

Paleo Solution - 268

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Howdy folks. Robb Wolf here, another edition of the PaleoSolution podcast, very excited to welcome back one of my favorite guests that I've ever had on the show, still the most popular podcast that I've ever had, Dr. David Perlmutter, MD, author of Grain Brain and the soon to be released Brain Maker. Doc, how are you doing?

David: I am doing great, thanks. How are you Robb?

Robb: Very good. We had some spring snow here in Reno. So it's actually spectacular outside, so very nice.

David: Wow. I'm on my way to Oregon later today.

Robb: Nice, nice. Well, you should have some good, good -- I think that they are getting a little bit of snow and some precipitation too, which the west desperately needs that here, so yeah.

David: I can't wait.

Robb: Yeah, so doc, what's new? You definitely -- your feet never touch the ground. You've got a zillion different projects going on. What is new in your world?

David: Well, as you mentioned, I will launch Brain Maker. The new book will launch in about two and a half weeks. Probably, by the time this podcast is aired, it will be out in the world. It really takes up where Grain Brain left off. It takes us to a whole new level of understanding that really every aspect of our health and physiology is powerfully influenced by the hundred trillion bacteria that live within our gut, the human microbiome. We're just beginning to gain a sense as to how powerful the role that bacterial colony plays in determining every aspect of human health and physiology especially in my world, especially how that relates to brain disorders.

Robb: Doc, you know it's interesting because I feel like Nutritional Science and Medicine in general where nutritionist concern we've been in what I've kind of called the macronutrient wars. This amount of protein, carbs, fat versus that amount of protein, carbs, fat and we finally have moved potentially I think to a spot where our understanding of the quality of food that we consume is important because of its effects on the gut microbiome. It introduces a layer of complexity that has honestly just kind of blown me out of the water. What are your thoughts on that? Like there is a great paper talking about dense acellular carbohydrate sources altering gut biome and this really place into the whole kind of Paleo diet, transition to industrial food sources being a problem? What are your thoughts on all that?

David: I would agree with you that the notion is that the Science is very compelling. But what I would say to you is that it is also very, very empowering that we now fully embrace this notion that we have co-evolved with this organ, the microbiome, this 3-pound organ that lives within our intestine. What you're talking with the acellular versus cellular carbohydrate publication that came out really nailed it I think in terms of taking us away from the notion of just carbohydrates, but looking at the carbohydrate and what form is it in. Is it in the form of being involved with fiber and that is key.

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I mean humans have eaten fiber as long as we've been on this planet and beyond that, we've been consuming what are called prebiotic types of fiber, fibers that enhance the growth of the beneficial bacteria in the gut. I mean it's been estimated that our Paleolithic ancestors eat as much as a 135 grams a day of prebiotic fiber. It's thought that typically, the standard American diet provides only about 5 grams a day of this critical nutrient for the microbiome to enhance the ability of the gut bacteria to do what they do best and that is to liberate vitamins for our absorption, vitamins A, C, and K and even some out of the B group as well as their provision of what are called short chain fatty acids, the vitally important fatty acids for our physiology not the least of which is their role -- an important is their role in terms of brain metabolism.

So that said, we've got to nurture this microbiome. It's an organ no less important than the brain and the heart and the liver and without it, we have issues. Even when it's mildly traumatized as in when people take antibiotics, boy suddenly, they get a rip-roaring case of *Clostridium difficile* that affects half a million Americans each year and kills 30,000 of us just from upsetting the applecart, just from changing the array of the complexion of the bacteria that lives within the gut. What is so extremely exciting for me at this stage in my career is we're now seeing reams of well-performed research correlating changes in the diversity of the gut bacteria with neurological issues like Parkinson's, ALS, autism, multiple sclerosis.

In *Brain Maker*, I actually presented a couple of cases of patients of mine who've gone so far as to have what it's called fecal transplant, getting fecal material from a healthy person instilled into their colon to re-program their gut bacteria. This has allowed them dramatic improvements and things like multiple sclerosis and even a child with autism who could barely speak and couldn't interact socially. I didn't do the procedures, but they were done at various facilities and now, this child is speaking. We have a video with his parent's permission on drperlmutter.com and it's truly, truly remarkable what happens when you simply pay attention to the understanding this powerful role of the gut bacteria, and what happens when you address that. Boy, it's a level of empowerment in Neurology that I never anticipated at this point in my career.

Robb:

It's kind of crazy because I really -- 10 years ago, I thought I had had the stuff kind of buttoned up, ketogenic diet good for almost whatever ails. Then as we've motored along, I think I've understood better and better that ketogenic diet is doing a lot of different things in some instances

providing an alternative energy substrate for potentially insulin-resistant neuronal tissue. But I think I'm understanding more that what it's doing is often times pruning back small intestinal bacterial overgrowth, some bacterial overgrowth that shouldn't be occurring in the upper reaches of the intestinal tract and should be occurring further down and again that acellular carbohydrate being kind of an issue in that regard. I don't want to belabor this too much.

But again, there has just been so much comparison of macronutrient ratios. Could you talk a little bit about why this higher prebiotic fiber content, what does it matter where fiber gets digested or carbohydrates start getting digested in the small intestine versus large intestine, or colon?

David:

I think it's usually important. You keep bringing up the notion of this acellular carbohydrate and I would suspect that you're probably deriving that information from a report that appeared in The Journal of Diabetes Metabolic Syndrome and Obesity Targets and Therapy that was published back on July 4, 2012. That really pointed the finger again what they called as well acellular carbohydrates. These are carbohydrates that are divorced from or separated from cellularity or fibrous material or basically fiber.

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Carbohydrate connecting to fiber has been how humans have always consumed what little carbohydrate we've consumed. That is, the carbohydrate that's found in above ground growing and below ground growing vegetables and fruits in their natural form where they were just really deeply attached to almost set in green, but I want to say in green, deeply attached to the fiber. As such, this carbohydrate is not liberated at any significant degree in the small intestine and really makes it way to the large intestine where it then provides the substrate for again the metabolism and the replication of this good bacteria that live in the large intestine.

That said, by definition, a prebiotic fiber, a prebiotic is one that does not get digested in the stomach or the upper intestine and remains available for health providing properties by the time it gets to the colon, by the time it gets to the large intestine. That's the definition of a prebiotic fiber. So again, humans have eaten prebiotic fiber on a daily basis in massive amounts and again, it's something that we're just not getting. That said, what's the solution? What's the empowering part of the story?

And that is you don't have to go load up on some kind of special supplement. Just start phasing in prebiotic foods to your regimen and

what are they? They are things like jicama or Mexican yam, Dandelion greens, garlic, onion, leeks, and asparagus.

These are wonderful sources, rich sources, chicken liver, one of the most potent sources of prebiotic fiber of any land that you can get. These are things you can add to your plate immediately to boost up your prebiotic content and therefore, nurture the right type of gut bacteria who will then heal the gut lining and as such reduce inflammation in the body. The reason, I'm trying to connect the dots here, is because inflammation is the topic that you and I have covered in the past and it is the cornerstone player in such diseases as Alzheimer's, Parkinson's, multiple sclerosis, autism, cancer, diabetes, autoimmune conditions.

So we've got to do everything we can to put out the fire, and in fact, the word inflammation comes from inflamar, Latin meaning to light on fire. So that's our mission. If we want to have a traction point of reducing or having a preventive medicine approach to brain diseases, we have to start by targeting the mechanism of all of these issues and that is the role of inflammation as a cardinal player in each of these events.

So inflammation begins in the gut and it begins as a consequence of the balance being shifted away from the good organisms and more towards organisms like the bacteria or this group being compromised with more Firmicutes bacteria. As a consequence, when the bacterial array changes, then the ability of the gut to maintain its wall integrity is compromised. In other words, when you traumatize the gut bacteria, you set the stage for leakiness of the gut and as such, chemicals get from the inside of the gut into the systemic circulation and blast the immune system, lighting the fire of inflammation.

So once you can get your arms around how those dots are connected, you begin to get a sense that in fact, in brain disorders, we need to shift our focus away from the brain. Now, that sounds extremely counterintuitive, but the real answer to what we've been seeking in preventing brain disorders and even reversing them may not lie in the brain itself, but likely now, it seemed to be occurring in the gut. When we pay attention to things gut related, then we have leverage points for all kinds of processes, like inflammation, like free-radical mediated stress that play such important roles in causing a good brain to go back.

I've been practicing Neurology for a long time and it's kind of compelling for me to be interviewed here with Robb Wolff at this stage in my career and I'm talking about the gut. On the one hand, it's breathtaking. I mean

who would have thought that at this stage of my career, I'm talking about what goes on inside the large intestine.

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Robb: Right.

David: Because in my residency, that was something the gastroenterologist dealt with and we couldn't care less. It was as if things stay -- whatever goes on in Las Vegas stays in Las Vegas. Whatever goes on in the colon stays there. We now understand that the gut and the brain are intimately connected, and as such, it opens the door to a vast array of interventions of treatment protocols, not only for ongoing disease, but perhaps more importantly.

Robb: Preventative.

David: Target the gut. We understand that we can go a long way to preventing brain disorders now. So it's sobering, but empowering time in my life. That was a short answer to your question.

Robb: It's beautiful. I love it. It's either chocolate for my binge eating or fermentable carbohydrate for my soul, which --

David: Well I'm going to be okay with a little chocolate, but then chocolate contains polyphenols. What we understand about chocolate is that that polyphenol content in and of itself acts as an antioxidant, which is good for the brain, which relates to reduced risk for things like Alzheimer's, but beyond that, we now understand that polyphenols also change in a positive way the makeup of the gut bacteria.

So what a leverage point now to understand that 99% of Robb Wolff's DNA in your body is not the DNA that came from your mother and father. It's the DNA contained in the microbiome of the bacteria that live within your gut. Only 1% of the DNA in your body is what we get from our mother and father. The rest is bacterial. It's pretty compelling to think that these cells who outnumber us 10 to 1 are controlling our mood. They are controlling appetite.

They are controlling all aspects of our metabolism and they are manufacturing the very neurotransmitters, the serotonin, the dopamine that have been the targets of this incredible pharmaceutical and dedication to developing drugs to modulate them. When the bottom line is they're coming from the gut bacteria and we now see so much information from people like Dr. Emeran Mayer at UCLA that there is this

intimate relationship between how we perceive the world and various species of bacteria that live within the gut.

Robb: Some interesting studies indicating that certain parasites will alter behavior to perpetuate their propagation like making mice unafraid of predatory animals like cats and that whole life cycle. It's very fascinating.

David: Oh that's for sure and there was a new publication that came out just within the few days that showed that looking at a tribe of individuals living in South America who really weren't very much exposed to modern lifestyle, etc. They carry a whole group of organisms called Treponemes, which actually seemed to be very adaptive for and they seemed to be very positive in terms of their ability to adapt to various types of stress, etc.

There was a really interesting report that came to us out of England and demonstrated a really interesting correlation between the level of parasites in the gut in specific countries and the incidence of Alzheimer's in those countries. What I found was in those countries where there were lots of parasites and lots of diversity of the gut bacteria like Sub-Saharan Africa, Kenya, places like that, that their incidence of Alzheimer's was extremely low in comparison to Northern European countries where we are and in America where we are obsessed with hygiene and bombarding our bodies with antimicrobials and our diversity of bacteria is dramatically reduced and the correlation was much, much higher incidence of Alzheimer disease.

So these, as you well say, there are very powerful upsides to having a diverse array of bacteria as well as parasites living within the gut. It's always been there and this new report that demonstrates these Treponemes and these what are called the Matses tribe that lives in, I guess, Peru. I think that's really interesting information. In fact, it was published on the Huffington Post three or four days ago.

Robb: It focused on the Treponemes. This is the family that like Syphilis and Lyme's disease and a few other interesting critters existing that I was not actually aware that they could be a commensal gut organism as well.

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David: Let me take a step back for your listeners. You used the word commensal and I think that commensal means co meaning together and mensa means eat and we call this bacteria commensals because they share the table with us. What you eat is what they eat. That term, I just love, and again it does call to our attention the notion that we've got to reevaluate our sense of bacteria.

When we all grow up, bacteria were agents of death. I mean, we know that bubonic plague wiped out a third of Europe in the 14th century and that said, we've lived in fear of bacteria and we continued to do so with hand sanitizers of the end cap of every island or grocery store. God forbidden we have germs on our hands. But the reality is that that is a perverse arrangement that the more we compromise this organ, the microbiome within the gut, the more we set the stage for dramatic changes in our metabolism, vitamin deficiencies, especially low vitamin D and see it every day, and more importantly, increasing inflammation and changing the regulation of the immune system.

So you wonder why, we don't wonder, I'm going to tell you and I won't give you the answer, but why there is a significant increase of various autoimmune conditions in children who have been deprived of a microbiome. What does that mean? Where do we get our first microbiome? We get it at the time of our birth when we passed through the birth canal. What a mechanism.

This vertical transmission of information we all know about, we get top down genetic information from our parents, but now, we understand there is a horizontal transmission, side-to-side transmission and that happens at the time we are born passing through the birth canal. We picked up all these microbiomes, all these bacteria living in mother's birth canal that perfectly prime the infant in terms of his metabolism, her immunity, inflammation heals the gut lining much sooner than children born by C-section.

When a child is born by C-section, they don't get that very important initial microbiome. Their gut becomes populated with whatever happens to be in the operating room or on the surgeon's gown and I would indicate that obviously would not be the ideal situation. As such, what we now understand is there are increases in risks associated with C-sections for things like ADHD being tripled, autism being doubled, diabetes increased about 60%, allergies about 70% and becoming obese as an adult and that child risk is increased 50% born by C-section.

Now to be clear, Cesarean sections are a wonderful lifesaving procedure. I am not trying to mommy-bashing here. There is absolutely a time and a place for this wonderful procedure, but right now in America, this process, which deprives infants of their microbiome is occurring in one-third of all births. So it's hard to imagine that one-third of all pregnancies and births are so complicated that a C-section is required in America. It's

not like that in other countries. In certain Scandinavian countries, the number is 8% of children born by C-section.

Now we understand an animal work is that the effectiveness of immunizations is absolutely dependent on a healthy microbiome that there is this interaction with the gut bacteria that takes place that allows immunizations to work more effectively. As a matter of fact, in the mouse model in which there is no gut microbiome, no bacteria in the gut, some forms of immunizations don't work at all and so yet, children are born by C-section and then are immediately immunized against hepatitis without a microbiome present.

So I think we have to take a step back and recognize that this gut bacteria thing is playing a huge role in so many aspects that open the door to trouble. So many aspects of human physiology that are setting the stage for dramatic events like autism and ADHD and type 1 diabetes, obesity even as an adult and so we really have to rethink that now.

A researcher at NYU came up with a really brilliant idea. She said, look this is what we do. If a C-section is going to happen, we will put a sponge in the birth canal prior to birth and will take it up prior to mother getting the mandatory IV antibiotics, which is mandatory before a C-section, 100% of cases in America.

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We will take it up, we will keep it warm and then when the baby is born, we will put this, will inoculate baby's system by rubbing this stuff, this goo all over the baby's face in hopes of inoculating him or her and priming the immune system. I think it's elegant. I think it's brilliant, but I think it also speaks to the importance of passing through that birth canal. That is a stamp upon that child that has an indelible effect upon his or her immunity and metabolism lifelong.

Robb: Doc correct me if I'm wrong, but we're talking about multigenerational effects because this perpetuates on and on. It alters the epigenetics of that child and that will alter the way that they interface with the microbiome that they experience throughout the course of their life and so it has multigenerational effects.

David: Well I'm going to take that even a bit further in just a moment, but I want to just break that down if I may for your listeners. That is we do understand that the microbiome does in fact influence the expression of our genome. One was recently published actually on a pregnant women, divided into two groups, one that had a high ratio of this group Firmicutes to Bacteroidetes and one with a low ratio of Firmicutes to

Bacteroidetes and what they found was -- I used those terms because I think your listeners are going to see that those two groups of bacteria which are about 80% of the bacteria in the gut. There are going to see these terms time and time again, Firmicutes and Bacteroidetes.

So when there are higher levels of Firmicutes, what was found is their work changes in the expression in these women in the genes that deal with things like metabolism and inflammation. So some of the genes were turned on that could increase risk for cardiovascular disease and diabetes in those with higher levels of Firmicutes and what we understand is that in world populations today, there is a low Firmicutes to Bacteroidetes ratio, but in cosmopolitan populations, the ratio is reversed. Children who are not best breastfed have higher Firmicutes. Type 2 diabetics have higher Firmicutes. Obese individuals have higher Firmicutes.

So why it's an issue is because not only are there changes in the gut when the Firmicutes group is higher in terms of extracting calories from food and therefore paving the way from obesity, but there are changes in epigenetics. The changes in the expression of our 23,000 genes that also sets the stage for maladaptive things like cardiovascular disease. But here's the part where I want to take it even further. A new study has just identified in humans, insertion of bacterial genome sequences in our genome. How breathtaking is that? They're not just sitting in the gut. They are implanting their DNA in our DNA, not just regulating the expression of our DNA.

So to turn a blind eye on the gut bacteria in this DNA age, you got to understand that Robb Wolff's podcast here is super cool. This is leading edge stuff. This is the cover of Scientific American these days. This is where researchers are going. Yeah, it's vast and yeah, we all though we knew everything talking about low carbs and ketogenic diet and avoiding gluten etc. We've just open a new kind of worms and these are good worms. They are going to help us out.

Robb:

Speaking of worms, I was reading a study of introduction of porcine pinworms in humans, which will elicit an immune response. But the pinworms can't take a permanent residence, but this being very effective for host of GI problems and their suspecting autoimmune issues and the number of other things, which again leads back to what you we're talking about with maintaining a parasitic load is actually advantageous. It's very interesting,

David:

Yeah, as a matter of fact, that was published in Scientific American way back in 2010 and even prior to that, years ago, whipworms eggs were being used to treat various autoimmune conditions as well. The point is that we've been living in a symbiotic relationship with these seemingly pathogenic organisms for eternity, for as long as we've been here. Even mammals and animals across the board are deeply colonized with bacteria, fungi, viruses, worms etc. and we've gotten along, in fact, not just gotten along, but we supported each other.

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These organisms need a warm wet environment where they are great source of food, that's the gut. We're just feeding them and their -- it shouldn't be as happy as can be, but when we start to eat a food for example that has been laced with round up or glyphosate, which is an herbicide, there are over 750 products now that contain glyphosate. Again, that's sprayed on the very food that we eat. We know that that changes the microbiome. We know that 4/5 of American has taken antibiotic every single year and it is the most commonly prescribed medication for children 10 years or younger in America and beyond that, we know that 75% of the antibiotics used in America are actually used in livestock to make them fatter.

David:

So Dr. Martin Blaser wrote a wonderful book called Missing Microbes and brought our attention to the notion that when you change the gut bacteria, you set the stage for obesity again by favoring the Firmicutes group and this can be induced by antibiotics. You give antibiotics to animals to make them fat and now you give antibiotics to children and children are becoming obese and eating the wrong food. It sets the stage for trouble.

The mission of Brain Maker, the reason I wrote this book is at least empower people with the knowledge that these events are happening, A and B what can you do reverse it and it means begin including probiotic foods with every meal or at least two meals a deal. What are probiotic foods? There are fermented foods of the traditional kimchi from Korea, good yogurt, kefir, sauerkraut, persevered lemons and other variety even cultured sour cream.

So there's so many fermented foods that are available. Take a good probiotic supplement and also add back the prebiotic fiber that has been part of the human diet for millions of years, add back things like Jerusalem artichoke, artichoke itself, asparagus, onions, garlic, leaks, so many of these foods. My favorite is dandelion greens. I mean health food store carries dandelion greens and they can be sautéed, a little lemon and butter and garlic. There you go and you can take it twice.

Robb: [Laughs] Right.

David: This is a way to nurture the good gut bacteria who are going to just come to bat for you. There're going to regulate immunity. There're going to reduce inflammation and again recognize that inflammation plays a pivotal role in every degenerative condition that you can think of and this is really becoming the key to health. The other thing is to get rid of these carbs. These refined or as you mentioned acellular carbohydrates and welcome fat back to the table, have good levels, healthy levels of olive oil, coconut oil, nuts, seeds, grass-fed beef, eggs, cholesterol-rich foods wonderful for the body.

How incredible it is that just last month an advisory panel to US government, the Dietary Advisory Committee said, hey as a matter of fact cholesterol-laden food pose no risk for cardiovascular disease. What? How could that be? We we're told that cholesterol was the devil itself and that if we ate foods with cholesterol, horrible things are going to happen to ourselves and every generation thereafter. So finally so common senses coming back to the table understanding that humans have always eaten fiber rich foods, foods that have rotted or fermented and foods that had contained rich levels of unaltered fats like you find in nature. Fat is a key player for human health also regulates immunity and you know, the dry weight of your brain is 70% fat. You need fat to think straight so.

Robb: Right.

David: It's a time of rethinking things and how amazing it is that every time you and I get together and chat, what's happening is we're looking back at humans got through, what allowed us to survive and more and more we realize that it's really getting back to this paleo program. What did our ancestors do? It's time that we emulate that because our genome evolved to communicate with our microbiome. So this metagenomic approach meaning at the whole organism. The genome in the gut, the genome that we carry from our parents all are interacting to create health in you and me and so it's time we take a step back and embrace that much, much bigger picture.

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Robb: It seems to be a lot of sense to me and it definitely I think the cat's out of the bag. I look at it similarly. If you do a science history reading which I'm prone to do because I don't have much of a social life, I just hang out with my family. You read the early stories of when quantum mechanics made

it into the physics scene and there was contention and debate and name calling and nearly fist fights over this stuff and now it's part and parcel of modern physics and communication theory and all that type of stuff. But I think this idea of kind of an evolutionary template applied to medicine is still controversial, still not mainstream but I think that like good memes similar to good bacteria when they infiltrate a certain system and they're going to have some pretty good staying power and I think we'll see that perpetuate itself.

I have a question for you, though. Because so many people are sick, often times the introduction prebiotic fiber, fodmaps and those sorts of things can really throw people for a loop because they have small intestinal bacterial overgrowth. They're getting fermentation of fibers too early in the digestive tract. What do we do for folks like that? How do they tackle this, this process?

David: That's a very good question to ask because certainly what we see in the clinic and that is by and large, people have aggressively traumatized their GI system and this SIBO, small intestinal bacterial overgrowth syndrome is a big challenge and there are various that you can take. I mean the mainstream approach is to give yet more antibiotics, aggressive antibiotics and frankly, I would indicate sometimes that's necessary. Sometimes, you actually have to do that to sterilize if you will but what I think moving forward what we'll see is aggressive approaches to reset the lower gut and that may just take care of everything. In other words, fecal transplantation I think is going to go a long way.

I think that humans are, dare I say, designed or are inclined to tolerate the fodmaps and that fodmaps have been again part of our human diet for such a long time. We see these patients all the time and it's a very big challenge. But I think as we move forward, the more aggressive approaches that we can engage in terms of reestablishing gut health via fecal microbial transplant which is certainly the most aggressive or perhaps at the very least probiotic enemas which we have used quite effectively, I think we're going to see that this is a really good way to reestablish balance. You know, you're right this is not mainstream as yet. People say, oh gee Dr. Perlmutter, why do you put yourself out on the limb like that? I say, hey when you're out on a limb, you have the best view of everything.

Robb: [Laughs].

David: So I am happy to be there and they say, you know this is really outside of the box. Why do you want to be outside of the box? I explained, my

mission is not to be outside of the box. My mission is to make the box bigger so that the things that like you and I are talking about right now ultimately become accepted and I think the needle is being pushed and I think we're seeing these good things start to gain traction especially from a research perspective.

I'm not able to say as yet where I'm going to be doing this but I'm going to be visiting with an extremely well-respected clinic soon with the idea of getting their microbiome project moving it forward. But also starting clinical interventions, trials rather in terms of neurologic disease but you know, it's important that we have outliers and not everybody accepting the status quo. Ronald Reagan that "status quo" is a Latin term that means the mess that we're in.

Robb: [Laughs].

David: I become friends with Dr. Amar Bose many years ago. He made headphones that sound, reduce--you know, Bose audio.

Robb: Yeah.

David: After touring his develop facility at Massachusetts, we went back to his office and on his door going into his private office was a quote by Belgian Nobel Laureate Maurice Maeterlinck that says, at every crossway on the road to the future, each progressive spirit is confronted by a thousand men appointed to defend the past. You know, there's comfort in the past in how things are done and how they've always been done but I think that more and more people are gaining a level of comfort with change and recognizing that it's important.

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I mean we're seeing your ability to call up a car on your iPhone wherever you may be around the world and instantly that happens. That was a paradigm change in taxi service. But yet people kind of kicked and screamed about that to start of with but now it's accepted. So there're various things that have been part of the day to day and I don't have time for that on my patients who suffer with debilitating conditions like Alzheimer's, Parkinson's, MS, autism, ALS. They don't have time to sit around and nod their heads because nothing can be monetized that the pharmaceutical industry could not create products to help them therefore they suffer. That's not good enough and that's why we go to bat for them and we explore things. Might we be wrong? You bet. Thomas Edison said that he learned more from his 99 failures than he did from his 1 success.

Robb: Right.

David: So were going to stay in the batter's box and keep swinging but now with this notion of the microbiome and the research that's coming out and the successes that we are seeing in people who had no benefit whatsoever from any approach, there is no turning back. Let me give you an example. I recently saw a 10-year-old autistic child and he couldn't speak except in single words. He wouldn't interact. In the examining room, he sort sat in the corner and did a repetitive hand movement. I explained exactly what I'm talking to you about today with his mother. I said you know, halfway measures only work halfway. This is a kid whose microbiome had been traumatized.

Why? Because during the entire third trimester when the mother was pregnant with him, she was on antibiotics for a recurrent urinary tract infection. He'd been in the hospital with pneumonia, lots of antibiotics, lots of digestive issues clearly suggesting his gut had been traumatized. His mother engaged a program of fecal transplant, found a donor, did fecal transplant and now this child speaks in complete sentences. He looks you in the eye. He went with her to the beauty parlor the other day and spent 40 minutes sitting next to her just chatting with her, interacting with everybody. His mother sent me a video of this child around Christmas time just talking about what he's going to have for lunch and the emails that I'm getting from his mother are breath taking.

I mean they're encouraging us to continue doing this work. I actually put his video as well on Dr.Perlmutter.com. What a success story. I just think that there is no treatment for autism and it's increased 7 to 8 fold in its incidence in just the past 15 years. It's a modern day epidemic and suddenly for the first time when we've targeted the gut and left the brain out of the equation for a minute, we've gotten success and the success is breathtaking and again who would know that that's where the answers to these very challenging brain disorders may very well lie.

Robb: Doc what's the--this maybe, clearly it's a multi-factorial story like we don't go outside. We could maybe argue that chlorinated water is a problem with gut microbiome. We have ubiquitous antibiotics both that we take in our food system. People will talk about cultures that consume a lot of rice, that consume a lot of legumes. Is there just some sort of like threshold, some rubicon that gets passed? It's difficult to mathematically to pin down kind of macro perspective. We could say, okay we have these different factors. Once we pass a certain point of all these

convergent issues, these is where we start seeing increase level of disease. Does that make sense?

David: It does make sense. I mean we live in a society that looks upon disease as caused by a single agent and that was derived from the so called germ theory. We're led to believe and we instruct our up and coming doctors today to believe that diseases have pretty much a single cause and again it was derived from the notion of the germ theory.

Robb: Which is so interesting because we're back to bacteria again.

David: Yes, it is but it was misinterpreted.

Robb: [Laughs].

[0:45:01]

David: So that said when you adapt that mentality that there are single agent causing disease then you do two things; #1 you spend your life looking for a single remedy for that cause and #2 you begin to neglect the notion that there are multiple factors that conspire to ultimately manifest as disease. There's a doctor Dale Bredesen at UCLA and he has actually now reverse Alzheimer's in 9 of 10 patients by using a 36-point approach, not Alzheimer's drug or two. A 36-point approach that included higher levels of essential fatty acids, cutting their carbs, daily exercise regimen, normalizing vitamin D level, etc.

So I think the time has come for us to embrace the notion that disease is caused by multiple factors and if we're going to gain traction over these diseases, we've got to approach them from a multi-factorial perspective as well. Now I think there was a sense in your question that you're hearing various ideas put forth by those who would say for example we shouldn't eat meat for whatever reason and I would take a step back. I mean the China study I think brought up some very good and positive information indicating that people these days who eat meat have higher risks for certain disease and I would 100% agree with that because absolutely by and large the meat that people are eating is god awful stuff.

Why? Because it's been given green and cattle have never eaten green and this is green may have been sprayed with herbicides. This are cattle that by and large in America, they well have been treated with antibiotics. So were consuming food that is traumatic to the microbiome and as such would that be associated with things like cardiovascular disease and colon cancer? Why not? Makes sense to me.

So the idea of saying who people who eat meat by the studies would show that people eating meat are at risk for X, Y and Z and I would indicate that's like saying let's do a study on alcohol consumption and we're not going to differentiate between people drinking Jack Daniels or drinking a glass of Merlot each evening. So my point is you can't just say meat, you got to quantify and qualify what is it that you're talking about. Are you talking about people eating fish? Well are these farm raised tilapia from china or is this wild salmon. There is a big difference and we have to be a little bit more circumspect in our assessment of what qualifies for the various food macroscopic food areas that we are studying.

By and large, I think that what we're clearly seeing and what has been now really validated even by this US governmental dietary recommendation is that the thing that's putting nails in the coffin are the refined carbohydrates. For purposes of our discussion today, Robb, just look at the role of consuming refined carbohydrates unchanging the gut bacteria in and of itself. That is a powerful factor that weighs the gut bacteria in favor of this detrimental root called there firmicutes and sets the stage for type 2 diabetes, sets the stage for obesity and immune dysregulation. Again, the corner sound of so many of our most dreaded issues. So I think the big strokes are to emulate what are forbearers consume and what our forbearers consumed are the foods to which they had access. There were no wheat fields. There were apple orchards. There were no orange juice cartons growing on trees. We ate what we could kill or mostly what we would find. Face it, humans were scavengers like buzzards. Our paleolithic ancestors came upon a carcass, hey calories and fat they'd eat it.

Robb: Right.

David: So that said and we were filthy and that's very distasteful for people to consider that but we lived in harmony with gut bacteria and there is this understanding called the old friend hypothesis. What does it mean? It means that when we have these bacteria, parasites, worms living within us we develop tolerance and because we've been exposed to them since birth if were living in a world or culture that isn't so fixated in our hygiene. We not only tolerate these organisms but with time, we develop a more of symbiotic relationship where we nurture each other. You talked about earlier the inoculation of the gut with porcine worms and as I mentioned whipworms.

As I mentioned this new study, it just came out a couple of days ago showing treponemes and treponema pallidum is as you mentioned

syphilis as one subspecies of treponeme. But we've got to reframe this notion of these bacteria in a good, good way and this is the biggest--this level of science is going to prove be the biggest gift, the biggest blessing I think since understanding genetics, since understanding the germ theory. This is huge.

[0:50:41]

Robb:

Correct me if I'm wrong with this but some of the challenge that I see all of us facing with this is so much of this does not lend itself well to the randomized controlled trial like we have interesting stuff where like children exposed to H. pylori appear to do well with that. they tend to have a selective advantage. There's some protection against different diseases overtime but if these kids gets exposed to antibiotics early and we clear the H. pylori and then an adult is inoculated with H. pylori, then we potentially have some very deleterious gastrointestinal consequences but these are all observational. It doesn't lend itself well to an RCT. Would you agree with that? I mean I really feel like we're going to have to modify our standards for what meets scientific criteria and a lot of that in my opinion just needs to be outcome-based medicine.

David:

Well I would say that we are seeing intervention trials happening and as a matter of fact I just on Dr.Perlmutter.com, a couple of blogs ago, put in a blog about a recent article that's called, a possible link between early probiotic intervention and risk of neuropsychiatric disorders later in childhood, a randomized trial. This is actually very interesting study that took children, 75 infants, when they were born and during the first 6 months of their life, they were given a probiotic which is called lactobacillus rhamnosus. You can buy it at the health food store. So for their first 6 months of life, they were given a probiotic, some were and some weren't, and they followed these kids for 13 years. Incredible. What a study. What they found was at age 13 years that in the children who received a placebo, 17.1% of that group was diagnosed with either autism or ADHD and in the group that received lactobacillus rhamnosus, the percentage of who had either of those problems was zero.

So that really answers your questions about an interventional trial. I think we're seeing them happen and I think it's very, very exciting because when you get to the level of an interventional trial then it means that there's enough of the correlative information that people are now looking at causation and that's what an interventional trial can do. Let me give you an interesting trial that I'm really fascinated by. I mentioned earlier Dr. Emeran Mayer publishing the journal gastroenterology and what he did at UCLA is he took 36 women. Three groups, one group got a

probiotic yogurt, another group got a yogurt without probiotic, and the third got a placebo.

They did functional MRI scans of their brains and then they repeated these functional MRI scans of the brain at 4 weeks. When these women were receiving these MRI scans, they were shown very disturbing pictures of people's faces. What they discovered was on functional MRI, the parts of the brain that kind of light up with emotionality were markedly diminished in women receiving the probiotic. They were less threatened by the fact that these pictures were awful and scary compared to the other two groups. Now that's profound. That is indicating that a simple probiotic injection into the gut change the way these women perceived and responded to the world around them.

Robb: In that fight or flight response, the adrenocortical area.

David: That's right.

Robb: Wow.

David: It is profound and so at our lecture at Harvard with Dr. Mayer, afterwards I said, this is unbelievable. I'm going to put you in my book. I mentioned in Brain Maker because I wrote about this in Brain Maker. As any scientist would do, he played it down and said, well you know we have of course much more work to do, etc. But that said and he was very humble. As a matter of fact, I recently learned that he--I'm sharing an international microbiome conference in Hollywood, Florida in October of 2015 and Dr. Mayer is going to be one of our speakers and he'll present this data and follow up data.

[0:55:17]

We also have an interesting fellow from Amsterdam who has done 250 fecal transplants that effectively have reversed type 2 diabetes in those individuals. It's pretty incredible effect of what happens when you reprogram the microbiome. I don't want your listeners that that's what they need to do to regain their health. I mean as I outlined in Brain Maker, there are so many things to do right now in terms of our food choices and lifestyle choices to reprogram the gut bacterial immediately so everybody doesn't need to run out and start doing the fecal transplant.

But the reason I include the information with you today and also in Brain Maker is I just--it really makes the point about what can happen when a person aggressively reprograms the gut. These are the types of responses

and results that we are now seeing and again his is coming from me as a neurologist, a field where we've had precious little to offer our patients in terms of any kind of therapy. I mean as growing up as a neurologist, pretty much my job was diagnose and adios

Robb: [Laughs].

David: Meaning you name something, okay you got XYZ but unfortunately we have no treatment for that. We're not there anymore. We're opening the door to an incredible new, a panorama of treatment possibilities. It's absolutely a great time to be alive and practicing medicine.

Robb: That's incredibly exciting. I've been working on a blog post called the death of specialties and part of the idea is what this evolutionary frame work particularly directed at the gut that what the GI doc needs to do is not all that much different than what the brain doc needs to do. We're really tackling the same stuff.

David: It's so true. You know people say, oh well we're now hearing about this gut brain connection, okay. What about the gut liver connection? What about the thyroid gut connection?

Robb: Right.

David: You have a leaky gut, you set the stage for autoimmunity and the next thing you know you have autoimmune thyroiditis or Hashimoto's thyroiditis. The take home message here is who knew. Everything is related to everything else. It is a holistic perspective. This reductionism which plays upon the work of Descartes, looking at the body as separate individual parts, the lung are the bellows, the heart is the pump and the brain is your laptop. That doesn't work anymore. We recognize and celebrate and empower people with the notion that there is this beautiful dance that occurs throughout the body but for our purposes moving forward, what is the relationship between the brain and the gut? Now that we're starting to understand it, we're starting to be able to implement therapeutic strategies that are working. I think what moves the needles most unfortunately in our society is when there's a drug that's developed to fix X, Y or Z. This isn't going to be drug. It's going to be a process of multiple things that have to work together to bring about reestablishing health in the gut and therefore in the brain.

Robb: I could not say it better. I could not agree more. Doc were coming up on an hour. I could soak up 6 hours of your time today but we'll call it for good now and then we'll get you back on in a couple of months here and

maybe do some question and answer. Doc where can folks track everything down? We're going to have links in the show notes to Brain Maker on Amazon. Where else can they find your work?

David: Well I'll send you a link to--We put a really cool book trailer video like a movie trailer on YouTube. I'll send you that link.

Robb: Okay.

David: But if they want to follow me or stalk me I guess.

Robb: [Laughs].

David: My website is Dr.Perlmutter.com and my Facebook site where I post everyday as well is David Perlmutter, MD. Twitter is David Perlmutter.

Robb: Fantastic. Well doc thank you so much for being on the show. Thank you for writing Brain Maker. I'm very excited for your work and honored that you were willing to bring down property values with us once again on the show.

David: I'm not sure I get that but knowing you, it had to be positive so.

Robb: Very positive. Very, very positive. Yes, yes, very positive.

David: Alright. I'm sure we'll talk soon, Robb, and I want you to know I really appreciate that you offered this to me to be on your program today and I so value and honor the work that you're doing. It's such a huge contribution.

[1:00:10]

Robb: Thank you. I mean it's hard not be excited when you have some vague inkling that what you're doing actually benefits people. So yeah it's fun stuff and you coming into the scene being literally top of the food chain neurologist, world renowned and really embracing all these different concepts from modifying carbohydrate intake, ketogenic diets and now really going deep on the gut microbiome. It's interesting background, 2001, 2002 if one jump on PubMed and put in to their search engine if you put in intestinal permeability, you got back about 300 citations and most of them painted the concept the intestinal permeability is quackery.

Now I think that were past 11,000 citations, the immune response to gut status is possibly the hottest area of the immunology research in the world right now and rightfully so. I think that we're finally getting some

answers to some very complex problems because we're actually looking at the right spot which is quite far south instead of all the way north. It's very interesting.

David: No question and again there are plenty of people wanting to defend the past and have at it, but not for this progressive spirit. I mean when you're confronted by patients and their loved ones on a daily basis who are suffering with these issues and they say, doc what else is going on? Do you have any other ideas? That's the motivation to press on and we'll continue to do that and people tend to be down on what they are not up on and that's okay for them.

Robb: Right, right. Well doc thank you for continue for continuing to do your great work and looking forward to seeing more work from you and thank you again for your time.

David: Great. My pleasure, Robb. We'll talk soon.

Robb: Okay. Take care.

David: Okay.

Robb: Bye, bye.

[1:02:18] End of Audio