Paleo Solution - 358

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Robb: Hey, folks. Robb Wolf here. Another edition of Paleo Solution Podcast. I have Dr. Dan Han, the Chief of University of Kentucky Neuropsychology Services. Doc, welcome to the show.

Dan: Thank you for having me.

Robb: We were chatting a bit before I started recording. I think I mentioned to you that our listeners have a lot of interest in the formative background of what brings people into their current professional path. Would you mind talking a little bit about your background? It's quite unique and very interesting.

Dan: Yes. Well, I don't have a very romantic story but it is a weird one actually. I used to be a high school assistant principal before doing what I do now. So it's completely from the left field. Initially it had nothing to do with what I'm doing now. So I worked with high school drop outs actually. And we had a retrieval program so that we could provide second chance at a high school diploma. And we had a mission of 300 kids annually. It was an alternative school program with public schools curriculum. Seventy percent of our graduates were going onto college. Most of the 30% that weren't going to college were enlisting into the military to become service men. So I had a lot of fun time doing that.

And while I was doing that I always had an affinity for neurosciences. And I would be on the committee overseeing individualized education plans, special education and so on for youth with learning disabilities and so on. And I just was fascinated with how well that worked. So I decided to pursue neurosciences and clinical realm and looked into that. And then that just kind of involved into doing neuropsychology today.

Robb: It's interesting. I'm fascinated by the neuroregulation of appetite. I really have a pretty strong interest in traumatic brain injuries and different nutritional and knowing conventional therapeutic opportunities. Can you give folks a little bit of sense of your background there?

Dan: Thank you for guiding me. So with the background that I just described, one of the things that I noticed consistently was the horrors of American diet in youth for our alternative high school program. And that's been a consistent thing not just in that population but in my [indiscernible] population. Now I see folks with epilepsy, head trauma, also Parkinson's, all sorts of brains disorders. And one of the most consistent things are disregulated diets and important nutrition or lack

thereof, and some of the eating habits that are behavioral and neurologic and just physiologic altogether getting in the way of recovery, better maintenance of health and so on.

And with all of those different routes of my career development I got involved with looking at neurocognition in patients undergoing chemotherapy because a lot of the patients undergoing treatment for cancer complain of memory problems and so on. So with that one of the fascinating things that we've noticed was that it's a very consistent thing throughout treatment that people lose sense of taste. So that actually creates further barrier, a bigger barrier in maintaining good nutrition and appropriate nutrition for optimal recovery. And those are some of the challenges that I saw evolved throughout my career. So I wanted to look into the mechanism of that and see if there are unique, interesting interdisciplinary and translation of ways to attack that.

Robb: There are lots of different opinions in the medical community, in the interwebs about different macronutrient ratios and things like ketogenic diets. What are you looking at with regards to that kind of bioenergetics side of the story?

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Dan: Well, as I'm sure you know, it's incredibly complicated and there are a lot of arguments to be made against or for any diets. It's like a jungle out there in terms of figuring out who actually has the source credibility versus not. And unfortunately in the process people who really need to optimize a nutrition for condition A or B or C -- it really comes down to trial and error for the patients because scientists, for the most part, don't necessarily agree either to get a group of nutritionists in a room. For the most part there's going to be good evidence-based science there but the implementation of the nutrition, that's going to be difficult.

But where I get interested mostly isn't about just looking at what works better than others because I personally think -- it's just going to be an interesting argument to be had between different disciplines until cows come home. But what interests me with what I do in neurogastronomy and applied neurogastronomy is to look at what actually can be done to increase compliance. So Robb, if you gave me a diet plan to follow whether it's the Paleo Solution or ketogenic curriculum and so on and so forth, it's all fantastic work and evidence-based to a certain extent but it doesn't do anybody any good if people don't follow.

Robb: If they can't follow it. Right.

Dan: Right. If they can't stomach it, it's certainly not going to happen. And if they don’t like the taste and if they happen to be eight or nine years old, it's just not going to happen. It's more than lack of discipline. It really is more than even lifestyle change. It really is just how the mechanism of your flavored precision dictates in a large part how you seek out food.

Robb: Right. Which is this fundamental element of a revolutionary biology like seeking out certain nutrients and the novelty and the flavor profile. That's kind of baked in the cake and you can't get away from that.

Dan: Exactly. I really appreciate your analogy there. Once the cake is baked you can't unbake it and break it apart and go back to the ingredients. And it's part of our evolutionary biological make up. So I'm interested in utilizing interdisciplinary and translation of sciences with artists and craftsmen, skills, traits people to come up with innovative ways to attack the flavor perception part so that ketosis can be handled with better compliance and different types of diet regimen whether it's to cut carbs or whether it's the Mediterranean mind diet to fight Alzheimer's, whatever it may be that is actually welcomed as opposed to --

Robb: Barely tolerated if at all.

Dan: Exactly.

Robb: Right. Do you notice any common threads in the story? What are some things that are helping in this process and maybe to just kind of set the circumstance? You mentioned maybe a nine-year-old child, maybe they develop epilepsy, and they just really don’t want to comply with an 80% fat, 15% protein, 5% carbohydrate diet. It's bland and unappealing or maybe just icky. They have some textural issues there. Is there any commonality that you're finding that helps people to navigate this process?

Dan: Well, that's a complicated question to answer so let me give it a preface. Having a nine-year-old give up French fries is virtually possible. It's wishful thinking and academic at best.

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So the preface of that is you got to ask the right question first. A, is the evidence there? Are there actual controlled studies that are replicable and reliable to provide information to guide patients that are ill and in healthy controls who are not ill to maintain health and maintain certain physique and so on and so forth? That's one part. That's only merely one part.

The other part is how do we get people to desire that. And your question is are there common threads for the latter part. So before I even get to answer that, the question is how much are we actually asking, how integrated all the sciences are to be able to provide that and ask that question. And the short answer to that is very, very little to none. I'll give you an example and it's going to sound like I'm off on a tangent but there's actually method to the madness. I'll get to the point.

Robb: There are no tangents on this show. It all leads back to somewhere.

Dan: So to give you an example. I'm in the department of neurology and I have additional appointments in neurosurgery and physical medicine and rehabilitation I do also work with sports medicine research. I have my investments in a lot of different fields but I could tell you and you could ask any academic clinician or any researcher, any scientist or any clinician, everybody stays in their silo. And it's incredible. Somebody could've cured a cancer in one department. The other department is not going to know what that's all about for years. And even when they do find out to implement what was found years ago, that's going to take additional years.

So the National Institute of Health -- God bless them -- actually developed a section that specifically looks at how do we bridge that gap and how do we actually shorten than process because even if some brilliant science was discovered, by the time it gets to the patient only about 2% of that information actually as utility. So how do we actually fix that is the question.

And to answer your question is -- and I'm copying out here -- is counter with another question. How do we bridge the gap between all the silos beyond nutrition and clinical sciences but actually involve agriculture, food technology and the people who are in the forefront of everything, chefs? And sommeliers, distillers, service people, all the people who are feeding us day in and day out. How do we get all the stakeholders together and create a method to even post the right question. What is the common thread for everything?

So neurogastronomy is the field that I got involved with relatively recently. The term was coined by Dr. Gordon Shepherd at Yale. He's a very, very prominent neurophysiologist, neurobiologist, author of multiple seminal textbooks, and towards the later part of his career as a smell neuroscientist. He decided to coin the term neurogastronomy, brain science of flavor systems.

And my answer, finally, to your initial question was I personally believe -- and I think we have the science to back it up -- that one common thread for all of the variables we're talking about is flavor perception. So how the human brain perceives the flavor really has -- it creates a lot of implications for not just

individual behavior but behavior for the entire species, what the species actually prioritizes in terms of agriculture, what the species prioritizes in terms of mass production because those are going to be market demand-dependent.

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So we have good science, and you have access to a lot of it yourself. A lot of people know what works better than others but how do we implement that. My answer to that is that common thread seems to be something as simple and complicated as flavor perception. That really dictates the market demand and the market demand dictates what's going to be mass produced in terms of crops. And that's going to determine what the next cycle is going to be. And unfortunately as you know and your audience know it's a vicious cycle because the market demand creates flavor perception to work a certain way in the brain and then you crave for it more and then it's just a continuous step.

Robb: Right. I really appreciate that you're pulling in everything from how we're choosing to allocate resources on the agricultural side all the way to what chefs and sommeliers are doing on the client interface side within restaurants or private eateries and whatnot. That's really fascinating.

Correct me if I'm wrong on this but my sense on this story, at least to some degree, is that the folks manufacturing these foods -- maybe not as refined the level as what you're doing -- but food producers -- we'll just call them junk food producers -- have been thinking about this neurogastronomy and experimenting with it, really, for a long time trying to figure out how to spin those dopamine centers in the brain like the Lay's potato chip line. I bet you can't eat just one and then all take that all day long. They've made potatoes and vegetable oil just to step down from cocaine in some ways.

It's interesting the industry has, I think, looked at this in a pretty deep fashion but it's only now that the medical areas that are trying to help us deal with chronic degenerative disease, obesity, type 2 diabetes, they're only now starting to ask those questions about like, "Well, maybe these hyperpalatable foods are fundamentally problematic. Maybe it's not just protein, carbs, fat but there's something else going on here."

Dan: Yes, absolutely. I was a naturalized citizen but as an immigrant I can say this, what I ate growing up in Asia is vastly different from what I got introduced when I came here. And it took a few years to really adjust. I loved it as a kid. I went to McDonald's every other day. It was the coolest thing. Wow. People eat this every day? I hate to use the term food addiction because there's so many core interpretation of what that means out there.

So compartmentalizing and saying this leads to that assumes that those two variables are separate to begin with, and that's just not how the brain works. So the brain -- to use a fancy term – like a [indiscernible] system, it feels things but it doesn't exist because it becomes very esoteric. But if you really hold on to your seat and really think about it, you don't own the brain, the brain is you. And if that physiological mechanism of wanting something is affected by physiological mechanism, stimuli from outside whether that's industry-created demand or behaviorally-created, habitual cycles or flavor that creates an addiction, whatever it may be, whatever it may be, that essentially is you but it's not thought-driven. It's a very physical mechanical process. Hopefully I'm not being --

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Robb: No. This is great. In my second book I talk a lot about the challenge that we face and that a lot of these kinds of decision making happen in the hedonic centers of the brain which are ancient and largely emotion-driven. And the main thing that we have to try to help people is a lot of logical information. And those two parts of the brain don't really handshake that well. You almost need like a Zen meditation retreat to be able to get the one part of that element communicating with the other, get some distance from it. Would you agree with that?

Dan: Well, I respectfully disagree but I'll let you know why. I think we're on the same page but looking at in through different lens. So let me give you an example of what I'm talking about. Fun fact for the day. Flavor often mistakenly believed as taste is actually 75% to 95% smell -- so olfactory chemoreception. All the chemical volatiles that actually comes through the nose, and then when you breathe out, as those volatile actually tickle the nerve endings that protrude out of the olfactory bulb and so on, that's actually up to 95% of taste, what you believe is taste. What goes on your tongue is actually a very small segment. And that's why when you have ENT problems like flu or something like they're all plugged up, everything tastes very bland because your smell center is not really properly working.

So what we're actually talking about is more flavor. So the flavor reception commonly mistakenly known as taste is actually 75% to 95% smell. So how that works? All those volatiles actually get received chemoreceptively and then that actually shoots into the entorhinal cortex. The primary olfactory cortex, the smell part of the brain is right next to the entorhinal cortex which actually projects into the amygdala which happens to be the emotional and automatic auto-response system.

So all the memory, all the things that makes you human, your soul essentially is very much dependent on that loop, on that circuit. And as that creates a certain loop you're going to be dependent on certain types of flavors. Not just about

making you feel good. It's way more than that in that all of the things that are apparently going against each other, they actually check in other and balance, almost like a political system. And as that circuit gets dependent on certain flavor loops, that's what your body is going to naturally crave. And that is, unfortunately, does seem to get affected by saturation effects from the market.

Unfortunately industry has tapped into that loop better than most scientists. I don't blame them. If you could replicate that feeling and create a demand and create a market for it then, of course, you're going to go for it. But my counterargument to that is at what point is individual will and responsibility actually come into play for global sustainability of crops and health.

Robb: Yes because we societally are facing almost an existential threat from the challenges of diabesity and overeating. All the while though, interestingly, we have a population that is suffering nutrient deficiencies too, just fundamental photochemical and vitamin, mineral deficiencies. So it's a really fascinating problem. It would be nice to be able to jump in a time machine and pop forward 100 years and see how all this plays out instead of living through it.

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Doc, what are some other nonfood maybe epigenetic signals that can influence this whole process? Does sleep influence it, stress, physical activity, maybe the gut microbiome? Do these have any significant influence on our sense of flavor and how that influences our behavior?

Dan: The short answer is yes. It's a very loaded question and I know you intended it to. And kudos to you because this is a very important query. All of those are systems problem. The gut biome is a relatively new topic that's looking at how the central nervous system actually receives certain signals through the GI system and how that actually affects the cortical functions. And that also occurs in disease as well. And there's also more and more information coming out in Parkinson's disease looking at gut-CNS connection and all these autoimmune systems and all these infectious disease agents and bacterial loads and so on. There's a whole field of science out there just looking at that. So the short answer is yes.

The longer answer really is, with that, we could spend resources just looking at the microcosm of different silos looking at how individual variables actually affect the whole system. And I think we've been doing that for some time now. I'm personally frustrated with lack of progress with given information. So I think the lost art is looking at integration between the silos. So when we look at gut biome, when we look at stress literature, when we look at flavor literature, when we look at industry literature, when we look at agriculture literature, how do we

tie these all together? And again, I think the common thread there, interestingly enough -- I haven't even thought about it until I came across Gordon Shepherd's literature and some of the olfactory and neuroscience literature -- is flavor. At the end of the day what you want to eat really determines how market is going to play out, and then it just loops back into what you want to eat.

So at some point if we attack that loop with interdisciplinary approaches all the way from the beginning like agriculture and sustainable crops and so on, and then looking at how the brain receives this flavor and nutrition intake wise and maximize that intake in the healthiest way possible, and then barrowing from existing psychology literature, especially social psychology, experimental psychology, of how these other senses help that flavor reception like color, ambient noise in the background, somatic texture and so on and so forth, how all these variables come together, and then utilizing all that information for our chefs, cooks and sommeliers, distillers, all the service industry people to apply to what we eat as consumers, I think then you could attack it as a systems package.

Robb: I love it. Correct me if I'm wrong but my sense on this is that we are effectively in an era of infinite information. And you can start chasing parts and pieces of that and never really get anywhere but we need -- I think that economists call it simplexity. We have complexity but there needs to be simple solutions that address things at a very macro level because we may not know, understand or be able to factor in all these minutiae -- I'm really excited about the gut microbiome but I'm also thinking that it may end up being a massive destruction towards just some very simple interventions to help people get healthy. Is that in line with what you're talking about here?

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Dan: Yes, I agree because global made tings so much better and so much worse at the same time. Information is at our fingertips in the first world, but vast majority are noise. There are very few helpful nuggets. And unless you know what you're looking for, you're query can't be answered because it becomes you get that ADHD response to information over and over. How many times have we gone on Google something, 30 minutes later you're looking at something that has absolutely nothing to do with it? Usually I'm at a cat picture or a Brazilian jiu-jitsu technique or something like that when I initially started with 2050 food crisis. So I'm just as much a victim of that. But I do believe that information overload without source credibility being established is actually just as dangerous as not having any information.

And to respond to what you've mentioned earlier, by 2050 there is an actual food crisis where that ratio of sustainable crop bank, the demand in terms of the species population has tilted to a point where we actually don’t have

sustainability anymore. So how do you feed 9 billions by 2050 the way we're consuming? And that's a real challenge. It's a global challenge. And just looking at all these variables and attacking them at the microscopic level I don't think has worked in the last 100 years. It's helped a lot in some ways, it certainly has. I'm certainly not going to diminish that. But it has also created side effects that are just as problematic like noise.

Like you said, gut biome, I think there might be something there. But how much researches are actually being attributed to that as opposed to something that might work better? I don't know because it's like that ADHD syndrome. You are overwhelmed with information and then next thing you know, you click on -- "Ooh, look at that. It's shiny." And 30 minutes later you're looking at cat pictures again. So given all that, I think the intervention and the art of integrating the existing resources really needs to be prioritized so that questions can be answered and attacked in a more efficient matter.

Robb: I completely agree. And I don't know if that's just confirmation bias and we're both knuckleheads or we're actually on to something. It's mostly likely that but we'll hope that we're actually on to something here. It's interesting to me too. Again, correct me if I'm wrong. But what I'm getting from you is this sense that we really need synthesis and interdisciplinary activity. But one of the weird things that popped up is -- and we saw this in the last political cycle -- people really want siloed experts and they want a particular world view that is going to support whatever it is that's really catering to their needs or ego or whatever have you. How do we affect that change to get more of these systems type thinking occurring?

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And when the chef stands up and addresses a group that is composed of computer scientists and immunologists and variety of other people, that chef's perspective carries some gravitas similar to everybody else and isn't just dismissed because they're not an expert in ex-silo, that they're part of this synthesis process -- how do you think we start making that happen?

Dan: That's the $9 billion question. I actually don't blame that process because I understand it. Sociologically and psychologically and historically in terms of evolutionary psychology it makes sense for the silo to be sought after. It's something that we're involved with that actually helped the species maintain life and integrity of the species. The simple process of categorization, that's something that we have ingrained in the species because it's a threat selection and you have specific bias for that. And that's helpful. You have to differentiate what is different from what you know to be safe to assume that there might be threat associated with that in order for you to survive. So that's a very logical

evolutionary process. Unfortunately it comes with side effects, everything you discussed. So that's the side effect.

I don’t know if sociologically and psychologically and neurologically we are at that epoch of evolution, almost like X Men, that we're going to do away with that silo mentality and phase out for the greater good. I don’t know if the species is anywhere near ready for that because the ingrained systems bias of almost evolutionary neurobiological and psychological bias of wanting to categorize things.

So instead of trying to defeat the silos and break down the silos I think the best thing in the evolutionary step is to embrace that diversity beyond just the political mouthpiece and actually let people embrace their silos but have another categorized interdisciplinary science of bringing the expertise together. So to give you an idea, I don’t care if one is a Nobel Laureate in medicine and physiology. That person probably won't create a dish as delicious as Fred Morin of Joe Beef Montreal. It's just not going to be as tasty because that's not what he does or what she does.

So I'll give you an example of what we've done in the last couple of years. So the International Society of Neurogastronomy, our symposium created what we called an Applied Neurogastronomy Challenge. It's a fancy, geeky way of saying we wanted to apply bench science -- we have a bunch of neuroscientists come up with variables teaching other people on the other side of those about how flavor perception work in bullet points so that it could be -- pun intended -- swallow. And then you had clinicians talking about -- in bullet points -- what flavor perception means to somebody who's undergoing chemotherapy due to cancer effects and how that gets affected in terms of the palate taste and so on, and what impact it has, nutritional intake during a time when they absolutely need optimal nutrition intake.

And then agricultural technologists and food technologists would come up with ingredients and sustainable and season-specific produce to fit the needs of the nutrition intake and attack the flavor mechanism said by the bench neuroscientist and the clinician. And we have a master chef taking all that information together coming up with the master dish. And then we had judges tasting those dishes. And there were current cancer patients undergoing chemotherapy.

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So that was an example of what I envision as a true translational applied interdisciplinary science and art in terms of attacking flavor the right way. So if we could replicate that for industry, if we could replicate that model for

sustainable crops and flavor mechanism, and if we could also have corporate industry buy in to make that a marketable plan for them I think we might have something to try.

Robb: That's genius. I love it. Literally, the hair is standing up on my neck. I absolutely love it. That is amazing. It's kind of funny because clearly I'm into this Paleo scene and I had a background in biochemistry but I will frequently try to drag people into, "Hey we kind of need to think about the economics of this and the evolutionary biology." And I start pulling in these other elements. And some people are okay with it but frequently folks are like, "Hey man, why don't you stay in your protein, carbs, fat lane and just not talk about this other stuff?"

This is a whole interesting topic. I think I was influenced really early as a kid. There was a guy, James Burke, who had a TV show called Connections. And he would go through these historical stories about where the printing press came from and how the printing press ultimately ended up resulting in women's suffrage, updating of the Constitution. Really amazing show. It made me think in some different ways. So it's, again, maybe some confirmation bias here but I'm really, really excited to hear about the work that you're doing here.

Maybe one final thing and you possibly alluded to this already because you're talking about considering this whole process from the sustainability standpoint, the palate experience standpoint. But what are some things that folks can do to improve their health and their enjoyment of their food on an individual level, and then maybe how did those have beneficial knock-on effects from this sustainability standpoint?

Dan: Well, the quick response to that?

Robb: Really, as long as you want.

Dan: I'll make it quick. I think it doesn't have to be complicated. Buy local. Buy seasonal. This is just a personal belief. There's really no way to have controlled study for this unless I get millions of dollars in funding just to look at it.

Robb: Or a new planet, yeah.

Dan: My belief, my, hopefully, educated belief is that the access issue has been contributing variable to creating all sorts of problems. It's easy for me and you in the first world to say, "We shouldn't eat this. We should eat this." But obviously a lot of people don't share that luxury. I'm painfully humbled and aware of that. But at the same time a lot of the problems, in my opinion, non-evidence-based, again, opinion is that there's a belief that's been fostered that everybody has the right to access whatever they want in terms of flavor, so watermelon in the

wintertime, peach off season, whatever it may be. While we've come up with the science to address that market need that is flavor-driven and desire-driven at the individual level, we created a lot of side effects from that just from transportation of the goods, sustainability of the crops that's not matching the natural resources of the region, all that, and the gut biome, again -- that kicks in too – terroir, which is a concept that's been used in wine experts for forever now as that certain flavor mechanism is going to influence by whatever that's region-specific.

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And then to actually have that need met halfway across the world when that is not locally-produced good, you create all sorts of problem just to meet that desire. So how can one individual start to have more sustainable and healthy cycle created for him or herself? I would assert buy local and buy seasonal, start there. And then I'm a firm believer that that person will start to notice that their flavor perception and flavor desire, a pattern will actually start to change in a matter of days to weeks. And then you recreated a certain loop. And you could do that at the individual level. But if we could have all these different disciplines working together to foster that for the species so that individuals can do that at the individual level and have industry buy in and create a market for it, I think that might be an interesting way to attack this problem.

Robb: I love it. Again, this has been some of my own -- to your point -- opinion-based message for years but in my gut when I think about decentralization and systems theory and whatnot, this is kind of what I've been arriving at. So again, this is a very good confirmation bias for me. I cannot appreciate you taking the time enough to be on the show. Doc, where can folks track you down and track the work that you're doing?

Dan: For neurogastronomy work, www.isneurogastronomy.org, that's the International Society of Neurogastronomy or you could just Google neurogastronomy. I'm certainly not at the level of neuroscientist as Dr. Gordon Shepherd or Tim McClintock or some of bench neuroscience founders, masters of their craft and olfactory and neurosciences. I'm nearly a humble academic clinician trying to tie all these things together. And Fred Morin, Ouita Michel, some of the master chefs, and Francois Chartier, master sommelier, have really been instrumental in making all this happen, and our agriculture specialists like Bob Perry. These folks all came together and asked the same question. What can we do to get out of our silos and learn from each other and try to make flavor work for health and global sustainability? You could simply Google us and that's what we're trying to do.

Robb: Fantastic. I will make sure that we get that in the show notes. Doc, thank you so much for coming on the show. Hopefully I get to meet you in real life someday and we'll share some food.

Dan: Yes, absolutely.

Robb: Okay, Doc. Thank you. Take care.

Dan: Thank you.

Robb: Bye-bye.

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