouldn't have humans.

But what's so fascinating is that the bacteria work as a collective whole. There are more bacteria on earth in mass, bacterial greater in mass than the mass of all the fish in the sea and the animals on earth and we can't see any of it, we're blind to it. They work as a collective whole, you know always say the bacteria, for example, in London, does not have a different agenda than the bacteria in North Africa. You know they work as a complete whole and they work in a seemingly selfless way to create a whole that is so much greater than the sum of its parts. One bacteria or ten bacteria or ten thousand bacteria by themselves or ten million bacteria is nothing. But when they group together across the globe they actually produce life on earth and we would not be here speaking if it wasn't for those bacteria working selflessly as a collective whole.

So knowing that and being so fascinated, backtracking to the people who were asking why is that so because they're responsible for the production of carbon and nitrogen, without which there would be no organic life. So already being so fascinated with bacteria since we are a product of nature, right, human beings, so if nature is held together because of bacteria, if life is really a consequence of the great gift of bacteria on some level then that incredible process must be going on everywhere in nature, including us as we're a part of nature.

So I was always fascinated with bacteria in us and always was against this notion of good versus bad bacteria that was very commonplace in functional and holistic medicine because, you know, we understand things in terms of context. When you're really understanding science and how nature works there's no such thing as bad, there's just context, what is the whole about. We don't say our ecology is bad or there's bad things in our ecology and then there's good animals in our ecology. They're all good animals, they're all good fish it's just the way they're working together and if you put humans in that ecology then you really have to ask that question. How is it all working together but you don't say well these are the bad humans, those are the bad giraffe's, it has to be a healed context.

So as soon as the research was coming out about the enormous amount of bacteria in us I was right there at the cusp waiting for the information to come out. I mean I knew it intuitively but you know when I saw the science, because we had the technological ability then to see the enormous amount of bacteria in us. So I was right there to receive that information and then I just used what I knew intuitively and I just predicted what would come. So I originally wanted to write the book in 2007 about bacteria and the microbiome but my agent thought I was crazy (laughs) but I revisited in 2014 predicting this. What I didn't predict is how fast it would evolve.

I remember walking with my wife in New York City in from of the Museum of Natural History and I said to her you know I wonder when the word microbiome will become a household term, I think maybe five years, maybe seven years. One year later there was an exhibit in that same place, natural history on the microbiome. One year later so that's my history but I was always interested in looking at things from a big perspective and always not accepting dogma. So it relates to other things that I've done in medicine, which I think relates to fatigue for sure, about thyroid testing but if we have time we'll talk about this as well. It's just the way I see things and that's just how I'm wired but it's also the will within me to want to look deeper, to better understand the human condition to be able to help humanity.

Alex: Something that really came out when I was reading your books last night was your real kind of passion for the subject and I kind of found myself going down the rabbit hole of fascination as I was reading. One of the statistics that really leapt out at me was that 90% of the cells in the body are not human. It's kind of the realization that this thing that I take to be me as my kind of living breathing entity but actually only 10% of it is mine.

Dr Kellma: Right.

Alex: I found that fascinating.

Dr Kellman: It is, it's going to cause us hopefully to really revisit the way we think of ourselves and the way we think of others and other cells and bacteria and the interconnectedness is so vast and so intricate, when we start to think about it, it will definitely make some very positive changes in our psyche.

Alex: It got me thinking about, and this is slightly off topic and it may be a whole kind of rabbit hole of its own, but it got me thinking about people that I've heard of that have had fecal transplant therapy and they'd actually had changes in personality as a result of it. How deep does the rabbit hole go but I'm mindful of not having a big digression here.

Dr Kellman: That's why I say caveat answer don't rush to get a fecal transplant (laughs).

Alex: Right (laughs). So maybe for people that are perhaps not so familiar with the kind of microbiome and also why the gut is so important in fatigue. Maybe say a little bit about the kind of function of the gut and why dysfunction can have such an impact in terms of ones energy.

Dr Kellmman: Right, right. So it's commonplace for people to think about the gut/brain connection, it's really the microbiome/brain connection. The gut houses the microbiome when the microbiome is not healthy the guts not healthy, that's the way it works because you know people talk about leaky gut, it's the gut bacteria the microbiome that's responsible for maintain the health of the gut wall. If the microbiome is unhealthy the gut wall will begin to 'corrode', it's going to fall apart. Without the signals from the microbiome we can't maintain a health gut wall, OK.

So if we have leaky gut the cause is that you're microbiome is not healthy, everything else is a secondary cause, whatever it is that people talk about primarily it's the microbiome. So and the microbiome, again you know trillions of cells they outnumber our own cells, they are speaking to the brain in many languages. They speak to brain, there's a bidirectional communication, they speak to the brain directly because the bacteria produce the same neurotransmitters as our brain does. I should really say it the other way, our brain produces the same neurotransmitters as the bacteria. They were here way before us producing these neurotransmitters, right. So they're communicating to the brain, sending signals to the brain and the brain sends signals back to the microbiome.

Now what are those signals? Well the microbiome is constantly evaluating the status of human beings and not just the nutrition and the physiology but the memories, our memories, our emotions, it's the bacteria who contain it all. They're a super computer beyond anything that we know of today and my opinion it will never be replicated, it will come close but it will never be replicated, because what they're doing is they're sorting out information that virtually goes on and on and on including past memories and childhood etc.

So they're sending signals to the brain as what is our status, are we in a state of crisis, do we need to send alarm signals, do we need to change the way neurons are speaking to each other. Yes those are the messages from the microbiome and they send it to the brain. They'll tell the brain to go into low gear, not to produce a lot of energy, why because the microbiome is saying we have to conserve, we have to go into a hibernation state because of these problems, right, and the problems started many, many years before including

childhood trauma. Now the neurons are changing the way they're communicating, the signals to the endocrine system is changing, the hypothalamus can be going into low gear, hopefully we can talk about that, not the person's depressed, anxious and tired and suffering from fatigue.

Now there's other ways that the microbiome communicates to the brain, via the immune system. It actually sends signal to the immune system and then the immune system translates that language into another language that the brain understands so now we have a second language going to the brain.

There's another language from the endocrine system, the microbme communicates to the endocrine system via various cells and then the endocrine system communicates to the brain. And what's so incredible is that the messages start from the mircobiome, the messages going up north from the microbiome to the brain versus the brain down to the body and the microbiome is 400/1.

Alex: Wow.

Dr Kellman: Yeah this is a revolutionary though. This is really just so phenomenal it's going to take many years before we fully 'digest' this and understand, right, its ramifications and the ramifications extend on and on and on.

Anyway so when the microbiome is not healthy the brain changes, the immune system changes, the immune system is more likely to be disregulated because when a microbiome is not healthy it can't regulate the immune system properly, right. So then you're more likely to go into a state of inflammation. Do you know that the microbiome educates the immune system, we wonder why that out immune system doesn't attack every cell in our body. How does it know what's friend and whose a foe? Guess what mibrobiome, the microbiome is their teacher, they teach the immune system who is who, how to create a health ecology, what toxins to go after. It also is responsible for maintaining the immune system.

If the immune system is not kept in check it could burn the body down it's that powerful. When the microbiome is unhealthy we're susceptible to inflammation, autoimmune diseases and you know people can have all the symptoms of an autoimmune disease and all the markers come out normal. Their rheumatoid factors are normal, their ANA is normal, CCB is normal, you name it, and they go to a doctor no everything's fine you don't have any autoimmune disease but they say well I'm suffering I have pain everywhere, my muscles hurt, my joints hurt, I'm constantly tired, no, no everything's fine your labs are completely normal.

What we're failing to understand is that when the microbiome is not healthy the immune system is not healthy and it may not manifest in certain markers that we know of but inflammation and autoimmune disease they're part of the spectrum. You could have no autoimmune markers but because you have inflammation because your microbiome's not healthy you're going to be suffering a lot more than someone who has known and established rheumatoid arthritis.

Alex: What comes across as you're talking which I think is really fascinating is that I think it's very easy for one, when I say one I mean myself (laughs), to think about the microbiome as being trillions or microscopic organisms which are just kind of there that are happening. What you're describing is that there is an innate wisdom, a kind of collective intelligence, which is functioning within that which is far more potent and powerful than just something one comes in and tires to disrupt or destroy or deal with in an over simplistic manner.

Dr Kellman: Exactly. You hit the nail on the head it has a software, it has an intelligence. Look lets go back to our origins, as I said bacteria are responsible for life emerging on earth. Again we would have nothing without bacteria and they're working as a collective whole, they have all the elements of a conscious organism. Why? They can communicate, they can communicate with each other now we know they can communicate with the body. They can respond to changes, that's another right. They can initiate changes, I mean if that's not a definition of a conscious simple organism what is.

Are computers going to be considered conscious one day? Well let's ask the question to something that's more relevant today, that is in front of us that we could potentially use to help humanity, is what about bacteria on earth. Is that the conscious organism and if it is wow that will change everything that we know about medicine and how we approach medicine and how we approach bacteria. So yes the answer is yes they are a super conscious organism, they have a software, they have intent and let me tell you this, not only do they respond and change they initiate changes. There's research now to show that the mutation rate of bacteria far exceeds the mutation rate one would expect just from spontaneous mutations. Meaning they're self mutating. This idea of randomness that is the basis of modern science is astonishing. No bacteria are initiating their own mutations with the 'purpose' of directing and enhancing and purposefully moving evolution forward.

Alex: That's also fascinating in the context of epigenetics because again as I was doing my reading of your work last night one of the things that also struck me is that you're making the point, we talk a lot about gene expression

and the lifestyle we live and how our life is and how that impacts upon that. The point you're making is that actually the genes of the microbiome is actually even more important, the 90% which is bacteria the genes within that is actually crucial.

Dr Kellman: Their genetics, their genes outnumber our genes 150/1. We're focusing on the genome project, right, which has kind of faded away it used to be big. Well of course it didn't lead to much because our main genes are bacterial genes and the epigenetic capacity of bacteria is exquisite. They are epigenetics sine qua non.
Alex: So it would be great to talk a little bit about some of the things that lead to the microbiome going out of healthy function and one of those is stress, I'd love to hear you talk a bit about the impact of that, but maybe also touch on some of the other key factors that can lead to imbalances here?

Dr Kellman: OK. So we all know that antibiotics is a major disruptor of a healthy microbiome. Perhaps many people don't know that most of the antibiotics that we consume actually comes from the chicken that we eat, poultry, it's riddled with antibiotics. But it's not just antibiotics that are culprits, also drugs like proton pump inhibitors, so many people across the globe are on medicines like Prilosec or protonex or persin. These are what's called proton pump inhibitors, they use for reflux, they use for indigestion and they block all acid production in the stomach. Well research has shown, I've seen this clinically I've seen this for years, that it disrupts the microbiome. First it causes increased infection and pneumonia and allergies, then they found that proton pump inhibitors could cause osteoporosis. Then they found even dementia but what's critically to understand is the common denominator is the alteration of the microbioe that it causes.

So look at the vast repercussions of an unhealthy microbiome. So proton pump inhibitors, yeah it's OK if you're put on it for a few weeks but people are on it for years and it's damaging the microbiome. So if someone out there is complaining of chronic fatigue, and I'm sure many are, are you on a proton pump inhibitor. Are you still on Prilosec or protonex or persin, if you are we just hit the jackpot as to why you're still suffering from fatigue. If you've been on antibiotics in your lives for a significant amount, lets say more than the average let's say for six months you had recurring sinusitis, and four years later you develop chronic fatigue and cell gut issues, or just chronic fatigue then brain fog and some of the other symptoms that are so common.

Well yeah you could trace it back to those six months when you were on antibiotics. It doesn't knock on your door six days later, it slowly, slowly evolves into problems and then six years later, ten years later, fifteen years later even, because then another trigger like stress, like you just mentioned,

could effect you and now you reach the tipping point. Now all of a sudden you're suffering from fatigue, you're complaining of brain fog, your memories not as good, your anxious, you're moody, you just can't function at work, you're relationships may be affected. And then perhaps some of you also have gut issues, some of you don't, you can have significant microbiome problems and not have any gut issues but many of our listeners I'm sure do. So anyway you have muscle pain and joint pain and the list goes on and we just can have a few of them. The ill effects of an unhealthy microbiome really is from A – Z, sometimes you could have one issue and sometimes you could have sixteen issues.

Alex: One of the things as I was doing my reading that also struck me was the clarity you were bringing around the role of the thyroid in this and the crucial role that it plays in creating the hormones which power the cells in the gut and the brain.

So maybe touch on that and obviously we'll come to in a bit some of the ways that you work to correct these issues but the thyroid is an important piece.

Dr Kellman: Yeah let me just answer a little bit more, just 10 seconds, for the last question. Also you said stress, and we'll talk about that, but also adverse childhood experiences let's never forget that because that is the biggest epidemic today.

Alex: Yes.

Dr Kellman: And that effects you're microbiome, we have to think if we're suffering from fatigue we have to go back that far. But if you read my book I provide answers for those adverse childhood experiences which really will help you heal, but that's also affecting your microbiome. Then of course toxins, etc, anyway that completes that.

Alex: Thank you.

Dr Kellman: Now lets talk about thyroid. OK, thyroid disease is an epidemic, now why do I say that? Because of endocrine disruptors in the environment. It's well established, this has been known in the 60's about this, I think the name was Coulson. There were books written about this in the 60's, in the 70's, in the 80's. One famous book is 'Our Stolen Future' that was written I think at least 25 years ago describing the horrible epidemic that we're experiencing, that reptiles are experiencing, fish, you name it and all animals and humans too because of endocrine disruptors.

What are endocrine disruptors? These are chemicals in the environment that do not have to be at high levels to really disrupt the endocrine system, the hormones, especially the thyroid and why is that. The thyroid is very, very vulnerable to toxicity so these endocrine disruptors can ne phthalates, they could be heavy metals, they could be BPA, dioxin, they could be from chlorate, the list goes on and on and on.

Again you don't pick this up in labs, most doctors don't know about this, you don't find it in the New England Journal of Medicine and no one's connecting the dots that yes it must be affecting humans because it's affecting reptiles and fish. But yes just because we don't see it and we don't have a blood test for it we have to look bigger, we have to be like those nurses, what was it 200 years ago, that said no you could get infections if you don't wash your hands. But we don't see it but it's still there. This is really recapitulating that story.

Now thyroids affected but here's the problem the routine blood test fails to detect it in so many people. I could tell them look regular blood testing of thyroid is good as regular testing that most doctors use just for screening people, right. But if all of you you're suffering from fatigue, you're suffering from brain fog, you're suffering from gastrointestinal issues, depression, anxiety and it's been going on for years you deserve more than just the routine blood testing. You deserve a new understanding of having evaluate blood tests and the limitations of that testing and you need to know about the test that I feel every doctor should be using whose treating patients with unexplained problems, fatigue, etc. It's called the TRH Stimulation test.

Now let me tell you about this but first I want to say what are routine tests. Well we know the thyroid makes T3 and T4, now the T3 and the T4 could be bound to a protein or it could just be circulating freely, so that's called free T3, free T4, when its bound to a protein it's called total T3, total T4. Then there's also something called Reverse T3, we'll leave that aside for a second, and there's thyroid antibodies and type TPO antibodies, and thyroglobulin antibodies but then there's TSH.

What is TSH? It's coming not from your thyroid function, it's coming from the pituitary gland in the brain. You see the pituitary is like a barometer, it monitors the levels of thyroid hormone and it says wait you know the levels are low lets make more TSH because TSH will try to stimulate the thyroid to make more hormone. And yeah it does secrete it and it tends to do so but most of the time it's not successful. So doctors make this assumption, like many assumptions doctors make, that I'll just measure TSH in the blood if that's high that means the thyroid is low, right. It's high because it senses there's something off in the thyroid we've got to make more thyroid so let's pump out more TSH.

But it's an assumption that that TSH is always going to be high in the blood. Maybe at 9 o'clock in the morning it's high but at 11 o'clock it gets normal because the pituitary is conserving it, right. And do you know that there's research to show that the TSH value in the blood can vacillate 40% in any given day in someone who doesn't have low thyroid. My belief is the longer is goes on the less likely you are going to see it in the blood because of a principle of nature called conservation.

Anyway the TRH test folks bypasses all this because TRH comes from a hormone in the hypothalamus that stimulates the pituitary to release TSH so when we inject TRH, it's totally safe it's a natural compound, in the vein it stimulates the pituitary to release TSH. Now once thyroid there's going to be a lot of TSH in there, right, it's building it up because it knows it has to stimulate the thyroid. It may not be high in the blood but it's going to be high inside the pituitary. When we stimulate it and if a lot comes out it tells us the thyroid is low because that's why the pituitaries pumping out so much TSH.

Now in a healthy person more would be pumped out too but not nearly as much as when someone has low thyroid. That's the test that they used to use by the way but they've only stopped using it for various reasons, but I resurrected it and I could tell you its changed the lives of tens of thousands of people and maybe a hundred thousand people because we're able to detect the low thyroid that was missed by routine blood testing. Not only in adults but in children with developmental disorders and finding the same.

So now we come full circle, yes the endocrine disruptor really is causing problems but the routine test is missing it. So the bottom line is like this, if you're suffering from fatigue, if you're suffering from brain fog, your memories not as good, perhaps you're gaining weight and you can't lose weight, but that's not necessarily a must. There are people that aren't heavy and have low thyroid. There are other symptoms, could be constipation, don't be fooled you cold just have fatigue and your thyroid could be very, very low and the routine tests come normal, don't assume that you don't have a thyroid problem, OK. If you don't have access to the TRH test, which doctors should be using and I've been begging the holistic medical world to start doing it but they don't know how to do it, I would teach it if anyone's listening please I'd be glad to teach this test because I think it's such an important functional medicine blood test and you can take people out of their misery. So it's an important test.

Then there's other stages, by the way we talked about hibernation. Another thing that I've found is that in a lot of people with chronic fatigue that they've had for a long time there's a down regulation from the hypothalamus to the pituitary to they thyroid and everything's low and only through the TRH test

could we pick that up. But that's another topic, it's called NTIS, but we'll talk about that another time (laughs).

Alex: I think it's a fascinating piece of the jigsaw and I'm glad you went into it. I'd love to talk more about how you work with repairing or rebalancing the microbiome and you have a model of what you call the Four R's, which I think is a very neat way of organizing it. So I'd love to hear maybe the big picture of that and then we can come to each individual R.

Dr Kellman: Yeah, yeah. I mean I didn't make up the four; it's been around from the beginning in holistic medicine. I have maybe five r's sometimes six r's, you know look I just want to back track a little bit. When the thyroid is even a little bit low it is going to profoundly effect the gut and then the microbiome so that's the connection between the two. Thyroid and microbiome you have to look at both. A low thyroid is going to affect the gut and the microbiome and the opposite is true as well.

Alex: There's a vicious circle that one can get into there.

Dr Kellman: 100%. It's such a vicious cycle and circle. Getting back to the question you know how do you heal the microbiome, what do you do. Well first of all we have to come to a new understanding of bacteria, they're not our foe. Just the tension of thinking that it's a foe is hurting the microbiome in itself (laughs) but looking at it as a friend you'll get the microbiome to be healthier as well. So one thing is to change our conception of bacteria, two is the dietary changes. You know first of all, eating more salads, eating some of the prebiotic super foods, for example jicama and leaks, Jerusalem artichokes, I outline many of those foods in my various books 'The Microbiome Diet' and 'The Microbiome Breakthrough'. These are foods that the bacteria really like to eat, some of you may like steak some of you may like being vegan, well this is what they like. They like certain foods that have certain compounds in them and these foods that I just mentioned have those compounds. It could be a arabinogalactans etc.

Even changing our diet is so important. Fermented foods, you don't have to eat a lot, obviously if you have a lot of bloating in my book I talk about that the diet could change a little bit but in general fermented foods. Sauerkraut, kimchi, even a little bit you don't have to eat a lot, could be very, very healing for the microbiome.

Then of course the diet can be very simple, as I said just more salad, and then I know its in vogue about eating a lot of meat but there's a lot of research to show that may be unhealthy for the microbiome. Also too much fat but I believe that the research is referring to unhealthy fat but you have to be

careful about making assumptions about what is the healthy diet today and not fall prey to what's in vogue because you should look into the research of the effects of a heavy fat diet and heavy protein on the microbiome. So the dietary changes.

Now prebiotics are very, very important. My opinion is that the right types of prebiotics could be even more beneficial than the probiotics themselves because it's great to get the microbiome to heal from within, the word id endogenously. Let's tap into that intelligence so we would want to use the right types of prebiotic. Frequently people need hydrochloric acid because they're deficient in hydrochloric acid, sometimes enzymes, and then certain super microbiome products like Butyrate, which I think the sales in Butyrate is going to go up now (both laugh). Butyrate is a product of bacteria that is so important for the health of the microbiome and we can take it as a supplement.

Alex: Yeah I know it's one of our Director of Nutrition's favourite products for healing the gut so she will be very happy you mentioned that. To say a bit more about the food piece, and I'd like to come more into the other pieces in a second, but on the food piece are there particular key pieces that you recommend? I mean I guess it's a given that people are taking out the kind of wheat's and the sugars and the dairy's and that kind of stuff, but maybe say anything specific about what you think is important for people to take out which can be feeding the problems.

Dr Kellman: Yeah. You know what's interesting is when you start eating the healthy microbiome foods your appetite, what you crave, begins to change. So it's going to happen naturally that you're not going to like as much the unhealthy foods. So of course excess processed foods, excess sugar, refined foods, these are all not healthy foods for the microbiome of course. So those are foods of course that we should eliminate. We think also sodas and even too much juice, especially if the sugar content is high, we have to be careful about that.

I'm a firm advocate of organic eating. Eating organic foods even if it means you eat less, especially chicken that's it's organic, antibiotic free, hormone free, and you know the pesticides in the environment are really horrific so you know to try to eat the foods that don't contain some of these pesticides and chemicals is so critical.

Alex: Yes and you mentioned hydrochloric acid and digestive enzymes, maybe for those that are less familiar say a bit more about why they can be helpful in the digestive process and why perhaps people may have become deficient in the first place?

Dr Kellman: You know a lot of people, look a lot of you all who are listening, you've probably been suffering from fatigue for a while, that will in itself cause a demission of hydrochloric acid production. Chronic stress could do that, not in everyone, we shouldn't assume that everyone has low hydrochloric acid but may do and if you don't have the right acidity in the stomach then the microbiome will get off on the wrong foot because you need the proper acidity in the stomach for bacteria to be kept in check, the right types of bacteria, then for the right type of acidity and pH that enters into the small intestine. Without the hydrochloric acid then the small intestine will be off and then the health of the microbiome, which is dependent on a proper pH, will then be in a suboptimal state of health.

Alex: Yeah it's almost like you're making it work much harder than it needs to by sending down food that's not already digested to a certain level right?

Dr Kellman: And then that's another reason, absolutely. If the food is not properly digested that's also going to adversely affect the microbiome.

Alex: Yes. You made an interesting comment just a little bit earlier where you were saying that you prefer to give prebiotics to probiotics. For those that don't know the difference, and the point you were saying is it's helping the healing happen from within, but maybe just explain that difference to people that are not familiar with that.

Dr Kellman: Yeah. So probiotics are the actual bacteria that you could take and you can buy all different types of probiotics. Prebiotics are just the nutrients that the bacteria flourish on and there are different types of probiotics. Now there's inulin, there's arabinogalactan, there's one called XOS, the list goes on, galacto, oligosaccharides, many, many different types of prebiotics and basically those are just nutrients that the bacteria flourish on.

So we need to take those but we also have to be careful because some could cause bloating and if you have a bloating issue be careful but ecosia and apple pectin do not cause bloating. So many types of prebiotics that nourish can cause the microbiome to flourish and it's very, very important to take the proper and the right types or prebiotics. It's also very important to know that probiotics and to know that they're not all the same. For some conditions you need these types of probiotics and for other conditions you need different types of probiotics. This is why I call it the term 'microbiome medicine' to show that it's a very complex intricate field and it's not about just throwing in some probiotics, which again also prebiotics, it's also things like hydrochloric acid, it's also things like Butyrate, and it's the right types of probiotics.

Alex: what helps you determine what it is that are the ingredients people need? Is it primarily the clinical picture of are there particular testing that you'll do? So if your designing a programme for someone, specifically in terms of the kind of repopulating of the bacteria, what would be your kind of methodology of deciding that?

Dr Kellman: OK. You know there's a number of ways of assessing the health of the microbionme. Well first of all you know you want to see it's affects on us so we could measure various immunological markers, markers of inflammation, like CRP, IO6, IO-6, tumour necrosis factor, many cytokines and inflammatory markers that we could measure. If they're elevated well that's a reflection of an unhealthy microbiome. You could measure various bacterial products, by products, organic acids, and we can then make deductions about the balance of the microbiome.

We can measure LPSF in many, many different compounds that we could measure to see that the state and health of the microbiome. And then of course there's stool testing and there's all different types of stool testing, there's testing like your biome that measure and looks at the whole shebang. At everything, you know what is the genetic profile of your entire microbiome. Then there's stool testing that has a much narrower vision but that doesn't mean that it's less important, I think it's extremely important, to see if there's imbalances at this overgrowth of certain bacteria. Many are exceeding the percentage that they should be in in a healthy microbiome and you can pick that up in various stool tests that are available today.

Alex: So we're pretty much out of time but just a couple more questions. One of which is that you mention in your books about microbiomes super foods, just say a few words about some of the potent things that people could eat that would help in this process.

Dr Kellman: Radishes, eat some radishes. Eat a radish a day and it's going to take you far, more than an apple a day. But yeah I said Jerusalem artichokes, jicama, jicama's wonderful it's a great, great food for the microbiome. Leeks, asparagus, trying to think of real, real super foods. You know chilli is very healthy for the microbiome so there's a lot of foods right there, again you don't have to eat a lot of these super foods, just a few, you know a radish and jicama and then the next day you could get some artichokes, eat a lot of salads, you can't overlook that.

So that's sufficient and then you can have kimchi every other day, you don't have ot have a lot, a tablespoon, two tablespoons, if you really like it and it's not causing any problems for you have more. Then there's so many different vegetables now that various companies are fermenting so you can get

fermented beets, you can get fermented cauliflower, you can get fermented anything nowadays and I think that's great, that's a great trend.

Alex: Fantastic. Dr Kellman this has been absolutely fascinating and you mentioned a couple of your books here that people can check out 'The Whole Brain Diet' and 'The Microbiome Diet'.

Dr Kellman: Actually 'The Whole Brain Diet is not mine', it's 'The Microbiome Diet', unless I wrote a new book I don't even know about (laughs).

Alex: It's got your name on it.

Dr Kellman: Oh you know what it's a different version in England, oh I like that title.

Alex: Discovering more about your own work as we talk (laughs).

Dr Kellman: I didn't know that, I love it, thank you for telling me I wrote another book.

Alex: There you go, you're most welcome. For people that want to find out more beyond your books maybe tell us a bit about your website and some of your resources and some of the ways people can work with you.

Dr Kellman: Sure it's kellmancenter.com my books are on Amazon, I've written articles and they're all over the place, I'm sure you could locate them, and stay in touch by connecting to our website.

Alex: Fantastic. Dr Kellman thank you so much it's been absolutely fascinating and I really appreciate your time.

Dr Kellman: Thank you Alex it was a really wonderful interview, thank you so much.

Alex: My pleasure, thank you.