



The Gluten Expert Discusses Gluten, Grains, and Diabetes

Guest: Dr. Peter Osborne

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Dr. Mowll: Hello and welcome back to the Diabetes Summit 2018. This is Dr. Brian Mowll, The Diabetes Coach, certified and master-licensed diabetes educator, and IFM-certified functional medicine practitioner. I have with me here today a repeat guest, one of our favorite guests actually, for the Diabetes Summit, not only mine, but a lot of the participants. We always get rave reviews. And that's Dr. Peter Osborne.

So, doc, welcome back to the Diabetes Summit this year.

Dr. Osborne: Hey, thanks for having me. It's always a pleasure.

Dr. Mowll: Yeah. Really, I mean, the comments we get on your presentations are just glowing. The people love these talks. You have a great way of making complex topics very simple. And we always seem to get straight to the point and cover some really powerful information. I'm excited to do that with you again today.

Dr. Osborne: Yeah, me too.

Dr. Mowll: All right. So I'm going to introduce Dr. Osborne for those of you who haven't seen him or don't know him and then we're going to dive in and get started today.

So, Dr. Peter Osborne is the clinical director of Origins Health Care in Sugar Land, Texas. He is a Doctor of Pastoral Science and a board-certified clinical nutritionist. Often times referred to as “The Gluten Free Warrior,” he is one of the most sought-after alternative and nutritional experts in the world.

His practice is centered on helping nutritionally support those with painful chronic degenerative and autoimmune problems using natural methods. He's one of the world's leading authorities on gluten sensitivity and lectures nationally to both the public as well as doctors on this and many other nutritionally related topics. He's the founder Gluten Free Society, the author of *The Gluten Free Health Solution* and *The Glutenology Health Matrix*, a series of digital videos and eBooks designed to help educate the world about gluten. In addition, he's the author of the bestselling book, *No Grain, No Pain*, published by Touchstone, a division of Simon & Schuster.

Dr. Osborne has served as the executive director and vice president for the American Clinical Board of Nutrition. He is on the advisory board for Functional Medicine University. He has been featured in or on Fox News, CBS, PBS, Celiac.com, The Gluten Summit, Radio MD, People's Pharmacy Radio, Underground Wellness, *Muscle & Fitness Hers*, the *Journal of Gluten Sensitivity*, and many other nationally recognized publications.

So, Dr. Osborne, you certainly are the world's leading expert on gluten and gluten sensitivity. And we'll talk about that today as well as grains, other diet factors, and inflammation related to diabetes and metabolic health. Excited to get started with you.

Dr. Osborne: Yeah, me too. This is a topic I'm really passionate about and I love to share it.

Dr. Mowll: Great. So a lot of people have heard now about a gluten-free diet. They've heard about gluten problems. It sort of, I think, reached a crescendo at some point. And then there's been some backlash against it—almost become a joke in a way in some circles, kind of, conventionally, medically, I think, that everybody is gluten sensitive. And it's become sort of a fad to get off of gluten now.

But certainly, this is no joke. Gluten is very serious. And I think it'd be great just to start off by helping people understand really why gluten is a problem now in our culture when, for thousands of years, people did eat some version of bread, for example, and what kind of problems gluten can really cause in the body.

Dr. Osborne: Well, I think, even going back in time, we have to understand that gluten has always been a problem. It was never not a problem. I mean, the oldest writing of the celiac affliction predates the Bible. And we've got archeological evidence, we've got bone evidence with genetic evidence in that bone that alludes to gluten sensitivity as being a cause for chronic degenerative diseases including osteoporosis.

We know that the short history of modern men—so if we just look in the last 150 years or so, what most people believe is that we've been eating all this grain for all this time. But you've got to realize that processed grain and cereals were really only an advent in the late 1800s. Dr. Kellogg who was—Kellogg cereal, right? Dr. Kellogg, he's a gastroenterologist. And he used and created cornflakes as a gut irritant to alleviate constipation. So he actually used the cereal to irritate the bowel to relieve constipation. And people who overate meat—so they were eating too much meat. At that time, heavy, heavy quantities of meat would back you up. And then he would use the grain as an irritant to basically unblock the bowels.

And so he was a great marketer. He was a great businessman. And he had a brother. The Kelloggs were twins. And basically, they created the company, the cereal company. And everything that we've come to believe about cereal and Post was right on his heels. Post Toasties and Grape-Nuts was actually one of the first cereals invented.

So we have this very, very short-term history actually of cereals. Cereal has only really been around for about 120 years or so, not much longer than that. In 1943, cereal was such a problem that the United States government stepped in and banned it. They said you can't sell it unless you fortify it. Because beriberi and pellagra, which are diseases of B vitamin deficiency, which play a role in diabetes too—but these two B vitamin deficiencies were so rampant, thousands of people were dying annually as a result of processed cereal.

And so the government said, "You can't sell it anymore unless you're going to fortify it." And this is where our food fortification laws actually came into play. So in 1943, what Kellogg and some of the other cereal companies did, instead of saying, "Hey, quit eating cereal, it's bad for you and it's causing beriberi and pellagra and killing people," they said, "Eat more of us because now we're fortified with vitamins and nutrients, so we're even better for you," right? So it's a play on words. They were just good marketers.

And so then our kids—well, not our kids—but our parent's children grew up, right, and our parents grew up in this error of cereal being shoved down our throats with tigers and leprechauns, cartoon characters. As a matter of fact, the research on cartoon characters on cereal boxes and placement on cereal boxes is down to an exact science. The angle of the cartoon characters on the cereal box, it's like a 12.5-degree downward angle and it's positioned—I can't remember the exact amount in inches. I think it's 48 inches on every grocery store shelf so that your children looking up at that cartoon character see that character as an authority and a figure of trust. So that's how dialed-in the cereal companies have their marketing.

So you wouldn't understand that we have been under this influence for decades. And again, if you go back in time and ask, well, why so much cereal? Why is everybody promoting it? Well, another piece of history—during the Great Depression, the government stepped in. In order to save small farmers, they subsidized grains. So they took taxpayer dollars to keep farmers in business, and they subsidized the growth of corn and the growth of wheat and some of these other grains. And those subsidies have never gone away.

Even after the Great Depression ended, the subsidies are still there today. But we don't have small mom-and-pop farmers anymore, not really. Who are our farmers? Monsanto, right? We have big corporate conglomerations who are taking your tax dollars to grow poisonous food and to add poison to it to harvest it, poisons like glyphosate. And then they have the marketing figured out and it's so dialed in that they have pretty much all of the United States brainwashed into believing that cereal is somehow a healthy, balanced part of your daily breakfast. And that if you don't eat it, you're a heretic, right? So that's kind of where we're at. And people don't realize the history of cereal that way. So I think it's important to understand that.

But if we're just talking about gluten, gluten itself, for people who have gluten sensitive issues is a major, major problem. And it can create blood sugar elevations. It can create damage to the GI tract. It can damage nerve tissue. Remember the second largest nervous system in the body, second to the brain, is the gut. And so gluten exposure can damage the nerves in the gut, can damage the nerves in the brain, can trigger elevations in blood sugar, can cause a systemic inflammatory response that leads to muscle loss and weight gain and contributes to cardiovascular disease and diabetes.

And people just don't realize that because we've all been told eat eight to 10 servings of whole grain every day because that's what the Food Guide Pyramid teaches in grade school. But the Food Guide Pyramid was written by attorneys and lobbyists. It wasn't written by scientists or doctors. So you've got to keep that in mind understanding that, again, just because we're told something is true doesn't necessarily make it true especially since there's no real great scientific evidence that says that we need grain in our diet.

Then we can add to that the way grain is grown today, where we've got genetically modified versions, we've got the pesticides, so like glyphosate and atrazine. We've got other elements that are added to grain. For example, when grain is stored, it has a high preponderancy and tendency to grow mold. So a lot of mold grows on the grain, Aspergillus and Cladosporium are different types of mold. They grow in the grain and they produce mycotoxins like gliotoxin and ochratoxin and aflatoxin. And these mycotoxins create chronic inflammation and can lead to immune system problems.

And that's not all. Grain as a food itself is very, very high in omega-6 and very, very low in omega-3. So people who are eating 80% of their calories from grain are unbalancing their omega-6 to omega-3 ratio creating a predisposition to inflammatory diseases. And that's not all either. Many of the grains are now being detected where we could find mercury and lead and arsenic and cadmium in them. These are heavy metals that cause disruptive biochemistry and inflammation.

So when people say, "Hey, we've been eating grain all this time." Yeah, maybe there's a history of grain in the human diet in agrarian or agricultural societies, but there's also a history of disease in those societies and oftentimes we forget that part. We don't bring that story to the table.

Dr. Mowll: Wow, that's amazing. So a lot of what you just revealed I think is very specific to the way grain is grown today and processed and stored and so forth. But you also made light to the fact that grain has potentially and gluten has potentially always been a problem. Can you talk a little bit about maybe how bread has changed? In other words, what was bread during Biblical times if you know versus what it is now?

And I'll ask sort of a corollary to that, which is I've noticed that when my patients and clients travel to other countries, they'll often come back to me and say, "I didn't even as clean a diet as I do when I'm home but my blood sugar was so much better." We talked about that, is it stress? Is it being away from home, out of your normal schedule and having a little bit more time to relax? But many times it's not a relaxing vacation. They're out exploring and doing things. Maybe it's the activity level. But a lot of times it just seems to come back to the food and the food quality.

So could you talk about those two things, maybe what bread once was versus what it is today. And then maybe what some of these foods—maybe even grain-based foods, but other foods as well—are in other places, like places in Europe and so forth that maybe are a little different than the way we treat food here.

Dr. Osborne: Yeah. So different countries certainly have different laws regulating the levels of chemicals and regulating the pesticides and other things. I will say this, if you're gluten sensitive, if you're really truly gluten sensitive, don't go to Europe and eat the bread. Because you're still going to damage yourself regardless of what somebody else has told you. If you have a true gluten sensitivity, don't go eat the bread. If you're not gluten sensitive, but you found in the United States that avoiding grain as a general rule of thumb makes you feel better, then what are we talking about? So we look at Biblical types of bread. We're talking about sprouted bread.

First, let's understand what grain is. Grain is the seed of grass. So grass grows, sprouts the seed. We take that seed and then we mill that seed. We grind it up and we produce the bread from that seed. What is a seed, Brian? It's a mechanism that was created whether, you're Christian or whether you're biblical, whether you believe in God or whether you don't, God created seeds or nature created seeds as a vessel to protect and preserve their own species. That's what seeds are. They don't have the ability to get up and walk away from predators. So they have to have some mechanism to protect themselves so that

their species don't go extinct. Otherwise, the animals would eat them into extinction, right?

So seeds of grass have developed hard outer casings that are hard to digest through. So some people have a problem with grain because that seed casing is just really, really hard to break through or it creates a lot of digestive disruption. But there are proteins that we've identified in grains, several different kinds of proteins. One family of proteins in particular, is called amylase-trypsin inhibitors. And they do what their name implies. They inhibit amylase from the pancreas. They inhibit your ability to secrete amylase, which is a digestive enzyme.

So they basically, the seed's mechanism of defense is chemical warfare against your pancreas so that you can't digest it so that you'll poop it out. And when it gets on the ground with your poop around it, that's fertilizer. And now it can continue to perpetuate its own grass, its own species, right? So understand these seeds are designed to survive your digestive tract. And so if you're eating them en masse, they're going to create digestive disruption whether you're gluten sensitive or whether you're not gluten sensitive.

It's like the old beans song. Beans are the musical fruit. The more you eat, the more you toot, right? We all grew up singing that song, learning that song. It's because they're hard to digest. Beans are a form of seed. And so grains are a form of a seed as well. And I want you to think about it in that way. Generally, they're hard to digest.

But back to your original question, which is what's different about ancient grain versus the grain today? In ancient times, we would sprout that seed so that the casing would open up. We would—basically through sprouting, you denature and you use up some of those anti-nutrients and anti-proteins and agents that are in that grain, that are designed to protect it. Especially if you're fermenting it with the fermentation process, some of the bacteria destroys some of those immune-inducing proteins that are found in grains.

So those ancient grains, if you will, had that as a benefit. But they also had this as a benefit: there was no pesticide. There was no bromine. A lot of our grains today are brominated because bromine is a dough conditioner so it makes the bread chewier. So they didn't have that. They didn't add hydrogenated fats. They didn't add processed corn sugar, right? So if you look at a loaf of bread today,

just go look at a standard loaf of white bread. It's got a list of ingredients this long, right? And only one of those ingredients is flour. The rest is all stuff. It's all chemicals. It's all garbage.

So we really ask the question, why is the bread different today than it was 2000 years ago? A big reason is just the way we manufacture the food and process it. So if you take somebody who's gluten sensitive and give them a bread, they're going to react to the bread for the reason of the gluten. But they're also going to react to all that other garbage that's in it. So like they get hit twice as hard. When you take somebody who's not gluten sensitive and you give them modern bread, they're not going to feel so good because it's just not good for you, right?

And so I think we sometimes tend to forget, look, you can't get healthy, eating food that's not healthy. That's not a practical assumption. And if you are trying to restore or achieve some semblance of health, if your diabetic, if your blood sugar is high and uncontrolled, and you're eating food that's highly glycemic—I don't care what any dietician tells you, I don't care what any nutritionist or any doctor tells you. If you're eating food that promotes elevations in blood sugar and you're already battling a blood sugar problem, there's no way you're going to come back from that.

So grain is—one of the properties of grain, especially processed grain, is that it promotes elevations in blood sugar. There are types of sugar in grain that sends your sugar soaring and make it really, really hard for your body to make a recovery to rebound. That's why so many diabetics are going ketogenic. They're going the opposite of heavy grain. They're going heavy fat. They're going the opposite of heavy carb; they're going heavy fat.

And I don't know that that's the answer either because I think certain diets can be used for certain extensive time and they can have a positive outcome. But if you continue on that path, if you continue on that line of thought, that diet actually comes up damaging as well, again, for some people. Everybody is a little bit different.

So I think you have to understand that the fundamental rule of nutrition is you can't get healthy eating unhealthy food and processed bread, processed grain, processed cereal, processed peaches and bagels, and spaghetti noodles and all that other stuff. Those things are not healthy for you no matter what you've been told. You've been lied to.

Dr. Mowl: That's a great point. And you mentioned different diets and how different diets can affect different people in different ways. One of the things that is getting a lot of attention right now in diabetes care is the vegan or plant-based diet. And I think there's probably—there's healthier ways to do that and unhealthier ways to do it.

So obviously, if you're eating a largely grain-based or certainly processed grain-based vegan or vegetarian diet, that's not a good idea for anyone. But I get concerned when I look at the vegan or vegetarian or plant-based diet for people with blood sugar problems because you have to ask where are they getting their protein because we do need some protein. And mostly, it's coming from beans and some nuts and seeds, but mostly beans. And then they're going to eat, typically, a lot more fruit. Which for some people might be absolutely fine, but for people with blood sugar dysregulation, that's still a lot of sugar even if it's natural sugar. And people who are glucose intolerant and can't process glucose well, that worries me a bit.

So what's your experience or your opinion on vegan or plant-based diet, vegetarian diet versus more of a low-carb diet, a grain-free diet that we usually talk about?

Dr. Osborne: So let me preface that by saying what my opinion is on what diabetes actually is. Okay, my opinion on what diabetes actually is, is it's carbohydrate toxicity. If we really boil it down to, what is it? It's carbohydrate toxicity, for most people. Now, that's not a 100% true. We're not talking about type 1 diabetes autoimmune disease, that kind of thing. We're talking about type 2 diabetes, adult-onset diabetes or, in this case, sometimes child-onset because we're seeing more of that happen.

But carbohydrate toxicity, so to go on a low-carb, higher fat, higher protein diet for many people works not because it's the right diet to stay on for the rest of their life. It works because they've taken a toxicity of a base of foods and they remove that and they've lowered that level of toxicity so their body starts to respond.

So if we're talking about a vegetarian diet, depending—like you said, you've already mentioned that if it's a vegan diet but it's largely grain based, it's a bad idea. If it's a fruitarian diet, which is largely fruit based, it's a bad idea. If it's a well-balanced vegetarian diet with lots of variety of fresh, locally-grown, organic,

seasonally available fruits, vegetables, nuts, then we're talking—that's a better balance.

But these people still need to get protein because one of the commonalities behind diabetics, the type 2 diabetics particularly, is that they're overweight initially, and they're under-muscled, and they're inflamed. And all that inflammation in order for them to heal, in order for them to repair from that diabetes long-term requires protein to build new muscle because we've got to build new muscle to reregulate the metabolism.

One of the side effects of high sugar is a cortisol response. And cortisol is a hormone secreted by the adrenal glands that triggers muscle loss. This is one of the reasons why diabetics are quicker to gain weight. They are inflamed. That cortisol leads to muscle loss. The muscle loss—I call this the—I call it the “grainflammation” cycle because typically most people's diabetes is caused by excessive grain and sugar. But increased cortisol leads to muscle loss. Muscle loss leads to muscle atrophy and shortening of the muscle. And that in and of itself will lead to weight gain because the less muscle mass you have the slower your metabolism. Muscle sets part of your metabolic rate.

But the shorter the muscle, the more joint compression it develops. So these people their muscles are atrophied. So think of that. If your hamstrings and your quadriceps and your calves are atrophied, that compresses the knee joints. Now, we get a physical compression because the muscles have atrophied.

So when that person tries to get up and go exercise or get up and go walk, their knee hurts because there's pressure and the cartilage is under pressure. And they can't walk as far because it hurts. And because they weigh too much, there's more pressure. And the muscles are too short, so there's even greater pressure. And so they start avoiding exercise. And now, not only is their diet carbohydrate toxic, but they're not able or not capable of exercising due to pain.

And so then, generally what happens with all that inflammation is they go to the doctor, what happens? They get put on metformin. They get put on some type of blood sugar regulating medication and then they get put on pain medication. And the problem with that long-term is that metformin blocks CoQ10, vitamin B12, and folate. And you need vitamin B12 and folate to heal.

So if you've got damaged, inflamed tissue and you're taking a medicine that blocks those nutrients, you're going to prevent the healing process from

occurring. And you need CoQ10 to generate energy production in the mitochondria. So if you're taking a medication that blocks CoQ10, you're going to be tired all the time and you're not going to want to exercise.

And if you're taking pain medications, you're also blocking folate and vitamin C and you're blocking iron, so now you're creating a potential for anemia. And anemia makes you tired. And anemia reduces your oxygen capacity and you need oxygen to heal damaged tissues. So you get stuck in this vicious cycle, right?

And the only way out of that cycle is to recognize, "Look, I got to get my blood sugar under control through diet," that's the primary thing. "I've got to choose foods that are not going to elevate my blood sugar." And vegetarian, fruitarian doesn't matter, it's individualized. It's per the person. So, like, some of these people are saying, "Hey, everybody with diabetes should be on vegetarian diet." That's poppycock. That's rubbish. It's a generalization about a person.

And in order to really, really discern what is creating the diabetes, we need to understand who the person is, what the person is eating, what their exercise is like, their sunshine, their sleep, their stress load, whether or not they're exposed to toxicities in the environment through their workplace. We need to understand those things so that we can make a better assertion about what to do about those things, how to change the diet so that it's unique for the individual and not just the generic, "Hey, do this special three-week diet and let's put your blood sugar under control." Because what happens with those generalized diets is many people get on them and it gets worse.

Dr. Mowl: You mentioned inflammation several times over the last few minutes and I really see that as a major factor when it comes to blood sugar problems, insulin resistance in diabetes; metabolic dysfunction; obviously, cardiovascular health; even brain health, which we can talk about in a few minutes as well. What are, in your mind, the biggest triggers for inflammation in the body?

Dr. Osborne: Well, there are four in my experience with patients over the last 16 years in the clinic. And the first one is food. It's food. And it could be a food that a person is allergic to. It could also be too much of the wrong kind of food. It could also be processed food. It could also be what's in the food. That's "flood" not food, "Frankenfood," right? So like preservatives, dyes, chemicals. That's not food. But we call it food, right?

So food is a trigger for inflammation depending on the person. In my experience, grain is one of the biggest inflammatory-inciting foods and there are a lot of reasons why. I wrote about them all in *No Grain, No Pain*. If your audience wants to pick up a copy of that and read it, they can get the in-depth of what I want to talk about. We don't have time to go into that today.

But food is one. Chemicals are another. So heavy metals is a perfect example: lead, mercury, aluminum, arsenic, cadmium. These are just different types heavy metals that are frequently found in our environment that people get overexposed to. Besides that, pesticide is a chemical. Atrazine and glyphosate are probably two of the most common types of pesticides that people are getting regular exposure to, that we know those pesticides can create pretty severe inflammation.

Other chemicals—look, I've had patients who were allergic to their lotions and soaps and shampoos, to their toothpaste. I had a patient one time who was allergic to an ingredient in her toothpaste, her gums kept bleeding. She was on all these special treatments; her gums wouldn't quit bleeding until we found out she was actually allergic to her toothpaste. So the chemicals that are in some of these things, good or bad, if you're allergic to them, it's a problem for you as a unique person.

So food and chemicals, two big triggers. A third trigger, infection. Not a cold, not a flu. That's not what I'm talking about. People get colds and flus. I'm talking about chronic low-grade infections. For example, some people have yeast overgrowth, right? And a yeast overgrowth in the gut or a yeast overgrowth vaginally—some women get vaginal yeast overgrowth or oral thrush, right? These are major problems in our society today because of the overuse of antibiotics. So many people are taking so many antibiotics. Antibiotics kill off your good bacteria, and yeast are then allowed to thrive. And yeast produce toxins inside that are potentially creating a lot of different types of inflammation for different people.

So infections, not just yeast infection but bacterial infections. There are a number of different forms of bacteria, like *Klebsiella*, and *Pseudomonas*, and *E. coli*. These types of bacteria can create systemic inflammation in different individuals. And sometimes a person has a low-grade chronic infection because their immune system has been suppressed because their blood sugar is too high. Remember when your blood sugar goes too high, you suppress immune

cell and cytokine function among other things, and you are more prone to picking up infections. So those types of things are very, very common as a cause for inflammation or as a trigger for inflammation.

And then the fourth is lack of nutrients. We don't suffer in this country or really any industrialized nation, they don't suffer from a lack of calories. Everybody gets enough calories, right? But it's calories without nutrients that are a big, big part of the problem of inflammation. So think about vitamin and mineral deficiencies. Vitamin D deficiency causes inflammation. Vitamin C deficiency causes inflammation. Zinc deficiency causes inflammation. Vitamin A deficiency causes inflammation.

So depending on the individual, again, it always boils back down to who that person is, what they're low in, what they're getting that's the wrong thing for them, what chemicals they're being exposed to, and what nutrients they're not getting enough of, or what nutrients they're not capable of absorbing, or what drugs they are taking that are causing these nutrient deficiencies.

I've got right behind me here—this is one of the preeminent medical texts on drug-induced nutritional deficiencies written years ago. This book is over 20 years old. It's not new information. It's just that how many doctors have a book like that on their bookshelf? They don't. And they're prescribing medications that wreck nutrition, and then the symptoms of the medicines become malnourishment. And then this patient is suffering from malnourishment as a result of the attempt at treating the disease in an incorrect manner that won't actually lead to a resolution.

So, ultimately, those are the four biggest triggers in my experience, in my opinion as far as the inflammation is concerned. And inflammation is an equal-opportunity destroyer. You can have inflammation in any area of your body, whether it's your brain, whether it's your blood vessels, whether it's your heart, whether it's your legs, your muscles, your bones. It doesn't matter.

Inflammation, generally speaking, it's generally systemic unless you have localized trauma like a broken bone or a bruise where there's normal inflammation as a result of the traumatic damage. But when we're talking about diabetes, we're talking about systemic inflammation.

Dr. Mowl: And then that can lead to all sorts of other problems. Obviously, really the main cause for vascular disease, many forms of cancer can be related

back to inflammation, definitely metabolic and endocrine issues, diabetes at the top of the list for sure.

And then brain problems. Brain problems are a big issue today. We've heard Alzheimer's and other forms of dementia called type 3 diabetes because the connection between blood sugar and insulin signaling and brain health. And I think, again, a lot of that goes back to inflammation. Can you talk just for a minute about brain health and how inflammation can affect the brain?

Dr. Osborne: Yeah, absolutely. One of the things that happens with elevated blood sugar is a fancy medical word called glycation. Simply put, imagine this. Imagine pouring syrup on your floor at home. Now, go walk through the syrup and walk on your carpet and walk around the house. What's going to happen? Now, you're going to spread the sticky. You're going to collect dirt. It's going to be a big mess, right? Now imagine that your bloodstream has too much sugar in it. It has syrup on it, right?

Now, what happens in glycation, what that word really means is that the proteins in your body that circulate through your bloodstream—there are a lot of different kinds of protein. Some of them carry vitamins and minerals. Some of these proteins are actually hormones, like insulin is a polypeptide. And when you have too much sugar in your bloodstream, too much glucose, those proteins are coated by the sugar. Basically, they get sticky, okay? And that's called glycation.

That's why when a doctor wants to measure your blood sugar on average for the last three to four months they run a test called hemoglobin A1c. That test is a measure of the glycation of the protein hemoglobin in your red blood cells. And it's important to get an average of your blood sugar, but that protein hemoglobin, it's basically sticky and it doesn't work as well so it won't carry oxygen as well.

So imagine your hemoglobin has got sugar all over it. Your insulin has got sugar all over it. Your testosterone, fellows, has got sugar all over it. Ladies, your progesterone, your estrogen has sugar all over it. They're sticky. Those hormones don't work. They're sticking and they're clotting and they're clumping together and they don't interact with the receptors on the surface of your cells or on the surface of your nuclear membranes. And so, now, you have hormone disruption, right?

And if we're talking about the brain, this excessive sugar leads to clumping and folding of proteins. So when that sugar is bound on to those proteins, proteins change shape. They fold differently, okay? And if you've ever heard in dementia, which is now being called type 3 diabetes, you've heard the term beta-amyloid plaque-ing. These beta-amyloids are poorly folded proteins as a result of elevations in blood sugar changing the structure of protein. And these proteins are deposited in brain tissue. And they're sticky and they're gumming up the way your neurons communicate to each other. So now, your neurons can't access other neurons where memory is stored and so your memory starts to slip, and you start—your function, your cognitive function really, really starts to decline.

So just think of it in the most simplistic ways that if your sugars are running high, just like that sugar would make your floor sticky and then in turn make your house a mess, that sugar in your blood is going to make your brain a mess. It's going to make your kidneys and your liver a mess. It's going to make any tissue in your body, particularly the tissues that have the smallest blood vessels like your eyes and your kidney, right?

Because the blood vessels in the eyes are so small, and when they're exposed too much glucose, they are easier to damage. A diabetic is 30 times more likely to go blind. A diabetic is 16 times more likely to lose kidney function, because those are the areas where the blood vessels are the smallest, where that extra sugar has the preponderancy to do the most damage.

And your brain, the damage can occur in your brain too. And you don't want that because nobody wants to see—first of all, nobody wants to have dementia. But nobody wants to take care of somebody with dementia. That's a very, very stressful and taxing ordeal for any family to have to go through.

Dr. Mowl: So, what's the best way to protect your brain health, to protect yourself from diabetes, to protect yourself from cardiovascular disease, and the best way to reduce inflammation and encourage the body back to health? What are some of the best things that people can do now to improve their health and protect themselves?

Dr. Osborne: Number one, I mean the common-sense stuff, right? This is advice without a doctor's guidance, right? Number one, sunshine. Sunshine is so, so critical for diabetics because most diabetics are pale ghosts and they are inside

too much because their skin doctors have told them, "Worry about skin cancer." And the reality is, is that's another myth we can get into another day.

But the issue is that sunshine allows you to produce vitamin D. And one of the most notorious causes or contributing factors, nutritionally, to diabetes and high blood sugar is vitamin D deficiency because your pancreas is full of vitamin D receptors that, basically, if your sugar in your bloodstream goes up too high, it will tell those vitamin D receptors to produce insulin so that you can regulate your blood sugar. But if you don't have enough vitamin D, that doesn't happen. So it's a free thing you can do every day, go outside. Right? Go outside and get some sunshine.

And if you live in a northern climate where that—above 27 degrees latitude, get you a sunlamp. Get you one of those sunlamps you can hang on a closet door and make vitamin D. Or take supplemental vitamin D. But there are more benefits in the sun than just vitamin D. So I really, really—don't try to rely solely on a supplement, get outside. So that's one really easy piece of free advice.

The other is move your body. Move your body. With diabetics, big part of the issue is that diabetes is oftentimes caused by sedentary behaviors. One of the things I love is I love the standing desk concept. If you work a day job and you're in that computer, and then you're on the front of the computer screen, and you've got the mouse, and you're sitting in that big chair. And when you sit down, understand what happens is your back muscle is atrophy. Your hamstring muscle is atrophy. Your knee is atrophy. The cartilage inside your knees gets sticky. And then when you get up to walk, you're stiff, and you're tight, and it hurts, and you can't exercise. So the standing desk concept is really, really awesome.

And I'll just show you. You see me right now. I've got a standing desk. Here we go. We're moving it up so that I can stand up and talk at the same time. So having a standing desk and even going one step further, maybe even putting a treadmill under that desk where you can walk a little bit. So that's free exercise, right? That's something you can do. So if you're stuck in a desk for eight hours a day, there aren't any excuses as to why you still can't move your body, right?

But the other thing you can do is you can go outside. You can go outside and walk. You can join a gym and exercise. There are a lot of different things you can do to induce movement. My advice is pick something that you like. If you

like a sport, go play it. But don't go play it as if you're 18, if you're 40 and you haven't played it in 20 years, because then you'll get the weekend warrior injury, right? And then you'll be out. And we want to make sure that any exercise program that you start up, that you start out slow and build it up. Because if your body is diabetic and you're atrophied, you don't want to go injure yourself when you're trying to help yourself.

So exercise and sunshine, really, really easy. Beyond that, get you a good blood glucose monitor. And, again, this is without a doctor's help. If you can't afford food allergy testing or you don't have a doctor who's willing to run it on you, when you eat, check your blood sugar two hours and four hours postprandially. So after you eat, check your blood sugar two and four hours. If you find patterns in the types of foods that you're eating that are really, really spiking your sugars, identify what those foods potentially are and get them out of your diet, cut them out of your diet.

Because some foods, especially like vegetarians, we were talking about that earlier, beans for many people cause rapid elevation in blood sugar. If you're going on a vegetarian diet and you're avoiding meat because that's what's trendy and popular, but the beans are spiking your sugar, you can run into some serious problems ever getting that regulated.

So monitor your own glucose. Empower yourself to kind of look at your diet and pay attention to what types of foods might be elevating your sugar versus not. And I've seen some very strange things elevate people's blood sugar you would never even think, like cucumbers. Wow, cucumbers elevate your blood sugar? Yeah, big time. So monitoring those things with a simple blood glucose monitor can also be very effective.

Dr. Mowll: And not that cucumbers elevate everybody's blood sugar, but there are people who might have a sensitivity to them and see that rise. So I think, yeah, like you said, it's important to do a lot of self-experimentation and investigate those foods for you. Which fruits can you tolerate, how does your body respond to dairy, cheese, and other foods like that? Even beef. I've seen beef raise people's blood sugar in some cases.

So it's just very individualized, like you said. And it could be a food sensitivity. It could be a problem in handling whatever is in there. Maybe too much of the wrong type of amino acid for you at that time. Who knows? But the point is test.

Test yourself. It's very simple. It's very easy to do and provides great feedback. So I love that advice.

Dr. Osborne: Yeah. Yeah. And if you could do one thing, one really, really big thing, have your—and I know you're very familiar with this test, Brian. It's a nutritional deficiency test where you can measure the big things that really, really can hinder your ability to manage your blood sugar. There are specific nutrients if we just follow the biochemical pathway of blood sugar management. You need vitamin D, magnesium, zinc, chromium, vitamin B2, vitamin B3. You need calcium. You need inositol. You need something called choline, which is like a B vitamin. But you also need CoQ10, copper, vitamin C, and the rest of the B vitamins. And if you're lacking in any of those areas, it can disrupt the way your body is capable of managing your blood sugar even if your diet is perfect.

So really having an understanding of what those nutritional levels are can go a huge distance for the person who's really just not getting it figured out.

Dr. Mowll: Wow, fantastic. As always, amazing content today. So thank you, Dr. Osborne, for being part of the Diabetes Summit. If people want to find out more about you, get your book, which is an incredible resource, I highly recommend, what's the best way for them to find out more about you and what you're doing?

Dr. Osborne: You can go to drpeterosborne.com, D-R-peterosborne.com or you can go to our foundation. Our foundation, for those of you who want to know more about the gluten-free diet, it's glutenfreesociety.org, O-R-G. If you want to pick up a book, you can get it in Barnes & Noble. You can pick it up on Amazon. You can pick it up at Walmart. It's at most major bookstores. Or you can just go to nograinnopainbook.com. If you go there and you pick it up there, we'll send you a free gift, a free guide on how to cure and heal a leaky gut.

Dr. Mowll: Nice.

Dr. Osborne: If you want that free report along with the book, go buy it there as opposed to some of the other retailers.

Dr. Mowll: NoGrainNoPainBook.com.

Dr. Osborne: That's right.

Dr. Mowll: Awesome. Well, I really recommend people do that. It's an incredible resource, as I said. And thank you for all the information today. Really interesting interview. We learned a lot about the food industry and some of the history of gluten and grain. So I think this one was really powerful and really fascinating. So thanks a lot for being part of the Diabetes Summit again this year in 2018.

Dr. Osborne: Hey, you're welcome, Dr. Mowll. I appreciate you and all that you're doing to help people change their lives.

Dr. Mowll: Well, thank you. And for all of you who are joining us today as part of the Diabetes Summit, I want to thank you for being part of this movement.

Remember everybody, keep climbing and don't ever give up. We'll see you back for our next session soon.