Dr. Osborne: Hi, everybody. Welcome to the Glutenology Health Matrix. I'm your host, Dr. Osborne. I am super excited to be bringing to you the world's ultimate masterclass on going gluten-free. Before we dive in to today's module, we're going to be talking all about what gluten is. You ask 100 people what gluten is and you'll probably get 100 different answers.

I want to share a little bit about my backstory with you because I think it's important that you understand where I'm coming from. When I was rotating through the VA Hospital in the Rheumatology Department during my graduate training, one of the things I saw on a regular basis was the wide scale use of medications to treat patients symptoms. One of the things I didn't see was doctors asking fundamentally, "Why do the symptoms exist? What is actually the trigger behind these different medical conditions?"

Now, most of what we saw there in the VA Hospital, again, in rheumatology, that's rheumatoid arthritis, lupus, dermatomyositis, scleroderma, ankylosing spondylitis, psoriatic arthritis, reactive arthritis, again, your common run-of-the-mill, rheumatological arthritis-types of conditions. All of these, what they have in common is that they're all autoimmune diseases. They are types of diseases where the body and the body's immune system starts to turn and create inflammatory compounds that affect and impact that joints, the muscles, the bones, the soft tissue creating, in many cases debilitating pain.

As a veteran myself, being in the VA Hospital, I was watching my fellow soldiers being medicated with these very, very powerful drugs and when the drugs failed to put the disease into remission, the next step in this process was they would be lined up for surgery and they would have a complete joint replacement done by the orthopedist. The model in the hospital, I was not really super excited about because nobody was asking why the disease existed in the first place.

To me, if we're going to be doctors and we're going to try to help people, we should always understand, how can we help people help themselves? That was just something we weren't doing in the VA Hospital. When I brought that to the attention of my attending docs, I was told, "This is the way it's done. Don't question the status quo."

Then I brought research because these diseases, as I said, they all had an autoimmune condition or autoimmune component in common. I started asking, what do we know about auto-immune disease, what is there, what is available in medical research that helps us understand what causes auto-immune disease better?

The number one thing that kept coming up over and over, and over again, in my medical research, was gluten. Gluten sensitivity at the time and we're talking over 20 years ago, gluten sensitivity at the time was the only scientifically validated and agreed upon cause for any form of autoimmune disease. In particular, celiac disease and celiac disease is not immune disease of the small intestine, so unlike autoimmune conditions of the joints and muscles and bones, it was different, but we knew what caused it.

To me, it made perfect sense to explore that as a model in the hospital setting at the VA hospital. I was promptly told, "No." Nobody wanted to help us explore whether or not gluten could play a role in other forms of autoimmune disease. Then I went back to the library and I started to find all this research on associations between gluten and rheumatoid arthritis and other forms of autoimmune disease, including things like chronic fatigue and fibromyalgia, other forms of auto-immunity like adrenal fatigue, which commonly when people start to develop adrenal hypofunction, they start to develop muscle joint pain as well as a result of that dysfunction.

I was pulling all this literature and all this research and saying, "Look, it's not just celiac disease, we have to be able to attempt some diet change in some of these veterans and see if we can find some improvement. Let's just do a small scale study and let's see what happens." Again, I was promptly told, "No, that we're not going to do anything like that."

I'm a tenacious doctor, I went back to the drawing board, I pulled more research on painful autoimmune arthritis and fasting. What the research on fasting at the time was saying was that, if you fasted people with autoimmune arthritis, in many cases, you could get pain reduction or pain alleviation in as little as 48 hours. What that told me, adding one and one together, gluten sensitivity's food. Fasting somebody and taking away food leads to reduction in their pain and improvement in their quality of life.

It only makes sense that it's a possibility that there's something that these individuals are eating that might be contributing to their autoimmune disease, again, into gluten and gluten sensitivity. I brought that up, I brought in all the research that I've been collecting and I was again, promptly told, no. I gave it one more attempt. My last attempt in the VA hospital was to introduce the concept of using omega-3 fatty acids instead of steroids and non-steroidal anti-inflammatories as a means to help with inflammation.

There were some interesting research study at the time that showed that in some cases, high doses official omega-3 fatty acids were as effective as nonsteroidal anti-inflammatories in pain reduction for individuals in research. I thought, "Okay. Well, we already as doctors, the medical professionals are already prescribing for prescription fish oil. This is not too far a leap from outside of their comfort zone. Maybe I can convince them to do a study where we look at fish oil and comparatively, see whether that manages pain as well as, or better than nonsteroidal anti-inflammatories."

Again, I was promptly told, "No, we're not going to do any research like that," and I was told as well, to quit asking. It was the old saying, "Three strikes and you're out." That was me, three strikes and I was out the door. I was not going to stay in an environment where drugs were being used. Understand, very powerful drugs. We're not just talking about a medication that has no side effects, methotrexate causes damage to the GI tract, severe damage to the GI tract. It's actually, it's a cancer medication. It was one of the primary tools that rheumatologists used in clinical practice.

Other drugs like nonsteroidal anti-inflammatories also damage the gut, caused intestinal bleeding, would deplete nutrients like folate and vitamin C. We also knew that steroids weren't a great idea. When you mix steroids with nonsteroidal anti-inflammatories what you got was an even more aggressive destruction of the gut. Of course, even at that time, we knew that leaky gut or intestinal permeability, in essence damage to the gut could actually contribute to the formation of autoimmune conditions.

Here, these guys were and these gows, they were being medicated with drugs that can damage their gut and that damage could perpetuate the very autoimmune condition that they were experiencing, even though it might reduce their pain, it perpetuated the disease. Again, it came back, in my mind, it came back to one fundamental issue, which is causation. What are the triggers that are creating the disease to exist in the first place?

In autoimmunity, we know for the most part it's not genetic. The reason why we know that is, since the 1950s, we've seen exponential increase in autoimmune disease. Now, genes don't change that quickly. The environment has changed quite rapidly. The way people eat has changed, the way people have been exposed to chemicals, all of these things have changed. We know that those have to play a role in the formation of autoimmunity.

Again, going back to gluten, I left the VA Hospital because I wasn't allowed to pursue truth. I wasn't allowed to pursue the actual research and what the research was saying in the rheumatological field, even at the time 20 years ago. One of my first patients in private practice was a little girl. Her name was Ginger. When she came to see me, she was about nine and her mother brought her in. Now, imagine, Ginger was two-years-old when she was diagnosed with Juvenile rheumatoid arthritis. Her condition was so severe, her knees would swell up so severely that she couldn't walk.

She couldn't go out on the playground with other kids. She didn't have a social life because she was in such chronic pain. She actually had a permanent port embedded in her arm as a result of this because she was in and out of the hospital so frequently to have IV pain medication.

For seven years, from the age of two to the age of nine, doctors have her on methotrexate to try to control her disease. They had her on intermittent bouts of pain medication in the hospital when flares really, really got bad. One day the doctor looks at Ginger's mom and he says, "You need to get ready and prepare for Ginger's funeral. She doesn't have probably six months left. There's nothing more we can do for her."

That's actually when Ginger's mom found me. When she brought Ginger in, it was a desperate parent looking for an answer, looking for some type of solution outside of, "Your daughter has six months to live, prepare for a funeral." Imagine that. Imagine being a parent and being told that. It's a terrible situation. One of the first things we did is, we tested Ginger for gluten sensitivity. Of course, she had a gluten sensitivity issue.

Within six months or so, we changed her diet and she was feeling so much better. She was able to get the permanent port taken out of her arm, she hadn't had any flares. Within 12 months she was in complete remission. Now, this was simply from a diet change. This little girl for seven years was pumped full of toxic compounds in the name of trying to manage her disease. No doctors ever asked why the disease was there. No doctor has ever tried to ascertain the underlying reason. She was told she was going to die and that there was nothing that medical science could do for her.

All we did, and I say very simply, all we did was changed this little girl's diet and when we changed her diet, we changed her life. It was at that time, that I understood the research I was doing. I understood at that time, this is where I need to get this information into the hands of more people. That's when I founded Gluten Free Society. It was a tool that was used at the time to help get people the information on gluten related illnesses. That's why I'm so passionate about putting on a Glutenology Health Matrix for you.

This is the first and only masterclass of its kind. I am going to dive into so much depth. You're going to know more about gluten than anyone that you've ever taught to once you get through these modules. In today's module, I'm really excited. We're going to be talking about gluten sensitivity, like what is gluten? Again, as I said earlier, you ask 100 people, you'll get 100 answers, most of them are wrong. I think we start with fundamentals today.

In this module, we're going to be covering true gluten-free diets versus traditional gluten-free diets and that'll make sense here shortly. We're going to be covering what gluten sensitivity is, we're going to be talking about terms like non-celiac gluten sensitivity versus celiac disease and silent celiac disease because these things matter, these definitions matter.

If you walk away from today's module with anything, if you have a firm grip over these definitions, you're going to be able to have light year leaps in your ability to change your diet, and move your path toward a safer healthier journey on the road to going gluten free. What is gluten? Let's start with a general definition. Gluten very simply put, is a storage protein found in grains.

Now, what does that really mean? The storage protein found in grains, so think of a grain as a seed. They're the seeds of grass technically. I say gluten is a storage protein, but it's actually more than one protein, it's a family of proteins. There are to date hundreds of forms of gluten that have been identified by scientists. We oftentimes refer to gluten as the singular term, but gluten actually, we should use the term glutens because there are more than one type of gluten for sure.

Again, as a general category, it's the family of proteins, the seeds of grass that they're found inside these seeds and their job is to help provide a source of nourishment for the embryo of the seed. Remember the job of a seed in mother nature's kingdom is to perpetuate its species. When a grass seed falls to the earth, gets rained on, it gets dirt on it, it germinates, it sprouts new grass. It perpetuates the grass species and the glutens serve the embryo by feeding it by giving it foods, proteins that are critical for its growth.

Also as these proteins are critical for the protection of the grain seed themselves, because remember animals, insects, all types of creatures try to eat these seeds, the seed itself has to have a way to protect itself because it doesn't have legs and arms. It can't get up, it can't run away. In an effort to protect itself, it's created and crafted highly specialized proteins that can damage the animals trying to eat them.

Again, understand when we use the word gluten, we're talking about a family of proteins found in the seeds of grass who's designed is to feed the embryos so that the grass can continue to grow perpetuated species, but also protect the embryo from being eaten into extinction, by predators who eat seeds as a means of survival. The common grains that we hear about with gluten are wheat, barley, and rye.

If you're looking at a food label and you maybe have gone to the grocery store and you've gone shopping, and you're looking at what is, and what is not gluten-free, typically what you're going to find is that any product with wheat, barley, or rye contains gluten. These are your common foods that contain gluten would be things like bread, pasta, cereal, bagels, toast, think of things made from flour in essence and that includes some beverages like beer.

If you're a big beer drinker it definitely has gluten in it, cookies, cakes, donuts, kolaches, flour goods, think of those things and you predominantly they're made from wheat flour, barley flour, rye flour, those are going to be what are our government and our food agencies define as gluten. We're going to dive into much deeper definition, so don't go away because here's what you're going to learn. You're going to learn that our traditional definition of gluten is actually very misleading and not up to date with all of the science that's out there.

Let's talk about the botanical definition first. There's the food labeling definition, which is gluten is a protein found in wheat, barley, and rye that when ingested can increase the risk for somebody developing celiac disease. That's your classic label definition. Then we have what's known as the botanical definition. The botanical definition is actually the scientific definition. It was a scientist by the name of T.J. Osborne, who actually originally separated out these different gluten proteins. He figured out chemically how to extract them from different plants. He's actually sometimes referred to as the father of plant protein chemistry.

What we know about gluten is that gluten is a mixture of proteins found in all grains. It's composed of two different types of sub fractions or two different types of sub proteins. Now, these proteins are called Prolamins and Glutelins. Now, the prolamin, Alpha Gliadin, is what most people, most doctors, most facilities that you might go to and get an education around gluten refer to as gluten, Alpha Gliadin, which is not quite accurate.

Alpha gliadin is one type of gluten, and yes, it's found in wheat, barley and rye. As I mentioned earlier, there are a hundreds of gluten proteins, up to 1,000. I think at last count that have been identified in alpha gliadin is just one type of gluten protein. Again, our labeling laws around gluten are loosely based on this one protein found in wheat, barley, rye, but somewhat dismiss all of the other forms of gluten.

This is scary and it's going to make sense in just a minute so stick with me. I know some of this is pretty scientific and techie, but I think it's important that we get you through this. Again, the scientific botanical definition of gluten is that it's the family of storage proteins found in the seeds of grass that are soluble in alcohol and they're broken down into two families. We have the Prolamins, and we have what are called the Glutelins.

All of these combined are different types of gluten based proteins. They're found in all grain, not just wheat, barley, and rye, but they're also found in grains like oats, and corn, and rice, and sorghum, and millet. We're going to talk about that here in just a minute as well. Now, again, the type of gluten that's related and most commonly referred to as the Celiac-inducing Gluten is called Alpha Gliadin. Alpha gliadin has only one type of prolamin, again, prolamin being one of the fractions of gluten. Stay with me on this. We're almost done with the techie part.

Let's define what a prolamin is. A prolamin like alpha gliadin, again, is any class of simple proteins, soluble in alcohol, and usually having a high proline and glutamine content found in the grains of cereal crops, such as wheat, rye, barley, corn, and rice. Prolamins are further subclassified into smaller categories. In science we always like to go overboard and when we find out one thing, then we want to go to the next level.

The smaller categories of problem means are referred to as Alpha Prolamins Beta, Gamma, and Omega fractions. It's the alpha and beta gliadins that are the most well studied as it relates to celiac disease. Again, think of prolamins, this big family of proteins, they're gluten proteins, but they're subdivided into alpha beta gamma and omega fractions. It's the alpha gliadin or the alpha prolamin that is generally recognized as a major contributing factor in celiac disease.

Hopefully, that is giving you some information to walk away with. Now, I'm going to show you a diagram because this diagram is super critical and super important. What this diagram is breaking down, is it's breaking down that different grains have different forms of gluten. Again, prolamins, glutelins, alpha, omega fractions, we're talking about gluten as a family of proteins. The common glutens in different grains.

You see on this diagram, we've got wheat. One of the common glutens found in wheat is called Alpha Gliadin or Gliadin. Gliadin represents about 69% of the total protein concentration of wheat. Then we have rye. Rye has a different kind of gluten called Secalin. 30 to 50% of the protein concentration in rye is this type of gluten. We have oats. Oats contain a type of gluten called Avenin. We have barley contains Hordein, and millet contains a type of gluten called Penicin. Corn contains what's known as Zein, a type of gluten. Rice contains Ozenin. Sorghum contains Cafrin, and teff contains Penicitin.

These are, again, all just different forms of gluten found in these different grains. Now, again, I might be confusing you already, because if you are coming into this series into this module, with your understanding that gluten is found in wheat, barley, and rye, and that's it, this is going to blow your mind initially. I want you to stay with

me because I'm going to show you a lot of science and research on why many people going gluten-free actually don't get better.

One of the reasons why is because these definitions, these definitions haven't been updated. A lot of scientists are so focused on wheat, barley, and rye that they forgot to see and look at the other grains. I want to show you, and I want you to understand the fundamental walkaway here is that, number one, as I mentioned earlier, gluten is the first medically proven, known cause of autoimmune disease, which is why I want you to understand that. There's 46 million cases of autoimmune disease in the US alone. It's number one cause of death in females over the age of 65, and it's on an exponential increase. We believe that gluten is one of the primary reasons why.

If we added all autoimmune diseases up, it would actually cause more deaths than cancer and heart disease. The problem in autoimmune disease is we separate them out. We don't do that with cancer when we're calculating death statistics. We lump all the cancers into the same category. We lump all forms of heart disease into the same category, but with autoimmune disease, we separate them out. If you add them all together, autoimmune disease kills more people than cancer and heart disease.

We're going to see more and more people developing autoimmune disease. It's actually the increase has been exponential since the 1950s. Gluten is one of the reasons why, and that's why it's such an important component to understanding what gluten actually is. All grains contain some form of gluten. Again, testing antibodies to gluten can be misleading.

This is the most common thing that doctors will do. They'll test antibodies to gliadin or other antibodies that measure for celiac disease, and so a lot of people are told they don't have a gluten issue when in fact they do. You have to understand that gluten sensitivity in and of itself is not a disease. It's a state of genetics. You either have the genes, gluten reactivity, or you don't have those genes.

Remember, your genes don't determine your fate, but it's how you treat your genes do. If you have gluten-sensitive gene markers and you expose them to gluten, the outcome is generally going to be excessive inflammation. A lot of that excessive inflammation is what is linked to causing and contributing to autoimmune disease. Now, we can identify the genes for gluten sensitivity, very, very easy.

In my opinion, it's a step forward in the advancement of how to understand whether or not a person should be gluten-free or not. Because if you wait for celiac disease, you have to understand it's one of the most underdiagnosed conditions in the world. We estimate that 1% of the population in the US alone has celiac disease, but we also know that probably about half of those individuals have a diagnosis the others don't.

That's where the conundrum falls is. It can take decades to get a diagnosis and that's because you don't just wake up one day with severe inflamed bowel that causes diarrhea, or vomiting, or massive weight gain. It's a very slow, tedious

chronic degenerative process that occurs over over many, many years. Sometimes it's hard for doctors to pick up on the nuance.

Again, grains are the seeds of grass. The seed has a bran casing or an outer layer and it also has an inner layer called an Endosperm, which contains 90% of the protein. This is where your family of gluten proteins are. Remember glutens are comprised of prolamins and glutelins. Inside that germ underneath the brand casing of grain, you've got all this protein and then underneath that layer, we have an embryo layer. It's in that embryo layer that, that it takes the protein to help feed it and it also that protein serves to protect it.

Any flour made from the starchy endosperm contains prolamins and is potentially toxic to the grain sensitive or intolerant person. This coming not from my lips to yours, this is coming from Dr. Steven Gislason, who wrote a book called, Nutrition Therapy a number of years ago. I want you to understand that I'm not the only doctor saying these things. I'm going to show you that here in just a minute as well.

Now, the food labeling definition for gluten focuses primarily on the presence of alpha-gliadin from wheat, barley, and rye and so none of the other grains are included in this definition as it relates to gluten-free labeling laws. Again, when you go to the gluten-free food section in your natural grocer or in your local grocer, you have to understand that by law, to call something gluten-free it really only has to be free of wheat, barley, and rye down to the level of 20 parts per million.

If it contains less than 20 parts per million of wheat, barley, and rye prolamin, then we can label that product gluten-free and get away with it legally. Because that's the legal definition that the government has put forth for food labeling packaging requirements. This is where we get into traditional gluten-free.

Traditional gluten-free is the classic definition. It is the gliadins found in wheat, barley, and rye, the known protein that contributes to celiac disease. That's your traditional gluten-free definition. It's based on a limited scientific analysis of the topic. It only considers wheat, barley, rye. Some people will say that oats are an issue. It's conflicting information. You'll get some say oats are a problem, some that say oats are not a problem. Stick with me. We're going to talk about why oats are a problem.

The traditional definition makes no mention of dairy as most of our animals today that produce dairy are fed massive quantities of grains. Now, here's the kicker. We know that in humans when a mother eats gluten that those gluten proteins show up in her breast milk and so when she is breastfeeding her baby, if her baby's gluten-sensitive, that could actually create a potential problem.

What no one has really truly studied is whether this happens with cows or goats or sheep or other animals that are predominantly producing our milk that are being fed largely as the staple of their diet grain-based food items. It hasn't been studied, but I think we have to turn our attention to this. I'm going to show you some research here shortly, that actually has looked at this and has made some very, very strong connections behind proteins in dairy, mimicking, gluten, et cetera.

Then we also have the fact that this traditional definition doesn't make any mention at all of grain being used in processing of different types of foods. Again, your gluten-free food items that are processed with rice, that are processed with corn or oats are being labeled as gluten-free, because the traditional gluten-free definition doesn't include those grains as part of the definition.

We also know it doesn't consider food, additives, preservatives, or pesticides as contributing factors to make gluten stronger or to make gluten more dangerous. I'm going to show you the science on how food additives and preservatives can actually enhance gluten and make it more toxic for you. We also know that the traditional gluten-free diet definition is not really concerned with health restoration.

Any of you watching this, who have gotten a diagnosis of celiac disease, probably walked out of the hospital or walked out of the research department with a goodie basket full of products that weren't designed to serve your health. Basically, they were designed to help you go gluten-free in the traditional sense. These cornbreads and rice pastas, and rice breads, et cetera, that are largely donated a lot of these hospitals to recruit celiac, diagnosed individuals as new customers.

A lot of these companies will donate money to the hospitals and donate these products to the hospitals so that they can give them to newly diagnosed celiac patients. Again, these products aren't good for you. There's no focus on health restoration and I think it's very, very important. If you understand that if you've been eating gluten for years and it's been damaging you and creating chronic inflammation, the number one goal or the number one outcome for you moving forward to change your diet, should be health restoration.

Not just substituting one type of food for another type of food, so that you can have a semblance of what you resemble or what you remember resembled bread it's so that you can restore your health. Nobody goes gluten-free for fun. People generally choose a gluten-free diet because they feel better and because they become healthier when they gravitate that way. They don't just like to enforce restrictions upon themselves.

Remember that traditional definition, it only includes wheat, barley, and rye. It doesn't include the other grains. It doesn't include processed food. It doesn't include asking questions about food additives, food preservatives, what is healthy and what is not healthy, and what a person should be eating to restore health. Remember that the goal of going gluten-free is health restoration. Let's take that definition and now let's bring in what I like to call the true gluten-free diet.

Now, the true gluten-free diet eliminates all grains based on comprehensive scientific findings. I'm going to lay those out for you here, so stick with me. It also looks at the potential for gluten in dairy-based on the diet of the animal. It considers processed food as a potential for cross-contamination issues. It considers food additives in GMOs and pesticides because those play an important role in how your gut is restored and how your gut health comes back to life.

It addresses difficult-to-digest foods also as a potential problem because remember many people with gluten issues, gluten can destroy the gut lining and it can destroy your ability to digest food regularly. If it's done that for 10 or 15 or 20 years, if you try to eat other foods, even though they may be gluten-free, but they're hard to digest, you might still struggle in your gluten-free recovery.

The true gluten-free diet also focuses on health restoration and health maintenance once restoration is achieved. Again, take home definitions. A traditional gluten-free diet is limited in the quantity of grains you're actually, eliminating and it's not really concerned with health improvement, as much as it is dietary restriction and what a person can eat that might not be as good for them versus the true gluten-free diet, which considers elimination of all grains and considers difficult to digest foods.

It considers food, additives, food processing, it considers pesticides, and all the other variables in food that can contribute to your recovery, because our focus is on recovery and restoration of health, not on the manipulation of diet because we all just love to restrict ourselves. Let's dive into what is gluten sensitivity now that you understand what gluten is? Let's talk about what gluten sensitivity actually means.

The current yet limited definition, okay, again, traditional versus true definition. Traditional definition is that gluten sensitivity is an immune reaction to the protein gluten found in wheat, barley, and rye and that the definition sometimes includes oats and sometimes it does not, just depends on which scientists that you're reading, but again, you're going to find conflict within the oat category.

This definition is often incorrectly used synonymously with celiac disease. I said this a minute ago, remember that celiac disease and gluten sensitivity are not the same things. Very, very important point. The current definition has some inconsistencies. One of the biggest ones is owed out is out safe, is owed not safe. Then there's also the inconsistency of using those two terms interchangeably.

Gluten sensitivity, celiac disease are used synonymously by most mainstream medical authorities, and that's an incorrect usage of the two terms. As a matter of fact, Dr. Marsh, he was the creator of the Biopsy Classification Scores for celiac disease created a term known as Non-celiac Gluten Sensitivity, because he felt it was important enough to differentiate celiac disease from gluten sensitivity. They're not the same thing.

Everybody with celiac disease is gluten sensitive, but not everybody with gluten sensitivity will go on to develop celiac disease, but they might develop other conditions and so again you've got the traditional definition that tries to use two interchangeable terms that are not interchangeable. It's inconsistent around oats, and it makes no mention of the other grains. It's largely focused on wheat, barley, and rye. Alpha Gliadin is the dominant focus of that traditional gluten sensitivity definition.

Now, I want to show you some research on why we have to reconsider a new definition. What we're looking at here are some studies on corn gluten. Now, corn gluten's nickname is also sometimes referred to as Zein, Z-E-I-N. Some people refer

to corn as maize, M-A-I-Z-E. What you can see here in this study published in the International Journal of Gastroenterology and Hepatology, maize prolamins, in essence corn gluten had low but definite activity, even though maize is reported to be harmless.

Well, that activity that they're referring to in this study was inflammation, in essence that corn gluten created inflammation in these patients. This study looked at the date 1983. It was published decades ago and this information is still not common knowledge. This is not new information. Now, you see in this research study, this was actually a case study more than it was a big study on multiple people. In this case, there was a young girl with celiac disease that kept developing peripheral neuropathy, and the reason why she was developing it was over cornflakes. They wrote her case up because when they took away the corn flakes, the neuropathy went away.

Any of you out there that are on a gluten-free diet or at least think you're on a gluten-free diet, you're eating the cornbread, the corn pasta, the corn flakes, and you're still struggling, like take this case study to heart. That might be one of the missing elements to you making the right diet change. We have another research study, same journal, the International Journal of Gastroenterology and Hepatology, the observation that corn gluten challenge induced in abnormal in a reaction in some of our patients with celiac disease is intriguing as maize is considered safe and is recommended as the substitute cereal and a gluten-free diet.

I don't think it's intriguing. I think it's alarming would probably be a better word. Now, what does this study really investigating? What they were doing was what's called a Rectal Challenge. They were actually, I'm putting corn gluten into the rectums and then measuring a compound or chemical called nitric oxide, which is a by-product of heavy inflammation and that's what they found. They found that people that their intestines were exposed to corn gluten we're making inflammation against that and it was creating potential problems. That study was published in 2005.

Now, here's another one published in 2006, corn gluten contributing to persistent antibody response in celiac patients. In essence in this study, what they found is that the celiacs who had gone traditional gluten-free, remember, they went wheat, barley, rye free, but they didn't go corn, rice, sorghum, millet, or oat-free and they were having continued persistent problems. Well, in this study they found that corn was one of the major contributing factors to why these individuals were still struggling on their diet.

This study was published in Plant Foods and Human Nutrition back in 2012 and you can see here that some maize prolamins contains amino acid sequences that resemble wheat, gluten immunodominant peptides. What does that mean? That means that corn gluten, the sequence of many types of corn gluten looked just like the dangerous forms of alpha-gliadin found in wheat.

In essence, these researchers compared corn gluten to wheat gluten, and found that corn gluten resembled wheat gluten enough to create a problem. You can see here they go on to say, "Analysis indicated that other zeins, other corn glutens contain

similar sequences or sequences that may bind even better to the HLA-DQ2, DQ8 molecules." Now, what does that mean? We're going to talk as we go through these modules, we're going to be talking about the genetics of gluten sensitivity, but HLA are the genes of gluten sensitivity. When you hear that term HLA-DQ, these are the genes that doctors can analyze to help you understand whether or not you have gluten sensitive gene pattern.

What they're saying here is that corn gluten was able to activate the gluten-sensitive genes to produce information, in some cases better than wheat gluten. Very, very important finding here because, again, most doctors are telling you when you get a diagnosis of gluten sensitivity or celiac disease that corn is perfectly safe and fine for you to consume, this study, definitely, refutes that information.

What else do we have on corn gluten? We have another study and you can see, this is a conglomeration of many of the studies on corn gluten, but maize prolamins could induce gluten like cellular immune response and celiac patients. If you have gone, what you think is gluten-free and you're still consuming corn, and you're still struggling with chronic inflammation, or you're still struggling with recovery. This might be one of those big reasons. Why? Again, my opinion, one of the big reasons why we need a major overhaul in the definition of what we're calling gluten in an effort to help educate more people.

This research study published in clinical and experimental allergy. Here's the author's quote, this was done in 1995, "The allergens in rice, corn millet, and buckwheat should be better studied before they can be recommended as alternatives." This is in reference to as alternatives for a gluten-free diet. Again, not just me saying this, I'm just the megaphone of the researchers in the grain world who are doing this wonderful research, but it's falling on deaf ears and very few people are aware that it even exists and they're not really mentioning it.

This research study published in the Journal of Pediatric Gastroenterology and Nutrition, found high titers were found in celiac patient's blood when tested against wheat glutenins, albumins, and globulins, which are other types of proteins, as well as against the barley, oats, and maize. Again, this is a study that found that these patients actually didn't just react to wheat, but they also

reacted to oat and maize. This study was published in 1987. Now there are a few studies here I'm showing you on rice causing gastrointestinal damage.

One out of the Journal of pediatrics found that food protein-induced Enterocolitis which is also referred to as FPIES, F-P-I-E-S, Food Protein-Induced Enterocolitis is a condition where different food proteins can cause chronic inflammation in the GI tract. This study found that rice was one of the most common causes of that.

Now, I know a lot of baby formulas, a lot of products that are gluten-free will contain rice as the primary substitute supposed gluten-free agent, but we know that rice can induce inflammation of the intestine. I have actually seen this in a number of cases in my practice over the years. Then we have another study published in the archives of disease in childhood finding that rice is a common and severe cause of food Protein-

Induced Enterocolitis or food protein-induced inflammation of the intestines. Again, these studies published in 2009 show that rice might not be as safe as we would suspect it to be in terms of a gluten-free substitute.

Now, let's talk about definitional differences. I'm going to put up on the board for you some different terms. Gluten allergy is typically considered to be an allergy or an immune response. Meaning the immune system looks at gluten and creates a response to that gluten and that response generally leads to some type of inflammation. A true allergy, we'll get into here shortly, but a gluten allergy typically considered to be an immune response. Key takeaway there is immune system reacts to the protein.

Then we have the term gluten intolerance and again, sometimes these terms are all used interchangeably. That's why I'm giving you separation amongst their definitions. I think it's important to get better clarity around this. Gluten intolerance is an inability to digest gluten and therefore the by-product of that lack of digestion can create problems in the GI tract. An intolerance generally, that's what that means. You've probably heard of lactose intolerance. Lactose is a type of sugar found in dairy and some people don't have the digestive enzyme capacity to break it down and so it causes gas, it causes bloating, irritable, bowel-like symptoms.

Gluten intolerance is similar to lactose intolerance in the sense that some people don't have the digestive capacity to break gluten down. It's tough to digest. Remember what we said, gluten was, it's a storage family of proteins found in the seeds of grass designed to prevent predators from eating it into extinction and so they're therefore many of these proteins are difficult to digest because their sole purpose is to create digestive discomfort in the animals or people trying to eat them.

That in and of itself, gluten intolerance is common among many people because if you eat a lot of it, the more you eat depending on the robustness of your digestive tract, you can eat a certain level of gluten and at a certain point, you're going to be intolerant to it because you don't have the digestive capacity. Now, some people have weaker digestive systems so that intolerance shows up a lot sooner, but that's what intolerance is. It's an inability to digest that food.

Now, when a food doesn't digest in your GI tract, generally, what happens is it changes your flora. It changes your microbiota. The byproducts of that lack of digestion can create secondary problems like immune-related problems. This is where you'll see in this definition that it's an inability to tolerate gluten and there's both an immune and a non-immune type of reaction. The immune reaction is when you don't digest it, it creates an alert in your immune system to come in and look at it as an enemy whereas the non-immune is the inability to digest.

Then we have the term gluten sensitivity and gluten sensitivity is probably best served as a mash of the above two terms, gluten allergy, and gluten intolerance. Really, if you look at it, gluten sensitivity is a spectrum that involves both the allergic component but also the intolerant component. Then you have another term, that term is Celiac disease. Celiac disease is an autoimmune disease of the small intestine that's caused by gluten-induced damage. Again, these are all different in

their definition. They don't mean the same thing. I get this a lot. A lot of people say, "Well, I don't have Celiac, why should I go gluten-free?" Remember Celiac is not the same thing as gluten sensitivity.

Now, I'm going to show you some proof in the scientific literature on what I'm referring to. Now, you may recognize a few of these names. There was a book written a number of years ago called The Gluten Syndrome and it was written by a gastro or a pediatric gastroenterologist out of New Zealand. His name is Rodney Ford and you can look him up. He's got a lot of books. He's a fantastic doctor. I've interviewed him at Gluten Free Society a number of times because he brings a lot to the table but gluten sensitivity has traditionally been used synonymously with Celiac disease and that has been the focus of most research.

Dr. Rodney Ford in his book, The Gluten Syndrome, he put forth this new definition a number of years ago. We also have, what's known as non-Celiac gluten sensitivity. Now, this term was actually put forward by Dr. Marsh. I mentioned him earlier, Dr. Marsh is the doctor that developed the biopsy criteria for diagnosing Celiac disease. He knows a little bit about what he's talking about. He created the term non-Celiac gluten sensitivity so that people would quit using gluten sensitivity and Celiac disease as interchangeable. He wanted there to be a differentiation to avoid the confusion that he saw coming.

Now, I'm going to put up a diagram on the screen because I think sometimes a picture's worth 1000 words. What you're looking at here is gluten sensitivity. On the left-hand side is not a disease. It's a state of genetics. If ignored, in essence, if you ignore what your genes are capable of doing, and you do it anyway, then you can trigger illness and that's what this is referring to, is that gluten sensitivity is not a disease, it's a state of genetics but if you eat gluten any way, you can develop Celiac disease as a result of that gluten consumption.

Now, that being said, that doesn't mean that everyone who eats gluten is going to develop Celiac disease. There are a number of different conditions that are linked to gluten sensitivity. In module two, stick with me in the next module, I'm going to go through the more than 100 confirmed conditions that have a link to gluten sensitivity and you don't want to miss that, but Celiac disease, again, being the most, well-researched, the most common, the most widely acceptable. Gluten sensitivity is not a disease. It's a state of genetics that have ignored, can trigger disease. One of the diseases it can trigger is Celiac disease.

Now, this diagram will also help make good sense of that for you as well. You'll see at the core of this diagram that gluten sensitivity or intolerance, again, those two words are sometimes used interchangeably. It's not a disease, but it causes disease. If you look at the diagram, representation here, the number of arrows, Celiac disease, bone loss, asthma, fibromyalgia, and chronic fatigue syndrome, thyroid, or Hashimoto's, psychological disorders, cancers, rheumatoid arthritis. These are all conditions that we know gluten can either cause, or in some cases contribute to, in other cases actually cause.

Let's talk about traditional versus actual definitions. Again, you've heard me use traditional as we relate it to the definition of what gluten is. The traditional definition of gluten is that it is a protein found in wheat, barley, and rye that contributes to the development of Celiac disease, and then you heard me say that the true gluten definition is that it's a family of storage proteins found in all grains that if consumed, can create an immunological response that can contribute to inflammation and lead to a plethora a syndrome if you will, of diseases.

Traditional definition, true definition, we're talking about traditional. Celiac disease is the only manifestation of gluten sensitivity is a traditional thought meaning that that most people who don't understand this topic very well think that if you don't have Celiac disease then there's no need to try a gluten-free diet, that's wrong, actually. The actual is that Celiac disease is a rare manifestation of gluten sensitivity. I said earlier that 1% of the population has Celiac disease. Well, guess what? It's estimated that 6% of the population has non-Celiac gluten sensitivity. Celiac is actually a rare or rarer manifestation of gluten exposure than other conditions related to gluten.

We know that in medicine, the intestinal biopsy is the gold standard for diagnosing Celiac disease. We also know that antibody blood tests are used to detect a protein called gluten. We know that in the classic sense or in the traditional sense, most doctors don't believe that symptoms outside of your intestine.

Again, remember the symptoms of Celiac disease are predominantly gas, bloating, diarrhea, vomiting, and pain of the GI tract. If you don't have those symptoms, most doctors traditionally don't believe that you have a problem with gluten and so what number four is referring to is extra-intestinal manifestations of Celiac disease are rare, extra-intestinal means manifestations of symptoms of gluten exposure outside of the small intestine.

Actually, what we know is it extra intestinal manifestations of gluten exposure are more common than the intestinal manifestation. Again, traditional thought processes versus actual thought processes. The biopsy and blood work are the gold standard for diagnosing Celiac disease. The actual is that genetic markers and diet observation are the gold standard for recognizing whether or not going gluten-free is the right move. We know that antibodies test can be useful but offer very limited information and can offer deceiving information. We're going to talk about that as well.

Okay. Here's what doctors are looking for. If you're talking about classic Celiac disease and all doctors in medical school, this is what they're taught as it relates to the identification of Celiac disease. Here's what I was taught when I went through school, I was taught that Celiac disease is very rare. You'll probably never see it so memorize the symptoms so that you can pass the test, that's the basic breakdown.

We were told, okay, weight loss, diarrhea, stomach pain, bloating, vomiting, were the symptoms of Celiac disease and if somebody didn't present in that manner, then you wouldn't ever consider gluten elimination as part of your advice or recommendation but in actuality symptoms can be, and usually are systemic and we know that different people respond in different ways.

Let me give you an example of how different people respond in different ways. Let's just use a classic drug like aspirin. Now, aspirin last year killed about 13,000 people not on accident, not because of overdose, just the standard normal use, people don't realize that. Now, how many people took aspirin and it relieved their joint pain, or how many people took aspirin and it relieved their back pain or their post-surgery pain, right? How many took aspirin to break a fever?

You have this whole spectrum of people that take aspirin, but they don't all react to it in the same way. Look, for some people it does help their pain, but for some people, even small doses can cause gastric bleeding, for some people, aspirin can cause an anaphylactic reaction for some people, aspirin can cause death. It's the exact same drug. How can the exact same drug have a different impact or an effect on different people? It's because different people are different by the term.

Gluten is much in the same way. You've got gluten. How can giving gluten to different people lead to different reactions? Very simply because they're different people. They're going to have different responses even to the same substances and so it's important to understand that as it relates to gluten because so many people are so tunnel-visioned in. They're tunnel-visioned in on looking at that set of stomach pain, vomiting, diarrhea, weight loss as the primary symptoms, and if that doesn't exist, then they can't fathom that gluten might potentially be a problem.

I'm going to show you some animated diagrams here to help get some of the point across. Allergy, we said earlier, we're defining gluten allergy. We said, an allergy is an immune reaction and that's what you're seeing here. Allergy equals an immune reaction. Now, there's two kinds of immune responses, broadly speaking or largely speaking. There's what we call acute allergy. If you follow the diagram to the left, what you see is an acute allergy, which leads to the production of something called IgE.

Now IgE is a type of antibody and if you've ever had ragweed or seasonal hay fever or something along that line, your body was producing IgE antibodies that were releasing histamines and so you got the watery teary itchy runny nose, fever, elevated heart rate, those types of symptoms that come along with an acute type of allergy but that also leads to the process of chemical inflammation and that chemical inflammation can create tissue damage and subsequently can cause disease if it stays around long enough if that inflammation is persistent long enough.

The difference between an acute allergy and a delayed allergy, a lot of the difference in the severity of the reaction, meaning an acute allergy, generally, the symptoms are much more severe and obvious versus a delayed response. The symptoms are oftentimes more subtle and not quite as definable. When we say I feel tired all the time, or I have general malaise, those are not quite as definable. Those are sometimes symptoms of delayed allergic responses, but then there's also a timing issue.

An acute response generally occurs immediately within three hours of exposure whereas the delayed hypersensitivity type of response generally occurs within up to three hours and as far out as three weeks. There's this much longer window of

reactivity opportunity for a person to have an inflammation reaction but if you look at the right of this diagram, you'll see the delayed hypersensitivity, there's three separate branches. There's what's known as a T-cell response, which is a type of immune cell called the T-cell. There's also antibody responses. These antibodies are produced by other cell types in your immune system.

Generally speaking, there's IgG and there's IgM. There's also a type of antibody that's produced in your secretions called IgA and then there's another antibody called IgD, which we don't know as much about, but the other three we know quite a bit about, and then there's something called an immune complex. Again, these three broad brushstrokes of how your body can react in a delayed manner but all three points to the same outcome and that's chemical inflammation, tissue damage and again, if the problem is there long enough, that tissue damage builds over time and it creates or manifests as disease the longer it's allowed to fester.

Now, if you to your doctor and you get a skin prick test, sometimes they'll draw blood and they'll measure, what's known as IgE. This is generally what an allergy doctor does is they'll measure an IgE response using a skin prick method where they either put patches on your back, or they jab you with little needles and see whether or not you get these curial wheel flares that occur on your skin. If you're trying to identify that allergen, that type of testing can be one method, and that's a common way that doctors will look at it but then you also have the delayed responses, and generally, you go to a doctor to try to figure out what you're allergic to, they're measuring IgG and IgA.

Now, this is true when it comes to gluten. There's something we call acute wheat allergy. This is one of the reasons why wheat has to be listed on a food label because it's one of the most common allergens. It's one of the top eight allergens in the world but that's acute response. That anaphylactic response where your lips swell, you break out in hives, your nose runs, you get water teary itchy eyes and then we also have gluten sensitivity. Again, there's an IgG and IgA component that typically doctors are measuring those two components as it relates to gluten, specifically for Celiac testing but what about these others?

As you can see in my animation, these others, the T-cell responses don't get measured. Generally speaking, the IgM responses are not being measured. The immune complex responses are not being measured. The genetics of gluten sensitivity are not being measured and these are big, big gaping holes in data collection and so this can lead to an individual going to a doctor if you get some tests done but not comprehensively so, you could be told that you're not reacting to gluten at all and that you don't need to be worried about it.

This is again, one of the biggest conundrums. This is why so many people don't get a diagnosis. It can take decades to get a diagnosis of Celiac disease because again, oftentimes doctors, when they run these tests, don't run them comprehensively enough to evaluate all these different arms.

Now, I'm going to show you another diagram because I want you to understand visually what we were talking about earlier with definitions of gluten intolerance or

gluten sensitivity. I said earlier that an intolerance was the inability to digest. If you follow me on the left side of this diagram, inability to digest can lead to a gut dysbiosis. In essence, you can change the flora in your bacteria, or you change the bacteria of your flora in your gut and that alters them and in some research studies in a negative way. It can actually minimize certain species and lead to or contribute to a permeable gut or a leaky gut.

Then leaky gut, of course, over time can lead to acquired allergies because when you have little microscopic pinholes being punched in your gut, then whole-food proteins can leak across into your immune system and start triggering it to overreact. This is how people actually become more and more allergic to more and more foods over time is this leaky-gut scenario and of course, that leads to tissue damage and subsequently, disease.

Then we also have with gluten intolerance or gluten sensitivity, we have something else that we've found to be true and has been measured in scientific studies and that is that gluten can damage and I actually did an interview with the researcher who discovered this. If you want to go check it out at glutenfreesociety.org, but Dr. Alicia Fasano who originally at the University of Maryland Celiac research facility is now at Harvard, actually discovered that gluten could create leaky gut because it disrupts a protein called zonulin.

Zonulin is an anchor that holds your gut cells together and so when you eat gluten, it can cut that zonulin or disrupt that zonulin so that your gut starts to develop again these gaps, these leaks intrinsically or internally. We know that gluten sensitivity can create contribute to leaky gut, not in one way, but in two ways, we also then know this, that when you don't digest the gluten, that leads to the production of immune system antibodies and inflammatory chemicals to those non-digested particles that can also lead to leaky gut, that can also cause tissue damage and disease.

There are multiple mechanisms that are happening here, and this is, again, the reason I'm going through all of this step-by-step with you is because I want you to understand that when you go in and you talk to your doctor and they are limiting what they're actually measuring with you, and they're not being comprehensive, then you'll at least be able to engage in an intelligent conversation to open the door to potentially additional testing that might help you get an answer because many people that have come to me over the last 20 years, one of the common themes I've found is that they've been to multiple experts and specialists.

They've been to Mayo Clinic, they've been to Cleveland Clinic, they've been to five GI doctors, they've been to four or five rheumatologists and all their tests for gluten were negative, not that they were negative for gluten sensitivity, it's the way they were tested for gluten sensitivity was not comprehensive to pick it up or to early detect it. Again, if you understand these things, you can engage in that more intelligent conversation. Traditional gluten-free versus true gluten-free, a summary.

Again, the traditional gluten-free diet is based on limited scientific analysis, it only considers wheat, barley, and rye, sometimes oats as a potential threat. It makes no mention of the dairy and whether or not there's a potential for gluten to show up in

the dairy of the animals so that we can assume. It makes no mention of grain, used in the processing of different gluten-free foods so it doesn't consider all grains and it doesn't consider the food additives, pesticides, things like glyphisate that we're now learning are part of this whole spectrum. It's again not concerned with health restoration. It's concerned more than anything, it's just concerned with telling people to limit their diet.

Now, a true gluten free diet, truly gluten free means you eliminate all grains based on comprehensive scientific findings, many of those findings I've presented to you in this module, so that you again, you can take this home, you can print these things out, you can give them to your doctor and you can have a better conversation and dive deeper into this for yourself.

It also looks at the potential for gluten and dairy considers processed food cross contamination. It considers GMOs and pesticides and addresses difficult to digest foods and it focuses on health restoration and maintenance, which is the whole reason you're changing your diet in the first place. As I said earlier, nobody changes their diet, because they want to restrict themselves for fun. So all that being said, now you have a truer definition of what gluten is and of what the true gluten free diet versus the traditional gluten free diet is, you have an understanding of gluten sensitivity, gluten intolerance, celiac disease, and, and what those different terms and definitions mean.

Again, you can have a more meaningful and intelligent conversation with your doctor. Now stick with me because coming up in Module Two, we're going to be talking about all of the plethora of different diseases that are linked to gluten sensitivity. As I mentioned earlier, more than 100 forms of disease can be contributed to or caused by gluten sensitivity, you're not going to want to miss this conversation. Hey, and make sure that you share this series with someone you love. If you know somebody who's struggling with autoimmunity, if you know somebody who's struggling to get through the gluten free diet and you just need an extra helping hand.

Click that share button below and make sure that you distribute this. We're giving this away, anybody can watch this for free, because we want to help as many people as possible. As always remember at gluten free society, our mission is to help save 100 million lives through our educational efforts and outreach. So please pay it forward and share. This is Dr. Osborne and we'll see you in Module Two

[01:04:17] [END OF AUDIO]