Introduction and guest background

Hi, everyone. Welcome to the Reversing Type 2 Diabetes Summit. I'm your host, Dr. Beverly Yates, ND. For this particular session. For our interview together, it's my honor to interview Dr.

Eric Gordon. He's been a groundbreaker and a pioneer and is very much a forward thinking physician who is looking at the difficulties of what happens with the realities of people's experience around complex chronic illness.

And in addition to a clinical practice over 40 plus years, he's engaged in research and is the president of the Gordon Medical Research Center. He's focused on bringing together leading international medical researchers and cutting edge clinicians.

Focused on ME/CFS, Lyme disease, autoimmune disease. Our conversation today is going to focus on the intersection of inflammation and how it drives some aspects of insulin resistance and genetic expression, and where people often get confused about what's what because we hear all sorts of things, right?

So we're going to help people think about this. So welcome, Dr. Eric Gordon. Thank you. Thank you, Dr. Yates. It's a pleasure to be here. It's kind of fun to be talking about a subject that we don't usually focus on, but it's such an important part of everyone's health.

Absolutely. Absolutely. So our conversation is going to focus on chronic inflammation, insulin resistance and that cell danger response. So can you talk to us about insulin resistance being a metabolic issue with genetic correlations, but no predominant single gene abnormality?

Well, I think in the last, you know, 20 something years, medicine has fallen in love with genetics. And so it was I of most patients we're always looking for, okay, where's the gene?

What caused this thing to happen? And unfortunately, it hasn't really worked because other than a few rare diseases, almost everything that affects people is a combination of of five, ten, usually hundreds of genes interacting.

And when we start looking, we find that it's really the small molecules that what we call the metabolites, the chemicals that we use to produce energy that have a lot to do with our health, and especially a little organelle, a little part of the cell called the mitochondria. And we've all been, you know, I think probably even most of the general public are familiar with mitochondria as the part of the cell that produces energy, that produces ATP.

But what's really interesting is this little organelle, which is believed to actually have gotten into our cell as being at one time a maybe its own free living organism.

But it joined us and it does have some of its own DNA, actually.

Inflammation, mitochondria, and the cell danger response

But this this little piece of us produces ATP, which is called the current, the energy currency of the body, but it also controls and modulates our immune function.

And the immune function is what produces inflammation. It's there to protect us, okay? Inflammation is what keeps us alive. You know, the body is constantly having to defend itself and protect itself from all the other critters that live inside of us.

Because, you know, we all talk about the microbiome, all those trillions of bacteria that live in our gut, but also all

the ones that are in our environment that we're constantly being exposed to.

So your immune system is very busy and the the mind of country are always sensing what's going on. Because when you get a viral infection, the first thing the virus starts to do, it's tries to use your own metabolites to make more virus.

Okay? It's making it's taking the molecules that your body would normally be making to make more of you and to make more of them. And the mitochondria senses that.

And because it's not getting the same nutrients that it was, getting the same small molecules and it begins to change its function. Now when it when it does that, the reason that I've gotten so interested is because, I mean, should I treat people with a lot of chronic metabolic illnesses or things that chronic fatigue or autoimmune diseases and along with that, people are often fatigued, tired, they don't have enough energy.

And for a long time people thought that these mitochondria were broken, that there was something wrong with that, when in reality what's happening is that they are just doing what they're supposed to be doing, but they're often stuck in one day.

When we get exposed to an infection, when we when we get sick in the first steps of inflammation are to try to contain another organisms like a virus or a bacteria.

And so the mitochondria start by producing less ATP and they also the mitochondria also are responsible for producing a lot of the building blocks of we make of our DNA and RNA.

And so we kind of turn that down in the first step of inflammation, which I. Dr. Naviaux, Dr. Robert Naviaux from University of San Diego, who is kind of my patron saint, I, I looked at him for many new ideas.

And so he has he has come up with this concept, what he calls the cell danger response. And he's broken it down into three steps. The first step is that the inflammation process that we're all aware of when, you know, if you get injured or get infected, you get tired because your mitochondria have started to make less ATP, they use up, they send some of this ATP up to the surface of the cell to use as a signaling molecule to tell other cells that there's a problem.

Okay. And when things are going well, this is a very transitory process. It lasts for a few hours to a few days, and then the next step is rebuilding.

That's the cell. That's what he calls CDR2 that first step of of of reducing ATP production. And at that same time, when you're reducing ATP production, you're increasing the amount of of glucose that you burn and and but you don't it doesn't go in.

It becomes a molecule called pyruvate. And we're not going to try to keep it too technical. But this small molecule that your body can put into the mitochondria and when things are working well, you make a whole lot maybe like 36 or 38 ATP, or you can burn it up in the cytoplasm and only come up with 2 to 4 Atp's The thing is, you can do a lot of that.

So that's a way to make quick energy because you can you only have anywhere from 400 to 500 mitochondria in a cell, but the ability to to make a small amount of ATP and a glucose in what we call the cytoplasm, the kind of the background of your cell, you can amplify that like 50,000 times.

So even though you're not each each little enzyme complex is only making a small amount of, of, of energy. You can multiply that. And so you can get a large amount of energy by burning the sugar, but in a very inefficient manner.

And so that's CDR1. That's the beginning of the inflammatory cycle where you're kind of like making less ATP, but you're using ATP as a signaling molecule.

In the second stage you're beginning to repair because you know that that virus got in there and you had to kill a bunch of virally infected cells. And now in step two, you are beginning to rebuild.

And so the mitochondria start to work a little more normally, but you're still getting a lot of your energy from burning sugar. And this is the same this is the stage that lots of cancer cells are stuck in.

Okay, Just CDR2 because people interested in cancer would know that cancer cells are very dependent on glucose. They don't burn fat very well. In fact, I should emphasize that.

So people understand as we move on is that the most efficient way to make energy is really to burn your fat. Yes, it is. But it takes but it takes your mitochondria working well to do that or I shouldn't say, well, it takes your mitochondria to be working in their normal function.

They're on their non inflammatory, their non self defense function to burn fat and, and that's the big connection between diabetes and inflammation is because when your body is stuck in low level inflammation you're there's going to be some of your mitochondria that are not burning fat and they're just burning sugar and we'll we'll tie this in later.

But then you get to that third stage of the cell danger response where the cells have you like built new cells, but now they have to learn how to communicate.

Okay, because they are kind of baby cells and now they're growing and they have to go to school. They have to learn how to understand the messages that are coming in in their cell membrane has to mature.

So they're you begin to get information from hormones because in that seed or two stage one, you kind of cut down some of that ability to communicate.

You know, you kind of get your cell to cell information isn't flowing as is as well because the cell membrane is in is a little hardened. And in CDR3, it matures and all those cell receptors, all those hormone receptors are now opening up and working.

And we're going back to a more normal metabolism. Now, chronic disease is mostly women. Some amount of cells in your body are stuck in CDR one, two or three, and many times different different organs and even parts of organs have some of these cells stuck in in different different steps of this cell danger response.

So this sounds confusing, but it is. But it helps us understand why disease is not so linear. You know, you can have good days and bad days. You can do well for months and then be sicker, you know, because it's a constantly it's constantly evolving and changing.

And what changes it is your environment and your environment. It's obviously, you know, how much sun you get, how much rest you get, how much you and the and of course, your diet, you know, and the health of your diet.

And one of the things that we have seen over the last 40, 50 years is that the change in diet has had an a huge effect on the diseases that we're seeing.

Because, you know, if you look back over the last 120 years, it's incredibly dramatic. But the last 45 years, it's probably almost as dramatic that, you know, heart disease and cancers were fairly uncommon illnesses in the 1800s.

Okay. And it wasn't that doctors couldn't recognize them. They were well recognize they just weren't that common. And it's not because everybody died when they were 14 that is, you know, one of the I think one of the stories that medicine has perpetuated, too, to make itself look better than it is, you know, because what's happened in the last hundred years is we've gotten really good at treating diseases that kill people when we're young.

Okay, You know, we've got really good ID like, you know, people don't die as often during childbirth. Babies don't

don't die as often. You know, we can we get the child on that early childhood mortality, which was the scourge of life in the 1870s, you know, before the 1900s.

I mean, I forget it was was one in five, which was like 20% or something of kids would die in that first year of first five years of life. So the first year it was just really horrible.

But now, you know, because we can treat infections effectively, people do quite well and we can treat trauma. I mean, I think that's the biggest thing that's happened is, you know, people can get incredibly hurt and damaged in accidents and medicine is amazing.

You know, we can we do a lot for that. But what we count on is once someone's been injured, we do our magic can we can like do surgery and we can give give drugs and support the body to survive and recover.

But then people have to heal. And it's said healing phase that we're not doing so well at. Okay. And I think and that's gotten worse, actually, because we can see allergies.

I mean, when I started medicine, only when I was growing up, allergies were not that common. Now it's almost like 50% of kids have allergies. You know, and autoimmune diseases are Hashimoto's Thyroiditis.

These thyroid illnesses, again, they were uncommon and now they're a dime a dozen. And diabetes type 2 diabetes, type 2 diabetes in in children was almost unheard of 50 years ago.

I mean, really, it was rare people didn't see it. And now again, it's a common problem. And so we and what's changed is our diet, you know, and how much, you know, what particular in our environment and what particular issue or what particular aspect of our of our diet.

It's hard to say for sure. I mean, obviously we all agree that the incredible amount of fructose in the diet, because people have to understand it is fructose is from fruit.

You know, I mean, it's it's good for us. And the problem is that when our ability you know, we didn't have that, we didn't eat that much fruit. And when we did, it was usually in the northern hemisphere as it was in the summertime, you know, So you you might eat a lot, but you were trying to gain weight because you had to survive.

WINTERS You know, if you lived in the northern Hemisphere, survival was an issue. So a lot of us have genes that are very good at when we see fructose, we do wind up actually storing lots of fat.

We use the fructose does things to our mitochondria which get them to go into a cycle that is actually inefficient but is if in inefficient at burning glucose, but very, very efficient I mean inefficient at burning fat but very efficient at making more fat because you need that to survive the long winter.

So but since we no longer have to, we you know, grocery stores and supermarkets are open all year now and there is plenty of food. So these genes that one at one time kept us alive are now getting us sick.

Okay. Because and it's the amount of glucose that snuck into the diet because every processed food uses corn sirup, which is another way of saying fructose.

Maybe there's a lot of and this change in our diet has just dramatically changed the size of Americans. You know, we have gotten larger and larger. And as Dr.

Yates and I were talking just before we started, you know, been carrying a lot of weight doesn't make you necessarily unhealthy.

How chronic inflammation drives insulin resistance

There are plenty of people who are large but healthy and there are plenty of skinny people who if we actually, you

know, take a look at their livers, have fatty livers.

And Arnold But the common cause behind this is probably fructose and the amount in our diet and on top of that, we have all the chemicals and toxins preservatives and all the herbicides and pesticides which and just the chemicals that are just part of in our building materials that we're constantly breathing in and being exposed to, that our bodies weren't designed to deal with.

And on top of this, we also have the EMFs, and God knows we don't have the data on that clearly yet. But you know, it does look like that might be a problem as well of creating a state of chronic inflammation.

So going back tying this together in formation is your body's self-defense. But when it stays stuck on part of that, self-defense is getting you to store that instead of burning fat.

And if you don't burn fat, you're going to wind up eventually with insulin resistance. So let's see, I hope that wasn't too much of a mouthful for for people to get a handle on.

No, I think that's really helpful. You just go through it and to unpack it so people can, you know, look at the layers of the onion, so to speak. You know, get down to the essential, the Pearl of it here.

Right. So you've had a chance to tell us about inflammation and how it drives into resistance, how the body is responding to various things, how it has historically been helpful for humankind.

But now in this moment, it's a problem because it's just too much. And to some degree, it would seem that for many of us, we are in a moment where we're going to have to really acknowledge how different today's world is and our access to some of these nutrients and micronutrients and ultra, ultra high processed foods and the problems with that.

Right, Because the lack of nutrient density, not eating things in there, season, etc., it just makes a real difference. And that isn't something historically humans have had to deal with.

But in this moment it's a very different game we're playing. Yeah, you know, and especially even in people who think they're eating healthy. You know, that morning smoothie. Well, if that morning smoothie contains fruit, you're usually overwhelming your body's ability to handle it because basically, you know, your intestines can metabolize for 2 to 5 grams of fructose and break it down into glucose and sucrose.

And your body can handle that really well. The liver has no trouble, but when you drink a glass of orange juice, you overwhelm your intestines ability and that fructose goes right to your liver.

And in your liver, that fructose will start that process of shutting down the mitochondria ability to burn fat and you start to make more fat. You you actually are building fat and you are sending that glucose out too.

To be made into the liver will make triglycerides out of it. And then that goes to your fat cells where they get stored and you do that before you're going to go on a fast or before you're going to go to work in the Arctic, that's fine.

But if you're doing that every day, you are eventually going to wind up with some kind of metabolic dysregulation. And if you in many people don't develop type 2 diabetes, that's obvious.

But if we ever we measure their insulin levels, their insulin levels will be elevated and that is happening. And then they're going to start getting hypertension and eventually maybe coronary artery disease or cancers.

It just depends. That's what you're doing is coming what what what disease you get when your system is overwhelmed depends on your genetics. But the stress, the stress you put on your body is your environment, is what you put in your mouth and where and how you live.

And what's very interesting is that in and when people start to develop insulin resistance, one way to short circuit

that is exercise, you know, because the at the cellular level, when you start to have inflammation and have all these, the issue is the fact that you store in your cells and well they will hurt you if they're in if they're if they're in if they're inside your muscle, your muscle cells.

But it's just but more importantly, that that is a source of something called Deus di Asil Glycerol. But basically it's a fatty acid. Fatty acids, fatty acids are very simple chemicals that that your body uses for ever for just everything help builds your cell membranes.

It's really, really important. They're just a very simple molecule with three carbons and some long we call long chain fatty acids, which is big long chains of carbon molecules, basically.

Okay. And but some of the there's a particular subset, this little thing they call Dag or di Gasol di Asal glycerol that when it gets into your muscle cell okay it will stop it will when insulin binds to your cell this there's a lot of this dag inside your cell.

It doesn't let the insulin signal signals inside the cell get that. We call it the good for or this receptor that has to get to the cell membrane for glucose to get in easily.

Okay. And so if you have this fatty acid inside yourself in suddenly you're not guinea glucose inside your muscle cells to use to burn for energy. Okay.

And it keeps floating around in the body and your body then makes more insulin. Okay, because it it's got to yell louder at those muscle cells. And when it does that, unfortunately, the amount of insulin in your bloodstream, let's say, is ten or 20 or even 50 or 100 after a night, right after eating.

But it's can be three times that inside your liver. Okay. Because you remember insulin is is produced in your pancreas and the pancreas is has one little duct that goes right to the liver.

So you get really high levels in the portable vein of of of insulin and that so you that really gives a big noise to the liver. And when the liver sees a lot of insulin in, okay, it starts making more fat and stops and it stops burning the sugar, okay, It starts storing it and so we have a cycle of of of of increasing insulin levels in the blood and increasing and it makes more fat, which it then sends to fat cells to store.

And the problem as fat cells get a little bigger, they get inflamed easier. Okay. And when they're inflamed, you get more of these this drug released and you have this kind of this very non virtuous cycle of getting more of this these fatty acids, this vague getting into your muscle cells, and then you have more insulin resistance.

So you're in a difficult bind and that's why inflammation so so the point is this I should be clear here. I mean, the point I'm trying to make is that inflammation.

Now, if you have something that's causing inflammation in your body and those fat cells get the inflammatory signal, they produce a lot more of that. Okay.

So you can wind up with insulin resistance because you're you're maybe eating too much glucose, but you can also get into insulin resistance just because you're inflamed and your fat cells are are putting too much of that dag into the bloodstream that gets into your muscle cells and that gets them to become death.

The insulin signal. So it you're you're stuck in a cycle. And that can be very frustrating because you can have a situation and we see a lot in these people with what I call the chronic inflammatory diseases, which are basically all chronic illness.

But so many folks who tell you, you know, I don't eat much, you know, my spouse eats twice what I do and I keep gaining weight and their weight doesn't change.

And I think that's what's so frustrating for folks is because, you know, you know, so many people who have issues

with their weight are looked at as though they're gluttonous, that they have no self-control.

All they do, they must be sitting there eating all day. And many people are trying to live on these really restricted calorie diets, 1200, 600 calories a day, and they don't lose any weight.

And that's because they have underlying inflammation. And so the the signal that's coming from the fat cells are going are are preventing the insulin signal.

And so their muscle isn't burning the sugar. And so it winds it back in the liver and you make more fat. And it's such a frustrating thing. And for years for I mean, to this day, many doctors still they they still blame the patient as though, you know, you're just not you know, you must be cheating, as we say, you know.

Yeah. Yeah. That that's a real thing. You know, so many of my patients over the years and I'm certain so many of yours, they've expressed that very frustration where they feel not heard, disrespected, and it hasn't really helped them address their own issues, their root causes, because of the fact excuse me, like you say, the muscle is not responding to these signals.

And instead the liver has gone into fat storage mode because of what's going on with their insulin response. And this primary issue around insulin resistance is making that difference.

Right. So thank you for just walking us through. Here's all the pieces, how this gets started and why it can be so frustrating. And I know people are going to be nodding their heads, recognizing themselves in that journey.

Yeah. And this is where so understanding that inflammation is can be driving this and this is inflammation. I use that word inflammation a lot. And and what I'm trying to say is that when I say inflammation, I mean that there are cells in your body that are protecting you and in that desire to protect you.

Yeah. Okay. They are, they are producing chemicals which if things work well, is going to be a transient cycle. You know, I always compare it to like it's, it's like getting angry.

You know, if you get angry at someone in the moment, that's fine. But if you stay angry, it's not, you know. Right. Right. I mean, like our psyches reflect our physiology very much the same stories.

I actually I think it's almost easier to understand how the body works. And we think psychologically than we think medically, because medically, we often think in such linear terms because medicine, again, was built on a model of of injury and acute, what I call acute illness and acute illness is when, you know, you get sick and you get better, you know, the body goes through its process, you know, all as well.

But the thing that we forget is that when you get injured, a whole lot of stuff happens that I've heard people call it the black box of healing. You know, we give you a medicine and all the medicine does is like a Band-Aid.

It stops the bleeding, it stops the extreme pain or the diarrhea or whatever, whatever the extreme symptom is. And then we wait for the body to heal. But if the body is able to complete that healing cycle, then we just keep putting more Band-Aids on people and that's where, you know, the kind of medicine that you practice, you know, that works on, like how do we help the body learn how to or not work, but how do we help the body get back to healing is so important because the medicine that I was trained in was just in how to find another Band-Aid, you know?

And that's what we do.

Diet, fructose, toxins, and environmental stressors

And that's where we have like with the autoimmune diseases, we've gotten better and better at finding more specific chemicals to block part of this inflammatory cycle.

Okay, too. But but if and if that block if blocking that allows the body to then heal, well, that's wonderful. But

unfortunately, most of the time, because we don't change anything else that's going on, the people just have to take that medicine for the rest of their lives, you know?

And I mean, we see that with type 2 diabetes is a great example. Like, oh, wonderful, we have all that, you know, look at TV right now and be like, you know, there's there's a million advertising for all these great new drugs that will actually make you thin and and you know but if you stop them you call comes right back.

Yeah because you know the rest of the changes that are needed underneath have not been put in place. People haven't been really fully supported in that.

They've been given a piece of the puzzle that could be lifesaving life changing, but it's buying them time. It still has to address the root cause. Right. And that that's what what's so important for people to see is that, you know, when you're stuck is to start thinking underneath.

Is there is there something that hasn't that hasn't healed or is my environment am I still maybe I'm exercising more? Because it was like, well, I was going to a point I just like to make to people.

Is that one of the cool things about exercise? If you really and you eat a ton of exercise, you know, probably well a fair amount, but you know, maybe 45 minutes a day of reasonable activity of pushing yourself, you can you can short circuit the insulin resistance because there's a chemical when you actually burn a lot of energy, there is a protein called ampk, which means basically it's what your body does to signal that you have to make a lot more ATP When your amp goes up, your body knows that it really needs to make more ATP because AMP is one of the byproducts of of of work, of metabolizing.

What is, what is the byproduct of metabolizing ATP and that will actually get that glute for to go through the cell membrane without the insulin pathway having to work so well.

So a lot of exercise will help do this, but depends on the inflammation. And then we have the other big issue of this low level toxicity. Okay. And low level toxicity is what we swim in because of our of our environment and the changes in our food.

And this creates this same what I call cell danger or gotcha knowledge of the cell danger response because, you know, viruses and bacteria, but also toxins because toxins interfere with some and with some part of the intracellular processes.

Sometimes they tie up or glue fire on, sometimes they tie up different chemicals within the cell. And this creates that same issue of the mitochondria aren't getting what they need.

Okay. They read mitochondria are constantly sensing their environment and if the the page, the acid base balance in that cell changes or the amount of of raw materials that are going into that mitochondria change, it will begin to react as though there is a virus there with that same thing of browning out making less ATP and also burning less fat.

So toxins will do the same thing as just having too much weight or eating too much sugar, you know, or fructose, you know. So and that's something that people don't pay enough attention to, and they really should, in fact.

Yeah we Dr. Pizarro, who is a very well known naturopath and he has been working for I don't know how long, but he's been he's been really, you know, trying to get some research published over the last years.

I'm showing how he can reverse type 2 diabetes by helping people detox, you know, by. And it makes sense. Yeah you know and by and how people detox is one you know stop eating toxic stuff stop living in a toxic environment and we and we forget toxicity.

I mean these days comes from everywhere. I mean, just living too close to a highway, you know, And we forget that, you know, when the wildfires was happened, you know, we were all very worried about these 2.5.

They were talking about these particles that were less than 2.5 microns in diameter, meaning these really tiny particles. They get put into the air with a forest fire.

Well, you get the you get similar particles every time cars, you know, driving at 50, 60 miles an hour, little tiny pieces of the rubber, you know, the rubber.

That's why you you need new tires every now, every now and then, because you're actually burning off the the treads. Well, they get air to air aerosolized into tiny into these tiny particles and they cause inflammation.

I mean, a lot of inflammation. It's everywhere. It really is. And it's everywhere. And but but we see that people who live close to highways actually have more inflammation, people who live close to, you know, things like golf course.

You know, people pay a lot of money to live on the golf course. Well, not a great place to live. It's good. I agree. It's a toxic area, isn't it? In they're toxic areas.

And each one of these toxins do different things. I mean, the small particles are very simple. They just trigger your macrophages, these white blood cells that sense things and macrophages.

Once they get inflamed, they definitely trigger fat cells because you've got macrophages that live all around your fat cells. And that's one of the things that we know will get these fat cells through these more of that, the ag, that insulin, that chemical, that when it goes to your muscle cells will get them to stop loosening the insulin.

So It's these are all circles and cycles and and that's what we have to remember about the body. I always want at that point I wanted to make again and again for people is that when you go to your doctor, they're thinking in a linear fashion.

They're thinking you have arthritis. I'm going to give you a medicine for the pain, for the arthritis done. You know, you've got something broken. We're going to put a cast on and allow it to heal on.

You have pneumonia. I'm going to give you an antibiotic. But they're not thinking about how the body actually heals. And the healing process is a multi dimensional process that's happening simultaneously in multiple levels.

And there's no A causes B anymore, and it's it's hard for our minds to comprehend because we are now at our heart we're engineers, you know, I mean, that's how we all tend to want to think is that, you know, because we're good at fixing things, but we're good at fixing things that we usually understand because we made them, you know, you know, we built the bridge.

So and we know and at the mathematics works, you know, Newtonian math works really well. You want to build a bridge, the engineer designs it. And at this point in time, you know, they can figure without even having to build it, how much stress it can withstand.

And it's all very it's not simple, but it's linear. It's all understandable and reproducible. But nature, we didn't create nature. And so we don't understand it that well.

And all our and all our attempts at applying are, you know, one in one is to mentality, to understanding how the body works, doesn't get us healthy. Now.

That's a great point you make. That really, really is that you know, I think that's really the essence of it. We're trying to translate how we understand the world a certain way to apply to everything, and not everything fits that model.

And so when it doesn't fit that model, we have to figure out, okay, now what do we do next? Right? So before we wrap up our interview, I have two more questions for you.

One is, can you share with us why the research on all of these things is so confusing? Like there's models that are based on rats or mice, you know, the murine models.

There's human models. Like like why is the research so confusing? Because people do get lost. They look stuff up. They're like, wait, it said, do this.

No, but that contradicts the other one. Well, well, I'm going to answer that in two ways because actually, before I get to the the animal stuff, I just want to say that the biggest problem in research is that research in order to do good research that will get you published, you have to isolate variables.

Okay. And actually, this ties into the animal models in way is you say what they've done in animal models is that they have the mice and the rats that we use are so genetically modified they're nothing like their wild type.

The ones that you know, that you see in the street or hopefully not in your house, but, you know, those and the ones that we use in the lab, I mean, like they're so different because we've genetically modified these animals so we can test one concept, you know, and and we do the same thing with drugs.

We want that drug to work for everyone. But we are so different. It doesn't it only works that way when the drug is targeted to a specific issue. So we're stuck with this very like, okay, if I can find the one thing that's wrong with you, and that's why we we wasted the last not wasted, but we spent a tremendous amount of money in the last 20 years thinking that we're going to find the genes for things.

Okay. And just a quick and I will get to the but a quick aside about genetics and diabetes. One of the things that doctor, one of the studies that Dr.

Why the research is confusing

Naviaux did in the early, early 2000 that really helped shape some of his thinking was he did a study on adult adults with diabetic kidney disease, but he had two groups, one from Philadelphia and one from San Diego.

And he was looking to he was looking at the genetics and their metabolomics. And looking at the metabolomics, I said, means looking at these these simple chemicals that we use to make energy with and and and build our tissues with.

Okay. They're not enzymes can be like thousands of of proteins big of you know we use molecular weight they can be thousands even up to a million they can be huge.

The things we call metabolites generally under a thousand of got killed carbons which is the measurement of molecular weight. So not that it matters. We're just seeing a thousand versus tens of thousands and hundreds of thousands and the most of the metabolites are in the hundreds.

Okay, So they're small and but when he looked, he found that he found about 15 metabolites that predicted that these people had kidney, he had had diabetic kidney disease.

But he found 17 genes that predicted it. But the 17 genes he found in San Diego were different than the 17 genes that he found in Philadelphia because his population in San Diego was mostly Hispanic and his Philadelphia were mostly Italian were different.

We but we make the same chemicals, we use the same chemicals, you know. But they didn't manage that because my hometown is Philadelphia. And I would think the environment like certainly in South Philly, there's a lot of oil refineries, things like that.

You know, the toxicity exposure might be different than what might what one might run into, let's say, in San Diego is interesting. Yeah, No, it probably it probably is.

But I guess the point for me is that the genetics didn't determine, you know, what really determine was that these small chemicals and these small chemicals are how you are, how your body communicates with its cells.

So now getting back to the rats in mice, just the simplest thing is that it turns out I believe it's in mice, that in mice, the the liver cells are the ones that tend to get insulin resistance first.

While in humans, it's the muscle cells that get the insulin resistance first. That's important distinction that again, that's important. Well, just again, a simpler way of thinking about leptin.

A big people people were interested in weight. Leptin about ten, 15 years ago was going to be the magic bullet for weight loss. Okay. Because in mice and rats, if you give them leptin, it will you.

They don't want to eat anymore because it's a satiety signal from the fat cells and it works great in people. It was a total failure. It didn't do anything about anything, but there was no weight loss.

So that's why and that's what's so frustrating, is that what we learned? I mean, animal experiments are useful to Amos places, but we still have to do the work in people, and it's very hard to do the work and people when people won't.

People are different. So you get and when you're working with animal experiments, those mice are all of the same genetic clones. And so you get kind of you get hints of where to look in people, but it's not very good.

That's why I said we've cured cancer in Mice, you know, for 20 years now. It just doesn't work in people because we're a little more complex. Yeah, it's not exactly the same.

Thank you for making that really clear. I'm sure people listening will be nodding their head and taking notes and just understanding that people are trying to do research to figure things out.

But some of what's underneath might not. You know, it clearly doesn't completely match what we experience as people. All right. So here's our final question.

As we end our episode here, which is to explain something that I know is very puzzling to people when they have chronic illnesses, particularly like, say, chronic fatigue, if they've got Lyme, if they've got type 2 diabetes, they've got heart disease, fibromyalgia, right.

And they gain weight. What is the role of chronic inflammation across these issues? Yeah, Well it's it's just that once your your fat cells are in this meal, you of, of of because fat cells you know, live like they don't live by themselves they're they have lots of support tissue around them and amongst them are the white blood cells as I said especially particular macrophages.

Macrophages are just a part of your first protection in the body. They're the they're the guys who really go out there and sense what's wrong and give the information back on to your T and B cells.

And we talk about T B cells now, because since COVID, almost everybody hears about them. But anyway, so when you have inflammation in the body from whatever chronic illness you have and whether it's from toxins or infections that locally that local inflammation keeps getting your fat cells to ship out, this DAG, this little tiny fat molecule that goes into your into your muscle cells and gives them it blocks the insulin signal.

So your blood sugars go high. And remember, this was just one thing I just want to emphasize at the end, the whole thing about blood sugar is that your brain needs blood sugar.

Your brain needs glucose, even if you're living, even if you're starving.

Chronic inflammation in fatigue, Lyme, fibromyalgia, and weight gain

Okay? Even if you're on a keeton ketogenic diet or you're just on a fast. Okay, You depend on your liver to make sugar for your brain, that's probably the most important thing it's doing.

So it's going to keep doing that really, really well, no matter what. And if you when you're in, when you're inflamed, you're not getting the right you're not getting the right signal.

As I'm jumping. I'm sorry. I probably confused people right there that confused myself. So basically because I went to I changed subjects in the middle.

I apologize. So there's two issues. One, there's the inflammation. Inflammation is going to irritate your fat cells. Your fat cells. You're going to produce these inflammatory chemical.

Okay, that normally would be sending some energy to your muscles. But when these when this hits your muscles, it is vague. It creates insulin resistance, partially because it's trying to keep the glucose getting to your brain. That was the point. Okay.

Because that's the most important thing your body wants to do because you will die very quickly if you don't have. I mean, we're talking I think it's hours for me.

I mean, it's very fast. You need you need your liver to keep making enough glucose to keep your brain alive. Okay. And so that's the prime directive. And and if and if that includes having a ton of insulin resistance, because that will keep your it when it's working that keeps the sugar in your bloodstream high and that's what your brain needs.

So again, it's a the thing we have to see again and again in human disease is that it's not usually something that's totally broken that's causing the disease.

It's just of a system that was designed to keep you alive has gone awry. Yeah, it's gotten just too much stimulation in today's world. Oh, man, that is great.

What a lovely overview of how all this works where it goes wrong and what we can do about it. That's really helpful to know. Thank you so much, Dr. Gordon. I appreciate that.

If people want to connect with you and contact you, where can they reach you? Oh, just our website is GordonMedical.com named after me and they can also look at info@GordonMedical is a quick link to find out the find us but GordonMedical.com is a great place to check us out and see what we do and see if we can be of help.

Hopefully we have a budget information there that can help people learn a little bit more about these chronic inflammatory conditions. All right, great.

Thank you so much. I appreciate having you on this episode for the Reversing Type 2 Diabetes Summit. Well, thank you very much. And I appreciate it. And I'm so glad you're out there getting this important information out because the more people know, the better they can be at staying healthy.