Episode 117

Robb Wolf: Hey, folks, Robb Wolf here. Greg, what episode of the podcast is this?

Greg Everett: I believe this is 117, if you would like to even believe that.

Robb Wolf: Nice! And to celebrate the auspicious occasion of 117 Paleo Solution Podcast, we have on the dashingly handsome Chris Kresser. Chris, what's going on, man?

Chris Kresser: What an honor to be on the 117th Robb Wolf Podcast. Incredible!

Robb Wolf: There's some sort of numerological significance to it I'm sure, right?

Chris Kresser: Yeah. I'm trying to figure out what that might be and how --

Greg Everett: It's kind of like the light bulbs in the basement apartment in The Invisible Man. If you could figure that out, you've got the whole thing nailed down.

Chris Kresser: I'd make this meaningful in some way to salvage my pride. But 117th, I just can't come up with anything.

Robb Wolf: Yeah, yeah, I don't know. It wasn't an even number. It's not like a Fibonacci sequence. So I don't know, man. I think you just have to --

Chris Kresser: Well, I think I'll just have to take your word for it.

Robb Wolf: Yeah, totally, totally. I'll have to out Chris a little bit like he was like, "So, do you want to plan this thing?" And I'm like, "Dude, we don't plan this. That's crazy talk!"

Chris Kresser: We are.

Robb Wolf: So we're just kind of brandishing Chris, threw a bag over his head, and he came to in a small cell with Greg and I leering at him ready to drill the podcast.

Greg Everett: If we were all in one small cell together, we can get it recorded right.

Robb Wolf: Mm.

Chris Kresser: Yeah, exactly.

Robb Wolf: That is true. That is true.

Chris Kresser: So Robb, you're approaching the big day.

Robb Wolf: Yeah, man. It's literally like if we go full term like 12 weeks out. So I'm on. Yeah.

Chris Kresser: How are you feeling about that?

Robb Wolf: My palms are sweaty and my heart rate is about 180.

Chris Kresser: Yeah? You're catching up on some extra Z's?

Robb Wolf: Oh, yeah. Oh, yeah. Yeah. Unfortunately, you can't bank it, but yeah.

Chris Kresser: We can't go into some kind of mandatory three-month hibernation or something like that.

Robb Wolf: I think that's what I'll do once the kid arrives. I'll just run downstairs and then be like, "Turn them off. You've got the boobs."

Chris Kresser: That's right. Let me know how that turns out. Let me know what Nikki thinks about that.

Robb Wolf: That will be a quick road to me getting my ass kicked. Your little one is like 6 months now?

Chris Kresser: It goes so fast. It's amazing. She is 6 months a couple of days ago. She had her first -- last week we started feeding her egg yolk. That was her first food. First day she is like, "Hmm, I'm not so sure about this one," and the next day she was like grabbing the spoon out of my hand and stuffing it in her mouth.

Robb Wolf: Nice.

Chris Kresser: She has picked up on it pretty quick and now anytime we have any food like fork or spoon or glass in our hand, it's like everything we can do to keep her hands off of it.

Greg Everett: We have the same problem with Steve.

Robb Wolf: Yeah, but Steve isn't housebroken whereas Keystone does a similar thing and he is housebroken.

Chris Kresser: Oh, man, yeah.

Robb Wolf: Sweet! So what else is cooking, Chris? We're going to talk more about some big projects that you are just getting launched here later in the show, but any?

Chris Kresser: Yeah, let's see. What else is cooking? I'm going to be at PaleoFX with you and a lot of other folks.

Robb Wolf: Honestly, you have no standards to this thing.

Chris Kresser: I don't know how we ended up on that thing. And then AHS later in the year and then the Weston A. Price Conference in November, which they were nice to have it in Santa Clara this year so minimal travel for me.

And I'm just starting an advanced weight loss class. It was offered as a bonus for people who bought Personal Paleo Code which we're going to talk about later. I'm pretty excited about that. That's starting on Saturday morning. And if that goes well, I'll roll it out to the public later on in the year. Big subject, lots of controversy, but I think we're making some progress.

Robb Wolf: Cool! I'll coax you for some information on that after we talk about the Personal Paleo Code. That would be cool to see how the two things dovetail together. So cool!

Chris Kresser: Good!

Robb Wolf: Sweet! So do you want to have Greg kind of carve through the questions here? There are some goodies in here.

Chris Kresser: Yeah, yeah. I've got some good ones here. Let's do that. Let's just go through them one by one. Some of them will be quick, some of them a little bit more long-winded because I tend to do that as everybody knows. So let's see where we get.

Robb Wolf: Cool!

Greg Everett: Absolutely. All right. Well, Ginnie. These are all from Facebook by the way so this person's name is not Ginnie from Facebook.

"You've touched on this before but wondering if you talk about migraine prevention. I know so many who are heavy duty narcotic meds, even during pregnancy."

Chris Kresser: Yeah, good question. So I mean obviously, I'm assuming everyone who writes these questions is already doing a Paleo diet or something like a Paleo diet. It's always a good first step. But above and beyond that, I've found that a low tyramine, histamine and arginine diet can be helpful.

So a little theory on why. Tyramines are derivatives of tyrosine, an amino acid, and they are found in some foods and some drugs; and normally, they are inactivated by a particular enzyme called monoamine oxidase or MAO, which is in the liver and the intestines. But some study suggests that MAO function is not really optimal in people who have migraines and that leads to excessive tyramines in the blood, and then that can cause things like a temporary rise in blood pressure or sweating, nausea, vomiting, and migraines.

So reducing tyramines can be helpful. Histamine has a similar mechanism. It occurs in food from microbial fermentation, so enzymes that convert amino acid to histamine, and then if there's an inability to clear histamine from the blood, you get excess histamine and that can contribute to migraines too.

So most of these foods with tyramines and histamines are actually fermented foods, so you're talking about things like cheeses, sauerkraut, kefir, alcohol, vinegar, and of course a lot of these foods are permitted on the Paleo diet and even encouraged in terms of the fermented foods, but if you have migraines, they might be problematic.

And then the last is if the food contains arginine, arginine is a vasodilator. So migraines are thought to be caused by excessive vasodilation of the cranial blood vessels and so that increases the amount of nitric oxide in the blood, arginine, and you get excess vasodilation and then you get a migraine.

So the only two foods though that are permitted on the Paleo diet that contain a lot of arginine are nuts and chocolates. So it's another reason not go nuts on nuts. We've talked about others before. But if you have migraines, you definitely would want to cut back on them.

Greg Everett: So no chocolate-covered macadamia nuts.

Robb Wolf: Damn you! Damn you!

Chris Kresser: Not so much.

So yeah, I've had pretty good success with these. I would say I haven't done any data gathering, but just off the top of head, I'd say 70% to 80% of people improved significantly. 20% to 30% of people who go on this diet just don't experience migraines at all anymore, and then the other 40% or 50% need some additional support. I use herbal formula that can be effective in treating migraines but the diet is a really good start.

Greg Everett: So how quickly will eliminating that stuff typically produce some results?

Chris Kresser: Usually pretty quickly. Within a week people will see differences if they're getting migraines out frequently. Of course if someone is only a migraine a month or two migraines a month, it's going to take longer to know if it's doing something.

Robb Wolf: Chris, we've had some pretty good success just with a ketogenic kind of Paleo intervention on migraines. Like we've talked about on the podcast, we've had a ton of testimonials along that direction. Do you think that they ketogenic deal, they're just eliminating some of these foods? It is ruling out the ketosis. It's probably more of the elimination of these foods. Do you think there's something with the way that we're changing cellular metabolism or kind of shoring up some of the problems on that, that hyperinflammatory state? Usually my go-to thing would be kind of a ketogenic intervention. So it's interesting looking at it from this perspective.

Chris Kresser: Yeah, I wonder. I mean I don't really know the answer to that question. But I mean as you pointed out, a ketogenic approach would probably eliminate most of these foods except for things like sauerkraut because you're not eating dairy, which a lot of the fermented foods like kefir and cheeses of course wouldn't be on a ketogenic diet. You're not drinking alcohol. So that could be part of it.

But also I suspect that -- I mean we know that there are a lot of other brain problems like Alzheimer's and dementia that involve problems with glucose metabolism in the brain. So it's not a stretch in my mind to think that there might problems processing glucose in the brain in migraine sufferers. So maybe put them together -- ketogenic, low tyramine, histamine, arginine, and we'd see it be even more effective.

Robb Wolf: Or like if folks are just trying to figure out an either or kind of strategy as a first line, try the low inflammatory approach like what you're

describing. Avoid these foods that may have some metabolic derivatives that are kind of pro-inflammatory; and if that doesn't work, then maybe you can go towards a ketogenic, Paleo, low tyramine, low histamine kind of approach.

If that doesn't work, then I think maybe it's not actually migraine. It might be something else. But because I weighed between you and I and we've seen some pretty shocking improvements on this stuff, they will likely stick to it.

Chris Kresser: Yeah, it is. It can be challenging because when you put all the -- especially if you do both of them together. But anyone who has suffered from migraines, they're usually among the most committed of my patients because it's so --

Robb Wolf: They are highly motivated.

Chris Kresser: Yeah, they are highly motivated. Yeah.

Robb Wolf: Cool!

Greg Everett: All right. So I'll take this next one, and hopefully, Robb, when you come back you don't sound like you're autotuned anymore. Sylvie says…

Chris Kresser: Sylvie, I like that.

Greg Everett: "In regards to iodine consumption and autoimmune thyroiditis, which I have, how do you feel about eating fish? Yes? No? Once in a while okay?"

Chris Kresser: Okay. So earlier on, I wrote an article. I can't remember the exact title but it was something about how iodine is like throwing gasoline on the fire if you have Hashimoto's. It's true that iodine can provoke or exacerbate an existing autoimmune thyroid condition, and there's some evidence that suggests it might even trigger autoimmune thyroiditis, either Hashimoto's or Graves'.

But after looking into it further and a guy named Mario who has done a lot of research in this area turned me on to some good studies on this, it seems that if you have adequate levels of selenium, then those potentially toxic effects of iodine are minimized or maybe not even present at all, and I've actually seen this in my practice.

Now, if I have a patient with Hashimoto's, I'll first test their iodine and bromide levels using a 24-hour urine test, a challenge where they take a

50-milligram iodine tablet and then collect their urine afterwards. And if they're iodine-deficient, I'll start them on an iodine protocol, but we do it in a very particular way.

So first of all, they take 200 micrograms of selenium to begin with and make sure that their selenium levels are repleted before they start taking significant doses of iodine, and then we start them at an extremely dose of iodine, so 400 or 500 micrograms, and they stay on that small dose for at least seven days and preferably more like two weeks before increasing, doubling it, and going up to a milligram.

And then they stay at a milligram for another 10 to 14 days and then they double that again to 2 milligrams. Then they might finally get to a therapeutic dose of somewhere between 12.5 and even as high as 50 milligrams but it could take six months to get there. It's a little laborious but it's worth the wait because iodine, if someone is deficient, repleting their iodine level is going to have a profound effect on their thyroid; and if you go too quickly, you can really make things worse.

So the amount of iodine that's in fish I think is absolutely fine. No reason to limit fish consumption because of iodine if you have Hashimoto's. Fish is also the highest source of selenium in the diet, although because of the increasing amounts of mercury, the selenium is not necessarily bioavailable on fish anymore because the selenium binds to mercury and creates a compound that's not easily absorbed by humans.

That's the good news because we don't absorb the mercury from the fish, but the bad news is that we don't absorb the selenium either. So while ocean fish used to be the best source of selenium, I think now it may be better to supplement if you have a thyroid issue.

Brazil nuts are a good source of selenium too but they're also the highest source of omega-6 in the nut family which I think we're going to talk about next whether that's even significant or not.

Robb Wolf: Cool!

Greg Everett: All right. Tyler says, "What do you make of the conclusion of the review paper that omega-3 to omega-6 ratio is a poor biomarker for health? The paper is not freely available so I'm wondering if the abstract may be misleading, particularly because the title focuses on cardiovascular disease, but the abstract makes the sweeping conclusion that the o-6/o-3 ratio is of little value. Does this change your mind about any previously

held beliefs regarding the health effects of omega-6 consumption, say for nuts?

Chris Kresser: Good question. Well, the Kraken helped us out with this and I think Robb and I both read this paper. Did you read it, Robb?

Robb Wolf: Yeah, yeah. There have been nice little papers along this line.

Chris Kresser: Yeah. We've been trading back and forth a bunch of stuff, and I'll throw my two cents in and then I'd love to hear your opinion, Robb.

Robb Wolf: Cool!

Chris Kresser: It's true that this paper suggested that the omega-3 to 6 ratio is not a significant factor in terms of cardiovascular disease, and the authors instead suggested that what really matters is the omega-3 status, whether you're eating or taking omega-3 or not is the crucial factor and not so much the ratio of omega-6 to omega-3.

On the other hand, soon after I read that paper, there was about six other papers sent by Matt and others, and of course I have about 30 other papers that show that excess linolenic acid consumption or omega-6 will do two things primarily -- it will reduce the tissue concentration of omega-3, long-chain omega-3 fats, and it will prevent the elongation of alpha-linolenic acid, which is the short-chain omega-3, to EPA and DHA, which are the longer-chain omega-3's.

So there's definitely some conflicting research on this subject. I don't know that we have the answer at this point, but I will say that I'm suspicious of the idea that omega-6 to 3 ratio is of little value. I know in my own personal experience, if I eat a lot of omega-6 I feel bad, and a lot of my patients report the same thing. That's particularly true in people with inflammatory conditions, and I'm just a little hesitant to throw out that idea based on a single review paper.

Robb Wolf: Yeah. And I think that that paper was really looking at red blood cell.

Chris Kresser: That's right.

Robb Wolf: RBC omega-3/omega-6 ratios and we started doing some talking about that, which was that definitely different tissues will partition different fatty acids in different ways depending on both nutritional status and just the preference of that tissue. So it's kind of funny because this RBC analysis is what I did at the Fred Hutchinson Cancer Research Center for a

long time. It was basically running this stuff, and now it's kind of like well, it was an analysis of basically all the fatty acids like everything from like butyric acid all the way up to the things longer than EPA and DHA. So it was a comprehensive gig.

But definitely empirically, I know for a long time when I first tried to help people with this whole Paleo idea -- you mentioned nuts and the problem with omega-3 or omega-6 content in nuts -- the idea that I had originally was like okay, let people eat as much almonds, whatever they want to do because that's easy, and then just kind of supplement with omega-3's. People got better but they didn't get great until we really started eliminating omega-6 intake and that extended even to like being a little selective about olive oil and some stuff like that, and all of a sudden things improved dramatically.

I think that that one paper which really details the metabolic pathways in which the short-chain omega-6's just basically block the elongation of omega-3's and also potentially the tissue accretion of omega-3's. That stuff can either get stuffed into cell membranes and then can affect cytokine and prostaglandin production or that stuff can get preferentially used as a fuel source, and polyunsaturated fats are highly preferentially used as a fuel source because it's very oxidizable and so the body is not going to store them; they like to get rid of them. So I'm kind of wondering if there's not something going on with that. So yeah.

Chris Kresser: Yeah. Great point about the tissue concentration. I think the Japanese study actually that they referred to in that paper in a sort of derogatory way was looking at tissue concentration, and then I think Landis's work has looked at tissue concentration as well.

So yeah, I'd say don't give up on that hypothesis yet, those of you who are listening, and try it out and experience. It's always interesting to -- I mean if you go out and you eat a bunch of omega-6 and you feel a lot worse, that's probably worth paying attention to.

Robb Wolf: Just throwing it out.

Chris Kresser: I do want to say though that I think there is a difference between fresh omega-6 like in walnuts or avocados or things like that and fully oxidized industrial seed oil that has been heated and processed.

Robb Wolf: Right.

Chris Kresser: It's true that eating excess of even fresh omega-6 quite possibly can be problematic, but I think the oxidized polyunsaturated fat is way worse.

Robb Wolf: For a ton of reasons, yeah. It exacerbates the inflammatory load and it immediately starts altering liver function as well. Omega-6 has a potential to alter liver function in a negative way, and then if you add the oxidized form of that, then you've got a direct tissue inflammation from dealing with all of that. So yeah.

Chris Kresser: Yeah, immediate effects.

Robb Wolf: Cool!

Chris Kresser: All right.

Greg Everett: All right then. Kathy, also from Facebook, says, "What can be done for fibromyalgia? Would a dietary treatment for leaky gut (like GAPS) work? And what do you think of GAPS?"

Chris Kresser: Okay. I'm going to go off for a little while so ring me in, interrupt, keep it from me just rambling on and on.

Robb Wolf: Greg and I will go grab a drink.

Greg Everett: Yeah. See you guys in a bit.

Chris Kresser: This is kind of an area of interest for me and there are some really interesting stuff happening in the last five or seven years in terms of fibromyalgia and our understanding of it and its relationship with chronic fatigue and myalgic encephalomyelitis which is kind of a new designation. They're always changing the name of chronic fatigue syndrome. It used to be CFIDS and now it's referred to as ME/CFS so that's how I'm going to refer to it here.

But let me first say that fibromyalgia often has a really strong relationship with gut health, and most people with fibromyalgia have "IBS" (irritable bowel syndrome) which basically means that their gut is messed up, and vice versa; a lot of people with IBS have fibromyalgia. So there's a lot of research suggesting a link between intestinal permeability or leaky gut, various kinds of gut infections, and endotoxemia that results from that, dysbiosis, et cetera.

But there is also a really close relationship between fibromyalgia and ME/CFS or chronic fatigue syndrome, and that's what I want to cover

here because there's, as I said, some interesting recent work and I haven't really heard it discussed that much in the whole Paleo blogosphere.

So originally, the diagnostic criteria for fibromyalgia or the definition of it was focused on pain and pain sensitivity at various points around the body. But lately, the newer definition moves fibromyalgia a lot closer to CFS and by including a whole pain index and categorical scales for things like cognitive symptoms, unrefreshed sleep, in particular fatigue and then a whole range of somatic symptoms including gut symptoms as we discussed earlier.

So there's a recent theory of what causes chronic fatigue and fibromyalgia that was developed by a really, really smart guy named Dr. Rich Van Konynenburg. He is not a medical doctor, he is a researcher, and his theory is that the underlying cause of both of these disorders is glutathione depletion and a block in the methylation cycle.

So let's first talk about glutathione. I think a lot of people are aware at least of some basics. It's the master antioxidant in the body. I like to describe it as the bulletproof vest. If we've got enough glutathione we're pretty well protected from oxidative damage, but if glutathione gets depleted, then we're not very well-protected and we're at risk.

So it's a tripeptide. It's glutamate, cysteine and glycine together. It's found in every cell in the body and it's found in two types. There's a reduced form, GSH, and then there's an oxidized form, GSSG; and this ratio of GSH to GSSG is what controls the redox potential inside the cell. So as I said, it's like the bulletproof vest; it determines how protected we are from oxidative damage.

Glutathione also conjugates a lot of different toxins for removal from the body and that's phase one, liver detox, and then it quenches free radicals that are generated in phase one detox in phase two liver detox. It supports cell-mediated immunity to help us fight viral infections and other types of infections, and it stimulates T regulatory cell production which balances the two sides of the immune system, the Th1 and Th2, so it keeps the immune system even and in balance and it helps protect against autoimmunity or treat autoimmunity.

But one other really interesting role for glutathione -- and this is particularly relevant in terms of the methylation cycle -- is that it protects vitamin B12 from oxidative damage by toxins, and without glutathione, B12 is really reactive; and if it reacts with toxins, it becomes inactive and

it can't perform the functions that active B12 is supposed to perform. A really important thing to realize about this is this pattern does not show up in a lab test for B12 because when they are testing for B12 in the blood they are testing for cyanocobalamin which is the inactive form.

So you could actually be completely normal for B12, or in fact, a lot of people with chronic fatigue have high B12 levels, and you're still having this issue where the B12 is being destroyed by toxins because of lack of glutathione and then the active forms of B12 aren't doing what they are supposed to do, which I'll describe in a second.

So glutathione is depleted by I would say just the modern lifestyle. I mean there are some genetic factors but basically anything that causes stress and I mean the big definition of stress, anything that disturbs homeostasis, not just emotional and psychological factors but food, toxins, environmental toxins, chronic illness, injuries, medications, et cetera. I mean anything that disturbs homeostasis will deplete glutathione.

So a lot of people, as you could imagine, considering that don't have enough glutathione, and that's particularly true in the chronic fatigue community. In fact, that's one of the best documented criteria of chronic fatigue syndrome or pathogenic factors is glutathione deficiency. I mean there's a lot of controversy over what causes chronic fatigue of course, but this is something that pretty much everybody can agree on is that there is a glutathione deficiency.

So the methylation cycle is the second part. The methylation cycle involves distributing methyl groups to various chemical reactions around the body, and these reactions make things like carnitine, CoQ10, phosphatidylcholine, melatonin, precursors for neurotransmitters. It's hard to overstate the importance of the methylation cycle. It also controls sulfur metabolism and balancing the need for methyl groups and for glutathione that control oxidative stress and then other sulfur metabolites like taurine and sulfate and cysteine.

And then it coordinates the production of new DNA, which is of course necessary for the production of all new cells, and it prevents or silences gene expression, and that's important because we know that in CFS there is an overexpression of genes so you get epigenetic changes that contribute to the symptomology that you see in chronic fatigue syndrome.

So going back to B12, it plays a crucial role in the methylation cycle and it has two active forms. So in one active form which is methylcobalamin, it acts as a coenzyme for methionine synthase and that's an enzyme that converts homocysteine to methionine. So if you don't have enough methylcobalamin, then you won't be able to convert homocysteine back to methionine and you have an elevation in homocysteine which is highly inflammatory, causes oxidative damage, raises your risk for heart disease and a number of other inflammatory conditions.

And then the second active form, adenosylcobalamin, acts as a co-enzyme for another enzyme that helps feed fuels into the Krebs cycle to produce ATP, which is the fundamental energy currency of the cell.

And then lastly in the methylation cycle, active folates act as a source of methyl groups and they participate in the synthesis of purines and other molecules that are needed for various physiological process. So that's in a nutshell what glutathione does and then what the methylation cycle does, and now I'll just summarize what happens when this full thing goes wrong.

So number one is that chronic stressors deplete glutathione, the reduced form of glutathione, and that leads to oxidative stress; and when there's oxidative stress, toxins will accumulate because we're not able to get rid of them. Those toxins interfere with the protection and the intracellular metabolism of vitamin B12. So when you get a functional deficiency of B12 and those accumulated toxins react with a lot of the B12 that's in the body and they make it inactive as I described earlier.

And then a lack of sufficient B12 establishes the block, basically blocks that methylation cycle by messing with methionine synthase and then sulfur metabolism becomes totally disregulated. And when sulfur metabolism doesn't work, glutathione will become depleted because glutathione is an end product of sulfur metabolism.

So then you're in a really nasty vicious cycle where low glutathione leads to destruction of B12 and inactivation of B12, which in turn leads to even further reduced glutathione levels. And then you get sulfur metabolites draining excessively into the transsulfuration pathway and then getting excreted, and that further depletes methionine. Then you get folate draining from the cells into the blood via the methyl trap mechanism and you're just stuck in this really bad vicious cycle and that's why chronic fatigue is a chronic condition.

Robb Wolf: Holy cats! I feel like I need a smoke out for that. Man!

Greg Everett: But let's hurry up and steer this boat back towards a more appropriate topic for this podcast, which is poop.

Robb Wolf: And speaking of poop, so the GAPS protocol with this, so part of where --

Greg Everett: Why don't you tell folks what GAPS stand for if they're not familiar with it?

Chris Kresser: Let me at least try to extract some practical information from that whole random -- yeah, people's eyes are glazing over.

So let me just say like the last couple of things about that. There's a way that you can figure out if this is happening to you, and there's a test called the Methylation Pathways Panel. It's offered by Health Diagnostics Research in the US and by I think the European Laboratory of Nutrients in Europe and a scan lab in Europe. I've ordered it for people in Europe and in the US. You have to be a practitioner to order it so you have to find someone who can order it for you.

There's also organic acids testing from places like Metametrix in Geneva, and there you'd be testing for urinary methylmalonic acid. If that's high, that means active B12 is low. Fromino-glutamic acid or Figlu, if that's high, then that suggested active folates are low; and then pyroglutamic acid, if that's out of range, then glutathione is depleted.

And then there is the MTHFR or methylenetetrahydrofolate reductase mutation panel, DNA panel from Spector Cell, and that will test for mutations, genetic mutations that cause problems in the metabolism of folate and homocysteine; and if you have the mutation, you're way, way more likely to be suffering from this problem that I described.

In terms of treatment, it's fairly involved -- I'll have to maybe talk about it another time or I'm going to be writing about it more and talking about it on my show. But it involves active B12, active forms of folate, phosphatidylserine or phosphatidylcholine and some other nutrients that support the methylation cycle. So anyone out there who is suffering from chronic fatigue or thinks they may be suffering from chronic fatigue or fibromyalgia, you can search for glutathione depletion and methylation block and you'll be able to find a lot of information. Like I said, if you need to test anything and you need some help, seek out a practitioner who specializes in this stuff.

Okay, back to poop.

Robb Wolf: And so tying in the GAPS, like the Gut and Psychology Syndrome, huge understanding that a breakdown in gut integrity leads into systemic inflammation. Like I've just been organizing my research to do some more writing and probably 12-15 papers on gut permeability and liver damage like a non-alcoholic fatty liver and related liver pathologies. Basically, it's still somewhat correlative. We don't 100% have kind of cause and effect kind of gig, but I think we have some really nice proposed mechanisms on this stuff, and it's all placed into this whole kind of downward spiral.

I mean once the GI tract is damaged, you have this huge influx of toxicants from the gut microbiome, from our partially digested food. That starts basically impacting liver function and also a lot of these -- I like the analogy of like the body armor kind of gig, like we started wiggling through our bodies' reserves.

And this is also where this can take a significant amount of time for people to spiral down, and it happens in such a slow insidious way, and two, three, four years down the road, it's like I can barely get out of bed. So there was never a punctuated moment oftentimes. It was like, "Okay. This is what caused the whole thing, the downward spiral, the bad sleep, the bad food, systemic inflammation," kind of feeding forward until you finally get the point where the wheels off the wagon.

Chris Kresser: Exactly. I'm so glad you brought that up because one of the biggest questions I see in my practice is "Why did this happen to me?" Like trying to find the one thing that went wrong that caused everything. I think it's way more complex than that and I completely agree with you that it's usually a combination of factors that unfold over a long period of time, and then what generally happens is you get one or more of these vicious cycles that are really difficult to get out of unless you know where to intervene.

So that's another important point though with treating this glutathione depletion and methylation block is that it's not going to happen overnight. There is only unfortunately one small clinical study that's been done on this treatment protocol, but it was very successful. But one thing to point out is that most of the patients didn't notice anything at all for five weeks. So I should say there weren't any statistically significant changes until five weeks. Some people probably did notice something.

But the really significant benefits started happening at three months, and when the study was over at six months, people were still improving. So

it's a long-term protocol and that's one of the reasons I think getting the test is probably a good idea even though it's a little expensive; it's about 290 bucks I think. But if you see the results on the test that indicate that you have this pathology, it's a lot easier to make a six-month commitment to a treatment protocol than it is if you're just not even really sure that that's what's going on.

Robb Wolf: Do you see -- like I've seen with folks that have some adrenal fatigue, one of the big buggers within that community, particularly kind of the CrossFit scene or related stuff, folks will start feeling a little bit better, recidivism is high, and they will relapse.

Chris Kresser: That's the debate of my existence.

Robb Wolf: Yeah.

Chris Kresser: I mean I really try to encourage people to not do that, but it's hard. I mean I don't understand. If you've been feeling crappy for a long time and then all of a sudden you start to have a little bit of energy, it's natural to want to use that and to want to start doing the things that you used to be able to do before, but there's nothing that will sabotage your treatment faster than doing too much exercise too soon if you're dealing with chronic fatigue and adrenal stress.

Because as I mentioned, anything that stress the body depletes glutathione, and exercise, especially intense exercise, is a stressor. It's usually a new stress for someone who is healthy, but for someone who is already glutathione depleted and fatigued and the adrenals are burned out, then it can be fairly catastrophic.

Robb Wolf: Cool! I just kind of wanted to throw that in there so that when folks are thinking about this or if they're a coach or a trainer or something, they have a client who is in this state, it really becomes a situation more of reining people in rather than trying to motivate them at that point, although you can't come from the other side where people have been so sick and beat down that you got to douse them with gasoline to get them to do much of anything. But it's an important thing to keep in mind.

Dude, that was awesome. Like seriously. I need to smoke after that because I just feel kind of whoo!

Chris Kresser: Hopefully we can get a transcript or something.

Robb Wolf: Yeah. We transcribe this. It usually takes about a week.

Chris Kresser: That's awesome. Cool!

Robb Wolf: We get it done in some off-the-grid thing. So I'm really interested to see what methylcobalamin -- if the guys can translate that, that would be awesome.

Chris Kresser: Yeah.

Robb Wolf: So Chris, do you want to do another question or do you want to jump in to the Personal Paleo Code?

Chris Kresser: Well, let's do one more from Boris because I can answer in about one sec.

Robb Wolf: Two shakes? Okay, cool. Cool.

Greg Everett: Boris says, "Is it okay to supplement 1000 milligrams of vitamin C daily long term for constipation if it's the only thing that provides significant relief?

Chris Kresser: Yes.

Robb Wolf: All right.

Greg Everett: All right.

Chris Kresser: I'll expand. I've said this before I think, but I think in almost all cases, the main cause of constipation is gut dysbiosis, so insufficient amounts of good bacteria or too much bad bacteria. 70% to 80% of the dry weight of stool is bacteria. So yes, vitamin C is safe at a gram a day over the long term, but I would definitely continue to look into how to heal the gut in the gut flora not because taking vitamin C at that dose is dangerous but just because constipation is a sign that something is not right.

Robb Wolf: Let's pump out the one from Monica then.

Chris Kresser: Okay.

Robb Wolf: The intestinal dysbiosis. Greg said to me to pull this back to poop because that's where we tend to function here.

Chris Kresser: Okay.

Robb Wolf: Do you want me to read it?

Greg Everett: I couldn't hear the last whole part of that.

Chris Kresser: Robb, you were breaking up a little bit on the Skype thing.

Robb Wolf: Okay. Am I back?

Chris Kresser: Greg, we're looking for Monica's question here.

Greg Everett: Okay. Monica says, "Can intestinal dysbiosis be cured by adhering to a strict GAPS protocol and avoidance of all grains and starches? Wouldn't the inclusion of safe starches like sweet potatoes, yam, plantains and the fermentable fibers provide mainly benefit for restoring the health in the gut flora?

Chris Kresser: Yeah. So this is a great question that's a somewhat controversial topic. My viewpoint on it is what gets me in trouble in the GAPS community. I think the GAPS diet is a fantastic approach. I think it's very effective. I did it myself for six months. I got a lot of benefit from it. I use it with my patients.

However, I'm not a GAPS zealot. I think there's a time and a place for it. I think that if someone does it for six months and is not getting any benefit and then is getting worse, it's probably not going to work for them and they should try maybe more like a Paleo type of diet.

I just get a little nervous when I see people doing something that's clearly not working for them for a really long time and often making them worse, and they continue to do it because people on the GAPS farm are telling them to just stick with it because GAPS has some kind of monopoly on healing the gut, which it doesn't. I mean that with the greatest respect for Natasha Campbell-McBride. I love her work and I think she and Elaine Gottschall from the SCD diet, which GAPS is based on, really have made a huge contribution with their approach.

But Monica makes a good point and one of the biggest problems I see with some people following especially the intro phase of the GAPS diet for a long time, which is essentially not zero carb but it's extremely low carb, that the bacteria in the colon, the good bacteria ferment soluble fibers that are found in safe starches like the ones that she mentioned. And if you completely eliminate those and other fruits and things that contain soluble fiber from your diet, you're starving all the bacteria in your gut. That might be beneficial if you have bacterial overgrowth like SIBO in the small intestine. If you do that for too long, you lose your good

bacteria as well and that's why you often will see constipation or other problems associated with not enough good gut bacteria.

So again, I do think it's useful, and at the same time I think just applying some common sense to it and being willing to be a little bit flexible in the context of the GAPS diet is really helpful.

Robb Wolf: So Chris, what's a vector that people could follow people on this? Because honestly, my go-to thing if somebody is in a scenario like this, just for me, maybe it's because I'm just a simpleton, but I tend to start people on that kind of lower carb Paleo kind of gig. It's funny; I've always recommended to people that they do like bone broths and stuff like that and cook down the whole animal. So I think you tended to have that stuff woven into things.

But then what's the delineation there? Should they start feeling better pretty quickly on that? If they don't --

Let's say that we've got a compounded problem of some pretty wicked adrenal fatigue, so then we're dealing with -- and although people with intestinal permeability, they tend to be insulin resistant and then you add on to that elevated cortisol levels possibly from food intolerances, I mean a whole variety of things. But how are you navigating that? Is it just simply throw in a really modest amount of carbohydrate? I mean we're keeping people under 100 grams a day which I think for the vast majority of people is probably going to be good. Do you start them off on the low end then titrate them up? What's a good way for folks to navigate that?

Chris Kresser: Yeah, it's really tricky. It kind of is case by case in my practice, but I can give a few guidelines in general the way I think about it.

Take someone who has got serious IBD like Crohn's or ulcerative colitis. They're having like 10 to 15 watery bloody bowel movements a day. They're facing surgery. I mean I get patients like this and they are in really, really bad shape. I'll put them on the intro phase of the GAPS diet and that is actually just bone broth and meat cooked in the broth. No vegetables even because vegetables with insoluble fiber, when the gut is that inflamed…

Robb Wolf: Can irritate the gut.

Chris Kresser: Yeah, it can irritate the gut. So they're basically just eating meat and broth until the diarrhea subsides to maybe three a day or something which is a huge improvement for people like that.

And they'll be on the full strict GAPS protocol where they do the GAPS, the intro diet very strictly until the diarrhea resolves, and then there's like six phases of the intro diet that they progress through very slowly. I have one patient who has been -- it took almost a year and a half for him to get completely out of the intro diet so that's on one extreme.

On another side, if you take someone who has got IBS type of symptoms, gas bloating, maybe some constipation and some diarrhea alternating back and forth but they're not in dire straits like in this either situation, what I would probably do is put them either on the GAPS plus starch or Paleo plus bone broth which is essentially the same thing. It's what you were talking about -- a lowish-carb Paleo with bone broth and the fattier cuts of meat and some of the starches like sweet potatoes, yam, plantains, et cetera. I mean I guess you can't really call it the GAPS diet if it has starch in it but they're the same thing.

So I'll start somebody on that, and if they feel a lot better which they usually do, I think that's a really good balanced approach for the long term because you've got enough starch and fiber to feed the gut bacteria and keep that healthy, but you're still getting the glycine-rich bone broth and fattier cuts of meat which help restore intestinal barrier integrity and you're still eliminating all of the good toxins that cause gut permeability in the first place.

And then of course there's somewhere in between where someone might start on the GAPS diet. I would say if someone is going to really give it a try, they need to try it for at least three months, and if they try it for three months and they are experiencing no improvement at all, not up and down because that can happen; that's a normal part of the healing process; but if they're really just getting worse and not experiencing any improvement, I would seriously question that approach at that point.

Robb Wolf: Cool! This kind of leads in I think a little bit or illustrates pretty clearly that there's a huge need for individualization with all this stuff and it's always a balancing act how do you throw out information to the masses so that you can -- what's the general message that's going to resonate or be appropriate to like 80% or 90% of the folks out there and then how do them ogre in and grab the remaining 10%, which if you go down that list you start getting more and more impacted people, sicker people, folks with more complex situations and whatnot.

You've been messing with this in the clinical practice for quite a long time and then you've come up with a system for taking this idea of going from

the general Paleo idea and offering this thing down and making it very, very specific for folks in the Personal Paleo Code. But what's going on with that?

Chris Kresser: Yeah. So just as you said, and this basically came right out of my experience in the clinic, my patient population is unusual. It's not who the typical physician sees. I see mostly people who are already aware of the Paleo diet. Maybe they've been on it for quite a long time or maybe they are just learning about it.

But one of the biggest issues I would see is there's so much confusion about how to implement it in a way that really works for them because as we all know, there's a lot of different voices out there in the Paleo community and while we agree on a lot more than we disagree about, there are still differences. Some people say dairy is fine when it's well tolerated. Other people say it should be strictly avoided. Some people say sweeteners might be fine in moderation. Others say absolutely not. Some people say that it's really about macronutrient ratios and calories aren't important in terms of weight loss, whereas other people say no. Actually, calories do matter.

And then people like myself have argued that white rice might be okay in moderate quantities because it doesn't have the food toxins in it and it's just mostly starch, while others still recommend avoiding rice. So I was getting a lot of people in my practice who are just totally paralyzed, the paralysis of analysis. They are on PaleoHacks and all the different blogs and forums and they just were overwhelmed. They didn't know what to do and so they just were kind of stuck.

I had a process that I had kind of developed working with people and helping them implement the Paleo diet and it's really similar to I know what you've been doing for a long time, Robb, which is starting out with a 30-day period where you remove all of the foods that are known to cause problems for most people, so a strict Paleo, lowish carb type of approach where you take out dairy and all grains.

And then there are some modifications there. I have a worksheet where somebody can do further modification of that initial 30-day period. So like if say I've got an autoimmune condition, there are some other foods that they would take out, if they have blood sugar issues, there are some additional modifications to make.

There are a lot of 30-day challenge resources out there that are really great. I know you've got one, Robb, and of course Melissa and Dallas

have one, and there's some awesome information out there. But what I really wanted to do was focus on what happens after the 30-day challenge because there's not a lot out there about that and that's where I feel like the biggest problems came up in people's process with this stuff. So they would do the 30-day challenge and then they would start adding foods back in and start to feel bad, and it was really difficult for them to tell what was going on.

So step two in the Personal Paleo Code is a very tightly controlled food reintroduction and I go into a lot of detail about which food should be reintroduced in which order, what symptoms to look out for, what to do if you experience symptoms, how to deal with it.

And then step three is where the real personalization happens. That's basically where we look at very specific tweaks and refinements for people with specific health conditions like thyroid problems or overweight or blood sugar issues or autoimmune disease or gut issues like we have been talking about.

We talk about macronutrient ratios. We talk about meal frequency. We talk about basically how to discover your own version of the Paleo diet or the Paleo template, whatever you want to call it, that's personalized exactly for you rather than following what works for some dude on PaleoHacks or what I say or you say, Robb, or somebody else.

Because ultimately, I think that while genetically we share a lot more in common than is different, there are some pretty key differences like everything from what our goals are. If someone is training for a weightlifting competition or CrossFit Games or something, their needs are going to be a lot different than someone who is like a computer programmer and sitting on their butt for eight hours a day, and there are a lot of other examples of that.

So I think the personalization is the key to succeeding with it over the long term and that's why I put this thing together.

Robb Wolf: I think that answer that I give now more frequently than any other answer is "Who are you? What the hell do you want to do?" because you can have a seemingly simple question, but then when you really ogre into it, the answer is going to be really dependent on where the person is coming from, and inevitably, I find that folks are trying to do multiple goals at the same time. They are trying to lean out and improve performance. They are trying to gain muscle mass and improve metabolic

conditioning and they end up kind of shitting the bed on both counts with that.

When I looked at your program, it's really good because it just creates this kind of very basic intervention in the beginning that is just simple. There's not crushing levels of detail. It moves people forward but then as they get healthier and they start getting even a little bit of awareness, it's like, "Okay. Who am I? What do I want to do? Do I want to be an athlete or I just need to be functional to raise my kids and stuff like that?" But then you can start dialing this thing in so that it's very specific for your needs.

But the way that you've done this is really good and it's indicative of a well-schooled practitioner who has been dealing with a lot of people for a long time because you can't overwhelm people with the details in the beginning, but then at some point, you need to be able to dial this stuff in and be able to meet folks wherever they are and kind of meet their needs and have it go from there.

So I'm jazzed. This is stuff that I've thrown out parts and pieces of but I never had the wherewithal like you to organize it and put it together.

Chris Kresser: Well, selfishly, to be honest, one of the main reasons I put it together was I knew it was going to save me a lot of time in the clinic just to be able to offer this to patients and to be able to put people through the process that makes a lot of sense and all the information that's there is really helpful for me as a practitioner.

Particularly, there are a few tools that I want to mention that I think make the whole process go a lot more smoothly for people who are just starting to adopt the Paleo diet. This is really aimed at both beginner and intermediate. I just wanted to say that this is not the thing for someone who has been on the Paleo diet for eight years and follows every single Paleo blog and knows everything about the Paleo diet and has tried everything. It's not for that population. It's for people who are just starting out or who are maybe a little bit into and are feeling stuck and have some questions.

So one of the things that I was excited about because I used something similar in the clinic is there's a progress tracking tool. So I think this is where a lot of people fall off the truck so to speak is we all have this tendency to as we improve our new reality becomes kind of the only one that we know, and we easily forget how we are doing before and it just becomes difficult to track progress. Let's say we're trying a period of time

without nightshades and dairy and eggs; we're trying an autoimmune protocol; it's really helpful to have a system that allows you to track your symptoms and how they change over that period of time, and that's what the progress-tracking tool does.

There's a number of questions that you answer, like for example in the category of cognitive mood like lack of motivation or anxiety or insomnia. You got a rating scale from zero to 3 with the frequency of how you experience those symptoms, and then the system will churn back a percentage improvement over whatever period of time you choose to view the results in and then it also displays the results on a chart. So you can actually visually see how you're progressing over the course of time on the program. So we measure subjective symptoms but we also measure more objective things like weight and BMI and waist to hip ratio.

The other thing I wanted to do is provide a whole bunch of reference guides with some really juicy practical how-to stuff because that's again an area where I saw people struggling is "Okay, what do I do when I travel? What do I do for snacks? What about nuts and seeds? How do you properly prepare those? What supplements should I take? I'm confused about fats and oils. How about condiments because most condiments you buy in the store have ingredients that aren't safe. How do I make bone broth? How do I make fermented foods?"

So we have ten different reference guides on all of these topics that go into a lot of detail on each of them, and the idea was to make this kind of like Paleo in a box. You open it up and you got everything that you need to make the Paleo diet a success.

Last along those lines and the thing that I was personally most excited about was the meal plan generator. So this is really cool. It's an online application and it allows you to generate meal plans using only the ingredients that you're eating right now in your diet. So you can go in there for example and you can choose to exclude dairy. Maybe ghee and butter is fine but you want to get rid of cream, sour cream, cheese, yogurt and milk, and then you want to eliminate rice. You want to do completely grain free and then you want to take out nightshades. So you check all those foods to exclude and then you hit a button to generate a meal plan for a day or a week or even a single meal and it will bring back all Paleo safe recipes but without the ingredients that you excluded there.

And then there are quick plans or you can do like autoimmune Paleo. You can do a very low carb. You can do like a 30-day very low carb

autoimmune. You can do a GAPS-friendly plan. We've got over 500 recipes from all the top Paleo recipe blogs and we're adding 25 to 50 every month.

So we've had tons of great feedback about this and I use it myself. It's a separate product from the Personal Paleo Code but you get a free 30-day trial to it when you join the Personal Paleo Code, and then it's 9.95 a month after that. Actually, in a couple of weeks here we're going to be offering the meal plan generator completely separately from the Personal Paleo Code. So far the only way to get it has been signing up for the Personal Paleo Code but we had a lot of requests to make it available for people who already have their diet wired but just want access to the recipe generator.

Robb Wolf: Nice. Well, folks that are interested in this, I have a little video piece that I'm putting together to explain why I'm endorsing this.

Greg Everett: Did you manage to shower for that?

Robb Wolf: No, I still need to shower and shave for that but I've got it blocked out a little bit. It's one of those things where I've had an idea about doing something like this for a long time. It's always a question of like resource allocations. Do I have the time to do it? Am I going to put the effort into it? and stuff like that.

But similar to the Healthy Baby Code, I had known for years, years that some sort of this Paleo type intervention was shockingly beneficial for fertility and I kind of rattle around what I was going to do but there's kind of a reality. I'm more a strength coach. I definitely help a lot of people talking about this stuff, but I haven't been elbow deep in the clinical side of this the way that you have.

One of the reasons why the book that I wrote was successful was because I had this interaction with just thousands and thousands of people and so I was able to kind of take most of the objections, most of the challenges that people had and address them in the book, and I think that's where it was successful and continues to be pretty successful. But what you've done with both the Healthy Baby Code and this Personal Paleo Code is you've taken a ton of clinical experience, seeing people both succeed and struggle trying to implement this stuff.

One of the areas that they struggle is just kind of the information overload and knowing how to triage, "Okay. What do I do first? What do I do next?" This is exactly the type of thing that I would have wanted to

make, but you did it way better than I could have because you got an experience that I just frankly do not have. So that's where honestly I'm just super, super jazzed about this thing because this represents, I don't know. Probably 85% or 90% of the questions that we had represented here from your Facebook page and that usually pop up on my page, it's covered in this, probably 95% of it.

Now, the thing that I'm living in terror is if you read Zen and the Art of Motorcycle Maintenance, the dude talks about whenever you answer one question it creates two more. So if that is the case, then the world will implode after this because you've answered almost all the questions. So if this generates more questions off of this, like literally like the space-time continuum will rift over around Berkeley and we'll all be done.

Chris Kresser: Right.

Robb Wolf: But yeah, I'm super excited about this and so we're going to have some linkage in the show notes for the Personal Paleo Code from my site and we're going to have a dedicated page there, and then you've got tons of information at chriskresser.com. I'm just super excited one, to have you back on the show, and then two, you've got this project and it's up and running. All of it sounds super cool.

Chris Kresser: Yeah. I appreciate you having me back, Robb, and the kind words. It's nice to see how well it has been received because I look back because I did this in the months leading up to leading up to Sylvie's birth and I don't know how I did it. It was so much work. All I have to say is I'm so glad I did it before Sylvie was born because it never ever would have happened otherwise. So finish that book.

Robb Wolf: Well, I made it dead trying to get the shit done I need to get done.

Chris Kresser: Yeah. That's the little thinly veil reminder.

Robb Wolf: That was a square kick to the balls.

Chris Kresser: Well, I look forward to seeing you in March in Austin, and anyone else who is listening, I hope to meet some of you there too.

Robb Wolf: Yeah, yeah, that will be a ton of fun. Anything else you want to let folks know that you have cooking or is that it?

Chris Kresser: Well, actually, just the little twinkle in the eye I guess. That's so early in the planning stages but I'm planning -- I think the next step for me is a

similar Personal Paleo Code, Healthy Baby Code, I don't know. I'm not going to be so lame to call it the Healthy Gut Code, but just the more I work with people, the more I see it's all about the gut, so I mean there's a lot of information in the Paleo Code about the gut and probably 90% of people, that's all they'll need. But I think my next step is going to complete A to Z how to heal your gut.

Robb Wolf: Pie Hole to Hoo-Ha. That's what I was thinking you call it, Pie Hole to Hoo-Ha solution.

Chris Kresser: Awesome, man. You could be my marketing guy.

Robb Wolf: Perfect. Yeah. I will tank your career in no time flat, so no problem.

Chris Kresser: Perfect.

Robb Wolf: Awesome, dude. Well, again, a huge honor having you on the show. I'm very excited to see how the Personal Paleo Code does. Maybe if there are some questions which there shouldn't be because you answered all the sham questions, but I'm sure there will be questions. People will want some refinement on this so maybe we'll get you back on the show, similar to what we did with the Healthy Baby Code. A couple of months after that launch we brought you back on to answer some questions so that would be cool.

Chris Kresser: Perfect! Sounds good. I'm game.

Robb Wolf: Awesome, Chris. Thanks, man, and thanks, Greg, for minding the store here.

Chris Kresser: Thanks, Greg. Yeah. Thanks again.

Greg Everett: Oh, yeah, yeah.

Chris Kresser: Always a pleasure.

Robb Wolf: All right. Talk to you guys later.

Chris Kresser: See you later.

Greg Everett: See you.