

Paleo Solution – Episode 145

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Hey folks, Robb Wolf here. Episode 145 of the Paleo Solution Podcast. This is gonna be a little bit odd because my partner in crime Greg Everett is on a much deserved vacation and so I'm actually gonna be flying solo on this thing. So we'll see how this goes. Definitely seems really odd jabbering into a computer all alone even though I guess normally I'm all alone with Greg in some remote location.

But just seems a little bit more normal that way anyway. Definitely we've reduced the IQ of the show by 95% not having Greg on this one but hopefully it's not too big of a cluster.

I'm going to mainly go through the Ancestral Health Symposium that just went down this past weekend in Boston at the Harvard Law School. Pretty cool gig - very very impressed so I'm gonna give you a little bit of the highlights of the things that I got to participate in with that event and yeah.

So we'll be back to our normally scheduled programming next week with Greg Everett in attendance. Just want to remind folks that there are a couple of more days left with our sponsor US Wellness Meats. If you place an order and you enter the code Paleo with the number 4 and then the letter U - Paleo4U then you will receive a 15% discount on your purchase.

So with all that in mind - so the Ancestral Health Symposium this last week - got to hang out with some good friends - Matt Lalonde, John Welbourn, a ton of people that I haven't seen in quite a while, was really a lot of fun. Blistering pace to these weekends.

Stuff is scheduled from early in the morning til late at night typically and lots of hanging out with people and talking and trying to catch up and all that stuff. It was a rough return here. I was pretty knackered but tons of fun. All of this is gonna be available from the Ancestry website.

I'll let people know when that goes live so you'll be able to see all of these talks plus many many more. The first day of talks were in one main room and the second and third days we had talks occurring in two rooms concurrently and we had a bunch of poster presentations and there was just a ton of information.

So obviously on the second day and third day I had to pick and choose who I went to and what I got to see which was rough because there were some things that were

double booked that I would've really liked to see but again all this stuff is gonna be available online.

They will have both the oral spoken piece of this thing as well as the slides that were presented, stuff like that. Pretty cool stuff. The person who kicked off AHS for this year was Professor Dan Lieberman. He's a Harvard professor of evolutionary biology. He's one of the really big barefoot running proponents and has done some really seminal work.

He had a paper published in science not too long ago, maybe a year and a half, two years ago that was looking at barefoot running gait and economy of movements, stuff like that and interestingly our very own Mat "the Kraken" Lalonde was one of the test subjects for that science paper and it's kind of funny.

Lieberman who is I think himself a pretty high volume runner and really like distance running and stuff like that he was commenting to Mat that his running technique was phenomenal and how often does he run and Mat looked at him with a very pained expression and said as little as possible.

So kind of funny.

Professor Lieberman - his talk was essentially whether we adapted for from this evolutionary context and the high points of his talk which it was just amazing. He covered an enormous amount of material but provided a really solid overview of this whole ancestral health kind of paleo concept.

One of his opening remarks is really important I think, something that is critical for folks to take home which is that we don't really have a singular paleo diet. I don't know we've talked about this at different times and I've ruminated on the topic.

The term paleo is unfortunate in some ways because it conjures up some kind of mental imagery about the whole caveman shtick and stuff like that. I go back and forth on that because on the one hand for many people it's a helpful template or visualization to think about pre agricultural times and what types of foods would have been available to our hunter gatherer forebearers.

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But Professor Lieberman made a really solid observation that I think is important with a lot of the things we've seen recently, Stephan Guyenet being one of the folks that has talked about the book, the 10,000 Year Explosion and talking about the really rapid evolutionary change that we've seen in the last 10, 000 years since agriculture and the implications that it has for how we describe this Paleo Ancestral diet.

If you haven't read the 3-part series that Stephan Guyenet has on Otzi the iceman and his genetics and the discovery that although this guy was appeared to be living is a hunter-gatherer, he genetically appears to be part of the lineage that is transitional phase between hunter-gatherer and agriculturalist.

And depending on who you are and where you're from, you probably have a potentially a much higher percentage of agriculturalist genes than hunter-gatherer genes which shoots in this notion that we've talked about in Paleo land for a long time that we're cavemen in pinstripe suits. Strictly scientifically speaking, that's not accurate but like Stephan Guyenet points out in his 3-part piece.

When we start talking prescription it doesn't really matter because we have a significant chunk of our population that is ill-adapted to grains particularly gluten-containing grains, some people aren't adapted to dairy, other people are less adapted to legumes, and so all of that, I think, that we're able to figure out still using this Paleo template as a starting point to give it a shot for 30 days, 60 days, see how it would look, feel, and perform tracked by all markers that health and disease reintroduce some of these Neolithic foods and see how you do with them.

And so with that, we're able to get a pretty high degree of success dialing in to our particular air fuel mixture with our macronutrients and all that. But again, back to professor Lieberman, he made this interesting observation that we don't just have a single Paleo diet or a single ancestral diet that we're talking about.

When we go back, maybe more than 3 million years we had ancestors that were still existing in largely fermentative metabolism not dissimilar from chimps and gorillas who have very capacious of guts and probably derived a significant amount of their caloric needs from the cellulosic fermentation converting cellulose into volatile organic acids which then get esterified into fatty acids and provide butyrate as a fuel substrate.

It's a pretty important stuff but Lieberman made the observation that we have different historical adaptations which have been conglomerated into our lineage and so we move from fermentative to a frugivorous background much more fruit oriented. And then somewhere in this mix, and I was talking to Mat Lalonde about this, we had a transition in which we started eating more tubers, more meat and we had the use of fire.

It's still a little bit nebulous to me exactly what came first and reading Richard Wrangham's book, *Catching Fire*, he makes the argument that we probably in either isolated pockets or a broader scene, we're not really too sure which but at some point, somewhere along the line someone in our ancestral lineage started using fire to cook food. And possibly, this was preceded by, say like, Australopithecines using stone tools or Homo Habilis using stone tools to crack open like the long bones of animals and get into that marrow to get into the skull casing.

And this drove the whole expensive tissue hypothesis adaptation where we started trading decrease gut size for increased brain size and this was important because of the socialization that we had and all that stuff. But the really important piece to this is what we are tracking is increasing nutrient density, increasing digestibility and moves critical to this increasing nutrient absorption. None of this really matters if we aren't actually moving nutrients into our being, into ourselves.

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I think with our understanding of these potent epigenetic inputs that - the environment, our food, these things can force selection processes which can be very very potent and very quick act at. What we see what the agriculture transition was it was and is significant problems with health.

It's been very successful with regards to reproductive success because we have more human beings on the planet than ever in history so agriculture's been a boom, in that regard. But, from a health standpoint, there are obvious problems that would popped up particularly as we've reached the point in which now, our nutrient intake per calorie has actually gone down with the refining of our food supply.

So, these historical adaptations have typically led to increasing nutrient absorption, increasing nutrient density. But now we're actually at the point where our food is so processed that the nutrient density is decreasing but the caloric density is increasing.

And there's a couple of folks later, I guess primarily Chris Masterjohn all dovetail back in on this discussion of tubers and carbohydrate absorption and some adaptations that are significant in a hypercaloric or hyperfed environment. But, Professor Liberman kicked things off - really really powerful talk, really good stuff, definitely check that out when the talks are hosted online.

The next talk that I watched from Mat "The Kraken Lalonde and his was on nutrient density. There've been a lot of different attempts at quantifying the nutrient density foods. Most of them end up vilifying saturated fat, sodium, cholesterol.

So, many of them end up placing significant weight on some things like kind of obscure carotenoids and some obscure anti-oxidants that we really don't know that much about. They are not vitamins. They are not minerals, not essential to health. You're not gonna die without them. They may present some sort of a benefit but we don't really know for sure.

So, Mat started looking at this whole nutrient density thing. He and I had talked about this a fair amount and Loren Cordain's and Boyd Eaton's older paper in the Journal of the American Nutraceutical Society where they basically put together a representative

paleolithic type diet based of modern available foods and kinda ranked out different foods based on the nutrient density and what not which was really solid paper.

But, it didn't have a really deep bench when it was analyzing the different nutritional inputs. There was like 1 input for like dairy, 1 or 2 inputs for dairy, only a couple of inputs for grains and stuff like that. So, when Mat started looking around at this stuff, he realized that it's been a very narrow treatment of this topic.

And so, Mat being the massive over-cheater that he is, ended up inputting into Excel about more than 7,000 different entries from the USTA nutrient database and then used that to rank the relative amounts of vital nutrients that we have data on. He did some normalization for like fiber content and water content and stuff like that. I'm not gonna give away the whole so try on this.

And there's actually one piece that I really wanna tell folks about but I'll wait for you to watch his presentation because it's a big win for the things that we usually hope near and to hear ourselves. But, the take away from this was that meat out of all the available food stuffs out there was the big winner, hands down. And within meat, organ meats were even far and away the greatest winners.

And this was even neglecting things like the essential amino acids which Mat didn't have really good data on all of those and so we couldn't compare meat relative to this other, say like fruits and vegetables and grains and stuff like that. So, meat would more than likely be even more powerfully the winner if we were able to factor in a few more variables.

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But the interesting take away from that, meat is buying easily the most nutrient-dense item that we have. When you start looking at other things, vegetable placed out really well. Fruit doesn't actually place out all that well.

It was kind of an interesting eye-opener for us. And a big one was that potatoes typically finish off better than sweet potatoes which I would have bet the farm but that was not the case. Sweet potatoes finished off really really well with regards to carotenoids, Vitamin A precursors.

And so you can make an argument, there are many many folks who live essentially on subsistence level calorie intake and nutrient intake. So you could easily make an argument that folks should be consuming sweet potatoes in place of grains for most of those people because Vitamin A deficiency is a real and legitimate problem for those folks.

But, it was a great, really good talk, solid, classic, crackin' type stuff. But, I think as we move forward, being able to strike a balance between this kind of a caveman anecdotal model which I think is still - I do think it's still valuable from just people having something that they can identify with. It's like, okay this is important because my ancestors ate this way and people have something they can wrap their mind around. But, it is anecdotal.

It's not a really super solid scientific placement to kinds launch things from evolution the natural selection still kinda wins out and really the winner in all that is this nutrient density piece. And if we add in an additional factor to this and if we consider, say like, immunologically active proteins like gluten or dimen or zyme from wheat, rye oats, barley, corn, rice and stuff like that.

When we factor the immunogenic potential of certain foods and maybe give that a minus strike then I think that from this nutrient density stand point, from the potential systemic inflammation immunogenic stand point, we have a really solid scientific credible place to actually argue for or against the inclusion of various foods in the diet. I think folks are moving to call those the crackin' standards something like that.

So, pretty cool stuff, really good talk, I think folks would dig it and it's gonna be something that - when these kinda ridiculous news pieces pop up kinda vilifying meat and meat consumption. And when people make these claims, not eating grains is going to lead to some sort of nutrient deficient state, it is crystal clear that, that is simply not the case and it's not a scientifically credible position to vilify kind of an ancestral or Paleo type diet.

It's interesting that dietetics community usually tries to build some sort of a case around the nutrient density concept that we should be eating more vitamins, minerals, anti-oxidants, per calorie than what we are currently doing. And by using their own standards and actually applying some rigorous analysis to that topic, it's very interesting what foods actually end up placing well in that story.

That also made an interesting observation which was historically, grains and legumes both have been - when folks count their nutrient density it's when the grains are legumes or in the raw state. And in the raw state, they look really good because, they, relative to their water content, relative to - all of this stuff was normalized to a hundred gram samples, I believe.

So, when you look at things, just as a hundred gram sample raw, grains and legumes look pretty good but the minor detail with that is you can't eat those things raw. And when you cook them, you dramatically decrease the nutrient density so it's just kind of an interesting thing that I think were gonna get a lot of mileage out of. Big things to Mat for doing that.

He had a buddy - I don't think he actually knew him until he started working on this. But, a guy who's pretty heavy in the biostatistics and the guy commented that Mat basically did a PhDs worth of work in like a week.

So, that was pretty cool and it was kinda hilarious during the - at the end of talks people were able to ask some questions. And there were a couple of folks that made some comments to Mat that were just amazing about - well I would have done this versus that.

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And, just knowing the amount of work that he did in a very short period of time and even the things that people are recommending - the only reason why Mat didn't do it was because the information was unavailable or else he absolutely would have done it. But, it was just kinda hilarious knowing the back story and then having these whipper snappers come up and say, well I would have done this instead of that.

But, what he gonna do, that's kinda the interesting effect of throwing this stuff out to the masses. Folks usually don't know the amount of work that goes into these projects.

The next person that I saw was Professor Peter Bolderstat. And his piece was on the reality of ruminants. He just got in really talked about sustainable agriculture, permanent culture, the grass-feeding of cattle and really made this very solid argument that the only legit sustainable kind of vector that we can be on is the utilization of grass-fed animals.

We start stepping outside the oil story which goes into producing grains, which were then led to cattle - really interesting piece that he did. He also made a really great point that the nutrient differences between grain-fed meat and grass-fed meat are important but not deal breakers.

And that, if you have somebody who is financially challenged, they don't have the money to put into grass-fed meat right now, that it's really difficult to make the argument for allocating money towards grass-fed meat at this point. It was - for me I've been kind of - I've made the exact same recommendation for a long long time based more on a gut level sense of this stuff.

We don't want the pursuit of perfection to prevent the ability to just do something which was good enough. And so, the way that I've tried to straddle that, keep on foot in both sides is that for people who are, like college students or large families on a really limited budget, you do the best you can and conventional meat is going to be way way better from a health perspective than what we're gonna see from eating tons of grains, for example.

But, if you are somebody who has more means and the animal husbandry issue, the sustainability issue, if all those things are important to you, then it behooves to put your money where your conscience is and to drive the sustainability side in the production of grass-fed meat because as we increase the production at some point, we're gonna start bringing those prices down.

Hopefully, we create some sort of a leveraged economic situation where we can change a lot of the subsidy pictures so that we can compete on an equal footing. Permaculture, sustainable animal husbandry, sustainable farming can compete on par with the more intensified agriculture.

We need to take the best of both of those and we've talked about this stuff on previous podcast so I won't belabor that a whole bunch. It was a great talk. Peter Bolderstat, he's an ag professor and a really really sharp dude. I got to hang out with him and talk with him after the event, super cool guy.

Next person of note in this thing I guess, as far as my experience of the event was, my talk talking about City Zero, the risk assessment program in Reno, Nevada. It seemed to be pretty well received. Folks seem to like it. We continue to get new information everyday as we move more and more of these police and firefighters through this program.

I just kinda shared the overview of the program with folks kinda led in on my hold Morse Law discussion that when technology and markets were allowed to kinda know a way at a problem typically things get better and cheaper with the exception of our current healthcare situation which seems to be increasing in cost at a nearly exponential rate.

So, that was cool, huge honor to be able to present my material to folks, just a ton of fun seemed to be well-received. This was almost the end of day one and then the final speaker on Day 1 was Joel Salatin and he - Joel's such a dynamic, cool dude, really really good presentation. He had no slides. He was just up there for 45 minutes, just shooting from the cuff. He had one pretty funny sequence though that was just - it was just funny.

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Because, you get used to speaking to a particular flavor of crowd - like, I'm use to speaking in gyms and being somewhat crass and then also the podcast which we have an explicit label on here. So, I tend to be kinda potty mouth most of the time.

But, Joel had this one line. He was talking about like kids needing to get outside and play in the dirt and do all those stuff. He said something like, kids need to start playing more instead of going and getting piercings and having tattoos and then having a bunch of dreadlocks and stuff.

And that was just kind of a moment of silence and I looked around the room and there's a bunch of piercings, tattoos and dreadlocks in this room [Laughter]. But, it was totally cool. I think everybody understood that it was all in the spirit of being entertaining and good fun and stuff like that.

But, it was just kinda funny, I was like, yeah Joel might need to change that for this particular crowd. It was great. It was a lot of fun. That was Day 1.

The Kraken took Welbourn and I to a Brazilian barbeque and we ate churrascaria until all of us were about ready to fall over and die. And then he took us to a bar where Welbourn fed me a bunch of cider until I was ready past out between the meat and the cider and the time zone change. So, that was a very full day on Day 1.

We rolled in just in time for John's talk on Day 2. And Welbourn was talking about food for performance. John's a really smart dude. You just don't expect it from a guy that's as big and ogresque looking as he is. But he's just a very very good speaker, really smart guy.

And he basically related this Paleo plus dairy particularly on the raw grass-fed dairy side of things as being very beneficial for athletic performance, really focusing on immune system health. And this understanding that people who have very robust immune system tend to bounce back from intense activity, tend to recover from large work load's more quickly. And this has been the benefit that he's found with this Paleo kind of orientation.

And then for him also the inclusion of fermented or raw dairy and some perceived immunological benefits from that. Excuse me; I still go back and forth on all that. But, it's fertile ground for n equals one experimentation.

You follow something like a cross foot football protocol for your strength and conditioning program assuming that you wanna get bigger, stronger, more powerful. If you don't wanna be bigger, stronger, more powerful then I guess you could do a different program and eat differently. But, I think in that athletic scene we've just seen some really good benefit from a dietary approach like this.

And John related a couple of stories, couple of world champion power lifters that he's done some consulting with. These guys were kind of train wrecks. Beforehand the conventional diet for these guys because they are just big dudes, like 300 plus, 400 plus pounds on some of these guys.

The usual wisdom is to just eat anything because calories were the main driver. You just have to be big. But these dudes end up with a ton of systemic inflammation. You can

make a pretty solid argument they're not optimizing performance, not optimizing recovery because they're only with a ton of systemic inflammation.

It's anecdotal, it's observational but when these guys eat their food along this power athlete line, less Paleo plus dairy, they get a significant bump in their performance. They end up getting personal records, world championship events and they report that they feel a lot better, look feel and perform better. Solid stuff at John's talk was a lot of fun. You'll definitely wanna check that out.

Doctor Peter Attia was the next guy I watched. Peter used to have the website The War on Insulin and then he's tweaked it and the new site I believe is Eating Academy and Peter's just amazing.

He's a polymath like the dude has an engineering background. He used to be in like energy futures and he's a physician. I believe he's trained as a radiographic oncologist, definitely oncology I believe is his background. He did a piece The Straight Dope on Cholesterol.

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It's a talk that's largely built around what Peter's have been writing on his blog which he has - God I think it's like an eight or nine part series called The Straight Dope on Cholesterol. And it is amazing. Peter is very gracious in acknowledging people like Tom Dayspring, Dr. Tara Dall, a ton of people from the National Lipid Association and credit stem with his understanding of lipid metabolism and the important - what is and is not important with regards to cholesterol as it relates to cardiovascular disease and death rates and stuff like that.

At some point down the road, we left Dr. Tara Dall on the show, I think I've mentioned her in the past. But, she's phenomenal, just very articulate, very funny, definitely I have a lot of fun having her on the show.

But, I guess the take away is from Peter's talk. If we were to - if there was one thing that we really needed to impress upon people is that cholesterol has a number. Particularly, LDL cholesterol, HDL cholesterol is just numbers, doesn't really tell us all that much. You can have a situation where an individual has a hundred milligrams per deciliter or whatever the measure is of LDL cholesterol.

But the really important piece in all this is actually how many LDL particles we have. And so we're shifting away from the cholesterol fraction that we've been looking at and looking more at these lipoprotein particles. And there's a dizzying array of this lipoprotein particles but the analogy is that, it's the cars not the passengers.

And so we can have a situation where we - you have two different people, both of them have a LDL cholesterol level of 100 but then their LDL particles could be a thousand or two thousands. And in the case of the one thousand number, it's largely non-atherogenic or at least the statistical probability of that one thousand number being atherogenic is much lower versus the two thousand number.

So, what this looks like is kind of like a gas law equation. It's just really how many of this lipoproteins particles are potentially interacting with the vascular endothelium. And the more of them that you have interacting with the vascular endothelium, the greater the potential problem.

And there are some dietary factors that can lead into this. If we start seeing hyperinsulinism and we see an elevation in triglyceride levels, these lipoproteins also carry triglycerides. They can become overwhelmed with the amount of triglyceride that they're carrying. When this happens, it basically dilutes the amount of cholesterol that is being carried in, say like, the LDL particle.

And the function of the LDL particle in addition to being a part of the innate immune system is that it is moving lipids, both triglycerides and cholesterol, throughout the body to be used in cell membranes and as a fuel substrate, the backbone for steroid hormones and what not.

And so if we end up displacing a significant amount of the cholesterol out of these LDL particles, then the liver will manufacture more LDL particles so that we move on average that the necessary amount of cholesterol throughout the body. But what this does is it increases the potential for atherosclerotic atherogenesis because we just have more particles floating around. I'm still of the opinion that this maybe a bit more of a symptom than a cause.

Like, if we have somebody that eats low carb Paleo, they have good vitamin D levels, they're not showing increased levels of, say like, vascular endothelium dysfunction from some inflammatory markers like - is somebody that eats low carb Paleo with an LDL particle count of 2000, are they still at the same level of risk as somebody with a particle count of 2000 but they also have elevated C-reactive protein and some other systemic inflammatory markers?

I would probably argue that, no the low carb Paleo eater is not at risk. It's a blind spot for us. We really don't know yet. So some interesting stuff has some interesting bearing on people with familial hypercholesterolemia, has some interesting bearing on systemic sepsis that maybe an outgrowth from gut damage or gut permeability.

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But, great talk The Straight Dope on Cholesterol from Dr. Peter Attia.

The next talk might be my favorite one of the whole event. It's neck and neck between Chris Masterjohn which was the next talk and then a guy who's just my hero in the cancer research community, Dr. Thomas Seyfried. But, I'll talk about Dr. Seyfried in a minute.

Chris Masterjohn's talk was oxidative stress and carbohydrate intolerance an ancestral perspective. I don't know if you follow Chris Masterjohn stuff via Western Price Foundation and also The Daily Lipid, but Chris is pretty much like the smartest dude in the room like whatever room it is.

He's the smartest dude there. And he just wrapped up his - I believe nutritional biochemistry PhD and so he's going to be really released on the world crackin' style. In some point, we're gonna have to come up with a nickname for Chris Masterjohn because the dude is just brilliant, really doing some great thinking and the lipid metabolism, appropriate macronutrient story.

And, one of the questions that he asked was basically involving this whole carbohydrate intolerance what not but he asks his question, are humans adapted to eat starch - which there was a safe starch panel that occurred after this which I'll talk about that in a second. And it's a great question and there's quite a lot of controversy about this.

But, Chris built a really solid case using this ancestral template, this genetic spaced ancestral model, to make a really solid case that starch has probably been a significant part of the ancestral diet for quite a while. And he bases this on the frequency of amylase gene duplication.

And so salivary amylase, specifically salivary amylase is released in the saliva. It's an enzyme which starts breaking down starch, converts the polymer of starch into glucose and basically initiates the digestive process. And Chris has some really interesting comparisons in the genotyping of most human's relative, say like, bonobos and chimpanzees and gorillas. And our next closest related relatives; they're virtually no amylase activity. They have a little bit but it's very very little.

And even in very isolated hunter gatherer populations who tend not to eat much starch, they tend to have orders of magnitude more amylase gene duplication relative to, say like, chimpanzees or gorillas. And so, even people that we would argue our very maladapted towards starch consumption; they show dramatically increased stability to express the amylase gene.

An interesting element of this adaptation - the benefit of this amylase gene is that an individual who has more copies of this amylase gene will produce more amylase and will therefore be able to breakdown starch more effectively and liberate more energy from

the starch that they are consuming. And this would represent a really powerful selection advantage.

And this is something kind of a founder's effect where you would have, say like, one individual in a population who gets this gene duplication. And then that individual has a very powerful selective advantage. And that individual's progeny would tend to push this gene duplication through the population very easily because they're just gonna have a survival advantage.

We see largely the same story with lactase persistency for example. So, on the genetic side - oh and then there was a piece related to that which I find really really fascinating. You could maybe make an argument, okay, if amylase is more active than we are going to introduce glucose into our system at an accelerated rate and this might be problematic with regards to increasing blood glucose levels and insulin response and stuff like that.

But, the really fascinating thing to me is that people with increasing rates of amylase gene activity also show improved ability to deal with carbohydrate load. And they deal with increased carbohydrate load in a very interesting way which is that when they start expressing that amylase gene, these people tend to preemptively release more insulin before the glucose has even hit the bloodstream.

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And so I find that very very interesting in that you had some sort of a communication in the genetic signalling and that a part of it is happening at the gustatory, the food chewing level. When we input starch we are breaking it down, sticking it in the system but then there's communication with the pancreas that is causing a pre-emptive release of insulin which then decreases the total blood glucose elevation for that particular meal and it decreases the total amt of insulin released overall.

So it's a really interesting adaptation and people who have lower amylase gene activity have less of this protective effect which is probably a lot of what we see in the population at large with regards to carbohydrate tolerance, blood glucose tolerance. An interesting question which I want to shoot to Chris Masterjohn and see what he thinks what does this mean for liquid foods and we're dealing primarily with starch here.

But what if we add something like a liquid food, a shake, a soda, something like that that can dump a large amount of carbohydrate into the system but potentially at a rate which is abnormal for the amylase gene activity and could that be a situation where even people who are otherwise pretty carbohydrate tolerant if they start consuming carbohydrates that are so refined that it bypasses their ability to it which I think kind of makes sense on a lot of levels but it would be interesting to see what he thought the implications for liquid food would be.

So that was an initial chunk of the talk which was making this argument that humans are probably adapted for dealing with starch consumption.

The other part of his talk was just asking the question well if that's the case why are we seeing such monstrous rates of insulin resistance, leptin resistance, type 2 diabetes, etc. I don't want to over simplify it but it boiled down to over consumption of food and it's a little bit heartbreaking for the dude that I used to believe in some sort of potent metabolic benefit to not eating carbohydrate but as time goes on it just becomes more difficult to hold that position.

But the point that Chris made and very big overview kind of format when we eat in general nutrients flow into our system and either gets stored or burned. When they get burned converted into ATP and energy and what not if you overwhelm the mitochondrial system with energy we start producing free radicals.

We start producing massive amounts of free radicals, massive amounts of peroxides. Those things will in very quick order kill lots of cells. This is the main thing that causes apoptosis in pancreatic cells either under autoimmune conditions or in situations in which people are experiencing significant oxidative stress due to type 2 diabetes.

But the survival advantage in that insulin resistance state if we are pumping a lot of nutrients into our cells overwhelming the mitochondrial complex producing a bunch of free radicals there is cell signalling related to this molecule called methylglyoxal which then causes us to be insulin resistant and that insulin resistant state prevents us from inputting glucose and triglycerides into our cells which already have too much energy. They don't need more energy.

What the cells are trying to do is prevent more energy from going into them and where they store that energy unfortunately is in the circulation elevating blood glucose levels, elevating triglyceride levels and so the state of elevated blood glucose, elevated triglycerides is not good. It's not healthy but it's far healthier and far less damaging to do that than it is to pump a bunch of nutrients through an already overwhelmed mitochondrial complex and then produce more free radical damage.

And to some degree this is also the smart change that we make with carbohydrate. If we consume too much carbohydrate and we were to face the situation where the body wants to start down regulating insulin sensitivity and prevent carbohydrate from being pumped through the mitochondrial complex a safer thing to do with the carbohydrate is to convert it to triglycerides, convert into lipids.

And then those lipids can be stored in fat cells and that's a comparatively benign non reactive thing to do with these glucose molecules relative to either letting them float

around the circulation and cause advanced glycation and product damage or pump them through the mitochondrial matrix and cause oxidative stress.

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The obvious problem that grows out of this is if we continue to hyper consume food then we are overwhelming the mitochondrial matrix causing systemic inflammation, causing oxidative stress that further exacerbates the insulin resistance. It's kind of a feed forward mechanism and somewhere in there the normal appetite control mechanisms get broken, leptin resistance ensues, insulin resistance ensues so we have a hyper fed, hyperchloric state which is sending all kinds of negative-prone inflammatory signalling, leptin resistance signalling but yet we're hungry and we tend to still consume more food.

It's an interesting story and he talked about like glutathione depletion and anti-oxidant depletion and stuff like that being co-factors in this whole story. I would still argue that frequently a low carb diet is very very important in reversing these processes. Protein and fat tend to be very very satiating. It's a great way to turn the boat but it was a great mechanistic treatment of asking the questions are humans genetically adapted towards starch consumption and I think the clear answer is yes.

But because of epigenetic issues either over eating or different environmental factors people loose the ability to deal with that carbohydrate intake and so we need to be very very thoughtful about that which leads into the next thing that I watched. Honestly I feel bad but I can only watch part of it just to frustration. It was the safe starch panel. Jimmy Moore, Paul Jaminet, Ron Rosedale, Catherine Shanahan and Chris Kresser were all in attendance on this.

Each one of these folks made their case for whether or not they thought starches were safe and the frustrating thing for me is that other than Chris Kresser, Chris just really gets this stuff and I think a lot of it's because he's a clinician. It's interesting. He was one of the earlier people to really start advocating for some people who'd been eating super low carb for a long time particularly in the high performance output arena like crossfitters and stuff like that these people need to eat more starch.

That they are under eating carbohydrate that they try to exercise at a high level, the high level of exercise depletes muscle glycogen when blood sugars drop trying to prop up the muscle glycogen then we get a cortisol release. Cortisol up regulates gluconeogenesis, we start converting protein into carbohydrate, the whole process stresses the adrenals and you can have some significant problems.

There are some folks on the panel that really really believed that we should be in ketosis all the time. I think that going in and out of ketosis is a very good, very beneficial thing. I think that training metabolic flexibility into our mitochondria is a smart thing to do.

We've talked about this a lot like hormetic stressors and stuff like that but I think the frustrating thing is that instead of really trying to look at overall mechanisms and taking some of the stuff from Chris Masterjohn's piece and stuff like that there was a lot more opinion.

Kresser cited some Okinawan data talking about starch intake levels and stuff like that and one of the panellists said - and Chris was citing an old 1950s, 1960s paper but a reasonably well done anthropological research paper talking about macronutrient intake among Okinawans and then one of the panellists just said I don't agree with your data. I lived in Hawaii and I didn't see Okinawans eat that way.

How do I say this tactfully?

The citation of scientific data was refuted a literally an observational piece of data and this kind of stuff kind of whole twatter. I'm all for n=1 commentary and stuff like that but I find it really tough to hold up something like this paper that Chris was citing and then just anecdotal response on that.

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My take with all these stuff for a long time just said let's see what type of carbohydrate tolerance we can find in people for somebody who's metabolically broken and has obvious signs and symptoms of dyslipidemia and metabolic arrangement. Let's get them on low carb Paleo, let's reverse that and then we can tinker with things and see where we go from there for athletes. We've pretty much always recommended that they post work out carbohydrates and refeed, refuel based on carbohydrate needs and work activity needs and stuff like that.

So none of this to me seems at all controversial but there indeed seems to be some controversy. For some of the people advocating the starch though and again Chris Kresser's fully gets all these stuff and he articulates this really well but there are some people who reach a point of metabolic brokenness that they're not really going to tolerate much carbohydrate at all and Dr. Tara Dahl from the National Lipid Association and I'll clarify these numbers. I'm going completely on memory on this. So apologies if they're a little bit off.

But she cites an A1c above 6.5 combined with triglycerides above 200 - she feels that's a clear indicator of severe pancreatic damage in a type 2 diabetic individual and that person's probably never going to tolerate starches to any significant degree. That person would be best served eating some sort of a ketogenic or very near ketogenic diet the rest of their life because they have whittled through so much of their pancreatic activity that they're going to be on both insulin sensitizing drugs probably metformin and potentially insulin also.

So if they have any pancreatic function left it's really smart to minimize the stress on the pancreas by reducing total carbohydrate load. For me again I think that we have some pretty clear delineation about where starch is appropriate and where it isn't appropriate and the fact that this is still a controversial topic it seems more like religious debate than anything else to me. So that's my thought on that.

I think that that was most of day 2 and then rolling in on day 3 Mark Sisson and I did a Q&A which was a ton of fun. Mark's just a super smart guy. We had a lot of fun with that stuff. Folks seem to enjoy the Q&A and then I got to watch several talks. I didn't get to watch all the talks that I wanted because I ended up going home a little bit earlier in the day.

But for those of you guys that have followed the performance menu for a long long time and old school crossfit when I was still on that scene you might remember that I interviewed a guy Professor Thomas Seyfried from Boston College and Professor Seyfried did a piece targeting energy metabolism and brain cancer. I did an interview with Professor Seyfried I want to say in 2005, maybe in 2006 but quite a while back and talking about metabolic control analysis, ketogenic diets, calorie restricted diets for endothelial derived cancers particularly astrocyte tumors and glioblastomas.

Almost 100 years we've known that cancer operates via the Warburg effect in which it largely shifts its metabolism to glucose as a primary fuel substrate and then depending on the type of cancer certain varieties can use things like glutamine as a fuel substrate. Glutamine is easily converted into glucose.

But basically one of the features of cancer is that it becomes metabolically inflexible so metabolic control analysis and some of these investigations into the metabolism of cancer seems to offer a potential solution which is limiting the fuel substrate that cancer runs on and not all cancers will react the same way like glioblastomas are very inflexible in using say like amino acids typically for a substrate whereas things like malignant melanomas are very aggressive, very dynamic and can use a variety of amino acids as a gluconeogenic substrate.

But Dr. Seyfried's point was really interesting in that it's his opinion and this may apply to all cancers. It may only apply to some cancers. It's unknown but we've historically looked at cancer as a genetic disease, like a genetic damage to DNA and then that damage to the DNA starts causing an unregulated, unchecked replication. It's Professor Thomas Seyfried's assertion - he's written a whole book on this stuff which is \$120 but I just ordered it and really interested in reading it.

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But it's his proposition that changes in mitochondrial function which lead into the say like the Warburg effect. Normal cells becoming tumorous or cancerous - the first stage

of that is actually a change in the metabolic profile and a shifting towards glucose metabolism or potentially glucose and amino acid metabolism shifting away from lipid metabolism that that is the primary stressor and it's that stress which then leads into the accumulation of genetic damage.

It's a really interesting change in the way that people look at cancer when we had the talk here in Reno for Specialty Health we had Peter Thia, myself, Garry Tobbs and a number of other people talking about the sweet tooth of cancer one of the keynote speakers Dr. Garry Abras who's a retired oncologist - he basically made the point that when you really look at the hard numbers on cancer therapy over the last 30 or 40 years they suck.

We have not done a good job of treating or curing cancer for the most part. They are just not typically that good. Lymphoma, some testicular cancers, some bladder cancers - we had some very high rates of success and then other cancers we had super low rates of success and he made the point that when we've gotten in and started mapping the genetics of cancers even in one individual say like breast cancer.

A woman ends up or I guess a man for that matter, somebody ends up with metastatic breast cancer you can sample cancer from one part of the body, sample it from another part of the body and the two different colonies of cancer will have entirely different genetic mutations and so there's been this hope of targeted chemotherapy to put one chemotherapeutic agent into an individual and that would deal with the particular genetic changes that that cancer has undergone but Dr. Abra's made the point that you may have tens of thousands of different genetic mutations in the various cell lines in one person.

So this whole idea of looking at this from trying to treat the genetic disease side of this with drugs like Cisplatin which cross links DNA and makes it more prone to apoptosis and programmed cell death that this is probably not gonna work and this is largely why chemotherapeutics have not really worked all that well thus far because we've mainly looked at this as an attack trying to destroy damaged DNA but the reality is that you have so many point mutations in these different cell lines that tackling it from that side just doesn't make much sense.

So some people have been looking at immunotherapy, trying to ramp up elements of the immune response and when the immune system is working well it can do a pretty good job of clearing cancer and then another part of this story is this metabolism base attack on cancer and it's interesting.

Professor Seyfried said that standard of care kills people and it sounds controversial and tin foil hat and all that stuff but it's interesting. He made a very interesting or provided an interesting description of what standard of care is which is typically chemotherapy, radiation and anti inflammatory steroids and so with radiations when you irradiate

tissue you cause a bunch of oxidative damage, cause cellular damage, cell stress, hopefully the cancer cells are more prone to the radiation than normal cells.

Interestingly a ketogenic diet or a calorie restricted diet actually improves the ability of normal cells to withstand radiation and chemo and so why it's not being used more aggressively as an adjunct therapy is anybody's guess but with standard of care the stuff that you will typically get when you roll into a standard oncology treatment environment is that the radiation will cause damage to the cells, that damage will release glutamate and the glutamate can get converted into glutamine and the glutamine is then easily converted into glucose.

So you're creating an essentially glucose rich environment by irradiating the cells and then because the irradiation causes systemic inflammation folks are frequently put on reasonably high dose anti inflammatory steroids basically prednisone and these anti inflammatory steroids elevate blood glucose levels.

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So the standard of care not only is it kicking people's ass exposing them to immune damaging radiation but it is also creating a really glucose rich environment which we know is what causes the cancer to thrive. The frustration from Dr. Seyfried was just palatable like when he was describing this stuff you could just tell how angry the guy about this.

He's a top of the food chain researcher but he got onto this line of investigation really early in the cycle so I think he was a little bit similar to say like Loren Cordain or some of these other folks - Jeff Volek who studies low carb - these people that get in to these areas early they just face a lot of abuse from their peers because what they're talking about is very very different, very controversial but it's interesting stuff and it really begs the question why are we not using adjunct therapy like ketogenic diets, like calorie restricted diets as a means of improving conventional treatment as alternative treatments. Why are we not using these in conjunction with immunotherapy treatments - all of these stuff is less expensive, it's less dangerous, lots of people die due to complications from standard chemotherapeutic and radiation route.

I don't know. It's a great talk. I'm gonna check that book, hopefully we'll get Professor Seyfried on the show at that point and talk about that stuff and then the last talk that I was able to see was from Professor Elizabeth Thiele dietary therapy and role in epilepsy. This was another talk about ketogenic diets largely the history of ketogenic diets in epilepsy treatment.

Epilepsy has been treated successfully with ketogenic diets for over 100 years and it is still hands down the most successful intervention for putting into remission the frequency of epileptic seizures. Frequently people only need to stay on the ketogenic

diet for a year or two and then for whatever reason things normalize and they're able to go off the ketogenic diet.

They're doing a lot of research in very - I still think low carbohydrate like in the realm of 50-60 grams of carbs a day but not necessarily ketogenic diet showing some really strong benefit in this area but Professor Thiele made a great point which was that many researchers, scientists, clinicians get really nervous about the term diet and so historically when we talk about ketosis we term it ketogenic diet and stuff like that.

There's almost like this real knee jerk response where people don't like the term diet. It has a short term connotation. It tends to have a high failure rate and stuff like that and so you get immediate pushback and so what they've been doing is just changing the naming of this stuff and calling it a therapy.

So nutritional therapy, therapeutic intervention, ketogenic therapeutic intervention and as they've changed the wording in their papers instead of getting it rejected they're getting accepted. That's interesting just the psychology that goes into that stuff. I was unaware but dieticians are not typically reimbursed by most health insurance companies for helping people to put together ketogenic diets.

It's a tough gig. We've created an environment which we will reimburse for pharmaceuticals, most of the times the pharmaceuticals are not gonna really work as well as a nutrition and lifestyle changes but we're more willing to pay for stuff that doesn't work versus putting money into things that do work. That's one piece of it.

Then the other piece is that these nutritional therapies whether we're talking about cancer or whether we're talking about epilepsy are just not that popular even in the research realm.

So that was the last talk I got to see. Stephan Guyenet did a presentation which I'm gonna check out when it goes online. There were a number of other people that had great presentations. I almost forgot Diana Rogers on the second day had Sustainable Dinner out at her farm and a bunch of people attended this even and I just got to give huge props to Diana, to the folks from the Western Price Foundation that helped with that, to the whole community around Diana that helped put this thing on.

[1:05:17]

I haven't put much work into the Liberty Garden Project for a long time just cuz I've been frankly buried but Diana and I had some conversations a while back and I really encouraged her to champion this thing because she has experience in large scale permaculture type farming and she had just a beautiful operation there, beautiful dinner, amazing food, amazing booze, possibly my new favourite drink now even over the norcal margarita is a pickle juice martini and it was with live culture pickles. It was

amazing and you get this little salty thing. So it's actually a nice palette cleanser bouncing between either one of norcal margaritas and the pickle juice martini.

But I just was so impressed with that. I guess closing thoughts about the Ancestral Health Symposium. It was a great event. This ancestral movement, the paleo movement - it's all driven by these social media interactions, this podcast, Facebook, Twitter, innumerable blogs now like this network exists online for the most part but I think these opportunities to meet in person and to network and to share experiences and to just put faces to names but do it in real time flesh blood.

I think that this is huge and critical to this whole movement moving forward. It's a lot of fun too. It's great seeing folks in these situations. Early in the Ancestral Health Symposium talks there was another talk that I only saw briefly, a piece of Evo's talk talking about the Evos diet which is basically a paleo type diet and doing some really legit clinical trial interventions on that program.

But the professor presenting that made the point that we should be seeing a lot more scientific output. We should see more output from this community than what we'd been historically seeing and I absolutely agree, 100% agree. We need randomized control trials. We need all that sort of stuff but at the same time research is really really slow and frequently a lot of the problems that we're asking don't lend themselves well to standard reductionist randomized controlled trial settings.

I'm not saying don't try to do it but what I am saying is that if we wait around for all the science to be in we're gonna have some problems. I guess my whole point to all that stuff is on a reasonably empirical level we have a good idea about what to do to reverse metabolic arrangements, to reverse or mitigate the effects of systemic inflammation that leads into autoimmune disease. We don't need to understand much more about the specific mechanisms of this stuff because we have ways to deal with this.

We know what's going on from an outcome based setting. We know that somebody who has an autoimmune disease. We've got a pretty solid autoimmune protocol to throw at people and we may not know exactly what's going on with each piece but all that we are asking people is to try 30-60 day intervention, see how they look, feel and perform, track some specific biomarkers that indicate disease or health processes and we can run with that.

That's pretty solid and those pieces I think we have shored up pretty good but the piece that really must happen is our food production and the community like what Diana put together was amazing and that if we're going to be successful that's the place where we've got to go.

The vegan scene or the more plant based scene - the thing that they throw back again and again is the lack of sustainability and I think that they're wrong. I think they're

barking up the wrong tree. That doesn't mean that we shouldn't try to build some alliances with those folks when and where we can but I think that if we are really actively developing these market-based decentralized food production scenarios which will then force the hand of the larger producers to start doing things in a different manner I think that this is where we start winning and winning in a real sense and a more immediate sense.

So I guess that's my closing thoughts on AHS 2012. Again apologies for not having a podcasting cue with Greg. We thought that we would be able to get all these stuff done but since I've thrown the baby in the mix if it's just baby then I could get a podcast on. If it's baby plus travel then it gets really really hard but I shouldn't be on the road much for quite a while so we should have this buttoned down.

[1:10:20]

Again apologies for not having Greg on. Obviously it's a lot more entertaining with his input on stuff but hopefully you found this thing helpful. If not hopefully it helps you fall asleep if you have insomnia and we'll be back to our regularly scheduled program here soon and definitely keep an eye out for the talks which will be available online via the Ancestry Foundation website.

So hope you guys are good. Take care.

[1:10:45] End of Audio