Plant-Based: Mastering Diabetes and Insulin Resistance with a Vegan Diet Transcript

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Introduction to insulin resistance and Rob Barbaro

All right, everybody. Another amazing, maybe the most amazing segment we've done here. Reverse Heart Disease Naturally. But we're going to shift gears a little to reverse insulin resistance naturally, which is a crucial part of reversing heart disease.

Since some people argue insulin resistance may be the most essential root cause of atherosclerosis and narrowing of arteries. Others will debate it. Certain lipid particles like LDL cholesterol, lipoprotein.

But let's dive deep with a real hero. Some of you know the term biohacker and a person that plays around with their health with various techniques. Well, Rob barbaro our interview guest right now is not playing around because he is experimenting in a way that could end up with his own health and health of others, very detrimental or very beneficial because to read Robby's bio is so exciting.

A friend and just watching him blossom, but he is now a master's in public health. He went back to school and got a degree. His coworker is a PhD from Stanford in nutritional biochemistry.

And they, as a team, make up what's called mastering diabetes with a New York Times bestselling book, of which Rob is coauthor, mastering Diabetes The Revolutionary Method to Reverse Insulin Resistance Permanently and type 11.52.

Prediabetes and Gestational Diabetes. You may know Rob from Forks Over Knives the years that he's spent there working, with Brian Wendel. And then, about six, seven years ago, went off on this amazing venture of coaching people all over the world.

Rob, I could keep going. I want to stop because we want to get the information. Thank you for taking the time and meeting with us for this summit. Doctor Kahn, what an amazing introduction.

Thank you so much. I'm honored to be here and can't wait to share some important information with your listeners. And I just got to share on a personal note, I'm not sure it was the first time I met you, but I think it was.

We walked through the West Hollywood produce market. You didn't have a little snack. You had a, you know, an entire truck, basically, that you were filling up with fresh produce, predominantly fruit.

You introduced me to Alicia Silverstone at that time. And her little son, bear, who's not so little anymore. And I was at this Hollywood stuff is great.

And this Rob is amazing. But I want to take a different path. Everybody listening? Robbie is a type one diabetic. From what, age? 12. Right? That's correct. Yes.

You look like you're 18, but I know you're a little behind the scenes at this point. So you've been type one diabetic. You have to have some insulin exogenous to survive.

And this can be yeah could be a pump. People talk about nasal spray but you have to have your body requires it.

Rob's type 1 diabetes biohacking and high-carb breakfast

But you've done some real biohacking so that you are on a different path than most diabetics. Tell us what was your breakfast yesterday a full day yesterday.

Standard day. Any day. Okay, so a full day of eating, right? I have to be clear. Right now I am training for a full Ironman, so that has definitely impacted how much I'm eating to a certain extent.

But nonetheless, I still eat a large volume of carbohydrates. So for breakfast where I right now, will I eat a large volume of carbohydrates? Anybody with the American Diabetes Association just fell off their chair.

So I just wanted to point out you're already biohacking in rare air dangerous territory for standard dietitian recommendation to a type one diabetic. The please.

Even though you're training for an Ironman, I thought you look bulked up. Tell us what you're doing. Yeah, that is correct. We will talk about the history, of adding more carbohydrate to, a diet for anybody living with diabetes.

But for my own experimentation, like you're saying here, a breakfast will be roughly 225g of total carbohydrate, which is for somebody who's following a really, really strict ketogenic diet.

They'll that's like, that's more carbohydrate than, like in an entire week. But I just had a 25g a day would be a strict ketogenic diet. You said 225g of carbohydrate for breakfast.

That's correct. That's correct. That's like. And number four calories per gram, per carbohydrate, more than a thousand calories from carbohydrates for breakfast during this training period.

Correct. And I, I specifically do my training. In the morning, so I may that's likely my biggest meal of the day. And so I'm actually looking at it right now, for this, this morning, it was exactly 225g of carbohydrate.

It was ten grams of protein, five grams of fat, which was 847 calories. For this specific smoothie. And what I know I asked you right before we went on, if those are props behind you and you pulled produce off the shelf, they're the real deal.

Tree tomatoes. And so this is a sample dia. It tastes like a pear baked in brown sugar with cinnamon on top, also known as Nespresso. So your listeners may be familiar with that.

This is, a tree tomato, also known as Tamara. Oh, it's sweet, and it's a little bit tired. It's an incredible combination. So to have that ever thinking 225g of carbohydrate.

Number one, you're not eating donuts, bagels, whole wheat bread. You've got these gigantic bowls of fruits and vegetables that make up, as you said, about 850 calories for your breakfast.

But they're the most gorgeous, colorful fruit rich. I mean, you're not drinking fruit juice and you're not eating refined products. Correct. Just gigantic amounts of whole fruits.

Yeah, with some vegetables. Let's talk about this. So the other important point here is you establish that I'm living with type one diabetes and that I must inject exogenous insulin to survive.

And it's that fact which gives me and all the other type ones an advantage for assessing what lifestyle behaviors improve or worsen insulin sensitivity meal by meal.

Because I wear a CGM, I wear a continuous glucose monitor, a Dexcom G6. I count the carbohydrate I'm consuming, I put it into a chronometer, and I know how much insulin is required to metabolize the carbohydrate that I'm consuming.

Whereas somebody like you and most of your listeners, you're missing a key data point. You can count the carbs you're consuming, you can test your blood glucose, but you don't know how much insulin your pancreas is secreting on a meal by meal basis.

The person who is able to create that device that can give, insulin levels on a moment by moment basis, like these

cgms, it's going to be an amazing invention.

But I ate that 225g of total carbohydrate, and I injected five units of no Vlog insulin. So that is a very, very high level of insulin sensitivity most people.

So that's like a 45 to 1 ratio. Most people living with type one, if we're going to be generous they would be like 15 to 1. So you do 225 divided by 45g of carbohydrate, five units of insulin.

So that's the ratio you're coming up. That's right, that's right a ratio is very little insulin for the amount of carbohydrate. And you were about to say a typical diabetic on an Ada diet would be if you put them at 15 to 1, that'd be generous.

So they would need to inject 15 units of insulin for that same meal. Okay. So and you have basically restored, you know, near ideal insulin sensitivity, right.

You know, the little bit of insulin you inject is going a long way where potentially the average American Type one or type two diabetic injecting insulin is encountering resistance to the action of insulin.

Correct? Correct. So as a person living with type one diabetes, your goal is to inject the same amount of insulin your pancreas would have secreted before your beta cells were damaged.

And that's roughly 25 to 50 units of total insulin per day. So on my high carbohydrate diet, where again, on a day where I'm very active, I can eat over 900g of total carbohydrate per day.

CGM insights: insulin timing, eating pace, greens, and walking

I still inject roughly 30 units of total insulin per day with that level of consumption, whereas there's published research on people living with type one diabetes following a ketogenic diet, who will consume 30g of carbohydrate per day and still inject 30 units of insulin.

So the magnitude of difference of the insulin sensitivity of, again, the approach that, you know, we're teaching here at mass for diabetes, low fat plant based whole food nutrition.

It's not just me. This is repeated in client after client or client. We happen to end up working with a lot of people who are living with insulin dependent diabetes, because both Cyrus and myself, the two founders of Mastering Diabetes, were both living with type one.

But the majority of our clients are people living with prediabetes and type two diabetes, and they experience the same benefits once you reverse insulin resistance for prediabetes and type two, you completely eliminate the condition for those people.

Low fat wholefood plant based diets. Again, you said that quickly. I want everybody to understand what your sector of the nutrition world is. Obviously, we've interviewed doctor Dean Ornish, we've interviewed Doctor Caldwell Esselstyn, we've interviewed, Juliana Hever and other amazing people and people I've heard over and over.

But you're the test case. It's what you said. A type one diabetic is basically a biohacking experiment that is critically important. You get it, right?

I mean, this is your health. It's your brain cells. So it's wonderful. Just before we close the chapter, lunch and dinner, you know, now, while you're training, just blow us away.

What you're eating day after day. So I do have I have four meals per day. So the lunch meal is usually going to be mangos, papaya and arugula. That's my go to lunch.

Happens to your Dexcom six after that unseemly gorgeous tasty meal. Yeah I love that you're asking that question.

This is why this is all so much fun.

Because you're like, oh, that Ada person who here's this just fell out of their chair. Well, wait till you hear the Dexcom numbers. So I have a time and range consistently above 90%, whereas the average person living with type one is roughly 55 to 60%.

Okay, I'm in range of range. Oh glucose. Well that's right. So for people living with type one diabetes, the agreed upon target range is between 70 and 180mg per deciliter.

Your goal is a person living with type one, or any insulin dependent form of diabetes is to stay in that range as much as possible, and the goal is to have a minimum of 70% of that of time and range, and that could be over any period of time.

I'm talking about a 90 day average. And again, so I'm doing this without an automatic pump. So I use multiple daily injections. I inject basically for my long acting insulin novella for my short acting insulin.

And I have a Dexcom G6. So those are my tools. The people who are using automatic pumps that make decisions for them, that they're seeing a higher average, paper published in New England Journal of Medicine was upwards of 70% for that category.

But again, so my my timing range is excellent. My 90% you said have that correct 90%. Okay. And what if I may ask? I know it's your personal medical data, but you share your A1.

See, people are familiar with hemoglobin A1. C correct. Okay. Very I absolutely I'm happy to share my personal data. I love sharing it. So my A1 c is 5.3%.

And here's what's really important about that. That is that's a technically a Non-diabetic A1 C. But that when we teach people to come in our program for type one, we're trying to have people stay between 5.5 and 6.5.

That's the target. If you have a very low A1, C is a person living with interdependent diabetes. It is possible to artificially make that number look good by having a lot of low blood glucose readings.

So if you have a lot of lows that balance out your highs, you can come up with a decent average. But that's not healthy. Nobody's looking for that. So my CGM data, where I have less than 4% of my time in real time, being below 70, being 69 or below, that is excellent.

So if I'm showing that I don't have a 5.3 a1 C because I'm going low all the time, I have a 5.3 a1 C because my blood glucose management is terrific. What have you altered with wearing a CGM?

Other than it being this basis to report, have you actually stopped eating a fruit or a vegetable because it did spike it consistently? I made two big changes because of the CGM.

Number one, actually, I would say three big changes. Number one, I put a lot of emphasis on insulin timing. We wrote about this in our book, but as a person living with type one, you are taught that insulin doesn't work right away and that you should inject before eating.

That's the basic guideline. Is a guy wait 10 or 15 minutes. Most people don't really follow it, but until I got the CGM, I didn't fully understand how important that was.

And I learned a lot of nuances because meal after meal after meal, you start getting these insights day after day. I've been wearing a CGM for well over, think it's been 8 or 9 years now, so, what I learned is that sometimes, again, as a person living a type one has a lot of nuances.

Sometimes if your blood glucose was going up before injecting the insulin, you're going to have to wait more than 15 minutes, because by the time the insulin started working, you were a little bit higher than you thought you were.

So let's say you're starting a meal and you're maybe you're like one 2130 or something, and you're slowly creeping up. By the time the insulin starts to work, you might be one 4150.

So you have to wait another 10 or 15 minutes for it to start coming down. So I learned how important it was to make sure I was at a blood glucose level of 120, and going down before I started eating.

If you're going to eat a low fat, high carbohydrate meal that glucose is going to get in your bloodstream very fast. You must have insulin that's working, that's ready to take it out of your bloodstream and into your cells.

You have you're playing a matching game as a person living with type one. You're matching your manual insulin injection to the carbohydrate you're consuming.

And that timing is very important. So insulin timing became a key key for me for keeping my timing range and not seeing again, this has a big mistake.

People see people make this mistake with type one and definitely with type two as well. They will eat a meal. I'm sure there's many people listening right now being like he is just some exception because I've done this.

I had a bunch of bananas and I saw my blood glucose spike to 200. He's crazy. There's. And this happens a lot with type ones. The insulin timing was completely off.

And they basically they basically if you I told a type one hey look go ahead and eat this banana and and don't take any insulin. They'd be like what's going to happen while you I'm going to go through the roof okay.

That's what happens if you inject insulin and you eat. It's as if you didn't inject insulin because it's not doing anything for at least 10 to 15 minutes.

What valuable lessons. So you're basically like an artificial intelligence supercomputer, but just out of years of experience that you can teach you believe what you are seeing in your own physiology is, you know, you teach this, you coach people to do the same.

Yeah. Okay. So okay. I'm sorry you froze there for a second, but you're back. Okay. So I gotta tell you the second thing, doctor con. Okay. The second thing is, I learned how important it is to eat slowly, to end, to chew your food.

Okay, that's number two. So how do I see these really nice profiles on my CGM? While eating 225g of carbohydrate is when I have that smirk, particularly in the morning.

Okay, and you'll know this from your research in your work, humans are more insulin resistant in the morning, so that meal in particular you have to eat, slowly.

So I will consume my smoothie over the course of about 45 minutes. I take my time, I eat it with a spoon, and that helps keep a consistent, steady bar.

Glucose number three I make sure to add leafy greens or non-starchy vegetables to pretty much every meal. And that also helps blunt any blood glucose spike.

And this is a very important tenet of our method, and how we help people who are coming to us in a very, very insulin resistant state to eat themselves out of that state in an intelligent way and not see crazy spikes.

Greens and non-starchy vegetables are very powerful.

Daily meal structure, early dinner, and amla tea

And the fourth thing here, doctor come, is the CGM taught me how impactful walking is. I'm controlling blood glucose levels. I learned that if I went for a ten, 15, 20 minute walk after a meal, I would immediately go low.

I would, I was like, wow, I have to plan if I'm going to go for a meal, if I'm gonna go for a walk after a meal, I have to take less insulin I have to account for if I'm going to do that, or I have to eat a snack before going for the walk.

Like, again, you're balancing these blood glucose lowering activities with the food you're eating. And this walking is a very powerful it's published very clearly in the research of people living with diabetes.

Walking is powerful, powerful. It doesn't have to be ridiculously strenuous exercise to see blood glucose management improvements. Crazy useful data. Your non-starchy vegetables.

I imagine your fruits are raw. I mean, they're out of the fridge. Ready. Your leafy greens are raw. They're uncooked. Your starchy vegetables will be an example, and they're lightly cooked or steamed or what?

I usually just keep it raw. For simplicity's sake. I will have bell peppers. I will have zucchini, cucumber, carrots, stuff like that dressing on top.

So my fruit is usually so ripe and so and there's such a great volume of it that the fruit juice becomes the dressing. And I do want to address the volume component because people will see all the food I'm consuming.

They'll see these large meals and just like, wow, that's so much food. And I like to reframe it and say, no, actually, that's a lot of water. The foods that I'm eating are high in their water content, and the most pure form of water that you can consume is the water that nature has filtered in high water content plants.

Thank you. And I will say, we're not at the end where we're going to give all of these credentials to look them up online. But his Instagram, mindful diabetic Robby, has some of the best videos of Robby eating these large bowls of very high carbohydrate complex carbohydrate, selected fruits and vegetables, very rich in water.

You can be at a meal with Robby by just going over to mindful diabetic Robby on Instagram. They're very educational to me. And I, lick my lips over how delicious everything looks.

So, just to finish up four meals a day. Number three. Number four. Pretty similar learning nuances there for, So number three is going to be another meal that is seasonal fruit.

So it might include a lot of berries. Still might include more papaya more mangoes like those are staples in my diet. It could include some lunches, like a sweet fruit meal and then and pre-dinner.

And dinner is more into like acid and sub acid fruit. So it could have like grapes in that pre-dinner meal. I'm basically just trying to get enough calories in there so then I can have a pretty light dinner that's very high in greens and non-starchy vegetables and basically finished my day.

So I'm not eating any food past 7:00. That's a that's a good cut off for me. Earlier would be even better. But again, as a person living with type one diabetes, this is a huge, huge learning point.

If you can thin if you can have at least a three hour gap between, when you finish your dinner meal and when you go to bed, you will have let your fast acting insulin run its course so that that blood glucose reading that you have before you go to bed, as long as your basal insulin is on point, your chance of staying steady throughout the rest of the evening is much more likely.

Whereas if you're trying to play this game of injecting fast acting insulin and having a snack before you go to bed, the digestion and how that is metabolized, it just becomes much more complicated and your blood glucose control overnight becomes a little bit more stressful.

And again, for people who want to improve their time and range to improve their A1, c controlling your blood glucose while you're sleeping is one third of your day.

That's going to have the biggest impact. If you want to, you know, pick the lowest hanging fruit, control your blood

glucose while you're sleeping. Your A1, C will improve, your timing range will improve, and starting with an early dinner is a key component to that.

Okay, odd question maybe, but people are buying cinnamon, fenugreek seeds, black cumin, Nogales sativa seeds. Have you experimented with any of those in your bowl and seeing any difference or it's not worth it.

You know, the only medicinal plant that I've experimented with is amla. So Cyrus and I, we actually created a tea to make amla more palatable. It's called amla green, and I consume the hibiscus version on a daily basis.

And so this is a extremely powerful plant. They don't really actually know exactly what is happening on a side, the level that makes it so effective. There's been plenty of research comparing it to, diabetes medications, cholesterol lowering medications, and this powerful medicinal plant outperforms them in many situations.

It's incredible. Amla berries are literally the most antioxidant rich whole food on the planet. The problem is the berries taste terrible. So we have taken the powder and put it into a tea and made a powerful so you can get all the benefits in the antioxidants.

So for me, what that has done is that has lowered my insulin requirement to treat the dawn phenomenon. So for everybody living with type one diabetes, they wake up in the morning when they start becoming active and getting ready for the day.

Their liver takes some glucose, puts it in their bloodstream, and you have to take a little bit of insulin to cover that. And if you don't, you have a lot of blood glucose challenges.

A lot of people are very confused about that topic. But my insulin requirement to treat the Dawn phenomenon decreases when I'm consistently consuming.

I've gone with periods of time where I was consistent, then I wasn't consistent, and now I learned. You know what? I just have to stay consistent. So I have that amla green hibiscus in that morning smoothie every day.

And again, it keeps my dawn phenomenon in check. So that's been powerful. I would love to experiment with those others, I really should. I feel like I'm already so insulin sensitive.

It's going to be crazy to see what happens with those other, plants. But, yeah, that's that's what I've done. And I'll back your testimonial. I drink, like green.com.

That's the early anybody can find it at. And I like the one mixed with hibiscus. So it has both blood sugar and maybe some additional nitric oxide blood pressure benefits is delicious.

It's a powder. You know, it's a cup of tea. It's a very simple cup of tea. It's a very frankly inexpensive product for high how how high quality and science back.

So, thanks for bringing that up. So let's shift gears in the last critical maybe ten minutes interview.

History of high-carb diets and insulin sensitivity research

It, you know, I introduce it. This is really, you know, what a fascinating discussion you, let us into your life, and what you're doing today and all the lessons.

But, you know, insulin sensitivity versus insulin resistance. Now, you guys have some unbelievably informative videos on mastering diabetes.org, or I thought it was. Org.

Thank you. Mastering diabetes.org. And what is insulin resistance. But share with us a little bit Gerald Shulman at Yale. And why does a low fat diet restore insulin sensitivity?

Whether it's a type one, type two, type 1.5, overweight individual, that's where we get back to reversing heart disease. I mean, how does a low fat diet we've heard about it from Doctor Esselstyn and Doctor Ornish and Juliana ever.

And my co-host Doctor Joel Fuhrman. How does a low fat diet restore insulin sensitivity no matter what type of human you are? Okay, I'm going to take us back to the beginning.

Okay? Insulin was first discovered in 1921. It was first used in humans in 1922, and Doctor Sansom published a paper in the Journal of the American Medical Association in 1926.

The paper was titled The Use of the High Carbohydrate Diet in the Treatment of Diabetes Mellitus. Okay, so we know going on this is this is again, as soon as insulin was discovered, you start to see some papers on this topic.

And here's what he did. So basically before there was insulin, diabetes was pretty much a death sentence. Like they really didn't know what to do. They were just trying to keep people alive.

And so he did what he called, in his own words, a radical experiment with 150 of his patients. He started adding in more high carbohydrate foods because now they had insulin.

They could they could they could handle this. And what shocked him after adding in bread, potatoes, milk and fruit, those are the higher carbohydrate foods that were restricted in the past.

What shocked him is that the insulin requirements maintained the same. They did not change throughout this approach and what happened is there were a bunch of benefits.

So these patients got back to normal physical and mental activity. There was no difficulty in managing their blood glucose. They improved their cardiovascular health.

The diet was more palatable. It reduced cravings for forbidden foods, and it was cheaper. So this is the beginning of researchers beginning to see, okay, wait a minute.

There could be something here. And then in the 30s, Doctor Rabinovitch published papers in the Canadian medical journal Canadian Medical Association Journal.

Okay, it's like Jama but for Canada. All right. And he also started to incorporate more high carbohydrate foods. He added fruit, he added bread and he added low fat milk.

He added also non-starchy vegetables. And he kept the annual product consumption to a minimum, he said bacon, fatty meats and fish and cream were forbidden, and this was about 24% of calories coming from fat, about 56g of fat per day.

So a little bit higher than what we recommend. But what he really saw was incredible. So people living with insomnia and diabetes, they had less insulin, less injections.

Nonsense. Independent people did not need to add insulin when they, increased their carbohydrate consumption. These patients, they were satisfied with their diet, their blood glucose control improved.

They had lower cholesterol levels. And it's important to note that in the paper, the quote is he's he fed them a practically iso caloric value. So they did not see these benefits just because he was feeding them a low calorie diet.

And so in his 1932 paper, he concludes, diabetes does not appear to be due to defective production of insulin, but to interference with the action of normal supply.

Then he did another another paper. It was like a randomized control trial. He compared two different groups. He concluded this paper saying carbohydrates increase, whereas fats decrease the sensitivity of the individual animal

and man to insulin.

So this is 1935 Canadian medical Association Journal. We are seeing researchers observing clearly in humans that if you lower the fat intake, insulin works more efficiently.

And then this continues. Doctor Hemsworth okay. He published papers in the British Medical Journal. He was a researcher in the UK. He says that, conclusion of a 1934 paper, it is evidence that on the high fat diet, insulin takes longer to act and then acts more slowly on the blood sugar.

Then, when the subject is given a high carbohydrate diet. And he did a lot of very, very sophisticated, elaborate studies that you can't even do today where he would inject insulin into healthy, normal, weight men.

Okay. And he would publish what was it called, an insulin depression curve. So he there's this one particular study, published in let's see, this one is titled The Dietetic Factor Determining the Glucose tolerance and Sensitivity to Insulin in Healthy Men.

This is published in Clinical Science in 1935. These are small groups of people, but still fascinating research. When you look at the history of this.

Okay, so there was one particular study where subjects eight seven different diets for seven days. And so this took a good chunk of time, was very thorough, very controlled in a metabolic ward.

And I don't know if this is video or not. And people can see it. Maybe we can publish some some pictures. Yes. Video. Okay. Well, maybe I should. I'll give a picture so you can insert it and share the screen.

But the picture is unbelievable. When you see he has an 80% of calories from fat diet. 69%, 58%, 47, 36, 25 and 13. Those are the seven different percent of calories coming from fat.

And in the images you see a clear, clear distinction into the size of the depression curve. So when the subject was fed an 80%, fat diet, it took insulin approximately four minutes to work.

And then it dropped their blood glucose to approximately. I have to actually blow this up on my screen. Let's see here, approximately 85, I think. Okay.

Then when it was 30% of calories from fat, the instead of working in two minutes and it dropped the blood glucose below 70. And you can see it improving some slide by slide.

So when he concludes this study this is doctor him worth saying. It is demonstrated that the efficiency with which a standard dose of crystal and insulin acts on the blood sugar is determined by the carbohydrate content of the diet, so that the greater the amount of carbohydrate in the diet, the greater the sensitivity of the organism to insulin.

And this goes on. I know we don't have time to go through all the history, but I mean, I just want to stress every time you say carbohydrate, you obviously could say complex carbohydrate, because what we're seeing behind you is obviously not bagels, not cookies, not white bread, not white rice, not sugar.

So correct. You have to stick, you know, to what you guys eat fruits and vegetables and starchy vegetables. And I mean, what is it about high dietary fat diets?

People here all the time, ketogenic and maybe high fat versions of Paleolithic diets. What is it about the dietary fat that's so toxic to the insulin signaling system or insulin, you know, sensitivity where just tell us how that happens.

I think we have at least a theory I would have, yeah. So you mentioned, Doctor Shulman's work. And basically what researchers have found is that when you consume excess dietary fat, number one, the biggest offender being trans fat, the second biggest offender being saturated fat.

And then too much on saturated fat can be a problem as well. But again, research is very clear when it comes to trans fat and saturated fat. Too much of that being consumed ends up getting stored in muscle and liver tissue.

And when you have excess fat in those tissues that blocks insulin from working properly, it's essentially as if the lock has been gum. So insulin is is the key.

It's supposed to open the door. So then glucose can be ushered from your bloodstream into your cells. But if that key lock, if it's all gummed up, if the signaling is not working and the insulin being the key cannot open the door, then you have glucose that is stuck in your bloodstream.

And it's really a defense mechanism. Because what's happening is your cells are saying, look, they have turned off the signaling inside the cell. It's called intramuscular lipids.

They have been turned off the ability for the door to open. Because what they're communicating is that we already have a bunch of fat in here. We don't need more fuel.

I don't want the glucose. So this is the defense mechanism where your body's protecting itself from getting in again, too much energy. And as you begin to eat a low fat diet, you begin to burn away this excess fat.

All of a sudden, insulin sensitivity is restored and you are back to becoming more and more insulin sensitive. That's that's the biggest component here.

But doctor, can we also know there are other components here consuming too much advanced glycation end products okay. From, you know, like processed meats.

That's a problem. All right. We know we wrote about this in our book excess leucine is a problem. Excess sodium is a problem. So there's a there's a whole component of inflammation when it comes to insulin resistance.

So there are other problems other nuances.

Why dietary fat drives insulin resistance

And what we have done mastering diabetes is we have created a program that addresses all of these points simultaneously. And that is why I considered at the beginning of this interview, and share how I have some extraordinarily high level of insulin sensitivity.

It's because I'm not just doing one thing properly. This low fat, plant based whole food diet is not just addressing the fat, it's also addressing excess protein.

That's another big one I didn't mention. Okay. So it's you could say it's a low fat, low protein, diet as well if you wanted to, but it's really more like appropriate protein because in our society we're just having too much.

And that Calzada has a delayed insulin spike. And again, people living with type one can see it clearly. But the bottom line here is when you follow a diet that is again, it's low in overall fat, again, particularly low in trans fat and saturated fat.

And it's high in water content. It's high in fiber. It's high in vitamins, minerals, antioxidants, low in advanced glycation end products, low in excess protein.

You put together this package, which not only makes you become more on sensitive, but it starts to give you the energy to want to move your body and then movement, which is an essential component of the mass and diabetes method, also improves your insulin sensitivity dramatically.

I think that was like the most powerful five, six, seven minutes of physiology. And, you know, everything you're quoting is science. And, Gerald Schuman at Yale, I mean, he did muscle biopsies where you can see these fat

droplets in muscle cells and you can see them diminishing using MRI scans.

So you would imagine just last couple of questions. If we did a biopsy of your, calf muscle, you probably would have, pristine muscles without those little fat droplets, I'm quite sure.

Don't volunteer do readily for that. I would imagine so. You know, I remember this question. Yeah. You know, this is the study I don't believe has ever been done, which is to take 50 people in your program that are really successful, type one and type two, and take 50 people in a ketogenic diabetic control program, of which there are and and do a two hour glucose tolerance test, which we're going to hear a little bit about more from one of our, experts you're interviewing.

That's sort of a routine test in their heart disease reversal clinic. What do you think you'd see in that experiment? And if you think it's been done correctly.

But I don't think so. I don't think it has been done correctly. I think you're correct. And what you would see, well, I would imagine you would see is that the people in the low fat group would show a very, very high level of insulin sensitivity.

Right. Like they you would just be like, again, you're looking at my numbers like, wow, like the amount of insulin that they had to secrete, you know, like it would be a 75 gram test.

Right. So you had to figure out like how much. And so like it would just be very clear their variance on sensitive not just like average insulin sensitive.

You would see they are like beyond like wow, there's something really special going on here. Now in the other group, what I would imagine you would see is definitely, I think if they're truly following a ketogenic diet and they were sticking to that ketogenic diet up until the day of the test, I believe they're going to feel that oral glucose tolerance test.

They can't handle 75g of glucose. Now, what the low carb community will say is, well, I need time to carb adapt. So if you if you did a study in another way where you gave the low carb group a chance to carb adapt and basically shift their metabolism, I think you would if they were, if they were at an ideal weight, you probably would see some pretty, pretty decent readings.

You wouldn't see anything extraordinary like, wow, like they're super insulin sensitive, but I don't think you would necessarily see something and saying, wow, like they're super insulin resistant if you let them carb adapt.

And I think that again, that's where this stuff gets really, really nuanced and really confusing in the research. And so we do know people will improve their internal sensitivity just by losing weight.

So of course, you can see, the low carb crew, the keto crew seeing improvements just because of the weight loss. You'd have to really do some, you know, iso caloric, testing here as well.

It's be a lot of nuances to doing such a, such a, paper. But again, our position again, I love the low carb people. I have a, you know, we I think we have a mutual friend who's well known, plant based, vegan, low carb, type one amazing woman.

Like, I respect everybody doing that stuff. I think, our biggest problem in this country is the people who are just apathetic and just aren't caring and are doing nothing.

We have way more in common with the low carb world than we have then we don't have in common. I love them, it's great. Our position is that, look, we don't we don't see even the need or the reason or the benefit of perpetually living in a state where you've put yourself into a state of glucose intolerance.

Right. So they would fail that oral glucose tolerance test if they were sticking to the keto diet because they they are

adjusting their physiology to be in a place of glucose intolerance.

We say, look, all the benefits you can get of being in a low carbohydrate diet, whether it's the weight loss, whether it's, you know, having more energy, whatever benefits you're seeing out there, you can get the same ones by following a low fat, plant based whole food diet.

And you can become insulin sensitive and you get to choose to follow a diet, which has been proven as the diet for the longest lived humans on the planet.

The keto world doesn't have that research yet, so they're there. They like, say, how look? Well, absence of it doesn't mean that it can't happen. I would just prefer to go with the one that's already been proven and stick and stick with that beautiful, beautiful.

Summary I agree with you. Apathy, which is the standard American diet, is the real enemy here. And I think you've challenged people so now everybody's stimulated.

They want to go read your book. They want to go to your website. They want to have you. And, doctor, I was coaching. What's a website again? Okay. The best place to go to is mastering diabetes.org.

And if you're interested in coaching, you can just click on Personalized coaching. You'll get a chance to talk to an enrollment specialist for free. We want to make sure we can help you. We want to make sure we're a good fit.

We want to get you aligned with the right coach. Depending what type of diabetes you're living at, depending on your goals, you need to be with the register and or dietitian.

Do you need to be with a certified diabetes care and education specialist? You need to be with a weight loss expert. Whatever you need, we're going to align you with the right person.

And that's how we help you through our website. And somebody is thirsty from the green. They're going to find it the same website or a special website.

They should go to, the green.com and absolutely get yourself some the green is powerful. It's actually quite delicious. And it's an easy way to get started.

And like I said, you can make it into a tea without water and you can put it in a smoothie. And I'm sure there's other absolutely you can put it in a dressing.

You could add it to any meal that you're cooking, like it's easy to get it in, but you want to make it a habit and do it consistently. And that's how you see the best results.

Perfect. Well, I gotta say, I think this, large audience is just rocking with excitement, rocking with information, and rocking with respect to maybe, you know, you and Doctor Sivers.

I absolutely love you guys are such, you know, I think you're celebrated, but you are the real biohackers, dealing with that theory, dealing now with I want to live to 180 like some very famous biohackers talk about.

You gotta deal with how my blood sugar is going to get me through the night without coma. And, you know, you've been very precise and scientific. And the bottom line is, you're not screwing around.

You're serious, and you're helping people. So I appreciate that. Back to you. And, thank you. Really been a great foundation for reversing your heart disease.

Naturally. Thank you. Robbie, I appreciate it. Thank you so much, Doctor Khan. You're such an inspiration. I'm so glad to be a part of this. Keep up the great work.

Thank you.