Paleo Solution - 316

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Robb Wolf: Hey folks Robb Wolf here, another edition of the Paleo Solution podcast. I'm super excited for today's guest. I don't know if she's smarter, better looking, funnier or what but she's got all of that in more. This is Grace Liu. She is a Pharm D. She is the founder of the Gut Institute and also the founder of the insanely popular podcast, the Gut Guardians. Grace how were you doing?

Grace Liu: I'm doing awesome. 2016 is just like on fire. Yeah.

Robb Wolf: Fantastic. You are indeed in Fuego so I am sure that pretty much everybody that follows the podcast knows about you. You had -- are you still maintaining the Animal Pharm website?

Grace Liu: No, I've kind of moved it over to the Gut Institute but then I just got too busy and I'm going to start blogging and I promise, yeah. There's so much data and we're going to resurrect on a lot of cool things on there.

Robb Wolf: Yeah, that thing was going for like six years.

Grace Liu: Yeah but we're coming…

Robb Wolf: There was a mountain of stuff.

Grace Liu: Yeah, I know 8 years and on its own like it would generate, oh my gosh, thousands ahead. It's awesome. But I have a book coming out in October.

Robb Wolf: Nice.

Grace Liu: Yeah and be All About Secrets Of Your Microbiome, yeah, and we're still thinking about the title and we over 200 recipes from my sister and I all about gut microbiome. It is awesome recipes with funky things like psyllium and inulin and all kinds of things.

Robb Wolf: Oh nice.

Grace Liu: Yeah, that will be coming out later.

Robb Wolf: Nice, right on. Well Grace, tell everybody about your background. You have a very interesting varied background. You've lived internationally and like you have a pretty fascinating experience you'll pull that you'll

draw from in your functional medicine practice. Tell folks about some of that.

Grace Liu: Yeah thanks. Thank you so much for having me on. I actually got into health and Functional Medicine because of you Robb back in 2008…

Robb Wolf: Sucker, sucker.

Grace Liu: Yeah. I'll be like ultimate in that as I was updating some of the slides I was doing for classes I was lecturing at, at the pharmacy schools. I was like, "Wow, everything I'm teaching is like totally wrong," and there's this Robb Wolf guy say, "Eating gluten free and changing your diet to reverse obvious diseases. Everything I treat with drugs, hypertension, diabetes, obesity and metabolic syndrome and PMS, infertility." I was like, "Who is this guy?" So I signed up for CrossFit, loved it, loved my gym out in Walnut Creek, Diablo CrossFit. It then just rightly changed my life

I heard you had the Nutri Workshop, you and Nicki head it out in Chico. I joined. Oh, my gosh, that just critically was the game changer for my whole life. My sister and I, we decided to go Paleo and we went gluten free and her daughter, her third daughter actually was born autistic and from the early beginning with the milestones, very hostile and after we went gluten free, 80-90% of all her neurological signs went away. She became pretty much neurotypical from neuroatypical so we were just bought in. No one else believed it. We came -- my whole family is medical, my parents, everybody.

It was a tough transition for me but after I moved to Shanghai it's much easier actually because I had time to just devote to it. I wasn't working full time anymore because my license didn't work over there. I just totally embraced Functional Medicine after that and I got certified. I did the AFMCP, Applying Functional Medicine To Clinical Practice and then that just ramped up my understanding of gut health actually.

Robb Wolf: That's awesome. That's fantastic.

Grace Liu: Thank you so much Robb. You've been super integral to a lot of my understanding of nutrition, biochemistry, health and everything ancestral.

Robb Wolf: Well I'm hugely honored that I had a small role to play maybe in the early stages of your work. But if we were to call you a student or a protégé or something like that, which would be a massive stretch to start off with but you have definitely exceeded me and you're knowledgeable of all this

material so it's incredibly impressive where you've taken all this and what you're doing with the Gut Institute.

I remember I think, Jimmy Moore interviewed me at the end of 2009-2010 on his podcast and he said, "What do you think the next stage of all this stuff is? I was going like, "Well, oh the gut. The gut is going to be like the next thing." Gut Genomics and all the stuff and it's kind of whacky to think back that was five, six years ago but it was a completely different world than the one that we live in now with regards to what we understand about gut, gut health. It's always been kind of baked in the cake, I mean even back with like mycetes and The Protein Power Lifeplan but it's -- we just had no idea back then.

Grace Liu: We have no idea and you predicted totally right on. I mean you started with the gut. You yourself had like the gut issues and they totally transformed going Paleo and that's what happen to thousands, millions, tens of millions of people when they try Paleo. I mean it's so profound for people and people don't realize like this, our diet could be so detrimental to our health. It's something that we eat, three, four times a day and that's what the gut microbiota states. We can shift things so erratically in just one meal and we know that already. When people go Paleo, they can risk all kinds of conditions

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I remember at the CrossFit Nutri Workshop that you and Nicki had in Chico. I don't remember how many stories you had. All these women were getting knocked up at your gym and then prior they were totally infertile. So within just a month or two, you wouldn't sign them up unless they went diet and the CrossFit working out so they got double benefits.

Robb Wolf: They got knocked up too.

Grace Liu: And then they have like [*indiscernible*] Awesome and they felt like sorry. You had to make them sign a disclaimer of increased potent fertility just by signing up.

Robb Wolf: Yeah when we were still using…

Grace Liu: That was in the water…

Robb Wolf: Yeah, when we were still using that the contract thing like there was a boxer, it's like if you were a female of child-bearing age, it is highly likely your fertility will increase and please acknowledge this and everything and people like, "What is this?" I'm like just trust me.

Grace Liu: It's not like all the male coaches are like in that section and you're like superhot. There was Robb like touched them but it was the combination of ancestral diet and myself.

Robb Wolf: Yeah, it was crazy and that all these gyms, you cruise around them and like there's like baby carriers everywhere and people doing thrusters with kids in their papoose that they're carrying them around. So yeah, it's really profound stuff. So from your point of entry with this kind of Paleo gluten free and then really going deep on the functional medicine side of things, like you've definitely expanded out your sphere of influence and where you try to direct people. Clearly, you're focusing very, very heavily on the gut which I think is, it's ironic in a way because we're like, well, this person is a gut expert but then when we look at the fact that cardiovascular disease, neurodegenerative disease, all kinds of metabolic derangement, type II diabetes, insulin resistance, all seems to have an underpinning with gut issues.

It's kind of like the unified field vary with all these stuff but how has your perspective in all this stuff changed? Like I know that you're really trying to get folks with an enriched gut microbiome, said that they're more resilient. They can handle insults from Neolithic foods. Like how was all that grown over time for you?

Grace Liu: So I, like a lot of people in Paleo land and I might have been even influence you in some ways. I went really low carb. I don't know if it was actually helpful if I need to but. Because there are enough people in the blogosphere who were ill and they finally think I'm on a low carb, I thought that's just something I would benefit from. So I did try and I tried and probably way too long because I tend to be this like OCD kind of really super extreme health person. I was doing like all these elite... Well not really elite but for me there were like endurance events, tris, sprint tris and half marathons. That was like a really bad idea for me. I wasn't actually adrenally, I didn't have adrenal problems but I got really, really damaged from a hormone, a synthetic hormone, it was the Mirena IUD**.** I didn't realize how bad it was and this is part of the reason why I just felt like I totally have [*indiscernible*] because of this.

So it's damaging. Everyone that do the damaging and at the time I turned the internet and nothing came up on it but now if you search on internet there's all these class action suits, all these women getting damaged. Their HPA axis is damaged. I just had a lot of damage with it. Same thing happens with many other medications too like male pattern baldness medications, five-alpha-reductase inhibitors, and other really potent

synthetic hormone blockers. They do the same thing for men. They make things really broken.

Anyway, so I didn't have that but I had that combination and then I got a big gut hit actually as a result and initially when I did go low carb like it helped me but when -- if someone pushes beyond their adrenal threshold kind of then the gut will suffer. So when I worked with people now -- because it just seems like everyone is affected adrenally and we can look at this on testing. You can ask them. I do a survey, no one passes to have perfect adrenaline and perfect cortisol regulation. No passes because I think it this day and age, everyone stays up late. They've had multiple stressors, multiple kids, multiple mortgages and career things. It's hard to escape that even me and I only worked part time and I have a lot of luxuries.

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So my focus has come down to like really evaluating adrenals and then getting them right because if you don't have enough of like the correct cortisol regulation, you can't heal the gut. The gut requires like adequate amount of cortisol and not too much. It's like the sweet spot, kind of like the goldilocks sweet spot. So my goal is to get everyone amplified on that, get their adrenals in line, plugged in.

Now just like gut recovery, I have so many tools and a lot of them are plant-based botanicals and things that would not normally be used for gut. They work really super well for the gut not just fiber. Fiber alone can't do a lot actually. We have to mend the tissue at the cellular level actually and that requires the steroids and vitamins, nutrients, minerals and actually a lot of this adequate adrenal function because we need like the right corticosteroids and we need adequate prostaglandins and a lot of these, we actually have to have catabolic… don't want so much of the catabolic hormone pathways but the anabolic ones. I'm not saying like people should be super high testosterone warriors initially but eventually that's the goal that women should become these fertile feminine fires and the men testosterone warriors. This is how we're meant to be ancestrally.

Robb Wolf: That's going to be a controversial topic. Although I think most of the people that follow the scene or kind of knuckle-dragging misantrhopes anyway so it will probably be fine. So Grace, have you messed around much with the DUTCH testing like…

Grace Liu: Yeah, I love the DUTCH. I was so lucky I met Mark Newman when I was in Shanghai. We chatted a lot on email and he sent me a bunch of kits but my practice hadn't really launched there so I didn't really use a lot of

them but now I use it quite consistently. It's so awesome. His test is amazing. I mean

I loved all the testing. Genova has actually very similar urine testing too and you can get really great ratios. I also have this drive actually for cancer prevention both primary and secondary cancer prevention because a lot of my girlfriends are touched by this. This test is just superb awesome like you can see the methylation pattern and then the ratio of like not very good estrogens and compared with very good estrogens.

For instance mine after in Paleo thanks to you and Nicki. After being Paleo seven, eight years when I did the DUTCH test, my god, like my ratio of my good estrogens over bad estrogens was like 20 times over than healthy controls. 20 times better than like actually a cancer could -- a cancer subject and it was like way above normal like all things Paleo. We can get great A1Cs. We get great vasculature, no diabetes, no hypertension and like high bad cholesterol, small dense cholesterol. We have very good fluffy cholesterol and good HDLs, HDL2s that are really protective. So this hormone pattern that comes out of the DUTCH is like amazing. You can see it all.

Robb Wolf: Right, you did so talk to people through that a little bit. I mean, it's kind of a whacky thing because even something like the three or four point cortisol reading or a saliva hormone testing which seems to be archaic compared to what this DUTCH testing is. But this is like super cutting edge holy-smokes stuff for conventional medicine like they're just…

Grace Liu: All of it. I mean in the salivaries. But just salivaries is just not super accurate. That's the problem and then people who are kind of -- I don't know to categorize it but they're either fast accelerators or fast methylators or fast something, they move cortisol into and metabolite very quickly but the cortisol metabolites are equally as strong or at least they still have a lot of potency so it's all about the signs of high cholesterol.

Robb Wolf: High cortisol, yeah.

Grace Liu: High cortisol yeah, sorry high cortisol

Robb Wolf: So just for folks that maybe aren't super familiar with this. The three or four-point cortisol testing can tell you like ideally we have relatively higher cortisol levels and yeah, yeah then they tend to kind of bottom out a little bit in the middle afternoon. Go up a little bit then they tend to go lower in the evening at least as a general trend. People who were kind of

broken, we oftentimes see what a flipped Circadian rhythm where the levels are quite high in the evening and low in the morning. But what's interesting about that and I was not aware of the DUTCH testing until I listened to the Chris Kelly's podcast where he was interviewing and what's his name again, the founder of the company?

Grace Liu: Mark Newman is the founder.

Robb Wolf: Mark Newman. He's fascinating. He was talking about the fact that if cortisol looks low, it doesn't necessarily mean that production is low. The clearance maybe exceptionally high. That we may be using it for variety of different purposes and depending on how it's used then we get different metabolic influence with that because it's flowing through different metabolic pathways. So doing a full accounting, we can kind of see where that allocation of resources is going and a cortisol level could be the same in five or six different people but the metabolites could be completely different which means if that cortisol is being handled in completely different ways. Do you see any rough patterns with that like somebody who kind of has this low cortisol like their low AM level and high PM level. What are some different ways that that cortisol is getting handled so that they may look similar on salivary testing but they're totally different on DUTCH testing?

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Grace Liu: Well so for one, I don't actually and I actually hardly ever ran salivary. I just didn't find them super reliable. I will just ask people how they felt and that would correlate pretty well with the adrenal function if they were in tuned with their body. So I have a lot of women they're not very in tune with their body. They just seemed to deny their bodies so they don't read the signs very well at all so you can't believe them. [laughs]

Robb Wolf: Right.

Grace Liu: Also, there's a couple people like you can't believe because they've really had pain tolerance. Like they're the warriors and that you were so I can't really listen to what they say either because none of it is true. But in general like someone who has a typical salivary pattern where like you mentioned they are like tired but wired at night so there is cortisol spike which normally at night we're getting for bed, everything should start coming down. These people have flat lined in the morning. They can't get out of bed. They are super tired and you're supposed to have a little spike in cortisol in the morning on salivary testing or otherwise testing. There's little spike but in general the serum level should be below 10. What I find is that a lot of parts of the salivary -- if I have happen to have a salibary data it does correlate okay with the DUTCH I think.

What I think makes the difference the most because just like gut testing and gut microbiota testing using either Genova or uBiome, we can change things so rapidly. In just one meal the data is going to look completely different.

So actually when I had my initial DUTCH test, I was really worried about a friend, someone who just recently got diagnosed with cancer at that time and it's really sad for her. So when I had my DUTCH test done, I normally am super relaxed at night. I go to bed at 8:30 but I was trying to stay up for the 10 -- you have to do at 10 o'clock. I was doing the four times cortisol urine spot test and I stayed up. I had this peak and I know like normally I don't have that peak and then when I repeated, it's all like totally normal and fine but we can certainly shift things super quickly on any kind of testing. So it's not always reliable like that and when I worked with clients, I really want to see them shift very rapidly so we can get the gut healing.

When I worked with people and I helped them rebuild their biome, we want that because we don't want dysregulated cortisol ever, unless necessary because it's only meant to save us from a saber tooth tiger. We're running off of from this volcano, rapidly erupting volcano. We don't want it on all day every day and it's super catabolic. So what that means is people can't lay down muscle. You can't lay down nothing and you organs are breaking down. Your gut's breaking down, your brains are breaking down, right. Your brain's breaking down and you're at shrinking study show high cortisol. It's highly related to low volume brain volume.

So we want to build up our gut and we want it strong. We want the muscles there strong. So I do lots of like botanicals now, really gentle like German Chamomile and other botanicals, boswellians, I mean like a super great extract for me. It's actually not known as an adrenal extract or anything like that but I've been using it because it blocks histamine which degrades our organs. It's catabolic. It makes the gut lining and mucosa like whether it's sinuses or vaginal or gut mucosa, histamines are not great and histamine is produced by all of our toxic gut flora so this is what I look out for in your intestine as well as gut testing. When I do the urine test, I'm looking for metabolites from clostridium which is super, super nasty and do you know what raises clostridium? Potatoes, starch.

Robb Wolf: Oh, really, really that's ironic. I was going to ask you about the monocroping via potato starch or really any… Well, if you want to shift into that like we've had lots of people get some success from low-carb interventions, ketogenic interventions but then sometimes that the

benefit starts shifting towards, maybe some problems and then there were some awareness that maybe the gut biome was being starved of fermentable carbohydrates. Maybe they were digging into the mucosal layer which is rich in proteoglycans and so the gut bugs were chewing through this mucosa that acts as kind of a condom between the epithelial cells and the intestinal contents and.

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Grace Liu: That condom is as big as the tennis court as big as your house.

Robb Wolf: Right, right because there's a lot of surface area.

Grace Liu: Yeah, 2700 square feet about they estimate.

Robb Wolf: You know it's pretty well understood…

Grace Liu: Big condom.

Robb Wolf: That like gingivitis -- yeah that's a huge condom that goes slow and be gentle.

Grace Liu: [Laughs] That's coconut oil.

Robb Wolf: It had lots of coconut oil on that one. It's well understood in the medical literature that dental problems like gingivitis, gum inflammation increases cardiovascular disease, problems and whatnot. It's really underappreciated that you have like a thousand times more acreage in your gut than you do in your mouth. So if you've got inflammation in your gut, you've got orders of magnitude greater potential to elicit inflammatory response. So clearly keeping all that stuff happy is important and so there were some buzz for a while about potato starch and I gave it a shot and I definitely felt like things improved for a brief period of time and then I started…

Grace Liu: Like crash.

Robb Wolf: Kind of crashed on it. So explain to people what the story is with that.

Grace Liu: I crashed meaningly. I actually know a ton of people that do and yeah, I think people just don't -- they're not it's not that they're not honest on the internet but it's hard to figure out things initially, right?

Robb Wolf: Right.

Grace Liu: So I've seen hundreds of gut testing and dozens of people that have been on the potato starch and it's really sad. Like they miss the whole human gut signature. Their gut no longer looks like a human signature. There's high clostridium, yeah, high whole bunch of things. If you do urine testing they are just full of gut inflammation actually. A lot of people have information but they don't even realize it right unless you do testing. You really can't know. Like tons of people have vitamin D deficiency. They didn't know and they took vitamin D and they feel super great, right? But a lot of times people have signs of, really subtle signs, silent signs of inflammation they don't know.

I saw problems because potato starch when you look at it, it feeds yeast. It feeds a whole bunch of yeast, aspergillus, candida, saccharomyces, all of them because these are really fundamental fungi life form that come way billions of years before humans and even through the evolutionary time. They can break down raw things better than we could. So they are, okay, eating raw -- breaking down raw, tiny little starch granules. Humans on the other hand, our gut flora has evolved. They don't -- all starch forms, they're all toxic. You can't eat raw tapioca. You can't eat raw beans, right?

Robb Wolf: Right.

Grace Liu: You're going to die. So our gut flora never ate raw, saw much raw. Other animals may like rats, rodents. That's fine for them and the gut signature for rodents and hamsters are really different from humans. They don't have the flora that make our brains awesome that make our mucosal lining tight. They certainly don't have the flora that mucosa, fiber as much, the oligosaccharides and fucus and things like that.

So the gut, many millions of years ago, studies are showing that somehow these researchers have the data but the gut flora had changed and there is an imprint. There is a certain signature and the human one is really rich in eating oligosaccharides like inulin and other fod maps actually and other fibers psyllium and whole grains, whole beans and all kinds of vegetables, romaine and lettuce and roots and stocks and leaves.

The cooked resistant starch is really the most awesome for humans. They break down into oligosaccharides. Raw starch on the other hand, because the granules are so tiny, the flora that eat it, they have to only -- they can only chew off like a glucose at a time. So in the human studies that came out, all of them have this like weird pattern. There's increased insulin when they do body fat measuring. There is higher body fat -- I mean how do you get higher body fat with fiber? Well you can with only raw starch.

Yeah, raw tapioca starch or raw, they use HAM which is high amylose maze corn starch but the same thing happens with potato starch too.

In this other study by Bodingham in 2014, she had a study in metabolic syndrome clients patients and they gave like a huge amount… So they saw the effect really, clearly 40 grams of HAM high amylose maze, they all had weirdly dysregulated guts after that which totally coincides with what I would see like for yeast overgrowths and E.coli overgrowths but they reported higher fatty pancreas. They did a DEXA. They had higher fat mass and higher butyrate.

So the problem is many people already have tons of butyrate. You don't need more butyrate but that's what raw starch can feed. All starches can increase butyrate but raw starches just particularly will feed this hamster kind of gut flora which humans don't have a lot of and these grow. When I look at in the biome testing, all the human signature will go down and these like nonhuman signatures go up and it corresponds to people not feeling so great often.

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Robb Wolf: Right.

Grace Liu: Sometimes they can tell us. Sometimes they can't. Like you could tell, others really just cannot tell. I was only kind of interpreting starch for a little while when I was first looking at the rodent DNA. It looked really great but when I started digging to the human and it's like, "Oh my god it increases cancer." Or in certain rodent studies, if they had instigating stressor, they had more cancers, there's tumors. I'm like, "What the heck is going on," and it's just like hoax. Like if you look the human DNA and now there's plenty and now there's a couple of rodent studies. They give some maize granules to rodents and they had increased anxiety. It couldn't complete a maze. They have these tests and they apparently have this way of testing their anxiety and they had more anxiety. The problem is that raw starches can feed specifically E. coli.

Again, these are really primitive kind of flora, yeast, E. coli and other ones. Humans have these too and that's why for instance when I took it with Matt Pepin, my co-host from Gut Guardians. When we took it, we just didn't feel well. I kept getting sick, my immunity was tanking. He couldn't sleep at all like it woke him every night. So we happened to be kind of like a little more aware of our bodies than some other people.

Robb Wolf: Got you. Got you. So one thing that I think has been hard for me to reconcile in all this stuff is trying to look at kind of an ancestral templates

and then figure out what the right ratio of cooked versus raw input should be…

Grace Liu: ***[Audio cut out]*** the ancestral template?

Robb Wolf: Yeah, we had a brief pause there while Grace's vicious attack animal was viciously attacking nothing so. Within this ancestral template, gosh I'm thinking like 50 different things. One of them is -- you always wonder or maybe understand how do you get into a certain problematic spot? That you're trying to map this thing. There was a great paper talking about dense acellular carbohydrates disrupting the gut microbiome and whatnot and so once this gut biome gets disrupted, I guess this is the bugger in the challenge. You start looking at the life history like were you born vaginally, yes or no? Was your mom healthy during that time, yes or no? And health being a very nebulous term like…

Grace Liu: Yeah very subjective.

Robb Wolf: Yeah my mom was alive and could do things but she almost certainly had autoimmune disease and type II diabetes at this time. She's a lifetime smoker and blah, blah, blah. Were you breastfed? When was your first exposure to antibiotics? How long did you have antibiotics? Like, I was on antibiotics tetracycline from the age of 13 the late 20 because of acne.

Grace Liu: Acne, yeah so many people are in that. Me too, I was on it for probably six months or something.

Robb Wolf: Yeah I was on it for like a decade and you start trying to trace some of the stuff back and so there's a number of insults that seem to get us into a problematic spot. One of the primary insults being that we argueably don't eat enough traditional type fibers, probably a mix of both cooked and raw type of fermentable fibers. But then when you're in that spot, it is bedeviling difficult to get back out. Like I have messed around. Just functionally I feel best when I'm running right around that ketogenic level and that because of doing jujitsu, I can sneak in about 100 to 200 grams of carbs on the higher end on big training days, the lower end on more sedentary days. It seems like maybe once every two or three months, I'll do about five to seven days, essentially ketotic to just kind of knock things down. That seems to be where I'm operating pretty well. I know a lot of people end up getting better recovery and they're able to eat more carbs, more variety in carbs. They're able to eat some beans and everything and maintain their blood glucose levels. There was also this paper that came out recently, the one in Cell -- the personalized glycemic.

Grace Liu: Aren't they awesome?

Robb Wolf: Response is totally amazing.

Grace Liu: Out in Israel.

Robb Wolf: Yeah, I've actually been shaking those guys down with some questions so I'm hoping to get them on the podcast. Two of the people have been kind enough. I basically -- there's like 50 people listed as authors on there and I wrote them all the same form email and I'm like, "Can I please ask you some questions," and like two of them responded yes so yeah. So I'm not even entirely sure what my question is here other than what are your thoughts on…

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Grace Liu: Well, I'm glad you love that study because Ludvig from out in-- I think his name is David Ludvig. He's found the same thing. If you have good insulin sensitivity, it really doesn't matter what the crap they eat. Good insulin sensitivity, you may or may not have long life span depending on your genetics and how bad the damage is or whatever but you can kind of eat whatever you want and you have really good A1Cs and good insulin sensitivity. But if you're insulin resistant and we can be insulin resistant, all manners of way like having adrenal insufficiencies, having pharmaceutical toxins like I did or you have poor gut health. So let's say your pharmaceutical toxins and poor gut health, you're insulin resistant or you're on potato starch and then now your insulin resistance is like way, way high like that hamster. We can get insulin resistant from so many different ways and then what we eat does make a difference.

What I would put out there is, okay, so we have like microorganisms living all over us. No part of our body is really sterile. Our bladder is not sterile. Nothing is sterile. For sure like babies are not born sterile. They've come up with new data now the placenta has bacteria and yeast in it and these really impact the baby and imprint the baby when the baby is born.

So since we're not sterile, and we're full of these microorganisms, they are searching some, especially the most toxic ones, the ones that make tons of histamines, morganella, klebsiella, hafnia, all these kind of not so great things in our gut and they're not bad. But when we're missing the BJJ warriors that should be out on the mucosal lining, right, they are like or croft or whatever. When we have the SWAT team out there, we don't worry about things breaking down the mucosal lining, hyper permeability or their endotoxins leaking into our blood stream because it's protected, right?

It's when the good flora are gone and they overgrow, klebsiella, morganella, E. coli, yeast and these all spew on a bunch of things like histamine. That's why people don't feel really well, they get brain fog or cloggy. It's just their sinuses that get clogged up and congested but our gut can get clogged up and congested too and our brains for sure and then these make a difference how we handle a sugar.

I love the probiotic.I have formulated. It has really high biphenyl longum. Biphenyl longum has something called the bifido shunt so as soon as our complex carbs get broken down, there's glucose, right as the monomer, the monosaccharide. We have glucose, fructose, whatever, and with the bifido shunt, they suck up the monosaccharide and then it goes where it's supposed to go. Bifido takes it up or it helps up regulate it so that our body takes up that's why we'll be feel full. We feel satiated and happy after we eat if we get the nutrients. So a lot of people don't get that after they eat. They're starving at the cellular level because their gut cannot regulate all these foods. Instead, they're feeding bad flora and yeast and they're putrifying up in the gut.

So let's say we have actually different kind of toxic flora and then we go lure and lure in our carb intake, the toxic flora still want sugar whether like bifido sucking it up or there's no bifido to suck it up. There's no sugar around and if we deprive them of it where do they go? So our blood stream is like 70, 80, 90, 100 milligrams per deciliter sugar, right? Guess where they go?

Robb Wolf: So they start piercing the intestinal wall.

Grace Liu: Yeah, exactly. I think they start going in our bloodstream. They pierce the condom and then boom, life ends but it's a slow life ending.

Robb Wolf: Slow life ending and not a lot of fun along the way. Similar to having kids, yeah, so the condom analogy is working.

Grace Liu: We used to have like dozens of kids and we only have like two.

Robb Wolf: Right, interesting.

Grace Liu: But they'd be helping us on the farm and like milking the cows. My kids do that.

Robb Wolf: Right. Zoe collects chicken eggs everyday so she's earning a little bit of her keep now. Sagan is still just sponging off the system but she's not yet two years old so I'll -- I guess I'll let that fly for a little while longer. So I

know because I've talked to you and I'm doing some work with you that you do testing trying to figure out where the person is in the spectrum and then figure out what the heck do we do to fix the situation.

Let's say that the gut has been broken for whatever reason. A person has been doing low carb and they generally felt better but maybe they've kind -- they've driven this process into a cul-de-sac. This is not getting them out into the broader world. They have very small bubble that they can kind of existing. What are you doing to try to help them get out of that bubble and I mean a lot of it dealing with these pathogenic gut bugs so how are we doing that?

Grace Liu: I have several phases of weeding but they're very, very super gentle because I found even through myself that you can over weed and then I had difficulty actually losing body fat once I over weeded and that was kind of pain in the ass. So there's a problem like there's a fine balance like we don't want to over weed and we want to over seed. We definitely want to provide as much like ultra-potent probiotic as possible along with really awesome soil probiotics like Prescript Assist is just amazing. It just gives people so much flexibility.

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I could eat gluten and dairy after I started this so I just love that probiotic. Then now with our new one and the ultra-potent one, I can extend people. They can liberalize their diet a lot faster as well. Like Kyle Kingsbury is a great friend and he loves my biotic fiber. He and his wife Tasha they did it. They actually got super fat on plenty of starch just like a lot of people do. It feeds yeast. It feeds E. coli and some people can be tall, but they were super cute with their body. They read the signs and they could end and they're like on and off. They're kind of cyclical, low carb, high carb so they could tell actually. But on bionic fiber, Kyle got really super strong and stop getting sick.

When I worked with people, it's great to look at Ubiome or any kind of testing. I prefer Genova and urine testing because with urine testing we can see what is actually spewing into the blood and then which gets filtered by the kidneys and it ends up in the urine. So when I see what's in the urine we can see multiple metabolites if they are spewing out of the gut from the gut flora.

What I found is that even if people are in super low carb, their yeast are there and spewing out still because yeast are so like -- they've been with us since the dawn of time and before mammals. Yeast are eukaryotic just like human cells and they can thrive anywhere and they are adapted to even eat ketones. We can feed them yeast and candida and

saccharomyces and other fungi. They're awesome biodiesel factories for ethanol, right?

Robb Wolf: Right, right.

Grace Liu: So how can you make a cheap form of ethanol? You can feed them raw yeast like potato pulp and all kinds of stuff and then they will crank out alcohol and that happens in a lot of bodies too. Like a lot of the crazy people in the case they're just full of alcohol and weirdly crap.

What I saw when people were doing that was that they get fatter and fatter and they restrict to diet more and more because they have too because they're getting fatter and fatter. That's because raw yeast starts just specifically selectively feed yeast, very primordial fungi.

But we can - so by looking and testing we can get the right kind of fiber. Actually in the beginning it's not great to have a lot of fiber because you're trying to remodel the upper gut which is very tender. There's only like one cell layer that separates all these like a trillion or two bacteria and then yeast from our blood stream because the condom is broken and so we want to fix the condom. There's multiple ways to do that. There's special fibers arabinogalactan. It's mostly actually probiotics that conceal the mucosa lining. That's how nature intended. That's ancestrally medically what happens. It's only when we lose things like we lose acidity or we lose the enzymes that keep toxic flora out of the stomach and small intestines then the whole thing falls apart.

When these overgowths happen they affect the liver. You can see it on liver testing. All the things that stream out of the small intestines they stream into the portal vein over just to the liver. So unless some is on a bunch load of liver support, you can always see damage on the liver often unless someone's…

Robb Wolf: So the ALT, AST elevating, right?

Grace Liu: Unless they've been super low carb for a while. That actually can heal the liver too. Like it takes a year but if someone has been low carb for over a year, you won't see the liver damage as much but you can always the urine org. So I looked at the urine organic acid, I love Great Plains. There's no any markers for bacterial overgrowth and 9 markers for fungal overgrowth, actually 10 if you include oxalates.

So a lot of time people have oxalates and then they don't know why. It's actually from yeast. They generate a lot of oxalates and then when their

yeast overgrows, they prevent bifido lacto and soil probiotics from colonizing and these are the ones that break down oxalates.

Ancestrally, we get soil probiotics from our environment, our food and at a contamination. We also have bifido lacto from our moms, from fermented foods and these break down oxalates. So as soon as you have an antibiotic or you're super low carb and you may lose bifido lacto and good probiotics. But if we don't take probiotics, we don't take probiotic foods, Fermented foods you don't have these that break down oxalates and then yeast overgrows and they produce more oxalates.

So oxalates are big problem for a lot of people when they crystalize. In autistic kids they cause this eye pain and they'll poke their eye. They want to poke their eye. Other people can have bladder problems, hip, joint problems. It's actually just oxalates crystalizing out. It's not just fun. It's as bad as uric acid for gout.

Robb Wolf: And that was something that Jeff Leach talked about when he was looking at the Hadza that they had these strains of oxalate metabolizing bacteria. So like there's been this kind of weird thing that if people did a big pile, a - of huge pile of grains or if the grains were a little bit long and the tooth are a little bit older than the oxalic acid content of these grains would increase. It's antipredation tool but it was interesting Leach pointed out the Hadza eat a ton of these things and it would theoretically have a very high oxalate intake. So you might think about like kidney stones and some problems but they had strains of bacteria that metabolize that oxalate so that was definitely interesting.

[0:40:43]

Grace Liu: That's interesting observation and thanks Robb. Because like in Japan they eat a lot of raw and cooked seaweed and they have only one particular strain. Bacteroides plebeius appears to have the DNA, the machinery to make the protein separate down certain forms of the fiber in seaweed. It's funny when I look at people's eubiome if they've lived in Japan for a while or they eat a lot of seaweed here in US, they have it. they have bacteroides plebeius. So I don't know how it gets entrenched in their gut but they are able to maintain it. So we can outsource these bugs that do a lot for us and that's why I love our formula in soil probiotics like prescript-assist because like our ultrabifido maximus and prescript-assist, this combination, it just allows people to eat so many things.

They break down. So these strains in studies, I don't know of particular ones do but when you look at study and since to me that's like the proxy. These strains like bifido and lactobacillus and soil probiotics and

prescript-assist, they break down microtoxins. They break down gliadin and they break down casein and lactose. So people who take these they overcome like the intolerance that they might have prior and they can liberalize their diet in. I'm not saying it's perfect.

So I was talking about Kyle. I'm sorry I kind of got off track but he couldn't eat gluten forever and then I'm like, "Dude you should be able to eat a little bit." I'll not flare like a little girl or whine like a little girl. So he took the bifido maximus and now he has no bloating. For Tasha's birthday they had a whole about load of like apple pie or apple strudels or something and no problems at all. But he used to get brain fog and bloating.

So not everyone gets these rapid changes but if we are able to remodel the gut and he's done a couple rounds of anti-candida things like over the years prior to all this. So with antibiotics as a pharmacist, we would always counsel people with antibiotics like, "Okay well, if you grow and you have signs of yeast infection let your doctor know it's probably the antibiotic because it's wiped out your good stuff and now you have nothing to combat. I mean no more jujitsu fighters to combat the yeast." The men have this too with any course of antibiotics and the more antibiotics they have, the more like yeast overgrowths and it shows up in funny ways like they can't put on lean mass. They can be psychocrazy or you can have like all kinds of weird autoimmune problems. These are potentially yeast overgrowths and with other toxic flora overgrowths and skin problems or fatty liver, fatty pancreas, inability to break down carbs, complex carbs because you don't have the pancreatic enzymes to break them down.

So it's all kind of tied together but I find centrally at the root is a lot of gut things. Now when I help people to rebuild their biome, we do the testing but we have multiple ways, multiple levels to heal everything along the path. So we have adrenal support. We have pancreas support. It's not a ton of pills actually but I work in phases with people generally about six phases so that we can rebuilt all that and then toward the middle and the end we can rebuilt the gut microbiome with lots of fiber, prebiotics which is fiber, another fancy name for fiber. So with the flora and the fiber, we can do so many things. We don't need to a fecal microbiome transplant and people's health can restore.

Like I have so many people now, their antibodies or autoimmune disease go down. They can eat a lot things. The psoriatic plaques or eczema plaques, they fall off within the first few weeks. People's minds, their brain can rebuild. They feel more calm. They don't have that internal agitation.

Recently, this year we've added Nutrigenomics and I have a friend, a colleague who works at the higher level for some really intense things but I do basic Nutrigenomics with people. We look at a lot of different variants because this determines why if they're turned on and expressing, not everyone expresses but if they're turned on, we want to work on it. A lot of people they have GAD1 mutations and they just can't feel calm. This mutation once mutated, we don't make so much GABA. GABA is our like Zen neurotransmitter. If we can't make that people get addicted because every time you get something that makes you happy then you want it again. So the mutations are there and then we can change some of it. So it'll help change behavior but ultimately also helps recover to get faster. One, a lot of these are histamine too and ammonia pathways, COMT, MTHFR, BHMT, DAO.

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When we have like all the dopamine breaking down, some people have lots of dopamine and then some people don't have enough, either way it's not great for the gut or the brain. When there's too much dopamine, dopamine -- to make dopamine we need ammonia and tryptophan and then it depends on the pathway sometimes. When they breakdown we can get ammonia and we can also get other things formaldehyde and hydrogen peroxide. All these things are super inflammatory. They're super inflammatory for the brain. They break down neurons and all the dopaminergic pathways have become just like vicious cycle. In the gut, our second brain which has like 100 million neurons, if we have this all breaking down like, of course, people's gut don't feel well and they don't trust their gut.

Robb Wolf: So Grace if somebody is, I mean, I wrote my book six years ago and when I wrapped up the book and I was like, okay, I'm going to go farm coconuts because this is going to save the world. I really won't need to do anything else and this is the end of the story and clearly, I was an idiot and it's…

Grace Liu: No, farming is awesome.

Robb Wolf: Yeah that wouldn't be a bad gig right now at all but where should folks jump in on this this shift and then where so…

Grace Liu: Okay. So like you were asking about the ratio like raw and cooked?

Robb Wolf: Yeah.

Grace Liu: In the beginning if your gut has really messed up and your gates are open and you don't have the gatekeepers, you don't have good soil probiotics,

you don't have good oxalate-degrading gut bacteria, you don't have lactobacilli and bifido -- I'm sorry all of these are pobably foreign to a lot of people but I'll just name their scientific names. But if we don't have the gatekeepers I kind of feel like eating raw foods and vegetables are little like going to Vegas and hanging out with lots of hot people and strippers. You don't know the elements and you don't know how much trouble you're going to get into. So until the gates are closed and things are safe and somewhat okay, like I think it's better to eat kind of cooked foods in the beginning but we definitely want transition to organic and soil-covered foods like when we can when it's a good time and when the gates are closed because unfortunately, with the good there's also a little bad as well, right?

Robb Wolf: Right.

Grace Liu: Yeah. But in the beginning if we're missing all the gut warriors and the guardians and the BJJ warriors, if we get exposed to anything, we're going to be just be opened -- it's just open game. Anything could happen. This is why when there is like -- so a lot of athletes like you hear about the stories like Christy Wellington or certain cyclist they have drop out of the race, they have like massive sore throat, sore brain or gut problems. Some flu, some stomach flu went through like all the teams or something, right? Some people get super sick and some people stay super fine and they're okay. It's probably their immunity and a lot of genetic factors but also their gut and studies do show like it's a fibrio…

Robb Wolf: It definitely seems to be a big like…

Grace Liu: Yeah they can give fibriotics on some volunteers and they see who get sick and who doesn't. Once you don't get sick, you have plenty of bifido lacto and they're probably about have about like soil probiotics but at that time they couldn't do the GWA studies or the 16S like phylogenetic studies. They probably can't see that in the gut microbiota but now we can. And a lot of these we understand. Like there's an ancestral template and when you'll have it you may feel fine on the outside but it's like a car, let's say half of the engine is there. You can kind of work and the car may look perfectly fine on the outside but it's got half the engine like how far is it really going to, right by far?

Robb Wolf: Right. On the testing side, what are some things that you feel comfortable recommending? I mean, we've always like doing basic blood work, fasting triglycerides, HDL, LDL, as a beginning point now. I think we're at a point where you definitely have to have LDL particle account in there. Like otherwise it's just kind of crap shoot. Like you could have two

different flavors in this accord and some without the LDL particle count, we really don't know what's going on with that. What else is reasonable even if maybe we don't have the full data on this yet like is it reasonable to be doing a uBiome or something like that so that people just have a baseline? What are the baseline things that aren't going to break the bank but are reasonable to throw in the mix?

Grace Liu: For me, okay, I kind of feel like a professional housekeeper but I'm more actually like a portfolio manager like if you're looking, talking about finances. A lot of people can think they can do their own portfolio management but they may not really know what's going on and they may not really know the market. I mean a lot of people can order these and I do offer like the uBiome consult or it's a 30-minute-counsult and I can help people look at what's going on in there and give them some ideas and things.

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I think it's fun to order it. As the testing gets better and when new products come out like hopefully I'm hoping to launch something later. But giving algorithms and helping people to understand what is healthy and good and what is not and how to get there. I think that will be elevated in the next year or two with all these like fantastic things coming up.

Right now, I think it's kind of hard. Like I look at the uBiome dashboard and, oh my god, like it totally sucks. It doesn't tell you anything and it just makes people more and more confused I believe. But I think they're fun. I think they're really great to get the conversation going. I sell all the kits, the Genova kit, the urine kits from both Genova and Great Plains and there are a lot of great interpretative guides. They're on my website. People, you can just read it and you can kind of diagnose certain things on your own. If you had a Tesla car, Robb, if you have your manual, you kind of can figure out a lot of things. If certail lights go up right or certain warnings go on or certain things, right? But is there something more intense going on, I think it's always great to meet with someone who understands a lot of the gut microbiota studies and how it impacts our organic acids and our physiology and function.

Hopefully, the Gut Institute and some of my colleagues and I, we're going to do more training on how this relates with Nutrigenomics later in the winter and part of the next year. But for now, I think it gets -- it's great to start because people are really wondering, what is good? How do they feel and then how does it relate to uBiome? I have a couple of cases on my website on thegutinstitute.com like Eli Markstrom. He's an amazing

Spartan athlete. I don't know if you've heard his podcast Robb? But I have a post up on my website about Eli.

Oh Robb are you there? And…

Robb Wolf: Oh sorry, sorry. There was a guy – so I'm doing the podcast not from home like I usually do because we're homeless while we're doing our remodel. I'm actually in my office downtown and the leaf blower guy just started walking by so I ended up muting it for a couple of seconds there.

So yeah, I've listened to the podcast with Eli about four times and it was super interesting what he described where he was more than a long pretty well on a ketogenic diet but he just felt like he had this governor. Like he didn't have the low gear and what was interesting to me is that he is -- I think he was running about 30% carbohydrate which for my total energy need is only about 150 grams a day. So we're not talking about like 800 grams of carbs for me or something but when I hang in that range, it seems to be pretty good balance between having decent cognition and good performance. I still think I've got some gut issues that I need to figure out but like he said that when he made that tweak and he started doing the bionic fiber and then your probiotic blend that it was just like night and day difference on his performance, recovery and whatnot.

Grace Liu: Oh yeah he was from like, he was raised like he used superhot 10% body fat. He went to 7.4 or something insane and he had this weird knee pain. It totally went away. His sleep became perfect. What's really what's profound is that people have signs that their gut is not doing well. He had lot of loose stools. Every time he did bulk of coffee, he got loose stools. He had to run to the toilet. I mean that's not normal. Anything you eat, it should be okay and your body and your gut flora should be able to break it down essentially. But after he did prebiotics and the bionic fiber and probiotics and actually a set of a weeding then he was good to go.

He was like a solid gold and then he got invited to the Elite Spartan races like you have to actually apply and he was accepted to that so his performance just went out the roof in addition to the body fat going down which he's really pleased. That wasn't his goal at all but that improved and also his brain became better. He had all these weird cravings like for sugar and food that all went away within a few weeks and his acne improved.

He did go dairy free like pure Paleo more dairy free and gluten free and he cut out dairy and then with the protocol his skin totally improved. No

more eruptions and really improved and that's what a lot of people tell me. Their optimism gets even better. Their mood gets even better and then if they have skin -- residual skin issues, those should get better as well. So he had a weeding protocol and some people like to do them but it should be done carefully I think. Make sure you don't lose the good flora and do testing to verify that and then choosing ultrapotent or a wide range of probiotics that you can tolerate.

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Some people can't tolerate histamines and a lot of the probiotics on the market are histamine producers so they don't feel so hot on it. Now, I finally made my own because I couldn't find it on the market but it's a completely histamine-free ultraprobiotic and they are the strains that mimic mother's milk. Healthy moms and babies they have plenty of these. They're in their gut. They're in the milk because our milk is not sterile either. It comes from our -- mom makes -- as the flora from the gut. They come up through the lymph circulation from the gut all the way up and then into the mastoid tissues and into the lymph then it goes straight into the milk so it can feed the baby, the legacy from mom to the next generation.

Robb Wolf: Right.

Grace Liu: Yeah and then healthy babies don't have these strains. They don't have bifido longum. They have weird other strains. A lot of E. coli, a lot of strep and so celiac babies are the same thing, they have E. coli, strep and they have starch eating bifido but they don't have the mucin eating bifido longum. That's why we really didn't like about potato starch either because if people did have B. longum, bifido longum it would go down on potato starch. There's no way it could resurrect. They would lose it. They would lose all the other mucosal BJJ stars with potato starch and like it was just awful like that it all go down.

And there's one dude, oh my god and he kept bugging me like Richard Sprague. I like him. He's so good at testing but he wouldn't see how like certain strains are good or bad. He would all these flora, it was clostridium on potato starch like clostridium botulinum and then all -- he'd lose all the good ones, akkermansia and bifido longum, they'd all like to disappear. He actually had them. So a lot of people don't even have this in the gut and he actually had them because he's relatively healthy and then he wouldn't check any other markers. I'm like, "You have to look at your body fat." He wouldn't measure his waist size. He wouldn't look at A1C. He wouldn't look at his lipid results, liver function tests and I'm, "Well do you really don't know what's going on?" and it's like,

"You're here to check and to see your engines working and you're looking at you're looking at your brake fluid." I'm like, what the fuck.

Robb Wolf: Right.

Grace Liu: Okay. So the problem with the gut testing is people just aren't correlating physiology, body fat, performance, brain function with the microbes there and you can now. There's like the Israeli study with the customized GI index and Gut Microbiota, the improvements in blood sugars. What a profound study. That cell study is just a game changer and it's everything that we're immune kind of, that the microbiota can do a lot of things for us.

Robb Wolf: It definitely answered a lot of the, one, it answered the, is there a one size fits all dietary approach? No, so that it kind of answer that and then it definitely cleared up some of the things that we would see clinically. Like just even though and I'm like the Paleo guy, I've looked at the food humus and I'm like dude you would need to be a private detective to find an insulin response from humus. This ended up being one of the foods in the study which about 50% of the people were favorable of responders and 50% were really unfavorable. The unfavorable people tended to already be dyslipidemic, insulin resistant and tended to have a profile of what we would characterize as pathogenic gut microbiota. So there was something about the fermentable carbohydrates and that that were not really doing those folks specifically any favor. So that was pretty was pretty fascinating.

Grace Liu: Right. Yeah. Yeah, they probably have more yeast and E. coli and strep and all those, like raw starch eaters as well as starch eaters.

Robb Wolf: That's a whole interesting thing too. All of the stuff is still currently only looking at bacteria and nobody is looking at yeast yet.

Grace Liu: I know.

Robb Wolf: So as we get it so would it be -- so we got the microbiome and then the fungi biome I guess…

Grace Liu: It might yeah. Myco.

Robb Wolf: Yeah or mycobiome I guess it's where it would be at mycobiome.

Grace Liu: Yeah, awesome like obesity gut microbio study, they compared healthy controls and OB subjects microbiota -- the microbiome. And they actually

have equal numbers of fungi but the OBs ones had way more candida and way more nasty like yeast and inflammation- inducing fungi versus the healthy controls.

Robb Wolf: Interesting.

Grace Liu: Yeah so it's quality over the quantity now.

Robb Wolf: Interesting. Well Grace, we could go on for days and days and days. Let's wrap this here and then let's circle back when your book is about ready to be released. I'll check back in with you on that and then in the interim where can folks track you down on the interwebs?

Grace Liu: I am on the interwebs. I'm a little like slower on the website. You can find me on Twitter. I like to post all my favorite studies over there and if you want to contact our office, the contact information on my website, thegutinstitute.com and we're also on Facebook at the Gut Institute. Thank you so much for having me on.

Robb Wolf: Oh, it was awesome having you on.

Grace Liu: Talk more to you later.

Robb Wolf: You -- well I will say that on the King of Poo apparently you're the queen of Poo so we'll rule the Poo kingdom. So awesome Grace. Well it was great connecting with you and I'm looking forward to seeing you. Are you going to be at the Paleo FX?

Grace Liu: I sure am, I will and Ancestral, AHS.

Robb Wolf: I should be at AHS as well.

Grace Liu: Awesome, cool.

Robb Wolf: Okay. Well we'll do some barbecue and hang out.

Grace Liu: That sounds great.

Robb Wolf: Okay Grace, I'll talk to you soon

Grace Liu: Great thank you Robb.

Robb Wolf: Okay bye.

Grace Liu: Bye. Cool thanks.

[0:60:48] End of Audio