**The Health Edge: Health Benefits of Nutritional Ketosis**

**Show Notes**

**Mark Pettus MD and John Bagnulo MPH, PhD**

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| Mark: | Welcome to the Health Edge, Translating the Science of Self-care. I am Dr. Mark Pettus. I have my backgrounds in internal medicine, nephrology and integrative medicine. I'm joined by my great friend and colleague, Dr. John Bagnulo. John, good morning buddy. Nice to see you. |
| John: | Good morning, Mark. It's great to see you as well. |
| Mark: | We haven't done a podcast in a couple of weeks. I know neither of us like to go that long without connecting. It says a lot about how busy life is at the moment. How you're doing? Everything going all right? |
| John: | Yeah, everything is going well. It's almost summer here in Ohio. I know we're a little ahead of you guys up there is Massachusetts but all the trees have [in the 00:01:08] flower have gone through that stage and it's sometimes 75 to 80 degrees out. It's great, it's good. |
| Mark: | Yeah, great time of year. We're just beginning to entering the trees budding and starting to blossom and time to cut the grass. I always love this time of year and birds all nesting. We've got a lot of activity there. It's always fun. |
|  | In Western Massachusetts where we live in the Berkshire, there's just so much beautiful outdoor sanctuary. We have this large wooded that we're surrounded by in it. It's almost like living in the woods and this time of year, everything just comes to life. I'll just sit and watch it all unfold. There's something really special about that. |
| John: | Yeah. On a different note, another special thing about this time of year as farmer's market back up. I found over the years, and a lot of people share this with you Mark, I'm not sure if you heard the same thing, but so many people say, "You know, it's so much easier to eat well this time of year and throughout the summer." I think that the farmer's market is a big part of it. |
|  | Another big part of it is the abundance of sunlight. It starts to help people feel better mentally. They stopped trying to self-medicate with bagels and other really carbohydrate-dense foods. That's a good segue into today's talk. How was it that restricting carbohydrates down to the point where you start to generate ketones? How can that be healthy? |
| Mark: | This is a great topic, John, and one that I think will be a bit of an eye-opener for our listeners in that ketosis. We'll go into how we would define ketosis because there were so much confusion. When that word comes up, John, it tends to elicit a lot of fear particularly in the medical community. I'm around a lot of really amazing, highly trained and educated people who still don't appreciate ketosis as anything other than a complication of Type 1 diabetes, what we would call diabetic ketoacidosis which is not at all what we're going to be talking about today. |
|  | Maybe a good place to start this, John is to ... If you were trying to explain what ketosis is, ketone bodies, where they come from, in a healthier context that we're going to be discussing it today, how would you begin to frame that because it's a bit sophisticated? |
| John: | Sure. For those of our listeners who may need to start here at the beginning, there's three main micronutrients that the body uses for energy which is carbohydrates of course and protein and fat. When your protein is moderately restricted and your carbohydrates are significantly restricted, and when we say ... When we talk about numbers, we'll get into that a little while Mark, but I think ideally people should look at these ways. |
|  | When fat makes up around 85% of our total energy intake and protein makes up around 10% of our energy intake, and carbohydrates, and we're talking about net carbs. This doesn't include fiber. When net carbs make up around 5% of energy intake, the body is forced into a process known as gluconeogenesis to generate small amounts of carbohydrates for an attempt to run the central nervous system on that. |
|  | Even though that production of a small amount of glucose through this process known as gluconeogenesis, even though it does generate small amount of glucose, there are massive amount of ketone bodies generated by this. When fat is being used as the predominant fuel for all of our metabolic needs, it's going to create these ketone bodies which are also, in their own right, one of the best and the most viable fuel sources for much of our physiology, almost all of our physio ... |
|  | There are a couple minor exceptions but whether you're talking about the brain and the brain's ability to run our ketones which is exceptional, where you're taking a look at cardiac muscle and how much more hydraulically affective cardiac muscle is when it's running on ketones as opposed to glucose, there are so many upsides to this that it is really unfortunate, Mark, that most of ... I wouldn't say most. I wouldn't have an idea to what percentage but a large number of very well trained medical professionals do look at a ketogenic diet as being very unhealthy because they are thinking ... |
|  | This would be my assumption, Mark, that this is the diabetic ketoacidosis which can be life threatening and can put people into a coma when this is nutritional ketosis which is not a starvation or diabetic-driven model. This is a model where people are getting plenty of calories. They can eat a very, very nutrient-dense diet providing, in many cases, far more especially like the fat side of vitamins, some of the ones that tend not to appear in such robust quantities and the average American that is based on carbohydrates, but this is a very healthy diet that is not something that's foreign to the human body. |
|  | I can get very long winded on this because as you know, Mark, I'm such a big fan of evolutionary medicine and of our ancestral patterns that have carved out the human genome to what it is today. Our ancestors would have had major, major periods of the year. It could have been months, not days or weeks where there were such a limited amount of carbohydrate in their environment. There would have been subsisting largely on fat and the protein of animal kills and what they scavenge. |
|  | There's just really good evidence that so many early human cultures had major periods of time. It's not just the Inuit which most people site because of their far northern latitude and relying on seal, blubber and things like that. There are many other indigenous populations that had major times of the year when they were definitely in ketosis. |
|  | Other mammal or mammalian models, it's really clear when you take a look at the diets of wolves, for instance, or other carnivorous. They can be ketogenic for major parts of the year as well and in no way health compromised and no way as health men compromised over the course of human history with this because the diet, again, is not going to be deficient in nutrients. It's going to have very, very favorable effects on ... |
|  | We've talked about some of these processes in the past. We can get into them again hopefully this morning, Mark, but autophagy, looking at the cell's ability to recycle damage or less effective internal components. A lot of good things come out of these nutritional ketosis or this ketogenic state, but really it just comes to a fat-based diet, Mark. |
|  | The idea of fat, of course, is saturated fat. The polyunsaturated fats can really mock up the process, so to speak, in a very subtle way that's very important especially neurologically. I guess that would summarize it. |
| Mark: | That's a great overview, John. Just to recapitulate some of the great points that you made, in diabetic ketoacidos where ... You see this in Type 1 diabetes. These are individuals usually diagnosed at very young ages who are simply not able to make sufficient insulin. Under those circumstances, blood sugars go very, very high and they're unable to get into the cell because insulin is deficient and the body produces ketones because from a biologic perspective, is in starvation mode. Even if a person is consuming a lot of calories, that sugar cannot get into cells. |
|  | That is indeed a very dangerous health state for any human being. That's often how Type 1 diabetics present initially when they are diagnosed. That's the context within which most physicians are trained to think about ketosis. Indeed, it is a potentially very dangerous condition. |
|  | Under those circumstances, you're looking at ketone levels, just to put this in perspective that are often 8, 10 millimoles; very, very high levels. What we're talking about in nutritional ketosis is not at all related to insulin deficient states. You are trying to create an insulin deficient state by shifting most of your nutrients from a micronutrient perspective to fat, John. |
|  | When I say, and listen to this, and ... I don't know if we'll have time to share our experiences. I know we've both been ketotic for periods of time in our own personal ends of one but to be consuming 80% of your calories in the form of fat is such a threatening and foreign concept to most people. Essentially, what we're talking about is transforming our metabolism from being a sugar glucose burning metabolism to a fat burning metabolism. In order to create ketone bodies, you really have to reel in that carbohydrate constituency. |
|  | You mentioned about 5% of net carbs, John, excluding fiber. I think for most people, when you look at what's published, there's a lot of really good data. We'll put some note where these studies are up in our website along with the podcast. Generally, you're looking at less than 50 grams a day of carbs. Everyone has a different threshold upon which they'll start to reproduce ketones. Just to give people a quantitative sense, generally you're looking at less than 50 grams. |
|  | When you look at most of the research, I've really been following closely Eric Westman's work at Duke. He runs the integrative health clinic there. He had done a lot of work with Steve Phinney and Michael [Volic 00:11:57] who I know you've met and spoken with not too long ago. Most of the folks that they're working with who are obese or who are diabetics, we're get into the many proven health benefits of this in a moment, but they're targeting largely the metabolic syndromes. |
|  | These are people, as we've talked about, that are now about one out of three of the American population, adults and working its way into young children and adolescents, these are folks that have more fat around the mid line; their blood pressure is tend to be borderline high or high; their lipids are totally whacked with very high triglycerides and very low HDL. Most of them are insulin resistant, pre-diabetic or diabetic. Generally, they will start with 20 grams or less per day of carbohydrates for a few weeks just to initiate ketosis and then, with self monitoring. We'll touch on that as well. Generally, you're looking at less than 50 grams to maintain those state. |
|  | This is just almost the opposite from a micronutrient percentage than what most Americans consume. We're saying five, maybe at most 10% carbohydrate intake. Most Americans are consuming 50% to 60% of their daily calories as carbs. We're talking about 80%, 85% coming from fat as the micronutrient. Most Americans today are close to the 30%, maybe low 30's. |
|  | The protein is important as well because many people think of whether it's low carb or paleo. A lot of people equate the two. They're not ... Ketosis is specifically wrapping down those carbohydrates and moderating protein is important and that our bodies can convert protein to glucose. It is gluconeogenesis that you refer to. Too much protein can interfere with ketone production. |
|  | I just wanted to emphasize, John, that this is almost the opposite in terms of micronutrient content that people are used to consuming. The ketone bodies that are produced, the beta-hydroxybutyrate which is the most common in physiologically active ketone body, the levels, you're talking anywhere from maybe 0.5 millimolar to 2 1/2 to 3, you might get it up to 4 or 5 if you're really restrictive but this is nothing like what one sees in diabetic ketoacidosis. |
|  | The pH of the blood and physiologic system with nutritional ketosis is perfectly normal. Again, to re-emphasize your point, John, it's clear that human biology is highly adapted to produce and to utilize ketones undoubtedly as an adaptation to what were frequent periods of deprivation of carbs and for our ancient ancestors and ... Even during rainy seasons where you might be eating more plant-based carbohydrate foods, the dry seasons where ... Jeff [Lyches 00:15:31] work with the Hadza where you get much more, as animals struggle the fine water sources, it becomes easier to hunt and kill. |
|  | The Hadza is an example of a more recently studied tribe, have dramatic swings in their micronutrient consumption based on the season they're in. Undoubtedly, ketones had become a survival adaptation. One that we are seeing tremendous therapeutic potential and one that is probably, just willfully under recognized right now, John. That's a good starting point for what we're talking about here. |
| John: | Yeah. Mark, you're point about the 0.5 to 2.0 millimoles being that sweet spot, or even as high as 2.5, that's like a third of what you'd see yourself that was in ketoacidosis. Usually, that starts somewhere around 7 millimoles. Maybe as high as 8 but we're talking 0.5 to 2.5. It's very difficult to get up to 4.0 without there being some very aberrant metabolic process. |
|  | If you're just restricting carbohydrates to 50 grams per day, even getting your ketone levels to 2.0, would be quite a feat, really. From all the people I worked with and seeing it also in [dome 00:16:51] trials that I've run, we got a ketone meter for our son who's on a ketogenic diet and has been on one for quite some time now. It's really interesting how much interindividual variability there is. There's rate variability within a person from day to day based on how much sleep they get, how much exercise they get and things on those lines. Then, there's an enormous amount of variability, Mark, as you know between among individuals. |
|  | You talked about what they're doing at Duke and how allowed was people with metabolic syndrome. It does require a very, very significant amount of restriction on some of those cases. At least initially to get them going, but other people can have 75% of their calories in the way of fat in about 15% to 20% from protein and 5% carbohydrate and you'll only find another person standing next to them that has to have a much more protein restrictions. |
|  | It's very interesting how we all are individuals with this. The numbers that I presented earlier, 85, 10, and 5; 85% of calories coming from fat is the one that I feel most confident in without knowing much about a person or how they'll respond. I'm a little discouraged by some of the literature that is used clinically where people who are in ketogenic diets who put this on 3:1 or 4:1 ratio is that, of course, you add up your fat and your protein and you get a 3:1 ratio to carbohydrate. |
|  | I don't think that's really that effective but it's still being used in a lot of hospitals for people who, let's say a child has epilepsy and clinically, they're going to be put on a ketogenic diet. It's interesting how much that 3:1 or 4:1 ratio has survived even though the 85, 10, 5 numbers are, in terms of research, shown to be much more effective for a larger number of people. |
|  | Again, there's a lot of individual variability with these numbers but for most people starting out with a plate that is going to look like mostly avocado, a lot of butter, a lot of coconut, it can be any form of coconut whether it's shredded coconut or fresh coconut, olive oil, and almonds to some extent although almonds, again, have a lot of polyunsaturated fat. They have a good amount of protein. They have some carbs, not a lot, when you subtract the 5, there's really not that much there in net carbs but there's just a couple of grams. These are the staples, really, of a ketogenic diet. You can weave in higher fat meats and you can eat high fat dairy products but unless you're eating full fat cream, heavy whipping cream, the protein and the carbs in milk, in yogurt can catch up pretty quickly and take you out of ketosis. |
|  | It's really interesting how if you walk in to a restaurant, as you just said, Mark, and you just ordered off a menu with a blindfold on, the average American would end up with about 65% of calories from carbohydrate or any about 20% or so of calories would probably come from protein and about 15% or so from fat. This is the absolute antithesis of that. |
|  | A lot of people feel very uncomfortable putting butter on their stir fried vegetables with a small piece of animal protein. A lot of people also feel very uncomfortable going on this direction because they have a strong aversion to animal protein. I would say that the ketogenic diet, if you're a person who has an aversion to saturated fat and you have an aversion to animal protein for whatever reason, this becomes even more difficult because it can be done. |
|  | The Pacific Islanders for instance have times of the year where they're basically ketogenic because they're relying on coconuts and coconut products. Unless the coconut is the anchor of your ketogenic diet, it's really difficult for a vegetarian or a vegan, for that matter, to be in a ketogenic state. I'm not trying to discourage anyone from that but people do need to warm a little bit to things like saturated fat. Maybe, at least, modest amount of certain animal proteins to make this more doable. |
| Mark: | Those are great points, John. Really, what we're saying is that in order to produce ketones, you really have to begin to shift your metabolism from a sugar glucose burning metabolism to a fat-burning metabolism. There's no way to do that other than to really and significantly, the micronutrient contents so that you can begin to nudge that metabolism in the direction of forming ketones. |
|  | As people restrict carbohydrates, John, they will start liberalizing or mobilizing their fat stores in addition to the fact that they are consuming. Those fats we know are then converted to ketones in the liver. There are two types of ketones. One is a acetoacetate which can be measured in the breath. There are tools out there. We're not here to support any particular brand but ketonix, K-E-T-O-N-I-X, is a breathalyzer tool to measure acetoacetate. The predominant ketone circulating in the blood and used as the fuel is beta-hydroxybutyrate and that is best measured with usually a finger stick in the blood which is what you're doing with your son. |
| John: | Yeah. |
| Mark: | That certainly would be considered the gold standard. You can get a finger stick ketone meter on Amazon for probably 50 bucks. |
| John: | Even less. The problem is the strips. |
| Mark: | The strips are expensive. There's a little bit of investment upfront but we always encourage in these end of lines to do some measurements to get a sense of where you're at and how sensitive you might be. As you point out, John, what it ... Because most people, once they start to do this, can begin to realize that getting into ketosis is not hard. If people fall out of it, there are usually reasons not getting enough fat, getting a little too much carbohydrate or maybe even a little too much protein where this gluconeogenesis is interfering with the use of fat as a fuel. |
|  | It becomes really easy to make those connections in one's diet when they are doing some self measurement. There could be a huge role for that. We'll start looking at some of the clinical benefits of which there are many. A point that you made, John, which is so important is we begin to look at the clinical benefits of nutritional ketosis, is we talked a lot about the mitochondria, this incredibly important organelles that have their own DNA, that are basically where we generate our ATP, where our fuel sources are ultimately oxidized and burned, where much of the free radical production from the diet has emerges and so many health issues. |
|  | Virtually, everyone that we talked about, whether it's diabetes or obesity or whether it's degenerative neurologic issue like Alzheimer's or cognitive decline or epilepsy or probably depression, to autoimmunity, et cetera, et cetera, will have on some level mitochondrial dysfunction. Ketones are the ultimate fuel for mitochondria. I don't even know what a good analogy would be but it would be like the difference between using the best super unleaded gas you possibly could in your car compared to just the really poor quality unleaded gasoline where ... How clean that fuel burns will vary dramatically. |
|  | Ketones are the ultimate fuel and mitochondria become the beneficiaries of that. When you improve the health and biologic efficiency of your mitochondria, a lot of amazing health promoting things begin to emerge. The autophagy and all that you mentioned there, John, is really, really important. That's probably one of the mechanisms whereby you see so many dramatic health improvements on ketogenic diets. |
| John: | Yeah, and I think, really trying to encourage our bodies to undergo this metabolic flexibility, that maybe more than anything else, when you look at the epidemic, we have diabetes and metabolic syndrome. It's like people are not only people addicted in terms of their taste or preferences to carbohydrate-based diet or to sugar-laden drinks and foods but even more detrimental to our health is the fact that people had become metabolically dependent on sugar. |
|  | I cannot tell you how many people that I've met over the years who, say, if they go for a two-hour hike and they don't have something in the way of carbohydrates, they become shaky or irritable. They describe what they think is hypoglycemia. That really tells us a lot about a person's state metabolically in terms of their just overwriting dependence. It's a lot like the global economy's dependence on oil. We got this amazing solar technology and we've got all these incredible ways that we can generate electricity that's clean like your analogy with the mitochondria, but we continue to burn something that produces massive amounts of greenhouse gases and really poisons our air. |
|  | It's the exact same thing that's going on internally. It's really fascinating when you start to look at that as an analogy. We have this incredible source of clean burning fuel ketone, as you describe and yet a lot of people just never ... That process will never get turned on if there is a continual stream of sugar coming to the body. This is why, for those neurodegenerative diseases, people will always say, "Why did it have to be so restrictive?" Those are not restrictive. Your body just won't generate the ketones and you're never going to start to initiate that metabolic flexibility. |
|  | Brain cells, there are some pretty good research and not just by people like David Perlmutter who I think is great. I know you're a big fan as well of, whether it's Brain Maker or Grain Brain, really he has illuminated the problems in the human brain when we are carbohydrate dependent. I really like his work, but there's really a long list now of clinical papers that have illustrated the importance of giving the brain a period of time whether it's fasting which we've talked about. Intermittent fasting is a really short period of time but then you can get into this ketogenic diet for a week or a couple of weeks, every once in a while. You can really clean house internally. |
|  | You can give those neurons stimulus that they won't get otherwise. That's the thing. People just don't understand that brain cells operate on two fuels: sugar and ketones. That's it. They cannot burn fat. I cannot use proteins directly. If the brain can only use glucose and ketones and you always have glucose in the diet, it will never start to burn the other fuel. Let's have a little of both. You got to give the body a pretty strict set of environmental conditions for which it's going to develop that metabolic flexibility. |
|  | That's the point I really want to drive home, Mark, is that yeah, this sounds really strict and it sounds extreme. It's not. Evolutionarily, it's not. Physiologically, it's only extreme when you put it against the backdrop of the standard American diet and of what food guide pyramid had shown people they should be eating. If you look at that 6 to 11 servings of everything from rice krispies, to cheerios, to bagels, to big loaves of fluffy white bread, that's what people have been told should be the foundation of their diet. When they're hearing that the foundation should be something like avocado, coconut, butter, that is pretty [wreck 00:29:01]. |
|  | That's where it really is extreme. It's extreme because it's being put up against bad information that we've been drowning in for 50 years now. The other thing I want to mention that's I think noteworthy is that a lot of people say, "Coconut oil itself generates ketones." Whenever I talk about coconut oil in any type of lecture, I do say, "Look. This is a great source of medium-chain triglycerides." A medium-chain triglycerides are very unique in a way they bypassed normal lipid metabolism. They're able to circulate and give the body these ketones very quickly. |
|  | You touched upon this, the thing that most people need to understand is that there's different forms of beta-hydroxybutyrate. The type of beta-hydroxybutyrate, the isotopes, so to speak, that we get from coconut oil, it appears at this point in time, is not as biologically affective at producing all of those great physiological benefits as are the ketones that you generate when you're in a carbohydrate restricted state. |
|  | There are a lot of different types of ketones that even under the beta hydroxy family, coconut oil is wonderful. It's a great add on. It can maybe make that 5% difference but 95% of the difference is really going to be made by being in that carbohydrate and somewhat protein restricted state. |
|  | I just want to make sure I added that because again, whether we're talking about this as being extreme or radical, it only is when you compare to what's we've been told to eat for so long. Then, when it comes to the types of ketones being generated, the type that you generate when you're in that micronutrient distribution pattern of 85, 10, 5, those ketones are more effective at stimulating the biogenesis of mitochondria like you're talking about than just throwing 3 or 4 tablespoons of coconut oil on your baked potato. It's going to taste great and you'll get a very, very small amount of ketones that will give you some advantage. I cannot tell you how much so but you got to leave the baked potato behind to get the real ketones that your body will benefit from. |
| Mark: | Fantastic points, John. It reminded me of much the same way that ... Another approach that I know some people are interested in, I don't think there's a lot of data yet, is the consumption of ketone esters, these synthesized ketones that one can consume. They get absorbed. You can get moderate elevations of ketone levels in your blood. |
|  | My take right now, John, is it's really unclear that taking a ketone ester, much in the same way that you just described through an MCT coconut oil based ketone production process. It's probably not going to have the same robust or profound physiologic effect as you see with nutritional ketosis where you're generating beta-hydroxybutyrate from the conversion of fat breakdown in the liver to this ketone bodies. |
|  | People are going to be seeing a lot more about this ketone ester supplements. My take is that the jury is really intriguing as it is. It maybe that a ketone ester as part of a healthy nutritional program is one that may be better than day to day without having any measurable ketone bodies in one's blood. The [jury 00:32:34] is still out on the efficacy that that might give compared to what we're talking about here. |
| John: | It got pretty good marketing because this last year's Tour de France winner, Chris Froome, supposedly was using raspberry ketone esters. He was almost stripped. It was yellow jersey ... I don't know. I should say almost but there was an investigation as to how much of a benefit he got in the tour using this raspberry derived ketones. That was more marketing than anything else and probably work wonders for the company that manufactures those. |
|  | I agree with you, Mark. In this situation, people will be looking for shortcuts. How can they still have their normal carbohydrate-based dieting? It's really unlikely that you'll find that those add ons are going to really take you to same place that the environmental conditions of a carbohydrate restricted diet will. |
| Mark: | In the 10, 15 minutes we have left, John, let's just go through a checklist of where there's a pretty reasonable evidence that suggest of health benefits. One that I think will jump out and be relevant for most people is weight loss. We know that. There had been several randomized control trials of low carbohydrate diets compared to low fat and other diets where clearly, low carbohydrate is a much more effective both short and longer term strategy for inducing and sustaining weight loss. |
|  | What we're talking about with nutritional ketosis is a more extreme restriction of the carbohydrate. It's probably the rambo of weight loss strategies. This is the work that, again, Westman is doing at Duke and others I know are studying. From a weight loss perspective, there is no substitute. This is an amazingly effective strategy that also reduces satiety. |
|  | We're not talking about starvation here. You emphasize that upfront. People can lose weight without ... What most people today experience is unrelenting hunger and cravings. It's a biologic state that is doomed to fail. What we're talking about is almost complete elimination of satiety and of cravings. |
|  | This become not only effective but sustainable strategies. Even if one gets a little more carbohydrate, if they cross the threshold of ketone production, they're still likely to have very effective maintenance of weight loss. This is a single great strategy to gain traction in one's life and to see improvement. |
| John: | Absolutely. The beautiful thing about this is not only as you mentioned, Mark, where people feel satisfied throughout the day. Their cravings will disappear but the mental clarity that comes to the weight loss is valuable on any other part of it, any other benefit. The mental clarity that people get ... |
|  | Sometimes, as you know, Mark, there's a withdrawal period when people are making that metabolic flex. When they're starting to get off of the sugar and they're getting on to fast, sometimes they feel a little foggy for a few days. They'll say to me, "I don't know if I could do this." I'll say, "Listen. You've been a certain way for 50 or 60 years. You've only been on a ketogenic diet now for three or four days. Hang in there. You cannot expect your body to shift overnight." |
|  | I look at the fact that people, when they're losing weight, not only do they get mental clarity but this is another huge side, is they preserve muscle mass. You don't get that with a carbohydrate restricted diet in its high, high protein in that situation because you don't generate ketones. Most people lose muscle mass, too. Who wants to lose weight and lose all their muscle the same time? For me, you're throwing the baby out with a bath water. You don't want to do that. |
|  | Muscle is our metabolic machinery. It's what we need especially as we grow older. That's where a lot of people that are doing this to try to get out of metabolic syndrome or trying to lose weight. They're losing their muscle mass if they're on a calorie restricted diet of if they're on just a low carb diet, just a lot of protein. |
|  | These are two major upsides that you can lose weight and also improve your brain and maintain your muscle mass. Those are things that are strong selling points for me in terms of, this is the rambo, so to speak, of weight loss diet. It's the most, for lack of a better description, holistic. You can still eat a very nutrient-densed diet, where if you're in a caloric restricted diet, I really worry about certain nutrients unless people are really, really up on the supplements they need to use. |
| Mark: | Great point, John. The weight you lose is coming from fat. We talked a lot about body composition. Once weight or BMI says very little, if anything, about their body composition ... This is the ideal strategy to reduce body fat composition, preserve muscle lean body mass. That's the holy grail when one is looking to reduce weight without compromising those lean body mass storage, John. |
|  | Other great benefits that we touched on, if you look at all of the aspects of metabolic syndrome, insulin resistant states pre-diabetes dramatic reversibility. These are states that can be reversed for some people in a matter of weeks which is really pretty stunning, John. I see people all the time who have metabolic syndrome that are on metformin. They're on statin, they're on maybe other medications to lower their sugar because they have Type 2 diabetes. |
|  | They're on low fat diet right there under the current recommendations of the ADA and getting the current advice and without any hope ever of reversing the underlying biologic state that they're in. They're off the mindset that this is where they are at. "I'm kinda stuck here. Oh by the way, I had a family history of this. My mother or father, my uncle or aunt. And therefore, it's genetic, right? I'm a prisoner of my DNA." I see examples of that every single day. |
|  | What we are talking about here, and if you are a diabetic and you embark on this journey, you really need to monitor your sugar very, very carefully because they will drop quickly and your need for medication will diminish quickly. It's really important that a state of hypervigilance impose its self here. You can reverse diabetes insulin resistance and metabolic syndrome, all that comes with that. Blood pressure comes down, the triglycerides which for most of these folks are off the charts high can normalize and come down dramatically in a matter of weeks. |
|  | The HDL, we talked a lot about the triglyceride HDL ratio and one that get that down or less than 2 or even 1, you see dramatic drops in triglycerides and significant elevations of HDL which again most physicians don't even think is possible and most pharmaceuticals continue to try to find patents to raise HDL. This is a strategy that will significantly fine-tune and buff, those lipid parameters, it's a dramatic shift and one that continues to amaze me, John, in terms of how quickly the shift can occur. It's transformative. Again, much like weight loss, I cannot imagine a more health transformative strategy from metabolic syndrome than nutritional ketonic strategy. |
| John: | Yeah, absolutely. To build on that, Mark, you asked about other clinical conditions. Really good evidence that this is therapeutic. We've already touched upon the neurodegenerative diseases. Parkinson's, ALS, Alzheimer's, which I don't have the numbers in front of me but it seems as though, every year, there's another spike in the incidence of these. It's just growing as an epidemic. There's all this in theories as to why. You've got environmental triggers that could have toxic effects on mitochondrial health. |
|  | I just reviewed a bunch of papers on ALS because the work I do here for functional formularies. They know now that with ALS, for instance, that the mitochondrial component of the disease that the mitochondria cannot migrate down the axon of the neuron. They get stuck in a sludge in that where the ketogenic diet, you can start to mobilize this mitochondria. They can start to move more freely up and down the axon which is really important as they have to generate energy down at the site of nerve impulse. |
|  | In all of these conditions, mitochondrial health and all of these neurodegenerative diseases, mitochondrial health in one way or another is improved. Again, it's when you give the body the stimulus, there's no longer going to be as glycolytic. You're not going to be able to be as dependent on the sugar, the corn syrup, the fruit juice. You're going to need more mitochondria to metabolize more fatty acids. |
|  | When that happens, this is the stimulus. It's ketones, it's a fat-based diet. That tells the body, "We got to have more mitochondria because we need a greater capacity to burn fat to get these really good improvements." The brain is at the top of the list where those improvements are seen. |
|  | I highly recommend, if any of our listeners who have a strong family history of Alzheimer's, who have a loved one with Parkinson's or ALS, really look at this and look at the research. If you come up against resistance with your loved ones primary care physician or care provider saying, "I don't think that's healthy," well then you're going to need to educate them and you can stir them to pub med, all the published medical journals or med line and have them simply enter in the search a ketogenic and the condition that your loved one has because there's a really long list of well-done papers as you know, Mark, that are really starting to illustrate the potential for this to change lives. |
|  | It's a shame that more people are not familiar with this, who have X, Y, or Z conditions. You got that, right? Then, I'm not sure what you want to add to that, Mark. Do you want to add anything to those neurodegenerative diseases? |
| Mark: | I think that's so critical, John. We've talked about Dale Bredesen's work in the reversibility prevention of Alzheimer's. A great book that people might be interested in by Mary Newport, Alzheimer's Disease, What If There Was a Cure?. This was a book that she wrote with her husband who had very advanced Alzheimer's. She was able to help him reclaim a great deal of nuerologic function which was felt to be lost forever prior to his ultimate death. He died back in January. |
|  | It was so compelling that she felt the need to write the book and to help other caregivers or loved ones with even more advanced cognitive decline. By employing strategies like we're talking about, she saw significant impact. I just think that this is really an area that is going to continue to get a lot of interest, John. It may not get the research it deserves because no medication will be forthcoming from the research but if anyone is dealing with cognitive issues in a loved one, Dr. Newport's book, Alzheimer's Disease, What If There Was a Cure?, is a really compelling and inspiring read. |
|  | Other areas, John, that I know we've touched on and that continues to grow, epilepsy and seizure disorders are ... There are a lot of people that I will see that maybe a bit more resistant. They require multiple medications to gain seizure control. A lot of this work has been done in the pediatric population. It goes back to the 1920's, from the male clinic. They knew long ago that if you could achieve nutritional ketosis, there was something very, very special, almost magical that was happening in the brains of these young kids whose seizure simply could not be well controlled. That is another, in that neurologic category, very, very important. |
|  | I would add, and even though I think these are somewhat uncharted waters from a research perspective, depression, John, which probably has a mitochondrial basis and may reside in the brain from many other sources as scenario of interesting research. Then, you get into the pediatric population with ADD and ADHD and even autism in the spectrum. Again, there's still a lot of question marks there. |
|  | If I'm a parent and I have a child struggling with those issues ... I think your example with Mac, John, is such an inspiring example of ... Because people are going to be quick to say, "I could never accomplish that. My kid would never eat that way." Your life story, if you don't mind, I'm just publicly commenting on that, John, is an amazing example of how possible this is in any child at any age particularly when the parents embrace it and understand it and plan their lives around it. Everyone can benefit from that. |
| John: | Yeah. I just want to add to this, I know although a lot of times, people cringe when they hear some type of diet in helping with cancer. It's that really unfortunate that that's the culture we live in now that you have to shy away from that whether for fear of the FDA or fear that you're going to be looked at someone as recommending something as a cure. |
|  | Make no mistake about it that cancer is highly glycolytic. Maybe cancer cells do have the ability to adapt in time to using fat or ketones as a fuel but it takes time for cancer cells to make that adaptation. As part of treatment, whether that's going to be with some type of conventional treatment or that's going to be with some kind of alternative treatment, a ketogenic diet, especially for many forms of brain cancer, brain tumors, is highly recommended. |
|  | In our son's case, it's been a game changer and it's probably the reason he's still with us. It's because of this. Again, I cannot tell you how many times I talked about this with an oncologist. I've said, "You mean you don't think there's a difference." They'll just shrug their shoulders and say, "No, I have no evidence that a ketogenic diet is any better than the standard American diet." I'll say, "Our cancer cells are highly glycolytic." They'll say, "Usually." |
|  | I'm not sure why we have this aversion to giving any credibility to a ketogenic diet to who have cancer but that's certainly the culture that we live in right now with most physicians. It's really unfortunate. Again, I'm not saying it's a cure, but I'm saying, it should be a part of an adjunct therapy for many forms of cancer because if you'll look at a PET scan, for instance Mark, a PET scan is really going on the metabolic activity of cancer cells. The original PET scans were developed with a ketogenic. |
|  | Two or three days, before someone went in for a PET scan, they were advised to have an extremely carbohydrate restricted diet to make these cancer cells appear with greater contrast. That has changed with technology. However, it's really clear that cancer cells are looking for sugar. If you don't give them sugar and you give them ketones and fat, they struggle to generate and to spread. |
|  | There's a long list of reasons but if I were to describe it, Mark, it is the closest thing we have to a shotgun approach for diabetes and for Parkinson's and maybe for types of cancer. When you go to a ketogenic diet, there's very little downside. We can get into those in the last minute or two we have. There's very little downside and there's an enormous potential for upside. |
|  | There's not a lot of risk here and there's a huge reward. The only downsides I see are people have to be conscious about hydration. Hydration requires some carbohydrate as part of the process. I really encourage people to drink plenty of fluid on this. Sometimes, 50% more than they drink. If they were not in a ketogenic state, people need to be a little more liberal with their salt and add salt to food. Again, these are processes that when the carbohydrates are pulled out of metabolism, you're going to lose a lot more sodium and you're not going to absorb as much water. I don't know, Mark. I just cannot understand why it's such a risky diet. |
| Mark: | Great points, John. In so many topics we touched on, it just says a lot about where the current mindset is at. Despite evidence to suggest the contrary, it can just be very hard to embrace a paradigm that's not congruent with the paradigm you've been in for so long. This is a good example of it. |
|  | I cannot imagine a better general metabolic tune up strategy than what we're talking about here. When you touch on cancer, John, I know some of the research that is published has been done in glioblastoma and other brain malignancies because of the brain's unique capacity to use ketones as a fuel. Thomas Seyfried at Boston College, S-E-Y-F-R-I-E-D, is at the vanguard of a lot of this research. |
|  | Again, there's a lot we could be learning about adjunctive ketogenic diet in people who are getting traditional treatments for all kinds of cancer, that we are not realizing the potential around simply because medical oncologist just don't have the knowledge or understanding to go there. Most dietitians that are supporting these folks, amazing and compassionate though they maybe, are not going to be aware of these mechanisms and the potential to leverage and approach like this. |
|  | The research simply, from the enterprises that we talked about all the time, that are largely funded by pharmaceutical industry and will have no pharmaceutical implication, it's very hard to generate these studies. I would encourage anyone confronting a cancer diagnosis to partner with a clinician that can maybe help them. In addition to the treatment they're getting, this is the first place I would go personally confronting such a diagnosis. |
|  | There really aren't many downsides, John, that come to mind as well. It's just the challenge of totally re-engineering one's mindset and reconstructing one's knowledge and having a willingness to experiment with this. It's really not nearly as hard to do as people might think. |
|  | Before we conclude, John, I'm a fan of Jimmy Moore. Jimmy Moore is a bit of a podcast thing icon. Jimmy is not a clinical guy but he's through his own experience of losing 200 pounds and having been ketogenic for some time. He has a great podcast which covers a lot of these themes. He wrote a really good book for the average person with Eric Westman called, Keto Clarity, C-L-A-R-I-T-Y. That's Jimmy Moore and Dr. Eric Westman from Duke who we touched on. That's a good one on one roadmap for the ketogenic diet. |
|  | Also, Eric Westman's site at Duke and some of the work that he's doing has some great information for people that can ... People are looking to drill a little more deeply. I like the work that he's doing and applaud that he's doing this at the epicenter of academia. When you hear him talk, he'll comment on many of the same things, John, how little credibility this stuff continues to get despite the fact that research does exist is more than compelling. |
|  | If you just looked at the underline biologic mechanisms, it's really quite intuitive. It just makes sense and yet, we know that often is not going to get you to where you think you should be getting for many, many reasons. This is just another topic that falls into that category. |
| John: | Yeah. That was great, Mark. Three details I'd like to leave our listeners with, if they're interested in trying this. Number one is, in no way should you restrict your green leafy vegetables or your none starchy vegetables. If you want to eat spinach, eat all the spinach you want. If you want to eat zucchini, if you want to eat cucumbers, these things are free foods. |
|  | They're not going to contribute a significant amount of carbohydrate or protein for that matter. They are going to be key because you need to continue to ramp up your potassium as we mentioned, [liberal 00:54:13] sodium. We want to make sure our listeners who embark on a ketogenic diet, eat lots of potassium-rich foods. Again, green leafy should be at two, maybe three of your meals, so that you can help offset what you might be missing in the way of hydration. That's really important. |
|  | The other two things are, make sure saturated fat and monounsaturated fats are the foundation fats in this. You don't want to use things like canola oil, corn oil, sunflower oil, sunflower seeds. You don't want polyunsaturated fats to be a predominant source of your calories. You want to keep those to a smaller percentage. Again, those can generate problems for the mitochondria in their own right. Keeping those to a smaller percentage, the diet is critical. |
|  | The last thing and I don't know how often people get this detail but you're going to have a certain amount of net carbs you can eat today. If it's fruit, I'd make it raspberry, not a banana. If it's a starch, something like rice, I'd make it a couple of tablespoons of white rice as opposed to some type of carbohydrate source which has more fructose. |
|  | Fructose and polyunsaturated fats are the enemy of our mitochondria. When you're trying to resuscitate mitochondria, bring them back to a more viable state, you really don't want them drowning in polyunsaturated fats or in fructose. It's going to be unlikely that there's going to be a significant amount of fructose in a carbohydrate-restricted diet. If you get that 5% over the course of a day and you may eat a banana, there's 11 grams of fructose right there. It might be a small step back in what otherwise could be continuous progress forward. |
|  | Just three details that I think are really important. Unfortunately, I don't get to talk about enough with the ketogenic diet. |
| Mark: | Fantastic, John, and a great point too. John, we appreciate our listeners connecting to the Health Edge. We encourage, as always, to check out our website. Check us out on iTunes. Give us a thumbs up if you like the quality of information you're getting. Please share with your friends on social media. Get the word out. |
|  | John and I, we don't push too hard on the promotional side. That's a bit of a liability at times. Spread the word and touch those you love and care about with this information if you think it's of good quality. We're also on YouTube. We'll get show note sound for this episode. |
|  | John, great topic. I know we'll be touching a lot more on this. Good to see you, as always. Thank you, bro. |
| John: | Thanks, Mark. Thank you, Mark. Thanks everybody. |
| Speaker 1: | (singing) |

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