Kiran Krishnan:

... medicine. All of these things, all of these types of traditional medicine approaches have always centered around the gut, largely.

And we all have experience with that. We all know that if you start to feel anxious or stress, your bowels start to hurt. We talk about having a gut feeling about something, "That doesn't feel right in my gut."

So we've always had this visceral connection to the gut and the rest of our body. Now, we start to understand why that is. And from a chemical, and biochemical, and microbiological point of view, why it's so intimately connected to our overall health and function.

And I would say that the simplest way to understand this is twofold. Number one... And this is the one-dimensional view of it.

Remember that a digestive tract is responsible for the breakdown, assimilation, and absorption of nutrients. So just thinking about it from that perspective, if your digestive tract isn't functioning properly, you're basically not able to assimilate and take in nutrients from food. And all your cells in your body need those nutrients.

And so, if they're not getting nutrients, they can't function adequately. If they can't function adequately, the organs they make up don't function adequately. And so, your system starts to break down. That's the most simple one-dimensional view.

Now you go beyond that. We also now know that less than half of the required nutrients that we have in our system come from food. There's so many things that are absolutely essential nutrients that our cells need, down to the mitochondria level, which are those little engines in the cell. There's so many of those kinds of things that we need to function as humans, that aren't even present in our food.

So then the question is, "Where do we get them from?" Well as it turns out, we have trillions of microbes in our gut that act as little nutrient infermentation factories that produce these compounds for us.

And in doing so, they support our system. And they've evolved our system to be able to function under this premise that, we can do all of these high ordered, high level of function, as long as we have adequate microbes in our system to provide us the base materials for it.

And in fact, we know that most reactions and all that, are driven by genetics. We have a gene that codes for protein eventually, and the protein does something in the system. We know that whole process occurs.

Humans have very few genes, actually. So we have about 22,000 functional genes. Which may sound like a lot, but if you know anything about genetics you know that an earthworm has about 22,000 or 24,000 functional genes. So we're not that much more sophisticated than an earthworm when it comes to our own genetic material.

But as it turns out, we have 2.5 million, 3 million genes in our microbiome that comes from the microbes in our system. So, 150 times more genetic material from the microbes than from our own genes and our own chromosomes. So, all of those genes code for things, code for proteins and capabilities that we require to be human.

So when you understand the centralized role of the gut in shaping the capabilities and the functionality of the human system, then you start to understand that if the gut is dysfunctional, then everything else starts to fall apart, because everything is dependent on the gut. And the gut is dependent on the microbes in the system.

So, it's that simple. It's an ecological issue. And it's very clear that the biggest driver of mortality and morbidity worldwide is a dysfunctional gut, which ends up being a leaky gut.

This was a 2015 publication in Frontiers in Immunology. It was what we call a meta-analysis paper, which is a paper that studies all the other studies on the topic. And they came to a consensus saying, the number one driver of mortality, which is death and morbidity, which is disease, is a leaky dysfunctional gut.

So when you think about it, you go, "Holy shit. That's the thing that's killing us and it's right here in this ecosystem."

And the beauty of it is, we can modulate it.

Michael Roesslein:

Yeah. And you mentioned that the bugs make nutrients, which I remember the first time we did a whole webinar on that, about 106 years ago, it feels like. And I remember being blown away. Like, there's B vitamins, that they synthesize the vitamin K2. And then also what's really cool is, the microbes make neurotransmitters.

And so, things like depression, anxiety... Which, you guys a couple of years ago put out the ZenBiome product, which is a strain of probiotic that's been shown to enhance neurotransmitters.

And so, the mood you mentioned, gut feeling, that's more than a colloquialism or slang thing. It's like, there's huge links now to depression and anxiety and dysfunction in the microbiome, in the gut.

And then, I just saw another one, that fraudulent Alzheimer's model that got exposed earlier this year with the amyloid plaques. I just saw an article that popped up today on my phone that showed me that, they've now linked a certain gut microbe to increased risk of Alzheimer's, straight to the brain.

So there's the gut-brain link, the neurotransmitter link, the nutrients, and breaking down of food, and then the training of the immune system. Which, that presentation of yours is probably my favorite one. Where, a lot of our immune cells get... Is trained the right word to use, by the microbes?

Kiran Krishnan:

Yeah. It's training. Yeah. And they actually will ceased to function without microbes providing them signals, because the immune cells are waiting around for an indication of what to do, from your microbiome. And the reason that the system is set up that way is because we house trillions of microbes in our system as a normal part of our commensal flora.

So if the immune system just carte blanche attacked microbes, it would be constantly attacking everything that's in our system. So the microbes have developed a relationship with the immune system where they go, "Okay, we're going to tell you which one are the problematic microbes. Those are the ones you go attack. Us, you leave us alone, because we need to have that working relationship."

And so, the moment an infectious microbe enters the system, the first things to notice that are the adjacent commensal microbes to that area. And they're the ones that, not only flag the site of action for the immune system, but then they provide the immune system with the threshold signals to know that, "Yes, this is something you respond to."

Because an under-responsive immune system is equally as dangerous as an over-responsive immune system. Both of them are bad. So you need an immune system that has some degree of intelligence as to what to do and what not to do. The microbes tell it what to do and what not to do.

Michael Roesslein:

And you mentioned over-responsive and under-responsive meaning, over-responsive is inflammatory conditions, autoimmune conditions-

Kiran Krishnan:

Allergies. Yep.

Michael Roesslein:

Under-responsive would be chronic infections, dangerous levels of infections, and sepsis, and all kinds of things that, if your immune system isn't working, you're more susceptible.

Kiran Krishnan:

Yeah. Cancer would be an under-responsive, right? Because normally, your T-cells... So all of us... Not to scare people, but all of us have cancer cells developing in our bodies all the time. But we have T-cells that are designed to be able to identify the presence of those and shut them down right away.

That's why one of the most... This is an interesting aside. But one of the most effective treatments for certain types of cancers is immunotherapy, which is where they actually use your own T-cells to go after the cancer cells.

And it works beautifully well when it works, because it eradicates the cancer without damaging anything else. And the cancer never comes back, because your immune system now knows what to look for.

But, here's the caveat on that one. The effectiveness of immunotherapy is dependent on what your microbiome looks like. The studies are very clear, for individuals that had a course of antibiotics before starting immunotherapy, the immunotherapy doesn't work or doesn't work well.

If you have high levels of certain keystone species in your gut, like faecalibacterium prausnitzii and akkermansia, the immunotherapy works better. And so again, it goes back to the gut immune response.

They're essentially the same system. They're all cells that are working together to maintain balance in the whole system.

Michael Roesslein:

That's fascinating and deserves more attention. I don't think enough people know that, especially around cancer treatments and how different of an outcome you can have. And that there's ways to modulate it, which we're going to talk about.

So I wanted to also talk about kids and microbiome. I mentioned at the beginning, after many years' wait, there's a MegaSpore for kids. We'll talk about that in a minute.

But kids, in birth, and early childhood, and growing up, really goes a long way to determine the health of our microbiome. And it starts right away, like day one. And then there's factors that contribute to developing a diverse, robust, healthy microbiome. And there's factors that contribute to having a depleted... I don't know the right word for the opposite of diverse.

Kiran Krishnan:

Yeah, dysbiotic.

Michael Roesslein:

Dysbiotic, and overgrowths, and... I grew up having tons of ear infections, which I now wonder if was connected to that.

Kiran Krishnan:

Absolutely, it is, and we can explain the connection. But, it is. Because ear infections...

So some people will have a genetic dysfunction in their eustachian tubes, which means that it doesn't drain well, the ears don't drain well into their throat like it's supposed to. So you get an accumulation of fluid in the ears, which can lead to an infection, and then that's where you get the problem from.

But it's a small percentage of people that actually have a eustachian dysfunction. A lot of it is really allergies and sensitivities. Because what happens is, in the upper respiratory tract, you start to get lots of hypersensitivity reactions. Or, you get over colonization by streptococcus and staphylococcus, and they produce lots of toxins and inflammation, and you get a lot of congestion in your sinuses and in inner ear. And so, you build lots of mucus and fluid in that area that leads to infection.

So, that becomes kind of the primary driver. And it's a very prevalent thing among kids. This is also why asthma is a very prevalent thing. Certainly in North America, asthma is an epidemic. There are almost 10 million kids in North America that suffer from severe asthma. And it's from very early on you start to detect it, at four or five years old, and they're on inhalers and all that for the rest of their lives. And that is a microbiome dysfunction.

We know spectrum disorders... I was just doing an Instagram Live today on spectrum disorders, where we know that-

Michael Roesslein:

I saw that. I saw it in your story.

Kiran Krishnan:

It was a busy day today.

Michael Roesslein:

Yeah, yeah. You were all over Instagram today, yeah.

Kiran Krishnan:

I did two Lives, one webinar, and then this is the fourth one.

But the spectrum disorders are something that starts in gestation actually, and it's dependent on the mom's gut at that point.

So we talk about the gut-brain... And this is where the ZenBiome comes from in terms of modulating gut-brain. The brain is always dependent on the gut. The brain cannot exist without a gut supporting it. And unfortunately, if your gut is dysfunctional, not only is it not supporting it, it's one of the most toxic things to your brain when it's dysfunctional.

Now, when the baby's in utero, the brain's obviously developing. But at that point, the baby's gut is not developing yet. There's no microbiome in the intestines. So the baby's brain is dependent on mom's gut. And so, mom's gut having certain critical components will determine how well the baby's brain develops.

So one important factor is, there is a carbohydrate that certain microbes in the gut produce called peptidoglycan. And the way they produce the peptidoglycan is, they have this beautiful exopolysaccharide around them... In fact, the 1714 ZenBiome strain has this exopolysaccharide. And within the cell wall, it has these peptidoglycans.

This exopolysaccharide allows this strain to be detected by your own dendritic cells. So when the strain is hanging out in the ileum, in the Peyer's patch area of the ileum, the dendritic cells actually recognize the species. It goes across the lining of the gut, engulfs this species, and brings it across into the basolateral circulation.

Inside the dendritic cell, it starts to digest the bacteria. And then, when it digests the bacteria, it breaks down the carbohydrates that are in the cell wall structure of the bacteria, and the dendritic cell releases the carbohydrate as peptidoglycans into circulation.

That peptidoglycan, when the mom's pregnant, will make its way to the placenta through circulation. The placenta has receptors for bacterial peptidoglycan. It binds it back to a peptidoglycan, and then transporters take it all the way to the baby's brain, where the baby's brain has receptors for it.

When it binds peptidoglycan, it stimulates the development of the blood-brain barrier, of neurogenesis... So it's all the synaptic regions, the differentiation of the different components of the brain. So, it stimulates a development of the baby's brain. Arguably the most incredible thing we want to happen to our babies in utero, which is the development of their brains, we've outsourced it to microbes to do that.

So it's mind-boggling, the connection between the gut and the brain, even at that stage. And then, when you're born, the rest of your life, you are dependent on the presence of these peptidoglycan to shunt all the inflammatory responses that occur with stress, and anxiety, and depression, and all that.

And those things will cycle on and become worse and worse, including Alzheimer's, Parkinson's, dementia, if you don't have this peptidoglycan to stop the inflammatory response. It's mind-boggling.

Michael Roesslein:

That's incredible. We couldn't make that up if we tried. The level of complexity there is incredible. And you bringing this up... And obviously this evolved together, we evolved with these organisms forever.

But, that made me think one area we missed with the microbiome is the effect on the mitochondria. That there's a theory that our... It's probably not even a theory at this point. That our mitochondria evolved from these organisms. Like, it's essentially a bacteria. It has a very similar makeup as a bacteria, a similar function.

And the mitochondria, which everybody in our audience is pretty familiar with, it was the hottest topic in the toxicity masterclass because of the role that mitochondria play in the body's ability to detoxify toxins. It came up in the brain and nervous system masterclass.

Mitochondria are the rockstars across the board in just about all the conversations, and they interact directly with the organisms in our gut.

Kiran Krishnan:

Oh, yeah. So the health and functionality of our mitochondria are completely dependent on your microbiome. Here's why. So again, this is another beautiful illustration of this co-evolution between us and the microbes.

And again, all of this comes back to the fact that we have very few genetic elements. So, we can do very few things for ourselves. We've been able to outsource a lot of critical functions to the microbes. For

example, we don't have a gene to produce peptidoglycan to stimulate our own brain development. So we outsource that to microbes.

Mitochondria require a compound called urolithin A. Urolithin, I'm sure has probably come up with some of your conversations about mitochondria. Urolithin is responsible for repairing and turning over damaged mitochondria. And in fact, the best definition for aging at a cellular level is something called the mitochondrial free-radical theory of aging. That shows that, biological age is well-defined by the number of mitochondria that you have functioning in optimum in your cells.

There was this landmark study that was done, where they took tissue samples from a five-year-old and tissue samples from a 90-year-old and sent them blind to pathologists, and they graded the tissue to try to figure out what was different between the tissue samples they were looking at.

The only difference they could pick up was that the 90-year-old had 95% of his mitochondria dysfunctional, and the five-year-old had 100% functioning mitochondria. This is why a five-year-old can eat this much food and bounce off the walls all day long, and a 90-year old can't get out of bed properly. Because their cells can't produce energy. If your cells can't produce energy, it can't grow, it can't repair, it can't function, and the organ that the cell makes up can't function the way it should.

All of this is dependent largely on this compound called urolithins. Urolithins don't come from diet. We can't make it. So, "Where does it come from?"

Well, we count on microbes synthesizing it for us from consumption of polyphenols. This is part of the reason why things like the Mediterranean diet is so healthy, because it's rich in polyphenols.

Michael Roesslein:

Polyphenols are the colorful things that are in fruits and vegetables, yeah?

Kiran Krishnan:

Absolutely. And that array of phytonutrients, not only do they themselves have antioxidant activity, keratinoid activity, they also feed certain microbes in the gut called akkermansia, for example. Who will convert the polyphenols to urolithins, which feed on mitochondria.

And so, mitochondria are absolutely ancient bacteria. So the way a human cell... For those who don't remember their cell biology classes. But a human cell is called a eukaryotic cell. Versus a prokaryotic cell, which is a single-cell microbe.

So a eukaryotic cell is essentially an archaea that swallowed a bacteria, and then incorporated bacteria in itself to produce energy for it.

So, the mitochondria is the energy center of the cell. It's an ancient pleotropic bacteria that's sitting in our cells. So-

Michael Roesslein:

So it domesticated a bacteria into its pet that makes its energy for it?

Kiran Krishnan:

Totally. Yeah. It domesticated it. That's a great term for it. And it's farming it all the time, because it figured out how to grow mitochondria as well, within the cell itself.

And mitochondria are so important that it has its own genome. And within the ribosomal DNA and RNA, the mitochondria has its own genes, so that it can replicate itself fast inside the cell.

And your cells, depending on what cell you're talking about, can have anywhere from a couple of hundred mitochondria to 2 million mitochondria. Depending if it's a brain cell that requires a lot of energy, or your heart cells that require a lot of energy.

And again, if your mitochondria start to disintegrate, which they will over time, and the reason why they do that is because of cellular respiration. The process of making energy and creating ATP, which is the energy currency, creates an exhaust called free-radicals. And free-radicals damage the mitochondria.

No different than the wear and tear on your car's engine. So your car's engine is working to produce energy, but there's exhaust and other things that wear and tear the engine, and you have to repair and maintain the engine. The repair and maintenance of our engines are dependent on microbes.

Michael Roesslein:

There's so much. We could go for hours. I want to go back to the kids-

Kiran Krishnan:

And we have.

Michael Roesslein:

Well, we have. I'll have to do a roundup. We have all these new people now that haven't seen some of the webinars, so I'll send out a couple emails. I have a roundup of dozens of webinars that you guys can watch.

We now finally have them organized in an effective way. They were all over our website for years. We found them, and categorized them, and put them on... Segments are going on YouTube. We're fancy now.

Kiran Krishnan:

Awesome.

Michael Roesslein:

Yeah, finally. It only took like eight years for some of them.

I wanted to go back to kids real quick and how our microbiome actually develops. Mira's favorite thing to bring up is that, cuddling and smooching on the dog all the time is good for her microbiome. And she's pregnant, so it's good for the baby. So this is an excuse to cuddle the dog more.

Out of all the webinars she's seen that we've ever done, that's the one tidbit of factoid that's stuck. Is that dogs are good for microbiome.

Kiran Krishnan:

Yes, they are.

Michael Roesslein:

So, it starts at birth. And if you want to just... I know this could be its own webinar. But quickly, "How does our microbiome get populated? What's good for it when we're young? What's not good for it when we're young?"

And then we'll get into some ways to work with that.

Kiran Krishnan:

Yeah. So at a high level, our microbiome starts getting populated to some degree, even in utero. I mentioned the peptidoglycan producing bacteria. So dendritic cells have been shown to be able to engulf certain microbes and bring them across the gut barrier to make them available to the baby.

They do that with other bacteria too, where there's some evidence that your mom's immune cells will grab bacteria and take it to the womb, to start to inoculate the baby's amniotic fluid and all that, before the baby's born and comes out.

So, hopefully the baby's coming out of the vagina. If the baby's coming out of the vagina, then he or she will gain a huge inoculum passing through the vaginal canal. The inoculum is made up of lactobacilli, bifidobacteria and a number of other anaerobic species as well.

The problem with the gut in the beginning is that, in the beginning, the gut is largely aerobic. Meaning, it has lots of oxygen in it. But a well-formed adult gut, or even a three-year-old gut, is largely anaerobic.

So what has to happen is, the oxygen has to get consumed. So basically, as the baby's passing through the mom's vaginal canal, he or she's picking up all these different microbes, swallowing it through the mouth, nose, ears, and everything else. It's going into the baby system.

And then the baby comes out and it hopefully cries effectively, and so the shunts are open. And then all of that goo sits on the baby, which is great, because it then starts to colonize on the baby's skin and provide a protective layer on the skin. Because the baby's going to encounter lots of different microbes as it comes out into the world, some of which that could be bad for the skin.

Especially ones that we shed a lot, like staph aureus for example, which is not great for the skin. I mean, we all have some degree of staph aureus, but you want higher levels of staph epidermis. So you want that kind of microbe to sit on the baby's skin and be healthy.

And of course, this is part of the reason why we shouldn't be cleaning these babies right after they're born. That stuff should be sitting on the baby for some time.

So then the baby comes out, and it's got that initial inoculum from mom through the vaginal canal and through defecation.

Now, for those of you that haven't witnessed a birthing process, a woman will almost always defecate to some degree during the pushing and all that. Which is fine, because a large amount of bifidobacteria exists in mom's stool, and that's part of where the baby gets exposure to bifidobacteria. Because for the next several months, the predominant microbe that's going to be in the baby's gut is bifidobacteria.

So initially, some of the facultative bacteria that the baby will pick up from the environment, and the people around there and all that are going to be streptococcus, and E. Coli, and so on. These microbes will start eating away all the oxygen, especially bacillus, in the gut. And then when the gut becomes an oxygen-free environment, the bifidobacteria will take over.

So for the next six months, bifidobacteria is going to be predominant in the baby's gut, and it's going to be one of the most important things that happens to the baby in terms of establishing its microbiome.

So bifido sets in. The baby's just getting breast milk. Breast milk is giving the baby more microbes. But equally important to the microbes that it's getting from breast milk, the baby's also getting oligosaccharides. Breast milk has up to 200 different types of oligosaccharides, which are prebiotics.

So all of those... And the baby can't digest any of those for energy. It's there purely to seed the microbiome with lots and lots of different organisms. So that's where the diversity starts to build in that first six months.

Then after six months, or eight months after the baby starts going to solid foods, hopefully you're introducing microbes through foods as well. And that's where some of the other exposure gets in.

Now, in the meantime, the baby's also getting interaction with dad, and family members, and partners, and everyone else that's involved in the baby's life. And one of the big things that we do that's not great in the Western world is, when you go to see a baby, everyone's squirting themselves with hand sanitizer and all that. As if you should be sterile when you go to see a baby.

That's not actually true. The baby has pretty decent immune protection from mom. The baby's not making his or her own immune cells yet, but has got good immune protection from mom, unless there's an issue there.

And then the diversification of the number of people that the baby sees, and the number of people that hold the baby, and breathe on the baby, and kiss the baby. All of those things have a huge impact on the baby's microbiome.

If that household has a dog, absolutely it'll diversify the microbiome, which is phenomenal. And then, once the baby gets to a certain age, up to one-year-old, what you start to notice about every single baby is that, every single baby ever born samples the environment with their mouth. They put everything in their mouth.

And this is a very interesting thing. I've done a whole lecture on just this part of it. Because when you think about that evolutionary behavior, it's non-human. And the reason it's non-human is, our mouths are not one of our primary sensory organs. If I find something interesting today, I don't look at it and try to examine it with my mouth. We're visual and tactile, and maybe we'll smell it to a certain degree. But, we visualize things. We see things and we touch things. We don't sample the world with our mouth.

And yet, babies are genetically programmed predisposed to do that. Because if you imagine an ancestral baby being born, what they're doing is they're sampling the environment with their mouth. They're getting all of the environmental microbes into their system, including bacillus. And studies show that early exposure to bacillus develops the mucus associated lymphoid tissue and the microbiome in the baby's gut.

So that is the basic premise between the first years. The rest of the next several years, it's about exposures in the environment, and what the baby eats, and how many things negates the development of the microbiome. Like courses of antibiotics, how much Cheerios they're eating. Of course, Cheerios has all this roundup on it. "What are they exposed to?" All of those things will determine what the baby's microbiome looks like going forward.

The ideal thing at that early age, is exposing them to the right probiotics, being out in the environment as much as possible, playing in dirt. Those kinds of things are the critical part, not over sterilizing the environment that the child's in. And then, as much interaction with family as possible, and pets, and animals, all of those things have a huge impact on the microbiome.

But the spores are so critical from day one. Because one of the things that the baby's trying to do by sampling the environment, is get these kinds of spores into their system.

Michael Roesslein:

So we're pre-programmed from birth to shove spores in our mouth.

Kiran Krishnan:

Mm-hmm.

Michael Roesslein:

That's the new slogan for Microbiome Labs.

Kiran Krishnan:

Exactly, "Shove some spores." We should have a T-shirt that says, "Be human. Shove spores."

Michael Roesslein:

I'll cut that 30 seconds and we'll send it to you. I'll be your new marketing person.

Kiran Krishnan:

Exactly.

Michael Roesslein:

That's fascinating. And so, for kids like myself, who... I actually don't know how I was born. I'm adopted. I don't know if I was vaginal birth or not, but I know I wasn't breastfed. I know I didn't have a lot of contact like that.

I grew up with a backyard swimming pool with chlorine, and I had a bazillion ear infections, I had really bad skin acne, all kinds of things when I was younger. I had all these symptoms of that.

And then I had a lot of depression, and anxiety, and ADD, and all kinds of stuff. And I'm guessing a lot of it could be traced back to that early lack of microbiome diversity. Somebody asked in the chat like, "What happens?"

Those are some things that could happen. But-

Kiran Krishnan:

Yeah. So allergies, asthma, food intolerances-

Michael Roesslein:

Allergies, asthma...

Kiran Krishnan:

Weight issues, skin. So acne, eczema, psoriasis, all of those things.

We also know that cognitive development-

Michael Roesslein:

Cognitive. Yeah.

Kiran Krishnan:

Yeah. So ADHD, behavioral disorders, all of them are related to a dysfunctional microbiome.

Michael Roesslein:

I checked a lot of boxes and I'm okay, so you can get through it. I made it.

So you mentioned kids shoving dirt in their mouth. Then, bacillus species are the species of organisms that are in the spore-based probiotics, the MegaSpore. And then you mentioned allergies quite a few times.

The story that a lot of our people know is that, that's how I found you and MegaSpore. Is because I gave it to my now mother-in-law, who had lifelong severe pet allergies, and asthma, and all kinds of severe respiratory reactive conditions.

And a few weeks later, she emailed me and said, "Hey, could this probiotic you gave me make it so I'm not allergic to dogs anymore?" And I said, "I don't think so, but I'll email them and call somebody and try to find something out."

And then I ended up chatting with you, and you explained to me over about an hour long phone conversation, how that's possible. And I was so blown away that we started doing webinars and now here we are.

We've since had a lot of people tell us that their food reactions, and their allergies, and asthma, and things like that improved quite a bit.

Kiran Krishnan:

Yeah. And my wife is a perfect example of that. In fact, we have really good data just from this week.

So, my wife has had a lifelong penicillin allergy. So everywhere, every doctor she ever goes to, "Oh, I'm allergic to penicillin. I'm allergic to penicillin." That's an important thing in to have in your medical records.

But she's also had confirmed allergies to ragweed, and pollen, and lots of environmental stuff. Mold, for sure. She had allergy tests done in high school, and college, and so on, and all those things were clear. And so, she used to be on Claritin, Allegra, all of these antihistamines and all that, to manage the allergy symptoms.

About a year into taking MegaSpore, when we first launched a product in 2013, she noticed, and she told me one day as well, she's like, "Hey, I stopped taking the medication, but I feel like I don't need it anymore. Do you think this has something to do with that?" And I'm like, "Absolutely." So I had the conversation with her that I had with you.

And so, she since then hasn't taken it again. And just this week, because she wants to go... She wants to see if she's still allergic to penicillin, so she can revamp those records. She went to an allergist and did the subcutaneous pinpricks, 40 different antigens, including penicillin, and she has zero reaction to anything. Not a single one of the 40 reacted when she had like 6 before.

So, it's absolutely phenomenal when you think about it. And there's a very clear cut explanation as to why it's not some sort of miracle. It's really that tolerance and the over-reactiveness of the immune system is controlled by the right type of microbes in the microbiome. And there's mechanisms do that.

Michael Roesslein:

It's incredible. Also, just a quick note, if you want your comments to be seen by everyone and not just me, you can change the thing to everyone instead of host and panelists. I don't know if that's intentional or not, I'm just throwing it out there.

Sometimes people are... Zoom likes to change the default settings, just to keep everybody on their toes. It's different every time I log in. Today, the chat was completely disabled for everybody, because that's fun.

So, let's shift gears. I don't know if you have a hard-stop on the hour, but I want to be respectful of your time and we have a few products to discuss.

Kiran Krishnan:

Yeah.

Michael Roesslein:

So, thank you for all that info. I'd like to start just... The MegaSpore, for the people that have been around here a lot, it's been something we've been talking about since there were a couple of hundred doctors using it, and there was like three of you in an office.

And three is now... I don't know how many people... I am friends with a lot of your employees on social media, and I see the events that you guys throw, and it's a lot more than three people at the events.

Kiran Krishnan:

Yes. It's getting busy.

Michael Roesslein:

And so, it's been around a long time. It's still very strange for me to see it looking like this and not like the old branding.

Kiran Krishnan:

I know. Me too.

Michael Roesslein:

I'm warming up to it, it just was a difficult adjustment. The other one was so ingrained in my mind.

So let's get into this, and then the kids one.

Kiran Krishnan:

Yeah. So I have a few slides on some of these products, so I can give you a quick rundown of it.

Michael Roesslein:

Perfect. Yeah, yeah, yeah. I'll just let you roll.

Kiran Krishnan:

So MegaSpore is the first all spore-based probiotic. Keep in mind that before we launched MegaSpore, there was no such thing as a spore-based probiotic on the market. The category didn't even exist.

And in fact now, in all of the market data on supplements and all that, they actually carve out spore-based probiotics as a separate category. So we created a category, which is super exciting to see.

And basically, to make the super long story of MegaSpore short, we were really looking at, "What is our normal interaction with microbes in the world? Once we're born, once we come out of the vaginal canal, and we stop breastfeeding and all that, where are we encountering microbes for the most part? And then, how would some of those microbes function as probiotics?"

Because a lot of probiotics are incredibly unnatural in the way in which they cause you to interact with them. So for example, if you take a probiotic product that has 15 strains in it. Let's say there's like 7 or 8 lactobacillus strains, and then there's like another 7 or 8 bifidobacteria strains, and it's a 50 billion or a 100 billion dose.

The problem with that is, that's a very unnatural way to encounter those microbes. And we've always hypothesized that that can lead to more problems than benefit, because when you have 50 billion of these 15 strains coming in, your body's going to respond to it. And that response may not necessarily be a beneficial thing.

And the problem is, none of those companies do studies to test what actually happens when you take those products.

And so, other studies have come out... In fact, there's been two studies coming out of Israel that shows that when you take those kinds of, what I call kitchen sink probiotics... Let's say, after a course of antibiotics, which is what they studied, it actually slows down the recovery of your microbiome. Because these random strains are competing with the similar strains in your gut. And they're competing for binding sites, and they're taking up binding sites, and nutrients and things like that if they survive through the gastric system.

Here's another problem. And this is data I just saw a couple of weeks ago, because I was in Ireland meeting with a bunch of our researchers there at the APC. That there's this concept of, "Is your probiotic silent, or is it loud?" And what I mean, "Is it silent in the context of your immune system, or is it loud in the context of your immune system?"

Because most of these probiotics, these are strains that are not necessarily identified by your body. Your body doesn't recognize them itself. So when you take them in, your immune system responds to them. And the part of your immune system that responds is your innate immune system, which means it's an inflammatory response.

So the researchers that are studying this bifidobacterium... So our bifidobacterium is that 1714 strain. That's the psychobiotic strain. That strain, with the EPS, with the exopolysaccharide, makes the probiotic quiet.

Meaning that, when your immune system sees it, it doesn't respond with any sort of inflammatory response. Instead, as I've described earlier, the dendritic cells actually engulf it, and digest it, and release components of that bacteria into your circulation. And it's been designed by nature to be able to do that.

Now, they tested something like seven other common bifidobacterium probiotic strains, and all of them were super inflammatory. So when those go into your system, it drives an inflammatory response. So, the majority of probiotics on the marketplace will likely drive an inflammatory response in your body.

And that's okay for some people. If you're perfectly healthy, and what you're looking to do is just kind of agitate and up-regulate your immune system, because you're trying to protect against cold, or the flu, or something like that, that could be fine. You're basically just kind of ramping up your immune system and just waking it up by giving it a whole bunch of targets every single day to pay attention to.

But if you have any sort of inflammatory condition, that's the last thing you need, is to increase inflammation.

We've done the same studies with the spores. We show that the spores are quiet with the immune system. They don't increase inflammation. In fact, both the spores and the ZenBiome strain do exactly the opposite. They bring down inflammation, they increase a cytokine called interleukin-10 that actually reduces inflammation. And that's the response you want of the probiotic.

But the problem is, you have no idea whether the probiotic you're taking does that or not, unless the company does studies. And nobody does studies. So, that's the big problem.

So MegaSpore created a new category. We launched it because we were looking for a solution for leaky gut, which is the biggest driver of chronic dysfunctions. And so, we published our first study in 2017, showing that MegaSpore absolutely alleviates leaky gut, and in as little as 30 days.

So it was kind of groundbreaking in that way. It created a category of probiotics. And by 2018, 2019, MegaSpore became the number one selling probiotic in the healthcare practitioners space. And it still is today, which we're very excited and proud about. So, it's fantastic to see practitioners using it.

And then we have the kids version. It took us a while to develop it, because it's not just straightforward putting probiotic strains in a gummy matrix. You have to, number one, figure out whether or not the strain is stable in the matrix over time. You want to also figure out, "When you digest the gummy, are the strains coming out? And are they coming out in the same format they would in a capsule?"

And you have to be confident in all those things. And it takes us a while to do these studies and get confident in things, so that we know that what we're putting out there is efficacious and beneficial for you guys.

So finally, we came out with a MegaSpore gummy. And we wanted a very clean product, so we have a pectin-based gummy with tapioca syrup. You know, just keeping it as clean as possible, because there's of course, many egregious ingredients that go into some of these confectionary formats.

So we're very excited and very proud of this. The format, the matrix, all of that, it's just perfectly well and perfectly dosed for people.

So for a kid, it's one gummy per day. My kids will take two if there's something going around school. Most recently, there was this rotavirus epidemic sweeping through the school. Half the class was out, kids are vomiting and having diarrhea and all that, non-stop. So during those kinds of times, my kids take two a day.

And then, if you're an adult, you could take one a day as maintenance, or two a day therapeutically as well, because adults love it just as much as kids do.

MegaQuinD3. So we've been the biggest producer and seller of vitamin K2-7 for 18 years now. Vitamin K2-7 is actually how I entered into the nutritional supplement market. This has been a passion ingredient for me for a long time. It's made by bacillus, which is another thing I love about it. Bacillus is the richest natural source of vitamin K2-7.

But it's also an essential nutrient that does things that no other nutrients in your body can do, or that we have exposure to. And we have none of it in our diet. So people in the Western world are clinically deficient in this nutrient. 95% of people are clinically deficient in vitamin K2.

Vitamin K2 is absolutely critical for bone health, heart health, nerve health, brain health, skin health and all that. I've done whole webinars on just vitamin K2, but everybody needs to be taking vitamin K2 as a supplementation.

Now, vitamin D is also a fat-soluble vitamin. And most people know about vitamin D and all the importances of it. But the problem with vitamin D is, you can take too much vitamin D. That's a condition call vitamin D toxicity, or better known as... Or, not better known, lesser known. The scientific term is hypervitaminosis D.

Hypervitaminosis D is characterized by having significant amount of soft tissue calcification. So then your arteries, your connective tissue, all these things start to get calcified and you can die from it. Hypervitaminosis D, or vitamin D toxicity.

The reason it does that is because if you take a lot of vitamin D without K2, vitamin D strips your body of all the K2. Because it's releasing a vitamin K2 dependent protein, which uses up all the vitamin K2 to activate the protein, and then you end up with a very, very severe morbid dysfunction in vitamin K2 deficiency.

So for us, lots of people like taking vitamin D, some people need vitamin D. So we said, "Okay, if you're going to take vitamin D, you have to take K2 with it. And it has to be stable K2 that has bioavailability and has studies behind it."

So we formulated this product with vitamin D, which gives you about 5,000 IUs of vitamin D and about 200 micrograms of K2.

Now, for me, I take this product in the wintertime. I don't use vitamin D in the late spring or summer, because I'm out a lot, and I cycle. I spend a good amount of time in the sun, so I get plenty of vitamin D myself. So during the spring and summer, I take MegaQuinone, which is a product that Rebel Health Tribe has had for a while. That has just K2 in it, no D.

But then late fall, through the winter, I start taking some D supplementation, but I would only take it with the K2 in it. So, MegaQuinD3 gives you the perfect pairing of vitamin D, vitamin D3 and K2 together. You can always take extra K2. Actually, when I take this product, I take this and still one capsule of the MegaQuinone. Because I want to get about 350, 400 micrograms of K2 in my system a day.

I've got a family history of heart disease, and I put my body through a lot of stress. And K2's really important for mitochondria. That's another thing we've discovered, a number of functions of vitamin K2. We have global patents on the role of vitamin K2 in the health of mitochondria.

Vitamin K2 can increase ATP production by almost 40% when you get it into your cells, when you get into your system. So it's a very important component of the electron transport chain.

Most people have heard of CoQ10, coenzyme Q10. That's a quinone compound as well. MegaQuinone, which is vitamin K2, is also a quinone compound. And as it turns out, it acts as an electron transporter in your mitochondria. So vitamin K2 is amazing for anti-aging and for mitochondrial health as well. Absolutely critical for it. So I take a lot of vitamin K2, because I put my body through a lot of demand.

SereneSkin. Michael had mentioned this to me in the email. You'll see the strains that are in it are similar to MegaSpore. We've just changed the dosing of certain strains like H236, because we want higher levels of carotinoids in the skin.

We also want to modulate the short-chain fatty acid production to get more acetate out of the gut. Because acetate is one of those short-chain fatty acids that make its way outside of the gut, and outside of the liver, to the rest of the body. It functions in the skin, and it brings down inflammation in the skin, and it can act as an antimicrobial in your sebaceous glands as well.

So we know that SereneSkin... We've done the largest probiotic acne study ever, and we showed that in a 12-week period, SereneSkin brings down non-cystic acne lesions by 70%. That's as good as any antibiotic that's been approved.

Michael Roesslein:

Did you say 70%?

Kiran Krishnan:

70%. That's a gold standard number to reach, because that's the best that any antibiotic that's been approved for acne can do. So it's-

Michael Roesslein:

Where were you when I was in high school, man?

Kiran Krishnan:

I know. Seriously, right? Because think about all the poor kids that are being put on 130 days of antibiotics to deal with the pimples. And it's not even really doing... It's not going after the root cause, because that long course of antibiotics are going to have create other problems with the kids down the road.

This is actually improving your skin by making you healthier. Everything that SereneSkin does in the gut makes you healthier. And as a result, your skin actually improves. So it's a phenomenal product. It's a game-changer.

The reason why I went after acne as an indication is because of the gut-skin access. And part of my goal in life is to prove the gut access to other things.

So, ZenBiome proves the gut-brain access. SereneSkin proves the gut-skin access. MegaSpore, with the studies we've done on the liver, proves the gut-liver access. So my goal is to really prove out a lot of these accesses and the influence that the gut has on these areas.

But then, the other goal is to intervene where the treatments for the issue are really kind of devastating to the body. I have another great example of that. But SereneSkin is one of those where, to me, if we can avoid using antibiotics in acne, we're actually doing a tremendous service to humanity down the road. So this is why SereneSkin exists.

This is-

Michael Roesslein:

Yeah. And they get put on really, really nasty antibiotics, too. I had a client years ago, that was on Accutane and a bunch of other really, really nasty antibiotics, that then we had to try to help repair him from all of the damage done by the antibiotics. And it was this cycle that he was stuck in.

Kiran Krishnan:

Yeah, absolutely. It becomes so hard. And Accutane is one of those that, one of the potential side effects is psychosis. I mean, it makes you nuts, actually. Which is mind-boggling that we have to do that just to deal with pimples on the skin.

And we know that acne is a really devastating thing socially and all that. But now we know better, so hopefully we'll start doing better. And we target lots of dermatologists and all that, to try to get them to understand the gut-skin access.

This is another product that was developed in hopes of negating some of the standard ways that people go about the issue of helicobacter pylori. Helicobacter pylori is a pathogenic organism, or a opportunistic pathogen in some respects, that at least 50% of adults have infectious levels of, and maybe higher than that. And to me, it's probably one of the most prevalent dysbiotic drivers in the body.

And the reason is two, or three, or fourfold really. But two things I'll mention about it that is really significant is, number one, it creates tremendous amounts of chronic low-grade inflammation in the body, because it eats through the lining of the stomach. And it's a gram-negative bacteria, so it spews out LPS, or endotoxins, into circulation from the stomach.

So it creates a tremendous amount of inflammation throughout the body, which now, that kind of inflammation has been shown to be associated with the development of things like autoimmune disease and infertility. And even cancers, outside of gastric cancers.

And so, H. pylori is responsible for a tremendous amount of inflammation in individuals.

And then the most common symptoms of having overgrowth of H. pylori are things like SIBO. Small intestinal bacterial overgrowth is absolutely associated with H. pylori overgrowth.

Then, things like gastroparesis. So that fullness and bloating in the stomach. And then gastritis, which is that inflammation and pain in the stomach when you eat. And then reflux disease, which is one of the most common things, and people are using antacids and PPIs all the time for reflux. A lot of it is driven by Helicobacter pylori.

And then of course some more serious stuff, gastric cancers, and ulcers and so on. So, it's so prevalent.

The problem is, the typical treatment for it is something called triple, and now quadruple therapy. Triple therapy is basically two broad spectrum antibiotics, plus a proton pump inhibitor, which negates stomach acid production.

And now the quadruple therapy they go to is three broad spectrum antibiotics, plus the PPI, the proton pump inhibitor, all taken at the same time. That's absolutely devastating to the system. It's like an atom bomb to the system to deal with reflux. It's crazy. Which is H. pylori driven.

So, we started screening. We have a massive database of probiotic bacteria, about 147,000 strains. So we started screening our strains just to see if any of them compete against helicobacter pylori, and we found this strain called lactobacillus reuteri, DSM 17648.

Not only does it compete with helicobacter pylori, the entire cell membrane structure of this bacteria has a very strong affinity for helicobacter pylori. And this cell happens to be a little bit smaller than the H. pylori cell, which means that a single H. pylori can bind four or five of these microbes.

And so, what it does... And it doesn't have to be alive. This is what we call a postbiotic, because the strain doesn't even have to be alive. It's not colonizing, it's not doing any of that. It's actually dead, but it's intact. But the outer membrane has a strong affinity for helicobacter pylori.

So when you consume this product, it's going to go and coat your stomach, and then it's going to run into and bind helicobacter pylori, coaggregate with it, and take it out of the gut through defecation.

It doesn't do anything else. It doesn't bind to anything else. It doesn't interfere with anything else. It doesn't create any other metabolic byproducts. All it's doing is going in, grabbing H. pylori, taking it out. It's such an elegant solution.

And think about doing that, with that level of precision, versus the atom bomb that three antibiotics and a PPI is to the system.

So, we have 10 published studies on this product showing its ability to reduce helicobacter pylori. This is another tremendous need to develop for the marketplace, because so many people suffer from symptoms that are associated with H. pylori. And then, the way of trying to get rid of it is really, really nasty.

So we wanted to give people, doctors, in particular, an alternative to look at supporting this normal level of H. pylori in the system. So that's where the PyloGuard comes from.

And then we mentioned this, the ZenBiome product. So we have Sleep and Cope. These are both made up of this bifidobacterium longum 1714, this strain which is a psychobiotic. And it has the capability of dramatically reducing a cortisol response when you're experiencing stress. It dramatically and almost

eliminates the inflammatory response from stress. It negates the reactivation of the HPA axis, which turns on your sympathetic nervous system.

So it shunts the body back from sympathetic to parasympathetic, and it dramatically reduces all the neuroinflammation that occurs when you undergo a stress response.

Now, one of the reasons why people who have a lot of stress and then they end up in this basal stress state. Is because their central nervous system is now taking tryptophan and converting it into something called quinolinate, which is neurotoxic. Versus taking tryptophan and making serotonin and melatonin, which is neuroprotective.

And that shunt, and that shift in going this quinolinate pathway occurs when you have dysbiosis and multiple rounds of anxiety and stress. And then you're stuck in this neurotoxic pathway, and you're constantly in the sympathetic nervous system and never in the parasympathetic.

So you can't rest, you can't digest, so you don't sleep well. Your immune system's not functioning right. You're always in flight or fight response. And then the rest of the system starts to fall apart.

What we've shown with this 1714 strain, this exopolysaccharide rich bifidobacterium longum, is that it completely shunts all of that system. It gets back to serotonin and melatonin, brings down all the inflammation in the neurons. It stops the overexpression of cortisol, shifts you back into the parasympathetic state so you can deal with stress appropriately and not have all the damage that comes along with it. Sleep well at night, have a good well managed mood during the day.

So, that's ZenBiome. And this is another game changer, because we have an epidemic of cognitive dysfunction. Especially post-COVID, we have these crazy alarming rates of anxiety and depression, and all of this social anxiety and everything else that comes along with it.

To us, people are really, really suffering, and they're self-medicating largely. So we have to get this psychobiotic out into the marketplace, so it can help people.

And the last one... I think you wanted to talk about this too, right, Michael? MegaGenesis?

Michael Roesslein:

Yeah. And before you get into that one, I just had one question. The SereneSkin... I'm crushing the chat box right now. Pretty good for a guy that's up at 2:00 in the morning.

But the SereneSkin, the studies are all on acne, correct? Do you have any evidence regarding rosacea? I had like five questions come in about rosacea and other skin issues with SereneSkin.

Kiran Krishnan:

Yeah. So we haven't done a study-

Michael Roesslein:

Or, eczema. Eczema and rosacea, sorry.

Kiran Krishnan:

Right. We haven't done a study on eczema or rosacea. Now, we have some empirical evidence, because we have clinicians that use it for inflammatory skin conditions. Acne is an inflammatory skin condition.

So what's happening in the skin mucosa is inflammation. In the case of acne, the inflammation also occurs in the sebaceous gland. That causes a swelling of the sebaceous and an overproduction of sebum.

And of course, if you have overproduction of sebum, you can get microbes stuck in the pores that form a lesion.

But the underlying mechanism is the same in all of these conditions. It's all inflammatory in the skin. So we know that it does help and does work to support people who have rosacea, and especially eczema.

I could say we have less empirical evidence on rosacea. It's more so on eczema and psoriasis. Those are the two that we see more and more feedback from our clinicians on.

So, we don't have studies on it. There's no harm in trying it for them. If anything, it'll help.

Michael Roesslein:

And can it be okay with kids, SereneSkin? The same as MegaSpore, yeah? It's just K2 and probiotics, right?

Kiran Krishnan:

Yep. One cap a day, yeah. Both adults and kids are one cap a day.

Michael Roesslein:

I would talk to a doctor for a little kid. But yeah, just a smaller dose.

Kiran Krishnan:

Yep.

Michael Roesslein:

Okay, go ahead. This is fascinating. Whoever writes your emails to your practitioners wrote a really good email about this when it came out, and I was intrigued. And I pictured myself taking this and becoming a caveman.

Kiran Krishnan:

Yeah, exactly.

Michael Roesslein:

But I'm curious, what happened here? How did this come about? What is it? I was reading it and I'm like, "I know this came out of Kiran's brainchild somehow." But, what's the story with this?

Kiran Krishnan:

Yeah. So this product is both philosophical and therapeutic at the same time. Those of you that have heard me talk before, I often talk about the scariness of the mass extinction that's happening with our microbiome.

We used to have 300, 400 prevalent species in our microbiome. And we can still see that in hunter-gatherer tribes that exist like our ancestors used to, that still exist today. We could see that level of diversity in their microbiomes and compare that to the average Westerner. We've run about 10,000 microbiome tests so far. We see about 120 species.

And then, when we described earlier, how the microbiome codes for most of our capabilities as humans, and we need them as a nutrient factory and all that. As we start losing microbes, we start to lose functionality, and lose resilience and capabilities. That's when disease comes about.

So there's some great work around the huge risk to humanity and to our health, by losing microbes because of our behaviors and our choices.

There's one called Missing Microbes, which is a book written by Martin Blaser, I think seven, eight years ago. It was one of the first kind of preeminent microbiome related books. And I think Martin Blazer and another researcher recently produced a program called The Invisible Extinction, I think. And that's a really well done program talking about the dangers of losing microbes in our microbiome over time.

And so, one of the ways in understanding what we've lost and maybe bringing some of it back, is by studying these hunter-gatherer tribes. So Papua New Guinea tribes, or the Hadza tribe in Tanzania. Or tribes in the Amazon, and so on. And there's brave researchers that are doing this right now, that are living among these tribes and studying their microbiomes. And trying to understand, "What microbes are very prevalent in their guts that are completely missing in the Western gut?"

This particular strain, this lactobacillus reuteri, is one of those strains that tend to be extremely prevalent in the guts of hunter-gatherer Papua New Guinea tribes people. It makes up a really unusually high percentage of their microbiome.

And when we started screening for this bug in the Western gut, we see none of it. Almost nobody has this microbe in their system. And when we start looking at, "What does this organism actually do? What genetic elements does it have? What are some of the functionalities?"

This microbe plays a very important role in tryptophan metabolism. Back again to the gut-brain axis, and inflammation in the neurons, and managing stress response and all of that stuff.

Michael Roesslein:

Tryptophan is a serotonin precursor, for people who are unaware of that. So, a happy mood.

Kiran Krishnan:

Exactly. Yep. Tryptophan is supposed to be converted to melatonin, which helps you sleep. And serotonin, which is a happy hormone. Serotonin does lots of other things as well. Not only does it make you happy, it actually helps your bowels move. Serotonin is very important for the gut for that reason.

And so, that's just one of the mechanisms of this type of strain, is the management of the tryptophan metabolism. We also are seeing lots of immunological impact of this strain, in terms of protecting the individual from infection and so on.

We're also seeing utilization of carbohydrates, which is a critical part to it. Because you imagine, lots of these hunter-gatherer tribes are eating roots, and tubers, and resistant starches and all that. So their microbiomes have developed to be able to utilize these carbohydrates really effectively, and produce high levels of short-chain fatty acids and so on.

So one of our goals over time, is to identify these kind of missing microbes that seem to be prevalent in a hunter-gatherer like environment and lifestyle, and have completely been lost in the Western world.

And then, identifying and doing the checks and the characterization of the strains, and then bringing it back to the western world with a hope of recolonizing our microbiomes with this species.

So this is the MegaGenesis. I would say, the way I think about using this is, if your gut is totally messed up right now, and you've got leaky gut, and you've had a history of infections, and a use of lots of

antibiotics, and you've got all kinds of issues. It's not the time yet, for this. Because we haven't done studies on a really dysfunctional gut yet, to know what it actually does in a severely leaky or dysfunctional gut.

So in that case, you would use things like spores, and prebiotics, and all these other things that you have access to through Rebel Health Tribe.

Where I would use this is if your gut is starting to get better and improve, and is relatively stable, or is getting to stability. Then you start adding this as an add-on, to really amplify the functionality of your gut to the next level.

It's no different than if you just start lifting weights. You wouldn't go to the gym for two hours your first day, right? Because your body's going to be broken and you're not going to be ready for that. You build up to it. And then when you want to take yourself to the next level, then you start doing the two a day workouts, and the 4:00 AM workouts, and all those crazy things. But you wouldn't do that from day one.

So the MegaGenesis, think of it as the next step once you start stabilizing your gut and your microbiome, to really push it to that next level.

And we've been doing some reverse pharmacology on this. Which is where... Lots of our staff takes it, and we have doctors that have lots of patients that take it. And we're asking them to report back what they're seeing and what they're feeling when they take it.

We get a lot of response on neurological brain cognitive functionality. But we're also hearing things unlike hair growth. We have a lot of people that are reporting improved hair growth, changes to the skin, and so on.

So it seems to be doing some real foundational things in the body. And it's quite exciting to know that you can take that next level up in your microbiome. And over time, what we're hoping to do is introduce more of these species to bring that back into our population. So hopefully we can harbor these organisms properly and then pass them on to our kids, like we're supposed to do.

Michael Roesslein:

That's interesting stuff. I am excited, because there's one on its way to Mira's parents' house where she's now at in California. We smuggle our things in suitcases to come here, because shipping them overseas is impossible. And your European distributors don't carry your whole line of products. So the more exotic ones I've got to smuggle over in suitcases from the States. So, I'm excited to-

Kiran Krishnan:

You've got to do what you've got to do.

Michael Roesslein:

It's going to make me a better hunter, obviously.

Kiran Krishnan:

Exactly. And forager too. You're going to be foraging for the baby, there.

Michael Roesslein:

Yeah, archer and forager. Wow. So I do have some questions, but we're already over time, so I've answered a lot of them myself. And then, there's a couple that I might email you about that I think I could probably get an answer for.

Kiran Krishnan:

Okay.

Michael Roesslein:

But, congrats on... Yeah, just shoot me an email. I put my email in the chat a whole bunch of times, but it's easy. It's Michael@RebelHealthTribe.com.

Some people wanted the antibiotic kind of protocol. You guys have come up with the recovery and the study around that and things. So, send me emails. I'll get you guys studies. I can get the studies on the PyloGuard. I can get the studies on... Any of the studies. Our rep is super fast at responding to those things.

You guys always have the best people, man. Your people are the easiest people to deal with of any company, ever, anywhere.

Kiran Krishnan:

Thank you. I really appreciate the team, yeah. And we hire a lot based on culture, and we find that that seems to work really well, if you hire the right people with the right mindset. You can teach almost any skill to relatively intelligent people. And so, if you hire people with the right mindset they do a phenomenal job. They care about our clients and our partners.

Michael Roesslein:

Yeah, yeah. They take good care of us. And I put in the chat... We got a celebration sale about all these new product releases going on. I put the code and a link to the Microbiome shop and our site. We'll send that out in an email, too. My email's in there.

Really exciting stuff. Thanks. I know we went over, so I'm sure you've got someplace... You're probably on 16 more interviews, or Facebook Live, or webinars, or something today.

I saw you on the Instagram Live twice today. I saw you putting it in your story, that you're going on these things. And I'm like, "Dude, he's got a webinar, Instagram Live, and other Instagram Live."

So when do they put you to work over there at [inaudible 01:09:37]?

Kiran Krishnan:

Oh, man. That's the worst part about it is... I have six hours of my day today booked with just interviews, and they're back, to back, to back, to back.

And then, as soon as I'm done with these, I'm going to crack open my laptop and there's going to be 200 new messages and emails of all of the business and operational things to deal with.

So that's when the work starts, is from 7:00 PM for the next four or five hours. So it's-

Michael Roesslein:

Yeah, you've got to work on European time sometime?

Kiran Krishnan:

Oh yeah.

Michael Roesslein:

Yeah. I force the people who work with me to do that as well, occasionally. But, we're pretty remote. We rarely have to interact. So I can do my things in my time. They can do their things on their time.

Lots of excited people in the chat. Thanks, everybody. Awesome questions. Awesome feedback. Very little drop off on an 80-minute webinar as usual. Over 180 people on live on a Thursday. Is it Thursday? Thursday evening. I lose track of the days.

So, thanks a lot, Kiran.

Kiran Krishnan:

Of course.

Michael Roesslein:

Next time you're over in Europe, you know how to get to Lucca, so we should-

Kiran Krishnan:

I'm coming. I'm coming to see you. It's been a while since I've been in that area, too.

Michael Roesslein:

Diverse fibers of pasta to feed the microbiome.

Kiran Krishnan:

Yes. Olive oil, pasta... Olive orchards are so close to there, right? They're amazing.

Michael Roesslein:

Yes, they are. And it's incredible, I moved two hours and the menus of the restaurants are 100% different, the foods are 100% different.

People don't realize that about Italy... And I didn't until I moved here, that it's not one country of food. Like, in the US there's, quote, "Italian food".

It's like 30 countries with their own little food pockets, and their own wine, and their own olive oil. And if you tell someone from Puglia that the Tuscan olive oil is the best olive oil they're going to fight.

And in Montepulciano, you could see Cortona across the valley. And they told me, "They make their porchetta wrong, because they put fennel in it. And we don't put fennel in ours, because we're not savages."

Kiran Krishnan:

I love that.

Michael Roesslein:

But the seriousness about the food is the reason why the quality is so high. So, I'm all for it. I don't have a team, so nobody badmouths me. I get to eat all of it and pretend like it's all my favorite.

But, it is. It's so hyperlocal and hyperseasonal. I have three farmers' markets a week here in this town.

But you eat what's growing now if you go to the farmer's market. I'm not getting raspberries from South America and mangoes from wherever. You eat a lot more seasonally, and local, and-

Kiran Krishnan:

Which is how we're designed to eat. That's the basics.

Michael Roesslein:

Yeah, yeah. I'm sure that has something to do with their nine plus year lifespan winning right now over North America.

So, thank you so much. Thanks everybody.

Kiran Krishnan:

Thank you. Have a good one.

Michael Roesslein:

Have a good rest of your day. Good luck with the work evening.

Kiran Krishnan:

Thank you. Take care. Bye.

Michael Roesslein:

All right, bye.