

Paleo Solution - 269

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Robb Wolf:

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Howdy folks. A slow start there for the system this morning. This is Robb Wolf, another edition of the Paleo Solution podcast. I'm very excited today. The guest on the show today is Lily Nichols. She is a registered dietitian and nutritionist. She has done the ungodly thing of writing a book about a topic which has no fence-sitters, everybody has an opinion and everybody's opinion is right.

Lily, you wrote a book about gestational diabetes. Why on earth did you do that?

Lily Nichols:

[Laughs]. I know, why would I choose such a weird topic? It's actually because this has turned out to be the specialty in my career basically since I started. So pretty early in my career as a registered dietitian and by the way, I'm not one of those food pyramid pushing calorie counting dieticians. I'm way more on the real food side of things.

Robb Wolf: You probably wouldn't be on the show if you were so yeah. [Laughs].

Lily Nichols: Probably not, I mean hence the name of the book, *Real Food For Gestational Diabetes*. Early on in my career, I had the opportunity to work with the California Diabetes and Pregnancy Program, which is also known as Sweet Success. For people who are listening who have gestational diabetes or know anything about this topic, you'll probably--if you've seen a specialist for gestational diabetes for example, almost all of them follow Sweet Success guidelines and that's because California tends to be pretty progressive about things so we have our own recommended standards for diagnosing and treating gestational diabetes.

I did a lot of training for clinicians, collecting data for research from the State of California. So we're really kind of on the forefront of research. So I helped them revised their guidelines for care and on their nutrition and exercise part of things and then that led me to work with a very well known perinatologist who spent 30 plus years working in the field of gestational diabetes and I was her diabetes educator and nutritionist in her private practice. So that's where I got to see how do these guidelines that we created, which at the time I thought were pretty darn good, how do they work in clinical practice.

So that's where I really got my feet wet. That's where I fell with gestational diabetes but that's also where I saw the gaps in the conventional recommendations and where things could be improved. So that sort of led me to develop my own way of doing things with gestational diabetes and really got much deeper into what the research says about nutrition and pregnancy and blood sugar and pregnancy, ketosis and pregnancy, all these controversial topics.

Robb Wolf: This going to be a good show. I'm very excited. I've written a few blog posts on gestational diabetes and we were talking about this before we start recording. The comments fall into one of two categories. Folks are either of the opinion that that information dramatically improved their life or this stuff is going to kill people, kill babies, and folks are going to die in the streets.

Lily Nichols: Right.

Robb Wolf: There's absolutely no middle ground between that. But before we jump in more, what is gestational diabetes?

[0:05:02]

Lily Nichols: Sure. Gestational diabetes--this is even controversial giving--

Robb Wolf: Right.

Lily Nichols: Giving you the full description but there's a couple different ways to describe it. So gestational diabetes is typically defined as diabetes that develops or it's first diagnosed during pregnancy. That's all fine and good. However, it could also be defined as insulin resistance or carbohydrate intolerance during pregnancy. I actually prefer to describe it as the latter, the insulin resistance or carbohydrate intolerance, because it tells us pretty much what's going on inside a woman's metabolism, inside her body and that's inability to handle a lot of carbohydrates without experiencing high blood sugar. So that's it in a nutshell and then it opens up this whole other can of worms of is it really something that caused by pregnancy? Is it something that's preexisting? Are there risk factors for developing diabetes later in life? We can go into all those details but at the briefest description of it, it's diabetes during pregnancy.

Robb Wolf: Okay. I like that one because it definitely focuses on clinical manifestations that can be tracked with blood work so makes it pretty concrete--

Lily Nichols: Exactly.

Robb Wolf: And quantifiable and what not. So Lily, correct me if I'm wrong but some of my understanding of gestational diabetes and just the process of insulin resistance during pregnancy kind of has some evolutionary underpinnings. Nutrient partitioning occurs in the body. When a woman becomes pregnant, we want to partition nutrients somewhat preferentially towards the developing fetus.

Lily Nichols: Right.

Robb Wolf: So there's a tendency for the mom to become insulin resistant in the muscle tissue in particular.

Lily Nichols: Exactly.

Robb Wolf: Also the adipose tissue so it's not like this is a "disease." This is normal biological process but then if we overlay poor sleep, bad food, altered gut biome, and we already have people that are overly insulin resistant or inflamed and then add pregnancy to that, that's where the problem really pops up.

Lily Nichols:

Exactly. Well, you summed it up perfectly in a nutshell and this is where I'll get a lot of flak because there's like two sides of the coin. There's like the conventional side which is like gestational diabetes it's horrible and then there's like the uber alternative side which is gestational diabetes doesn't exist at all. The true answer is it's somewhere in the middle like how much do we need to worry about this or not. You're exactly right there are metabolic changes that happen during pregnancy to shunt as many nutrients as possible to the baby.

One of the big things that happen in pregnancy is by about the 10th week of pregnancy, insulin levels are tripled to 3.5 times higher than they are pre-pregnancy. So that the beta cells in a pregnant woman's pancreas actually multiple rapidly to produce more insulin but that's coupled with insulin resistance which tends to go up as you get closer to term and then actually sort of tapers off right before delivery. But anyways, that's coupled with insulin resistance.

So if a woman is unable to produce enough insulin to overcome that insulin resistance or comes in to pregnancy already with blood sugar issues and insulin issues then we can end up with uncontrolled blood sugar levels during pregnancy and that's where there's this tipping point of like what's the threshold at which you diagnose gestational diabetes. That's a whole other can of worms because we dealt with this a lot with the Sweet Success program. It was like how do you best diagnose? That's a complicated topic but there're all different blood sugar thresholds and different tests that different doctors will use and there's no standard in the US.

The World Health Organization, all other countries generally do a 75-gram 2-hour glucose tolerance test. In the States, they'll do any combination of weirdo glucose tolerance test with different amounts of glucose, different thresholds, different numbers of blood sugar numbers that are exceeding whatever the level they have chosen to use. So it's kind of annoying. But I will say this in terms of physiologically what's going on when they look at the likelihood of a woman will get gestational diabetes, they have found that a lot of it can be predicated early in pregnancy by doing hemoglobin A1c and looking at the woman's which measures your average blood sugar essentially over the last approximately three months.

They found that women who have an A1c of 5.9% or higher when they do a glucose tolerance test of the usual 24 to 28 weeks which is how most doctors diagnose it, they have a 98%--a high A1c is 98.4% predictive of testing positive for gestational diabetes. So if you have a high A1c at the

beginning of pregnancy, you entered your pregnancy with pre-diabetes. I mean the cut of pre-diabetes is 5.7%.

[0:10:37]

Robb Wolf:

Right.

Lily Nichols:

So with this study that found the 5.9% threshold was uber predictive of it, you have pre-diabetes before you got pregnant. So your body is going to have a lot more trouble overcoming that insulin resistance either you're not making enough insulin or the insulin resistance is too high or there's a combination of both things going on. So I think as we're seeing the rates of gestational diabetes go up a lot more, part of that is how we're diagnosing and the universal screening that's recommended but also part of that is women are going into pregnancy already with insulin resistance. So you just can't control your blood sugar as well without being really, really conscious about what you're eating.

Robb Wolf:

So Lily, what's the problem with being diabetic during pregnancy? What's the outcome for both the mom and the baby?

Lily Nichols:

Well, for mom, long term, there's high risks of developing type 2 diabetes later in life. It's essentially this insulin resistant issues are going to continue unless you going to a good handle on what's going on with your lifestyle.

Robb Wolf:

Uh-huh.

Lily Nichols:

But for the baby, there's a number of risks associated with high blood sugar so various birth defects are associated with it. I mean blood sugar at a certain threshold is actually a teratogen, something that causes birth defects directly which is one of the reasons for women who have preexisting diabetes before they go into pregnancy so they have maybe type 1 or type 2 diabetes why doctors are super strict about their blood sugar control before they get pregnant because there's a very high rate of miscarriage in moms with preexisting diabetes. So blood sugar numbers are important especially early on.

But for diabetes that might develop later as a result of this physiologic insulin resistance, the baby can be born too large at birth which is called macrosomia that could lead to shoulder dystocia which basically means the shoulders get stuck in the birth canal during the delivery because the shoulders of large babies tend to be disproportionately large. It can also lead to hypoglycemia in the baby at birth which a lot of people are

confused about because they think well if the baby's been exposed to tons of blood sugar, wouldn't the baby's blood sugar be high, not low?

But these infants or babies who have been sort of marinated in sugar their whole pregnancy, we're talking uncontrolled gestational diabetes, at a certain point the baby's pancreas will start picking up the slack and producing insulin and so these babies are hyperinsulinemic. They have enlarged pancreas at birth and they over produce insulin. So you quite literally cut the cord and cut the supply of sugar and their blood sugar drops dangerously low and that can--

Robb Wolf: It's just like a poorly managed type 2 diabetic. They're trying to balance glucose and insulin boluses and they botch it once.

Lily Nichols: It's exactly that and there is some like some level of hypoglycemia is fine like very slight hypoglycemia is fine in a new born because technically they're fat adapted but these babies aren't fat adapted. They're sugar adapted. They're used to seeing this huge surge of sugar all the time and their insulin levels are way too high and then that later can lead to issues in childhood. So kids born to moms with uncontrolled gestational diabetes have a six fold higher risk of blood sugar issues and developing type 2 diabetes at adolescence, quite young. So their pancreas and their insulin production have been permanently altered.

That's what I am actually most concerned about is not like these minor things that happen right at delivery, not that they're minor but I mean if you only think of gestational diabetes is affecting your delivery and you don't think about long term consequences and its like, oh whatever. It's like, one day we have medical care to take care of those things. What you can't change is that if you're baby's been exposed to tons of blood sugar the whole time, there're disease risks and their genetic expression is changed and we call it fetal programming and it's very well documented in literature. So when it kind to like, we don't need to worry about high blood sugar because it's physiologic and its normal. It's normal to certain threshold but usually in a normal pregnancy like when we look at blood sugars in pregnancy, blood sugar levels are actually depress about 20% lower than somebody who's not pregnant.

[0:15:22]

Robb Wolf: Interesting.

Lily Nichols: Like normal pregnant woman has an average fasting blood sugar of around 70. An average 1-hour post meal blood sugar of 108, an average 2-hour post meal blood sugar of 99.

Robb Wolf: So there's some huge adaptation going on there

Lily Nichols: Huge.

Robb Wolf: Really trying to buffer the blood sugar highs and lows for the fetus.

Lily Nichols: Exactly.

Robb Wolf: Wow. We're just doing everything we can to screw that up. [Laughs].

Lily Nichols: Well pretty much and then of course the conventional gestational diabetes diet leaves a lot to be desired. I mean they suggest a minimum of 175 grams of carbohydrates per day. Everybody has different views on what's high and low carb or moderate carb or whatever but I consider 175 grams pretty high carb. When you have somebody who has carbohydrate intolerance during pregnancy, it doesn't make sense to give them lots of carbohydrates during pregnancy. I mean that's just common sense to me. I had to write a whole chapter in the book defending my views on that so.

Robb Wolf: It's always good to write a book and you know that you're in a fight right from a get go.

Lily Nichols: Uh-huh.

Robb Wolf: You're back on your defense.

Lily Nichols: [Laughs].

Robb Wolf: Somewhat in that vein within paleo land, ancestral health land, constantly the macronutrient wars rage where folks will point out historical data where most humans, most populations have consumed 55-60% of their calories from carbohydrates. The Kitavans eat 60-70% of their calories from carbohydrates. The thing that I think most folks miss again and again is that we've now had 30, 40 years of folks probably very consistently being if not gestationally diabetic at least insulin resistant since some epigenetic changes occurring in the population, which predisposed people to these things that you're describing like a lifelong difficulty in managing carbohydrate, a lifelong propensity towards obesity.

Lily Nichols: Right, right.

Robb Wolf: So this where the anthropological data is very, very valuable but maybe we even shoot ourselves in the foot with it in some ways. Because our micro evolution, the methylation of DNA in utero due to different environmental influences primarily blood glucose that may be predisposing people to insulin resistance that you just can't fix any other way than a low carbohydrate diet. I think I fit into that like my mother, I know she was diabetic now looking back as long as I can remember and all of--she died from diabetes complications. Both my uncles died from diabetes complications. My father died from diabetes complications.

Lily Nichols: Wow. Yeah.

Robb Wolf: Until I really figured out what my sweet spot was with carbohydrate, I was always kind of doughy, had blood sugar swings.

Lily Nichols: Right.

Robb Wolf: I had a really difficult time managing my life. But that's a really controversial topic like there's a lot of folks out there will say we need to eat a lot more carbohydrate. Here's some anthropological evidence for that and this is where the anthropology can actually shoot us in the foot. What are your thoughts on that?

Lily Nichols: Well, I'll say this I mean one of my very early introductions into ancestral nutrition was reading books by Dr. Weston A. Price--

Robb Wolf: Uh-huh.

Lily Nichols: Before I even went through my conventional nutrition training so that always kind of like colored the lens of how do we come up with these population wide guidelines when really there's so much individual variation based on genetics and heredity and what's available locally. But I can say this. It's going to depend a lot on what your genetic stock so to speak was accustomed to.

You can look at--if you go way up to the Arctic in the Inuit populations which used to have actually very low rates of gestational diabetes but because they're eating... I mean they're basically eating a ketogenic diet other than berries and some little bits of roots and tubers you might be able to find in the summer, you're eating like blubber and fat and organ meats from sea animals. I mean that's how you survive in that sort of a climate. So I think those people are probably more adapted to a much lower carbohydrate intake compared to somebody who might have originated from like an island nation where there's a lot of fruit growing

naturally granted the fruit from way back when was not hybridized the way that we have it. So bananas were not the bananas we see today. The bananas had seeds in them. They were much smaller and much less sweet and had way more fiber.

[0:20:18]

So even in these populations which ate more carbohydrates, it's still wasn't refined carbohydrates that was devoid of any nutritional value and devoid of fiber and processed into all these different things. I mean it was a different type of carbohydrate than we're coming in contact with now. Now, we just have this incredible quantity of primarily fructose available to us at all times. It's just unnatural. So I think the level of carbohydrates that somebody can tolerate is going to differ person to person based on their heredity, based on their activity levels and then based on what's their personal experience with food.

Robb Wolf: Right.

Lily Nichols: I mean I wouldn't say that I experienced being doughy so to speak but I definitely used eat a lot more carbohydrates and go hypoglycemic very easily get, super hungry, you know?

Robb Wolf: Uh-huh.

Lily Nichols: Although I didn't grow up in a household eating tons of sugar or anything, there are a lot more--I was just raised eating a lot more carbohydrates than I think my body does well on and there is type 2 diabetes in my family. So personally I also do well in a slightly lower carb intake not like the necessarily the ketogenic levels but that's just where I feel best so why not. But there is an interesting study I want to point out that looked at--you should check this out.

It's in the Journal of Medical Hypothesis that looks at the role of what they call a high insulinogenic nutrition in etiology of gestational diabetes. It's really interesting because it does set up that cascade effect that you're talking about in terms of high carbohydrate foods over stimulating insulin and then this and then the high blood sugar and then fetal programming and then the generation after generation of people who basically can't handle high carbohydrate diets.

Robb Wolf: Let's make sure that we get that one in the show note. Let's get a link to that. I just really love this stuff because to me it shines a light on this so that we understand both the historical story but we also understand kind of the more micro-evolutionary story more recently in the way that our

environment continues to change our genetics and our epigenetics, the way that genes are expressed. What are you doing? Clearly I'm guessing that you're not starting the morning off as a recommendation for gestationally diabetic moms or probably moms in general, probably not a giant bowl of steel-cut oats with honey and banana probably not like Ezekiel bread sandwich with smoothie for lunch and then brown rice for dinner.

Lily Nichols:

Right.

Robb Wolf:

What are you recommending for folks and how are you monitoring that relative to their blood glucose and are you mainly relying to A1c to kind of drive that boat?

Lily Nichols:

Okay. Let me try to start from the top.

Robb Wolf:

Okay.

Lily Nichols:

Breakfast, exactly the opposite of what you just described. It's like the cover of my book has like eggs with avocado and tomatoes--

Robb Wolf:

It was amazing.

Lily Nichols:

Which is like very, very low carb. A funny story about that actually because I shot this image in Alaska like in November and it was a real struggle to find good quality avocados.

Robb Wolf:

[Laughs].

Lily Nichols:

Those were the last tomatoes on my tomato plant. I was like I better not mess up this photo because there are no good tomatoes left. So anyways just a funny aside but.

Robb Wolf:

That's awesome.

Lily Nichols:

Yes, breakfast actually with gestational diabetes is a particularly important meal. I mean for everyone, it's an important meal because it kind of sets your blood sugar control for the day really and in gestational diabetes there is a surge in certain placental hormones in the morning plus the normal surge in cortisol that everybody gets which causes you to be more insulin resistant in the morning. So even in the conventional recommendations for gestational diabetes, they often suggest a breakfast of 15 grams of carbohydrates or less which is pretty shocking. You know, it's funny I've worked with hundreds of women with

gestational diabetes which means I'm like seeing them on a regular basis through their pregnancy, looking at their blood sugar numbers and food logs and seeing the correlation between what's going here.

[0:25:02]

Obviously different people are able to handle different amounts of carbohydrates but I never had much challenge. My patients never had much challenge my patients never had much challenge with their morning blood sugar numbers and it's because I pretty much always started them off at a low carbohydrate breakfast.

If you're going to have grains for example like 1 piece of Ezekiel bread but matched with a couple of eggs and a good chunk of butter or some avocado or if they do dairy maybe like a full fat Greek yogurt and some nuts and a little bit of berries in there like it was always much heavier on protein and fat and much lower in carbohydrates. So my clients generally don't have a ton problems with breakfast. I think is that breakfast is typically an oversized bowl of cereal with skim milk and juice and coffee with sugar, whatever is there. So people are just--you can easily get 100 grams of carbs in breakfast without even thinking about it, you know? And that might be the amount of carbs you can handle for the whole day. So that kind of covers breakfast with lunches and dinners. I do include in my book some sample meal plan which are--I don't call myself paleo per se or primal even. I kind of use the word real food because I just hate all the controversy that goes around with the paleo stuff.

Robb Wolf: You hate the dogma? Wow, that's shocking.

Lily Nichols: I realized that a lot of women who are getting gestational diabetes aren't necessarily eating paleo to begin with. So I do show how like greens and legumes and lower carb dairy products can fit into the plan but these can easily be modified to be strictly paleo or be primal-ish and have a little bit of dairy in there. But I recommend no matter what that people be conscious of their carbohydrates first when it comes to meals. So you go into your meals with good balance of your macronutrients like there's always a source of protein. There's always a good source of fat. There's always going to be a non-starchy vegetables hopefully and then it's kind of like testing the waters and see how many carbohydrates you can get away with and still have good blood sugar numbers.

So I tend to push people get the majority of their carbs from the non-starchy vegetables, the lower sugar fruits like berries, the lower carb dairy products. And maybe like legumes if they tolerate them or tiny bit of whole greens, the carbs that are in nuts and seeds that's already

compact with fiber and fat and protein which all help with the glycemic load so that there's naturally--like you don't even have to really worry so much about counting things like most women--

Robb Wolf: It's just baking the cake because you're not making bad choices.

Lily Nichols: Yeah. Exactly. It's kind of like there and because the focus is on real food which has way more micronutrients which automatically help with blood sugar control. All these stresses over gestational diabetes become less stressful, less problematic because you're not having to fight with your body to try to get good blood sugar control.

Robb Wolf: Right.

Lily Nichols: People are always like trying to--I don't know, it's like--I hear this a lot from people, as long as you like match your--as long as you add protein, it'll cancel out the carbohydrates. I was like, cancel out the carbohydrates isn't exactly the right way to think about this. Like yeah you'll lower the glycemic impact of the carbs you've eaten but you can't have like 2 cups of pasta which is almost 100 grams of carbs and like put some meatballs on there and assume that you're blood sugar's going to be fine. Like you probably want to make some noodles out of zucchini which are just as delicious and then everything will be fine and maybe you can get away with 1 piece of bread or something along with the meal or have a little room for a lower sugar dessert afterwards. But it just becomes just so much easier and simpler to manage this. We're not throwing a bunch of carbohydrates at somebody who's carbohydrate intolerant.

Robb Wolf: It's kind of shocking. It's kind of like you have a bad sunburn so do we try to mess around with sticking you out in the sun with sun block or do we just reel you back in and let you get the exposure that you're going to handle.

Lily Nichols: Exactly.

Robb Wolf: Lily, there's kind of a contentious issue, well there's lots of contentious issues, kind of circling back to the A1c story again.

Lily Nichols: Oh, yes. I didn't answer that question. Go ahead.

Robb Wolf: When I wrote some pieces of gestational diabetes, in my mind, it made a lot more sense to kind of drive the boat via A1c and so if you drop your carbohydrate load to a spot where you felt good and your A1c looked phenomenal then to me that seems like a good recommendation. There

have been some folks out there that and then the flipside of this is that doctors are not comfortable with that. They want you to do the oral glucose tolerance test and so there is a trick where you can eat more carbohydrates for three to five days and then "pass" your oral glucose tolerance test.

[0:30:24]

Lily Nichols:

Oh, yeah. Right.

Robb Wolf:

So you know, there's been some back and forth on that. One thought which is more the camp that I exist in is bugger the blood fasting blood glucose, bugger the oral glucose tolerance test. Let's just make A1c look good and if we really want to get detailed, we can look at fructosamine as another indicator of glycation.

Lily Nichols:

Uh-huh.

Robb Wolf:

If those look good, then were money like we don't have anything squirrely going on.

Lily Nichols:

Uh-huh.

Robb Wolf:

There's another camp out there and it's funny. It's kind of more in the paleo camp. They are making the argument that this lower carbohydrate eating during pregnancy is a super bad idea. The fact that you could eat carbohydrates and then pass your oral glucose tolerance test more effectively than eating lower carb is an indicator of that. Who's missing the story on that?

Lily Nichols:

Okay. What's interesting--there're so many directions I can go with this question.

Robb Wolf:

Oh, I know, I know, I know.

Lily Nichols:

What's interesting is and I love this, this is like a really, really good way to ask that question. As I was researching for my book because the recommending of low carb diet is like hearsay, for me to recommend a low carb diet in pregnancy even though when you look actually at my book like the carb recommendations aren't ridiculously low either. I would like to point out. But anyways, I was looking up insulin resistance in pregnancy and ketosis and pregnancy in all of these different research and I came across this study that was done on horses where they gave a glucose tolerance test to pregnant mares or pregnant horses and they

had the horses and I probably to mock up the description of this so I'll have to pull up the actually study.

But they had the horses either be eating their usual like hay and alfalfa like grasses because they're herbivores or have the horses be eating green based feed plus some of their usual grasses and stuff. The horses that were eating their normal diet of just grasses and hay and alfalfa and whatever, they failed the glucose tolerance test. They had impaired glucose tolerance. Then the horses that were eating the high carbohydrate greens which they're really are not genetically adapted to eat, they passed the glucose tolerance test.

Robb Wolf: Oh, that's fascinating.

Lily Nichols: I mean it was so hard to find this data on pregnant women because they like don't do studies--

Robb Wolf: Right, like that, right.

Lily Nichols: Potentially exposing a pregnant woman to "harm" but what was really funny is in the description in the study it was like, oh--it was basically defending that. Okay, well clearly these animals are adapted to eating a much lower diet and carbohydrates and therefore their insulin production wasn't up to speed to handle that pure dose of glucose. I mean it backed everything that you and I are talking about here like yeah if you're going to a bunch of glucose at somebody who's not adapted to handle a huge amount of glucose, they're pancreas is not going to be able to respond effectively because that's not normally what they come in contact with.

But I mean hopefully a woman is not having 50 or 75 or 100 grams of glucose, pure glucose in their diet at any given time or at any rate of consistency. That's obviously super unhealthy. So the glucose tolerance test is tricky. On one hand, it's been the way that gestational diabetes has been diagnosed for decades and although the amount of glucose, the timing of the glucose tolerance test whether you fast or not or whatever cut off of thresholds or diagnosis there are, it is the most documented way to diagnose gestational diabetes. So like when we're looking at data on GD, you're going to come across the glucose tolerance test all the time. I had a problem with it for the exact reason as the horse study that I mentioned which I don't think it's actually normal to be adapted to handle 100 grams of carbs per day.

So yeah, if somebody is eating really low carb ahead to time and they're maybe used to getting less than 100 grams of carbohydrates in their diet per day or even far less than that, their baseline insulin production is going to be much lower because there is a normal and healthy physiologic insulin resistance in their body that keeps their blood sugar ridiculously stable. So you throw a bunch of sugar at them and your pancreas freaks out. So I don't think that that's a problem. I much prefer, I mean I'm a huge fan of using A1c.

[0:35:31]

The perinatologist that I worked for since we both had worked with the California Diabetes and Pregnancy Program who recommends screening for gestational diabetes first trimester with an A1c by the way. That's recommended by them and that's when they say like they're pretty progressive like that's pretty progressive. It's pretty rare and find doctors who diagnose that way. But I can tell you in our practice which is super busy and it was all high risk pregnancy, so it was focused almost entirely on gestational diabetes like everybody would refer their GD patients to us and we also just had a--we were in an area where there was pretty high rate of gestational diabetes already, we diagnosed at least 75% of our women first trimester.

Robb Wolf:

Wow.

Lily Nichols:

It was rare that I would get a chart rose that was like, whoa! She had a glucose tolerance test, strange. Because you'd catch them. You'd catch that early on and then you have two-thirds of the pregnancy focusing on normal blood sugar control and because we get the blood sugar numbers well controlled, most of the time they don't need insulin or medication which I think is a huge, huge benefit. If you can eat a certain way and avoid medication that's like a win, win in my book. In terms of monitoring with A1c, actually quite a few progressive doctors will monitor blood sugar control during pregnancy with A1c because the day to day blood sugar numbers do matter like just what you do in fingerstick so usually they check their blood sugar like fasting and then after each meal. That matters because you do want to get the spike in the blood sugar and since the A1c is an average like you could be having like somebody with big swings with blood sugar highs and lows and they'll come up with it and okay looking A1c. But an interesting note on pregnancy is that A1c is actually artificially depress later in pregnancy because the turnover of red blood cells is faster. So it doesn't actually reflect the last couple of months. It reflects the last maybe six weeks or so.

So we would do A1c throughout pregnancy to track trends so like hopefully if say they were diagnosed, their A1c was 5.7. That's how we diagnose it. If you had pre-diabetes so A1c of 5.7 or higher, we treated you as having gestational diabetes even if you came in eight weeks pregnant and your A1c was 5.7. It was like alright gestational diabetes. We're going to have you test your blood sugar and manage this for the whole pregnancy. We would check A1c periodically to make sure that that level was at least staying the same or going down. If it was going up that could have been the person--people can get tricky. They cannot check their blood or check somebody else's blood sugar or check at the wrong time like 3 hours after the meal instead of 1 hour after the meal so they don't have high numbers because they're terrified of having to go on insulin or something. Right?

So A1c will give you additional information that the blood sugar numbers don't. However, the post meal like high post meal blood sugar and high fasting blood sugar are linked to problems with babies. Specifically the fasting blood sugar by the way is even very moderately or rather mildly elevated fasting blood sugars is linked to problems. So like for example an average like a usual goal for fasting blood sugar with gestational diabetes is 90 mg per deciliter or less. This gigantic study on gestational diabetes which had over 23,000 women across many different countries, it's called the Hyperglycemia and Adverse Pregnancy Outcome study or HAPO.

They found that women with an average blood sugar of 90 or less which is goal, their risk of their baby being born large was only 10%. But if a woman's average fasting blood sugar was 100 or higher, which actually when you think about it isn't that much higher, their risk of having a large baby was 25 to 35%. So like even very tiny incremental increases in average blood sugar leads to problems. I mean this is why our bodies are set up to so tightly regulate our blood sugar and particularly during pregnancy.

[0:40:03]

Robb Wolf:

So interesting. You know, in our own clinic we are screening police, military, firefighters, general population are cut off for insulin resistance is actually at 90 on fasting blood glucose and it's been scooted up to I think 100 or 105 maybe even 110 which is appalling to me and part of the reason why so many people are so broken. I want to back track really quickly about the horse study, something popped into my head and this is something that is often missed in vegan land. When we have herbivores eating grass, are they metabolizing carbohydrate? What's the organic molecule that fuels those animals?

Lily Nichols: Right. Well you know the answer to this but--

Robb Wolf: I do but I just like having smart gal say it so.

Lily Nichols: I mean it's super high fiber. There actually is a decent amount of nitrogen in grasses in other words protein but the fiber is actually digested into or rather fermented in their gut and turns into short chain fatty acids. So these animals are actually--

Robb Wolf: Fat fueled.

Lily Nichols: Technically fat adopted--

Robb Wolf: Yeah.

Lily Nichols: More so than they are carbohydrate adapted, otherwise they should be able to handle a super high intake of greens just fine but obviously, no. That changes their insulin output and their glucose tolerance.

Robb Wolf: There's a little thought in the anthropology evolutionary biology scene that pre-human ancestors very, very early had capacious guts, experienced a lot of cellulosic fermentation that produce short chain fatty acids and the part of our success transitioning into the more hunting type to the degree that we did that was because we were getting lots of these short chain fatty acids and part of dairying was reasonably successful because we're getting butyrate and propionate and all these short chain fatty acids so.

Lily Nichols: Right.

Robb Wolf: That's super interesting. I know one thing that makes folks absolutely petrified is this idea of ketosis around the pregnancy state.

Lily Nichols: Right.

Robb Wolf: What's the deal with that?

Lily Nichols: [Laughs]. This is like the most controversial part of my book.

Robb Wolf: Oh, it is. It is. People lose their minds over this.

Lily Nichols: I know. I will get into many battles over this but here's the interesting thing. I actually had to go way back to and it's sad that most dieticians don't even have this training including myself until I took it upon myself

to learn this stuff. But actually going back to what's going on in a pregnant woman's metabolism during pregnancy and the fact is nutritional ketosis or like mild ketosis is super normal and regularly experienced during pregnancy. If you have a woman do a 12 to 14-hour fast or rather 12 to 18-hour fast, I apologize, which is like it came to like eating dinner at 8 p.m. and having breakfast at 8 a.m. or maybe skipping breakfast and going to lunch. A high percentage of those women are going to experience ketones in their urine in the morning. It's just normal.

When you don't have food for a little while, your body switches to ketones and actually in later pregnancy, this becomes even more common. I think a lot of women who don't have gestational diabetes are not told to monitor their urine ketones so we don't even know like how common it is for a normal pregnant woman to pass ketones in their urine but women with gestational diabetes unfortunately are often told to check their urine ketones, which is silly and almost all of them will experience some level of ketosis during their pregnancy as measured by urine ketones.

Robb Wolf: Which is a totally normal biological process.

Lily Nichols: it is a totally normal biological process. I think every woman probably experiences ketosis at some point during her pregnancy especially if she is one of the one who has nausea or food aversions. But they've actually found now that the fetal brain that derives at least 30% of its energy from ketones. So were given all these warnings about, don't go to ketosis into pregnancy and that is the literally the only argument against a lower carbohydrate diet in pregnancy is the possibility of ketosis. That is the only argument, legitimate argument that you can find in the research which I actually don't think is legitimate anymore.

That's what's always thrown at you. You can't go lower in carbs because you're going to go into ketosis and if you go into ketosis, the baby's brain development is going to be messed up. Which by the way that idea came from a really old study that women who were on their day of delivery as they're admitted to the hospital, the nurses administered a urine ketone check and then they compared it to Apgar scores in the newborn. It says nothing about whether or not they experienced ketosis during their pregnancy and honestly, most of these of women who are full term, they are already experiencing some level of ketosis naturally. That's a physiologically normal reaction.

[0:45:54]

Robb Wolf: Apgar is incredible subjective and doesn't really give you any bearing over the long term health of the baby.

Lily Nichols: It doesn't mean anything. Now, where there is--there's so many directions to take this on which is why I was like--

Robb Wolf: That's why you wrote a book.

Lily Nichols: Old spots are on this because this part is so complicated and you have to choose your words carefully on this stuff. Urine ketones by the way do not reflect blood ketone levels which is really the only true way to measure ketosis. So a lot of these women are told if you have urine ketones, you're in ketosis or you're at risk for diabetic ketoacidosis and that's actually not true. They need to measure blood ketones so that's one aside. Urine ketones basically mean nothing. In one study they had women checked their--they checked their urine ketones and also their blood ketone levels and it was very rare that the two actually correlated. You could be spilling like large--usually urine ketone levels are measured in like trace, small, moderate and large. You can be spilling large urine ketones and have pretty much no detectable ketone levels in your blood. I'm going to say that to you because urine ketone test are completely useless and even California Diabetes and Pregnancy Program doesn't even recommend clinicians measure urine ketones in their patients unless they are insulin dependent, they're having super high blood sugar and you are anticipating that they might have diabetic ketoacidosis, which you then have to confirm with a blood test by the way. It just shouldn't even be tested because it means nothing.

Where ketones are a problem in pregnancy is diabetic ketoacidosis, which only happens in women who have preexisting type 1 or type 2 diabetes and they're insulin dependent and they somehow have managed to not take enough insulin to control their blood sugar. In this particular case, their pancreas doesn't produce almost any insulin or produces none at all. So if you don't have any baseline low levels of insulin which a pregnant woman with gestational diabetes will have, right? Because their insulin levels are already triple.

Robb Wolf: Uh-huh. Uh-huh.

Lily Nichols: They are. Like if you happen to have total beta cell burn out and no insulin production then your blood sugar levels can skyrocket and your body will be forced to burn ketones from breaking down your stores of fat and muscle essentially and that's where you can get diabetic ketoacidosis where the ketone levels are ridiculously high. I mean super

physiologic levels, your blood sugar levels are super high and the acid base balance in your body is significantly altered and that this associated in with brain damage and fetal death. That's a huge problem but is a metabolic emergency. It is not a normal reaction and somebody with gestational diabetes whose pancreas is still producing insulin that's never going to happen.

Robb Wolf: I'll get myself in further hot water and throw out there that the other topic that I get both love and hate mail on a few of the posts that I've put out on a type 1 diabetes. And that you could make a good argument that its probably better to manage that with a lower carb approach and use as little insulin as you possibly can to try to keep blood glucose and insulin levels within as tighter parameters because the best dosing methodology that we have is not as good as the way that your pancreas works

Lily Nichols: Right.

Robb Wolf: So if somebody went into pregnancy as a type 1 diabetic and they had properly managed their blood glucose with a lower glycemic load diet, they're probably going to do better all the way around.

Lily Nichols: Oh, absolutely.

Robb Wolf: Yeah.

[0:50:01]

Lily Nichols: I 100% agree with that and one of my other dietitian, diabetes educator friends whose into low carbs stuff, Franziska Spritzler. She is the site low carb dietician. She's written about this on her site how managing type 1 diabetes with a low carb diet and then matching with like the minimal amount of insulin needed is ideal. I believe that's the same way that it goes with the pregnancy as well.

Robb Wolf: I love it. Let's talk a little bit about you have a section, special foods for nutrition and pregnancy-eggs, liver, bone broth. There's some pretty good controversy that popped up a couple of weeks ago. You know what I'm probably talking about. There was a recommendation for a baby formula alternative that was based around liver. It had higher amounts of vitamin A specifically to also higher amount of iron than human breast milk. Clearly, human breast milk is the optimum food for a baby.

Lily Nichols: Right.

Robb Wolf: But what do we do if things don't go right? Have you seen any of the literature on that? There's a guy Pete Evans in Australia that wrote a book and like the Australian Medical Society like banned the book. I have done a little bit of research on this and although the vitamin A levels are higher than human breast milk by quite a bit, it's still not clear whether that's actually a potential toxicant which is what the medical folks are claiming. Do you have any thoughts on that?

Lily Nichols: I haven't looked specifically into his book to look at it--

Robb Wolf: Haven't looked out--okay, okay.

Lily Nichols: But I mean I am familiar like for example Weston Price Foundation if a woman's unable to breastfeed for whatever reason they have. Two different homemade formulas basically and one of them is based on liver. I think the vitamin A thing though stirs up a ton of controversy and the thing is it's hard to know if the recommended daily allowance or dietary reference intake like RDA or DRI whichever one they're using now. I can never remember.

Robb Wolf: Right.

Lily Nichols: It's hard to know if those are actually where they should be truly because for example, I don't know if you saw the controversy on vitamin D. But they just released a data showing that the Institute of Medicine's recommendation on vitamin D which by the way is 600 UI per day which is extremely low and completely crazy when you think about if you're fair-skinned and you spend maybe 30 minutes or so in the sun, you're going to make around 20,000 units of vitamin D.

Robb Wolf: Right.

Lily Nichols: But anyways, they found there was a statistical error and a calculation error in the setting of that guideline that underestimated the required dose of vitamin D at least 10 fold.

Robb Wolf: Wow.

Lily Nichols: So I haven't--there's been this obsession with vitamin D in the last 15, 20 years in the research and it's like all over the map. There hasn't been that same obsession with vitamin A and I wouldn't be surprised if there're issues with where the recommended dosage is. Obviously like I want to err on the side of caution with vitamin A. It is fat soluble. Excessive amounts can be problematic. But most of the study showing

that excessive amount that are problematic are using synthetic supplemental vitamin A. For example like specifically for pregnant women, I can't speak for infants, but when they've shown that excessive vitamin A intake during pregnancy from synthetic supplemental vitamin A is linked to birth defects but when they've study liver like equal doses of liver, it doesn't have the same toxicity. It's metabolized differently and if you're into chemistry and happened to take organic chemistry which at the time when I was taking that in school, I'm like why am I taking this class?

Robb Wolf: [Laughs].

Lily Nichols: But now I'm like, oh it make so much sense you make this teeny, teeny tiny little change to a compound and it's metabolized completely differently. It behaves completely differently. So the synthetic stuff is never the same as what we find in the food. So I'll leave with that on the vitamin A. I don't know what to say about the guy's formula because I haven't really looked at it.

Robb Wolf: I just got a copy of the book a few days ago via PDF and I'm rooting into that but I know that the Weston A. Price folks have had similar recommendations for decades and I just haven't heard of like huge numbers of infant mortality coming out of that camp. So it's just kind of left me scratching my head. There were a lot of people even in the paleo scene like super up in arms over this and saying that set us back like 20 years and I just felt like it was kind of hysterics.

Lily Nichols: Yeah.

Robb Wolf: Yeah, yeah.

[0:55:10]

Lily Nichols: I mean, I don't know, you look at conventional infant formula and it's like primarily corn syrup, solids and vegetable oil and then like milk or soy protein. It's pretty disgusting stuff.

Robb Wolf: Right.

Lily Nichols: So, I don't know, I don't know, I don't know what I'd do if I was in the situation where I was unable to breastfeed. I'd probably try to seek out donor milk before making my own formula but I don't know when you're in that situation, it's like what do you do?

Robb Wolf: It's funny everybody that was the loudest person in this conversation that was of course on the twitter sphere but none of these people had kids.

Lily Nichols: Right.

Robb Wolf: So I was making a point that we've had two daughters. Nicki was able to breastfeed Zoe, breastfeed Sagan and all that's gone well but in the back of her head, there was always this question of what if it doesn't go well? What do you do then?

Lily Nichols: Right

Robb Wolf: We had researched milk banks and donors and that's stuff is super expensive. Then you start saying, well okay we'll do--if things went sideways, we would one aliquot of that a day and then we would try to figure out like a goat milk formula or something.

Lily Nichols: Right.

Robb Wolf: When people--when you're so far remove from things that you can just be incredibly passionate about it and have no dexterity to the situation, it's very easy to have a strong opinion on it but then when you're thrown into them, the middle of that decision making process and if you just feel damned if you do, dammed if you don't,

Lily Nichols: Right.

Robb Wolf: It really sucks, yeah.

Lily Nichols: Exactly. Exactly.

Robb Wolf: Shoot, Lily, we're coming up on an hour here. I suspect you and I could talk for 6 or 7 hours on this and not even scratch the surface. Where can folks track you down so that they can get more information?

Lily Nichols: Sure. Well, you can find me on my main blog with is PilatesNutritionist.com or if you want to hear specifically about gestational diabetes or look into getting my book that's at RealFoodForGD.com. Soon, I will have a course for women with gestational diabetes come out that explains everything there is to know about gestational diabetes and help you sort of if you have my book already and you need help sort of coming up with how to customize it for yourself, you'll get more information, a lot more support, we'll have a support group with other moms. So those are the two ways to find me. I

have lots of freebies on my sites. I have four e-books on Pilates Nutritionist. I have a free guide for gestational diabetes on RealFoodForGD.com. So if any of those topics interest you, check it out.

Robb Wolf: Awesome. Lily Nichols, registered dietician, author of *Real Food For Gestational Diabetes*, it's been a huge honor having you on the show. People have limited ammunition so I'm glad there's somebody else that they can shoot at besides me on this so that's fantastic.

Lily Nichols: Well there's, what? Merely 150 or so scientific references in the book especially in chapter 11 which is all about defending ketosis during pregnancy. So you don't trust what I have to say, go back through the literature yourself and compile of rebuttal.

Robb Wolf: That's crazy talk, reading the primary research, yeah.

Lily Nichols: Yeah. Tell me what you think. I mean I knew this can drum up controversy and I almost left the book just being this straight up recommendations and not including the chapter on the controversy but because it comes up with literally every woman with gestational diabetes I was like I have to hit the ketone thing. But when you actually look at this through a lens of like common sense and ancestral nutrition and normal pregnancy physiology, it's not that complicated. It's really simple. So most of the book is very simple; it's just providing a very simple lifestyle and nutrition and real food advice and then there's a chapter to back up what I say just in case you think I'm actually crazy.

Robb Wolf: So they pull it out in the reviews. I like it and I love the notion that there are simple solutions to complex problems. We don't have to micromanage this stuff. We just need the big picture and then go.

Lily Nichols: Yeah.

Robb Wolf: Yeah.

Lily Nichols: I think people would be a lot less concerned about gestational diabetes if there was this option because the thing is I mean a lot of women that have it are unnecessarily--I mean they're forced to eat a high carb diet which causes high blood sugar which then forces them to require blood sugar lowering medication and insulin which some women will require no matter what. Those are not bad things and I go into that in the book but it takes a lot more careful management if you're on those and when you let the body manage its own insulin levels by eating in an appropriate way and moving your body in the right ways, it just takes all the stress

out of it. So I think there would be much less fear and hysteria about gestational diabetes if you can manage it simply which is what hopefully my book will give the women the option to do.

Robb Wolf: That's awesome and thanks for taking the bullet and putting yourself out there and tackling the questions that come up. I really look forward to seeing your success with this and would love to get back on the show later and talk more about this.

Lily Nichols: Oh, you bet. Yeah, we can do a whole show on ketosis and pregnancy if you want. That's a hot topic or potentially some of the things women can do to try to prevent gestational diabetes which is something I'm also passionate about so.

Robb Wolf: Let's do it.

Lily Nichols: You bet. Thanks for having me on the show, Robb.

Robb Wolf: Awesome, Lily. Thank you and take care. We'll talk to you soon.

Lily Nichols: Okay.

Robb Wolf: Buh-bye.

[1:00:56] End of Audio