Hello everyone and welcome back to the WellFuel podcast. My name is Sydney Flippo and I will be your host for today. Hopefully, you know me by now, but if you're tuning in for the first time, I am one of the registered dieticians who works on team ISN. So welcome. Today I am going to be talking all about gut health and inflammation. How is gut health tied to chronic inflammation and what we can do to reduce that inflammation response?

I feel like inflammation has been getting its day in the sun recently, but it's something that we talk about with pretty much all of our clients here at ISN on some level throughout their treatment process and their protocol. So I was going to try to keep this short, but there's so much information to fit in. So try to stick with me for today's podcast while I chat about all things inflammation.

So to start with, what is inflammation? Let's start with an example: so when you cut your finger, your immune system triggers an inflammatory response that comes to help speed the healing. So you may notice that an area around that cut turns red, and maybe it gets a little bit hot. Once our finger is healed, and it's feeling better, that inflammatory process subsides and we get back to a normal finger with no inflammation and no redness.

When we think about inflammation in the gut, we can actually apply that same principle. So let's say that we have bacteria or a virus that maybe starts to break down part of our gut lining - the immune system will trigger that same inflammatory response to help speed up the healing. But what if that inflammation didn't go away? And what if instead, it simmered silently in the background, quietly fueling even more inflammation and setting the stage for future health problems? Well, that's essentially what happens when we have chronic gut inflammation. And chronic inflammation is actually responsible for the leading causes of death worldwide. The prevalence of diseases that are associated with chronic inflammation is anticipated to continue to rise in the future. Inflammation can really occur anywhere in the body, and it's implicated in many conditions from things like Alzheimer's to heart disease, cancer, autoimmune conditions, and even type 2 diabetes. The gastrointestinal tract also has its own subset of issues that are tied to inflammation. So inflammation is involved in conditions like irritable bowel disease, IBD, gastritis, diverticulitis, celiac disease, and irritable bowel syndrome or IBS.

While these diseases typically result in localized inflammation, they can contribute to systemic or whole-body inflammation as well. This type of systemic inflammation is defined as a low level of inflammation that can last for months or even up to several years. So that's kind of scary when we think about the fact that inflammation can last for a very long time - up to years - into our future.

So let's talk more specifically about gut inflammation because I really wanted to talk about that today and take the time to talk about inflammation in the gut. So our body is home to a hundred trillion different types of microorganisms. The microbiome is the collection of bacteria, viruses, fungi, and other organisms that live in or on our bodies. And the largest number of these microbes inhabit our intestinal tract.

So keeping the gut bacteria in balance is actually essential because a robust microbiome actually plays a key role in maintaining our health. So when our gut bacteria become unbalanced, a condition called gut dysbiosis, it frequently causes intestinal inflammation by altering the expression of the genes in the GI tract that regulate inflammation - and this low level of inflammation can then lead to an increase in intestinal permeability, which we all kind of know intestinal permeability by another name called leaky gut. So one factor that can set the stage for this simmering type of low-level inflammation is a lack of microbial diversity - a lack of different types of bacteria in the gut. Studies have shown that when there is a lack of diversity among various strains of beneficial bacteria, harmful opportunistic gram-negative types of bacteria can activate the immune system and trigger an inflammatory response. Adding insult to injury, when these harmful microbes die, they release pro-inflammatory molecules - molecules that actually cause more inflammation - even if the level of these harmful microbes - whether they're alive or dead - isn't high enough to make you acutely ill. So when I think of acute illness, I think of food poisoning. Even if they're not high enough to cause something like food poisoning, they can still trigger low levels of systemic inflammation that can contribute to that wide overall body inflammation and those health problems that I discussed a couple of minutes ago. So scientists have discovered that people who are suffering from diseases that are linked to chronic inflammation, like Alzheimer's, cardiovascular disease, type 2 diabetes, and some inflammatory bowel diseases, actually have gut dysbiosis commonly. So it's very interesting that there's a tie between gut dysbiosis and these chronic inflammatory conditions that we have in the body. Now there are lots of habits that can contribute to gut inflammation, things that we can do in our own lives that actually contribute to that inflammation that's happening in the gut.

The loss of microbial diversity and subsequent inflammation is often a result of our daily habits and the environment that we live in. So what are some of the most common offenders of that? The first one, of course, is going to be diet-related. Eating a diet that is low in fiber and high in sugar and chemical additives can contribute to an overall level of inflammation.

So you likely already know that our dietary choices influence the composition of our microbiome, especially if you're somebody who is interested in gut health, and looks at a lot of information, you probably already know that. Western-style diets are high in fat, but particularly saturated fat and processed foods that can cause dysbiosis and gut inflammation by lowering the amount of healthy bacteria, specifically bacterioides. It's one of our main phyla and increasing the amount of formicates, which is another main phyla, as well as proteobacteria. So those things are going to cause inflammation in the gut. Dietary fiber, however, on the other hand, increases microbial diversity and supports the growth of beneficial commensal bacteria like lactobacillus or bifidobacterium, which can actually inhibit an inflammatory response and inflammatory process. So when we don't eat enough fiber, that works more toward contributing to this inflammation because we don't have the food for the beneficial bacteria. Diets high in simple sugars can also affect microbial diversity because they increase intestinal permeability, especially in the small intestine. And so we have this inflammation that's associated with an increased risk of irritable bowel disease. And in animal studies, they have shown that sugar can damage immune cells in the gut that actually modulate inflammation. They can decrease short-chain fatty acid production and in turn, increase intestinal permeability and increase the level of inflammatory cytokines,

which just leads to overall inflammation in the gut and then overall systemic inflammation in the rest of the body. So these are things that we want to think about. How often we're including in our diet, and what types of these things we're including in our diet because they can be contributing to an inflammatory condition that we have. Consuming artificial sweeteners can also, like large quantities of artificial sweeteners, can also contribute to inflammation in the gut. Overindulging in alcohol can include increased inflammation in the gut. Also - over-exercising. So it's not surprising that our exercise habits influence our gut health. I think you've heard us talk about this before on the podcast, if you've listened. But over-exercising can actually disrupt the composition of our microbiome, which can lead to intestinal permeability in the same way that food does. So be careful that you are doing the appropriate type of exercise for yourself because that is going to be something that is super important when we're thinking about inflammation and controlling inflammation in the gut.

Another thing that can contribute to inflammation just in our daily lives is misusing antibiotics, antacids, or non-steroidal anti-inflammatories or NSAIDs.

So antibiotics are prescribed to eradicate infections and they are needed in some cases. But in doing so, they are going to disrupt our gut microbiome and reduce the diversity of the bacteria in our gut because they kill off good and bad bacteria. This leaves our gastrointestinal tract vulnerable to opportunistic bacteria and infections, things like Candida as well as small intestinal bacterial overgrowth or SIBO. So antibiotic use, like I said, in some cases is warranted and very much needed, but we tend to over-prescribe antibiotics in the United States for a lot of different things. And so when there are a lot of antibiotics used for whatever reason, it is a possible risk factor for the development of irritable bowel disease due to this level of inflammation in the gut. So I just want you to be aware of that.

Non-steroidal anti-inflammatory medications can also cause injury to the mucosal lining in our entire gastrointestinal tract. So the mucosal lining helps to protect the immune cells and allows our body to have the processes to decrease inflammation. And when we lose that, we lose that ability to protect ourselves against inflammation in the GI tract. So if you need to use them for something, you know, choose wisely, I guess, is what I would say about that. Chronic stress is another thing that in our daily lives can contribute to gut inflammation and just inflammation overall in general. The gut-brain axis, which refers to the two-way communication that's happening between the brain and the gastrointestinal system, involves interactions between our nervous system, our endocrine system, and our immune system. Stress is negatively going to impact our gut health through this axis. Research has shown that stress can affect our intestinal permeability, the motility of our gut, our intestinal secretions, the microbiome composition, and intestinal inflammation. Some studies have found associations between stress and irritable bowel disease and relapse with irritable bowel disease if someone is under a lot of stress. If you are one of our clients, I know that we've talked to you a lot about stress and how it affects the GI tract. It can be an underlying reason and a root cause for why we have ongoing issues and why we can't heal from issues. So addressing the stress response is something that we focus on and ask our clients about all the time because it is so important for this process.

Another thing that we talk a lot about with clients is sleep. So a lack of sleep has been shown to actually increase our inflammatory cytokines that are associated with gastrointestinal disease, including IBD, GERD or gastroesophageal reflux disease, liver disorders, and even colorectal cancer. So sleep is important for you to get and quality sleep is important for you to get as well. Being exposed to industrial chemicals or environmental contaminants or air pollution is something else that can contribute to inflammation. So where you can, try to control some of these things.

Make sure that you have good air filters in your house. Make sure that you're filtering your water. Make sure that you're washing your produce, and buying organic produce when you can. I like to use the Dirty Dozen and Clean 15 list. They just released the new version of that from the Environmental Working Group to kind of help inform what things I could buy organic and which ones maybe if I don't want to spend the money on, I don't have to. So just where you can, control those things.

Smoking or using e-cigarettes is also something that contributes to inflammation. So if you are smoking currently or have in the past, it's just something that we want to take into consideration. And then having certain medical conditions. So things like autoimmune diseases, infections, and ischemia can all lead to gut inflammation as well. So just things to be conscious of when we're thinking about inflammation.

So because of the work that we do, I also wanted to touch on labs. What are some labs that we may look at to see what our inflammation levels are in the gut and what our inflammation levels are overall in the body? So you know that we're big fans of comprehensive stool testing. We like a couple of different types of stool tests depending on what we're looking at. So we may use a GI map. We may use a gut zoomer. We may use some other type of comprehensive stool testing. Those are usually our favorite two that we use in our practice, but comprehensive stool testing is a great way to see what the inflammation level in the gut is and what the bacterial makeup is. So those different bacteria that I talked about earlier on, we get to see all of those in a gut test, which is really cool. Sometimes we'll use food sensitivity testing or a wheat zoomer. So looking at wheat sensitivity, if we think somebody has non-celiac gluten sensitivity, which can cause some inflammation in the gut, we might look at adrenal testing. Like I said, stress is a big factor in this and the adrenals are what control all of those stress hormones. So we'll definitely do some adrenal testing on people sometimes. For systemic inflammation markers like C-reactive protein, the liver actually produces C-reactive protein or CRP in high amounts when there is the presence of inflammation in the body. So it's really an interesting marker to look at for overall systemic inflammation.

We also might look at a micronutrient panel because if we find higher levels of intestinal inflammation, we usually have poor digestion and absorption, and that can affect our micronutrients, the vitamins and minerals that we're able to absorb in our GI tract. So it's definitely something that we will look at with clients, especially clients who maybe you're having trouble losing weight and we want to see what we have going on on an inflammatory level and also if they're absorbing their nutrients or not.

So now that we've talked about all about inflammation, the things that can cause it, the testing that we might use to look at inflammation, what inflammation is, I want to talk about how we can reduce inflammation. What can you actually take away as actionable steps from the podcast today to help you with inflammation?

So number one is an anti-inflammatory diet. As we discussed, what you eat is going to either promote dysbiosis and gut inflammation or discourage it. Adopting an anti-inflammatory diet has been shown to decrease inflammation in studies. So it is clinically proven to decrease inflammation. One study showed that eating a Mediterranean diet supports a healthy microbiome and reduces key inflammatory markers like that C-reactive protein or CRP. A Mediterranean diet focuses on a variety of different foods, lots of colors of the rainbow, things like fish a couple of times per week, things like olive oil, avocado oil, avocados, nuts and seeds, and plenty of vegetables that have a lot of good fiber in them. Studies have shown that these foods not only counter existing inflammation but also provide us with antioxidants and anti-inflammatory benefits that are going to support our healthy immune response in the body overall. So that's going to help you to prevent chronic low-level inflammation. So an anti-inflammatory diet, which includes the Mediterranean diet, is one of the things that you can do and walk away with right now to help decrease inflammation in your body. We talked about how exercise can negatively influence inflammation. But I also want to talk about how exercise can positively influence regulation by helping to down-regulate it. So exercise might not be the first thing that you think of when it comes to gut health. Maybe it is because you've listened to our podcast before, but maybe it's not. However, one study found that taking part in aerobic exercise can promote the growth of beneficial bacteria. This increases our friendly bacteria in our gut, which produces short-chain fatty acids like butyrate, which can promote the repair of the gut lining and lead to reduced inflammation. The other cool thing is though, if you're not somebody who loves aerobic activity or loves moderate-intensity activity, lower-intensity activity also provides protective effects against inflammation. So it can lower the risk of inflammatory GI conditions like diverticulosis, colon cancer, and IBD. It can reduce the transit time, so the amount of time that it takes things to move from your mouth all the way through your GI tract to come out the other end. It can lower the interaction between pathogens and the mucosal layer. And it can also provide the microbiome with better composition and also produce short-chain fatty acids. So even if you don't like high-intensity exercise, low-intensity exercise is still just as beneficial. So whatever exercise excites you, whatever exercise works into your routine right now in whatever you're doing, it is just important to have consistency with some type of movement or exercise, whatever that might be. So I'll just throw that out there for you.

We talked about sleep before and how getting less sleep can negatively impact the inflammation in our gut. So what we recommend is getting between seven and nine hours of good quality sleep, which will help to support a healthy immune system, which will help us fight off that inflammation in the gut. So we say quality sleep. If you are someone who tracks your sleep with some sort of device, maybe it's an Aura Ring, maybe it's an app, who knows what - there's all sorts of devices, Apple watches, all sorts of things that can track our sleep. It's helpful to look at the amount of deep sleep and slow wave sleep that you're getting, to look at heart rate

variability and all of that too, to make sure that your body is recovering well when you are sleeping.

And then stress, right? So, making sure that we keep stress in check by routinely practicing calming activities. So things like mindful meditation, muscle relaxation, deep breathing, journaling, yoga, whatever it is that you enjoy doing that will provide stress relief for you. That is something that I want you to have in your toolbox regularly to decrease inflammation.

So the four main things that you can do for yourself to reduce inflammation if you walk away with nothing else are, an anti-inflammatory diet, exercise that you enjoy that you can do on a regular basis, sleep, and stress. So get enough sleep, get enough stress management.

I think it's important for us to also talk about supplements today. So taking a second to chat about supplements that may help inflammation is something that I do want to talk about. As always, before starting any new supplement, please check with your healthcare provider to make sure that it's right for you and your situation. That we're not adding anything that's going to interact with medications or other supplements that you're taking. But there are a few things that we can do to help with inflammation supplement-wise. So pre and probiotics are helpful. Prebiotics are the fibers that fuel the bacteria in our gut. So like I was talking about earlier in the section about things that can impact our gut health, you know, in an unhealthy diet. I also talked about those healthy fibers and the healthy bacteria there. Consuming prebiotic fibers will increase our microbial diversity and improve our short-chain fatty acid production, which can in turn reduce our intestinal inflammation. So eat prebiotic fibers or take prebiotic fibers if you're not getting enough into your diet. Adding a comprehensive multi-strain probiotic to your daily routine can also support a healthy gut microbiome. So that's where the pre and probiotics kind of go together there. Probiotic supplementation has been shown to enhance microbial diversity and reduce gut inflammation, but there are numerous different types of probiotic supplements on the market. All of them offer different types of strains of beneficial microbes. So it is wise to work with someone who knows what they're doing, a professional in the space, to do some testing to find out what types of probiotics are right for you. It's going to be helpful to take the right types of probiotics if you're missing a specific strain, if we are working on a specific goal, there are different types of probiotics that can help with that along the way. So work with somebody on any type of supplementation that you're taking to make sure that it is the right combination and the right type of supplementation for you. Omega-3s, are one of my favorite types of supplements for inflammation. They are probably one of the most important anti-inflammatory supplements that most people can benefit from taking. So the most important bioavailable types of Omega-3 fatty acids are DHA and EPA, and they're found in fatty fish.

Omega-3s can reduce or influence microbial diversity, decrease inflammation, and decrease inflammatory cytokines and endotoxins. So endotoxins are things that cause inflammation in the gut. And they can also regulate the production of short-chain fatty acids, which as we've talked about before, can reduce gastrointestinal inflammation. Supplementing with EPA and DHA has been used to reduce intestinal inflammation in a variety of different studies. So that's why I said it's one of my favorite types of supplements to use when we are trying to decrease inflammation.

Curcumin, which is the active compound that's found in turmeric, is something that in the gastrointestinal tract can regulate the microbiome, modulate the inflammatory cytokines, so decrease those, and provide antioxidant protection.

Curcumin has been used as a treatment for many anti-inflammatory conditions over time. It's well-studied as well. And then you might also see peppering, which comes from black pepper, and it is added to a lot of curcumin supplements to increase the bioavailability. So if you see a supplement for curcumin that has peppering on the ingredient list or black pepper on the ingredient list, that is why it helps with the bioavailability of the turmeric.

Colostrum is something else that is an interesting product that can be used to help decrease inflammation. So colostrum is the first milk that is produced after birth and it's rich in immunoglobulins and peptides and growth factors. So in supplementation, bovine colostrum is what's used and it can help to heal the mucosal lining of the gut and aid in a variety of gastrointestinal conditions where the mucosal barrier has been affected. So if you have mucosal issues, we could use something like colostrum to help with that. Glutamine is another interesting supplement that we can use for inflammation depending on the client and the case. So glutamine is an amino acid that is used throughout the body. The intestines utilize about 30 % of the body's glutamine and it supports intestinal cell growth. It regulates the intestinal barrier function. It balances inflammatory signaling pathways and it protects the intestinal cells against apoptosis, which is cell death. So it's very helpful in the gut. And that's why the gut uses about 30% of our body's amount of glutamine. So glutamine has been used to treat a multitude of different types of gastrointestinal inflammation, including things like radiation-induced esophagitis, NSAID-induced intestinal permeability, and exercise-induced intestinal permeability. So anything that has permeability because glutamine works on the intestinal barrier and balances the immune cells and protects the intestinal cells against death, and is helpful with those types of permeability issues.

And then the last supplement that I'm going to talk about today is Zinc.
So Zinc is an essential mineral that is involved in more than 300 biochemical reactions in the body, including DNA and RNA synthesis, which is crucial for our tissue repair. It plays a role in maintaining our intestinal barrier function, and zinc deficiency has been associated with an increased risk of infection, delayed wound healing, and also intestinal inflammation.
Research has demonstrated that it is beneficial for conditions like H. pylori, peptic ulcers, and chemo and therapy-induced enteritis or esophagitis. When we're looking at Zinc, it is in balance with copper in the body. So it's something that we will test in clients before we are doing supplementation to know how much supplementation somebody needs or if they need supplementation at all. So I just, again, want to encourage you if you are thinking about supplements for reducing inflammation, please talk to someone, a provider of some sort to make sure that they are the correct supplements for you.

So what are the long-term consequences of untreated gut inflammation? When gut inflammation in the gastrointestinal tract is not properly treated, it increases our risk of developing nutritional insufficiencies as well as a host of other issues, like heart disease, Alzheimer's disease, and

chronic inflammatory diseases that happen in the bowels. It could be type 2 diabetes. There are so many things that we discussed today that if it's left unchecked, it can cause or lead to and contribute to these other issues. Untreated inflammation in the gut can also cause inflammation outside of the gastrointestinal tract, right? So like I mentioned, cardiovascular disease, and diabetes, are things that affect other areas of the body as well. So we can see inflammation show up in a lot of different places. Under normal circumstances, the intestinal lining is a semi-permeable barrier. So it allows the absorption of water and properly digested nutrients, but it prevents the absorption of undigested food particles and toxins and microbes that are not supposed to get into the bloodstream. When there's inflammation in our gastrointestinal tract, it can cause this barrier, this permeability, this gut barrier, the lining to break down and increase that intestinal permeability, which as we talked about before, it's commonly known as leaky gut. Toxins and microbes and other things that are not supposed to enter the bloodstream can enter the bloodstream and the immune system promoting inflammation. So intestinal permeability has been associated with many different health conditions, including metabolic disorders, asthma, autoimmune diseases, fibromyalgia, chronic fatigue syndrome, liver disease, depression, and all sorts of things. And the symptoms of inflammatory bowel disease have negative effects on our quality of life. Any type of inflammatory condition that I just listed is going to have negative impacts on our quality of life and well-being, which can affect our daily activities. It can affect our performance at work or at school. It can affect our social life. And we find that clients with inflammatory conditions also have a higher risk of experiencing anxiety and depression, right? Makes sense. We have all these things going on. We have a decrease in serotonin and things like that. So just take care of yourself, and do what you can to decrease inflammation because it is such an important thing that we are thinking about on a regular basis. So hopefully out of the talk today, you got that the bottom line is that we can do many, many things to prevent inflammation and we can use supplements where needed to help combat inflammation that is already occurring.

So our goal is to prevent future inflammation and to get rid of and control the inflammation that we already have occurring. So remember, I talked about a few things today, anti-inflammatory diet, the right amount of exercise and the right type of exercise for you, the right amount of sleep, and the right amount of stress reduction. Those things are all very, very important and very tangible things that we can do already in our day-to-day life to decrease inflammation. If you already have a lot of inflammation going on, and you might want to reach out to work with somebody, we'd be happy to work with you to assess where that inflammation is coming from and help you get to the root cause of it so that we can decrease that inflammation and prevent those chronic inflammatory conditions in the future. As always, if this is something that you feel like you need assistance with, we would love to help you out. You can book a complimentary call with our team today to see if we're the right fit for you.

That is all for today's talk on gut health and chronic inflammation. We look forward to chatting with you again on the next episode of the WellFuel podcast.