DANNY LENNON: Hello, and welcome to another episode of sigma nutrition radio. I am your host, Danny Lennon. And this is episode 412 of the podcast. Thank you for everyone who's been sending in kind feedback about our recent episodes. And most recently, last week in Episode 411, we covered the topic of nutrition and bone health, and we covered a lot of ground in there. And a lot of you seem to really enjoy the episode. So, both Alan and I are very thankful for that. And so if you haven't had a chance to go and listen, maybe make a note that 411 is an episode you might want to check out. In today's episode, I am delighted that I'm going to be joined by Dr. Eirini Dimidi, who is a lecturer at the Department of Nutritional Sciences at King's College, London. And in addition to be a registered dietitian and nutritionist, she is also a researcher publishing in a number of different areas that we're going to look at, as well as her lecturing position. And the completion of her PhD was at King's College, London, where she investigated the use and effectiveness of probiotics in people with chronic constipation, a topic that we're going to revisit a lot in today's particular discussion. And then in 2016, she was appointed as a Research Associate at the College, where she has undertaken several different research

projects that relate to various aspects of dietary interventions in gut function and dysfunction. So, she has looked at nutrition based interventions that include fiber, plant foods, prebiotics, probiotics, low FODMAP diets, all these and how they relate to gastrointestinal health, and in particular related to certain functional bowel disorders, including chronic constipation and irritable bowel syndrome. We're going to focus in a lot on chronic constipation in today's episode, as it's an area as you will see where we really need more answers and is obviously a particularly challenging issue for many people. So, that is all within this episode, the show notes will be available over at sigmanutrition.com/episode412. There, if you go there, you can get more about Dr. Dimidi's background. I will link up to any papers that we may mention throughout the course of this conversation and any other relevant links. And then also, yeah, take a look through the rest of what's available on the website, including transcripts to our podcast episodes, and the sigma synopsis free weekly email newsletter, which you can find on sigmanutrition.com. So, with all that said, let's dive into this conversation with Dr. Eirini Dimidi. Welcome to the podcast to Dr. Eirini Dimidi. Thank you so much for joining me. It's an absolute pleasure.

EIRINI DIMIDI: Thank you for inviting me.

DANNY LENNON: I have a lot of questions I'm very interested to ask you about. But before we get to any of those, maybe for people listening, could you give them an introduction to your background of the work you do currently within the university, but also your research interests and your field of research?

EIRINI DIMIDI: Sure. So, I'm currently a lecturer in Nutritional Sciences at King's College, London. My expertise lies in diet and gut health and disease and more specifically functional bowel disorder. So, that's anything from irritable

bowel syndrome to constipation. So, I run a lot of dietary trials looking at several different types of interventions, such as probiotics, fiber, prebiotics, some plant based foods, the low FODMAP diet, and I'm trying to understand how all these foods or products could affect environment in our gut and symptoms and well-being. So, a lot of my research has to do about gut health and a little bit about immune health as well. That's a little bit more of my recent development in what I do. And as a background, I'm a dietician, I graduated from University of Surrey in 2011, and also my nutritionist as well.

DANNY LENNON: Fantastic. And I think there's a number of those areas that I'm looking forward to exploring. One of those, I think that a good point of departure here might be to explain the term functional bowel disorder that you mentioned in the introduction. And people might be wondering, well, what do we specifically mean by functional in this case, as opposed to other types of bowel disorders? Or what do we put under this umbrella? So, how do we actually go about defining what a functional bowel disorder is?

EIRINI DIMIDI: Sure. So, the very first thing to mention is that now it's very well knowledge that functional bowel disorders are disorders that are derived from the gut-brain axis. So, we see here that it's not just about the gut itself, but there is a link with our brain and our brain function in general. But if we want to define it more specifically, it's a spectrum of different gastrointestinal disorders that are characterized by symptoms of abdominal pain, bloating, and distension, and also abnormal bowel movement. So for example, constipation, diarrhea, or a mix of the two. And I think what makes those bowel disorders functional, is the fact that there's absence of any physiological or anatomical abnormality. So, basically, we do a bunch of tests and these come back negative, everything looks normal. But obviously, people are still experiencing symptoms, it still has a

massive impact in their quality of life. So, we tend to make a diagnosis then based on a set of symptoms and we do have criteria for that. And also they're characterized by how long they can last. So, when we diagnose functional bowel diseases or disorders, we always say that this symptom should be present for three to six months. So, it's not something actually that happens in a week. It's something that is there for a longer time.

DANNY LENNON: Yeah. And I guess that's going to be really important as we start digging through some of these different disorders that we mentioned. And so one of the key distinctions, I think that you've just outlined is that physiologically, we don't go just go and do a test and we can in the way we would for celiac disease and be able to pinpoint this is what someone has. But despite that someone is still experiencing symptoms. And so then we can move on to evaluating if it's one of these disorders.

EIRINI DIMIDI: Absolutely, exactly.

DANNY LENNON: Okay. So, within the umbrella, I think I'd like to ask a bit about chronic constipation. And with this, again, might seem something like people will say, oh, I kind of know what that means. But again, in terms of actually getting a diagnosis around it, or what theoretically should be a diagnosis maybe compared to what is actually done. How would we go about defining what we're actually talking about with chronic constipation in the way it would be seen in the literature, for example?

EIRINI DIMIDI: Sure. So, in terms of chronic constipation, that there's different types of constipation and it depends on, I guess, the pathophysiology behind it. So, what we've been talking so far is functional bowel disorder. So, that will be functional constipation and that's primary constipation. So, it's, again, where we don't really know what's going on. So, it's when we don't have any abnormalities going on that we can pick up in a test. And then we also have

secondary constipation, which is caused by something else that we have going on. So, that could be another disorder or another medication that we are taking and the side effects would be constipation.

Now, going back to primary constipation, because usually that's what we refer to as chronic constipation and that's usually what are referred to as chronic constipation. We diagnose that based on symptoms, again, we need to rule out that there's nothing else going on because if it is because of medication or disorders, then it's also treated a little bit differently. But in terms of functional chronic constipation, for somebody to be diagnosed with that they need to have symptoms of straining, so need to push a lot to be able to have a bowel movement, they need to have less than three bowel movements per week, they need to have a sense of incomplete evacuation. So, that would be for example, when someone opens the bowels, but they don't feel they have completely emptied the bowels, but for some reason they cannot. They need to have a sense of anorectal obstructions, that's a formal term that we use. It's just when patients feel that there's something they're blocking the stool from coming out and hard stools. Now they don't need to have all of them at the same time. Usually we look for two or more to be able to say that, yeah, that person has functional constipation. And they need to have it for about, I don't know, a quarter. Yeah, a quarter is what we say of all the bowel movement. So, not all the time, but frequently, and all of those symptoms.

DANNY LENNON: Okay, super interesting. So, there's a couple of things there. And I guess one thing at this point that some of our listeners who regularly listen to the podcast will have heard us on previous episodes in relation to irritable bowel syndrome mentioned one of those subtypes of IBS being irritable bowel syndrome with constipation. And now they might be noticing that some of the symptoms that they would

have heard they're both this constipation. And some of those abdominal pains are also present here when you've just discussed functional constipation. So, where exactly are those overlaps between the two? And then also, where are the differences? How do we go about distinguishing one from the other in this sense?

EIRINI DIMIDI: I'll start with the differences first. The major difference between IBS, constipation predominant IBS, let's call it like that. And then functional constipation is that in constipation predominant IBS, the number one symptom they experience, the predominant symptom is abdominal pain. And that's what we're looking for. And this pain is associated with a bowel movement. So, it may be that they have harder stools or infrequent stools. Whereas in functional constipation, abdominal pain isn't the predominant issue at all. It's all the other ones. So, straining hard stools and completed by creation, sense of anorectal blockage, etcetera. So, abdominal pain is really what differentiates the two. Having said that we do know from a lot of studies that there is a big overlap between the two. So, it is very possible that patients would meet the criteria for both of those disorders. And in that case, we tend to say that they are leaning towards the IBS side because of the abdominal pain being an additional symptom. But something also worth mentioning is that it's also possible that people will move from one to the other from time to time, we know that happens a lot, even just within the IBS spectrum. For example, somebody will have constipation, predominant IBS, but then suddenly, they may have diarrhea predominant IBS for a while. So, we know it's possible to move between different functional bowel disorders. So, there are a lot of similarities and a lot of overlapping symptoms.

DANNY LENNON: Fantastic. Thank you for clearing that up. One, I suppose probably big question. So, apologies for throwing this at you so early in the discussion is that I know a lot of your work has not only looked at some of these functional

bowel disorders, but then in another sense, looking at the gut microbiome and how that can influence health in many different ways. You've already mentioned that gut-brain axis earlier in one of your answers. And so in relation to what we know about the connection between those, do we see differences in the gut microbiome of someone with a functional bowel disorder? And if so, do we know what way around that is? Is it that the disturbance of the microbiome is causing disorder? Or is it when someone has one of these disorders that leads to a change in their gut microbiome? Where are we with current literature in this area right now?

EIRINI DIMIDI: Yeah, absolutely. So, there is a lot of research going on in the gut microbiome and functional bowel disorders. And indeed, we have seen differences in the microbiome in people that have these disorders compared to healthy people. And for example, both in IBS and in functional constipation, we see that people have lower numbers of Bifidobacterium, for example, lactobacilli, we tend to believe that they are beneficial bacteria to have. Now, the question whether it's the microbiome that triggers symptoms or having the disorder and whatever that means for everyone causing those changes in the microbiome. We don't entirely know that so far. The several interventions that are targeting the gut microbiome in these disorders, trying to see whether perhaps restoring that imbalance that we see all those differences that we see with healthy people will help with the treatment. And there are several interventions that show some promising results, such as probiotics or other interventions that target and affect the gut microbiome, for example, be the low FODMAP diet, but in this case, not in a very beneficial way. So, that will make unnecessarily a lot of change. It seems like it makes it worse in the short term. We have a little bit of not a very clear picture yet of how we can target it and improve the symptoms. But there's a lot of research going on, and we do have some

evidence, and we may talk about probiotics later on, because it's very relevant, but that would be one of the common ones.

DANNY LENNON: Yeah, for sure. And we certainly will circle back to probiotic supplementation and some of those trials. And you may correct me if I'm wrong on this. But I guess one of those difficulties in working out that question of which way around those issues are happening is, if we see benefits to a probiotic supplementation trial, that may not necessarily be down to a certain change in the gut per se and that probiotics are also may be doing other things more acutely that so it's hard to work out, is that something that we might be seeing in some of these trials?

EIRINI DIMIDI: Yeah, absolutely. And that's the thing with dietary interventions that can have so many different effects in the gut, but also beyond the gut that can improve our outcomes. As I said, even we know interventions that may affect the brain, and maybe that's through the gut-brain axis, that's how we see effects in symptoms. So, it's so much more than the gut microbiota per se. But it's also possible that it is about the gut microbiome, it is just we are not there yet to say that for sure.

DANNY LENNON: Right. So, if we do start thinking about diet, and before we come to maybe dietary interventions that would treat some of these disorders. If we think on, either from a prevention/risk reduction side, or what factors may increase risk of developing one of these disorders. There's obviously clearly dietary changes that can influence whether someone have an acute bout of constipation. If, for example, if their fiber intake is very low or they're dehydrated perhaps, do those same things apply with chronic constipation or are we dealing with something completely different in terms of risk factors for developing this disorders more related to genetics, or what we know about the risk profile of actually developing this disorder?

EIRINI DIMIDI: A lot of what you just described is common across the different functional bowel disorders, for example, the psychological element seems to be common in IBS and constipation. So, we know that people that experience perhaps anxiety and depression are more likely to develop those functional bowel disorders. In constipation, we also tend to see other factors playing a role, we see sex, for example. So, females, there's a much higher prevalence of functional constipation in females than males. What exactly is happening, we are hypothesizing. So, it could be because of differences in the diet or it could be hormones or biological, other biological reasons. We also know that age is a risk factor. So, the older you are, the more likely you are to develop constipation. Diet is also a factor, we see associations between dietary elements and the risk of having constipation. So, for example, low dietary fiber intake or very low fluid intake. So, there's several different risk factors in terms of lifestyle choices and also other characteristics. Does that answer your question?

DANNY LENNON: Yeah, perfect. Yeah, excellent. Yeah, thank you. So, with that in mind, if we move to maybe some of the dietary interventions that may be used, there's probably a few different levels that we can talk about here, whether that's on a very reductionist level of looking at probiotic supplementation very specifically, then we can start thinking about certain types of foods, then there's also overall dietary patterns, and then all the way down to maybe specific types of diets that you've already mentioned, like a low FODMAP diet. So, I guess, if we were to actually talk about fiber that we've just mentioned, given that, generally in the population we say for a healthy, got higher fiber intakes, or at least those within the recommended guidelines are going to be more beneficial than very low intakes. But as an actual dietary intervention for someone with a functional bowel disorder. What do we have in

relation to evidence of actually changing their fiber intake as an intervention? And what kind of results are we kind of seeing?

EIRINI DIMIDI: There's two different ways we can change somebody's fiber intake. We can do that through supplements and we can do that through their diet. So, by adjusting the diet or adjusting the foods that they are consuming. I'll talk first about, which one should I talk. Supplements is the most straightforward actually. And again, because that's where we have most of the evidence sadly, it's always supplements rather than foods where the randomized controlled trials are made on. So, we have a lot of trials showing that fiber can be effective in chronic constipation, but what really matters here is the type of fiber. So, not all types of fiber are effective. In constipation, it depends on a lot of factors such as, how soluble they are, whether they're fermentable or not. And the type of fiber that keeps coming up as being effective in several symptoms of constipation is psyllium. So, we know that about 10 to 15 grams of psyllium per day as a supplement seems to improve symptoms of constipation. We also know that other types of fiber may not be as good in constipation as supplements, for example, wheat bran, in the short term at least they could trigger side effects, such as abdominal pain, so they don't seem to be as well tolerated. Although these in the long term could subside a little bit. But again, the interesting bit here is that the type of fibers plays a huge role. It's not just any fiber. So, this is about supplements.

And then we have research on different types of foods that contain fiber, but also other compounds that may be beneficial in constipation, and their impact, and some of them are prunes. And also another one that we very recently hear a lot about is kiwis. So, kiwis, actually, I remember being in conferences in, I don't know, two or three years ago pre pandemic and just asking who thinks that kiwis help with constipation, and nobody thought

they did, because rightly so we didn't have much research in it. But recently we have had. So, it seems that kiwis can be effective in improving constipation acknowledging some limitations as well in the design of some of the trials. And also the same with prunes, we do have a trial infrequent bowel movements, people with infrequent bowel movements showing that could help. When we look at evidence for whether just increasing fiber intake in the diet, as you know, an overall diet through many different foods. By very surprisingly, we don't have evidence on that. Something that we just keep saying, we all keep saying that you should eat more fiber, just a whole dietary approach as an intervention. We don't have evidence showing that it helps with constipation, it's very surprisingly.

DANNY LENNON: Yeah, that is super interesting. And so in some of those trials, I've looked at, say kiwi or prune specifically, has the thought process being there's something unique to those specific fruits? Or are they just, is that a characterization of a broader group that they just happen to be the food that was being used?

EIRINI DIMIDI: Well, when it comes to prunes, for example, because that's the one that I think most people recognize as a food they would take if they had sudden bout of constipation. It is the fiber but it's also another compound that they have, which is called sorbitol. And so which can have for example, an osmotic effect in the gut so it can affect the water content of the small bowel, which by the way, also happens with kiwis, we've seen that in MRI studies, where they have taken MRI scans from the abdomen of patients and they've compared it to control and they've seen that following kiwi or prune as implementation, or consumption, there's much more small bowel water floating around. So, in case of prunes, it's also sorbitol. In terms of kiwis, it's definitely fiber and the fact that it has different fibers. I think that there's polyphenols are playing a role, which is the same with

prunes as well. They're not high in sorbitol or any osmotic substances like prunes are.

DANNY LENNON: And so then if we were taking a step back to that difference we're seeing with psyllium and wheat bran, and you said like psyllium seems to have these beneficial effects in chronic constipation. But wheat bran, we're actually seeing some more negative side effects come up. Is that just down to the different type of fiber and therefore the mechanism that they are they're working by. And if so, can you maybe just explain that briefly for people?

EIRINI DIMIDI: Yeah, of course. So, psyllium is a predominantly soluble fiber and it can be fermented by the gut microbiota, but it's not highly fermented. Whereas wheat bran is highly fermented. And what that means is that wheat bran, it will reach the gut microbiota, it will be fermented a lot, and as a result, there will be a lot of gas production by the gut microbiota and that can trigger the symptoms of discomfort and pain some times, and flatulence. Whereas with psyllium, although it could be fermented, it's also very soluble, it binds to water, which means that it can make, stores a lot softer, it increases to volume and that can apply pressure in the gut wall and that can trigger contractions to just keep things moving along the gut. And that seems to work better with constipation.

DANNY LENNON: Okay, brilliant. Yeah, thank you for that. One of the other things that I did want to bring up was to circle back to probiotics. And in particular, one of your publications, 2018 paper was titled probiotic use is common in constipation, but only a minority of general and specialist doctors recommend them and consider there to be an evidence base. So, could you maybe outline the goal of that study, and then maybe elaborate on some of the findings that the title is already suggesting to us?

EIRINI DIMIDI: Absolutely. Now, the study, I completed the study during my PhD actually, it feels ages ago.

What I wanted to do is, I knew there was research in probiotics, I knew I could tell from patients and people that I was interacting with as part within my job that there is that belief from the general population, that they are very effective and they try to include them in the diet a lot of time, a lot of them. And at the same time, I think the scientific world hadn't still made a decision on how effective they are. So, I actually wanted to capture that and see whether by performing a proper research study, we could capture that. But also I wanted to see what makes people choose to take probiotics for the gut health. What are the factors? What convinces them to take probiotics? And the same, so if doctors do recommend probiotics, what is it that makes them recommend them? So, in a nutshell, what we found is what the title says, it's first of all that people that have that self-report, so they say they have constipation. Most of them have tried probiotics for their gut health. Whereas only a minority of people that don't have constipation, have used them for the gut health, which means that, you know, people with constipation are obviously concerned and they're trying to find different ways to manage their condition, so one of them seems to be probiotics. But at the same time, only 20% to 30% of general practitioners and gastroenterologists recommend probiotics. And obviously, that's a big difference. So, when we try to look at the factors that determine use or recommendation with the general population was, of course, whether they believe they had constipation or not, whether they believed that there was research out there studying the effects of probiotics. So, you know, the belief that yes, there is research, so they must work. And also whether they had visited a complementary and alternative therapist, that was a very strong predictor as well.

Now, when it comes to the doctors, the only predictive factor for recommending probiotics was whether they believed as well that there was an evidence base for their use, which is

great. I mean, it really shows that ultimately, that's where people are trying to base their decision making. But what's really interesting there is, was that when we asked the doctors, which probiotic they would recommend for constipation, the ones that they predominantly, they recommended most frequently did not have any evidence for constipation. And it's not the fault, the literature is very confusing, there's still no consensus and a lot of times what we ended up doing, which is also what the guideline say is that ultimately, you can choose any for four weeks. Try it out for four weeks and see how it goes on. So, we don't have specific probiotic recommendations. So yeah, that's what that study showed. And yeah, I found it very interesting analyzing the results, because I could finally capture some real life thoughts and beliefs around probiotics.

DANNY LENNON: Right. Yeah. And it's interesting to see that kind of discrepancy because as you say, it's completely understandable because those doctors are essentially practicing in an evidence based way. If I can't find good evidence, then I won't prescribe something, but you have individuals then particularly for something that is very difficult to treat with any degree of accuracy or takes a lot of trial and error for some of these disorders like a chronic constipation. Of course, they're going to be trying things. So, as of right now, and kind of those in that three years since, based on the current literature, do you think we're in a similar place of kind of knowing probiotics or doing something? And there's general applications maybe for them, but we're still not at the point of being really targeted in this specific probiotic? Or this certain strain is going to do this thing and this population? How close or not do you think we are to that, say, in frontline care of like, being able to go into a dietitian and there being like a specific consensus around this is what type of probiotic we're going to use for, let's say, chronic constipation as one example?

EIRINI DIMIDI: The answer to that really depends on the condition. In chronic constipation, if you had asked me maybe two years ago, I would have said that we are, we do tend to have an idea of which types of probiotics seem to be beneficial, because I had published, for example, a systematic review and meta-analysis showing that Bifidobacterium lactis probiotics that belong to these genera seem to be effective in improving symptoms. Now, in the last couple of years, there's been new studies on other Bifidobacterium lactis strains that show that they are not effective. So, it's not just looking at the genera so the wider family to which they belong. But it needs to be really specific on the strain. And I think I think we are just as confused perhaps as we were beforehand, it doesn't mean that we don't, we cannot recommend specific strains. Because if you go back to the literature and you do locate a specific study that has been found to be effective, you can see that strain, you can see if it's somewhere in circulation and then suggest that one. But it's something that you have to do on your own and recommend it to the patients or it's not part of guidelines. We're not there yet.

DANNY LENNON: Okay. So, one of the other things I'm interested to ask about is that fermented foods because this is obviously hugely popular within the health food market broadly, if someone goes into a health food store, or even certain aisles in a supermarket now they'll see all sorts of fermented food products, kefir, kombucha, kimchi, sauerkraut, etcetera. With these, and this may depend on what specific food we're talking about. But first of all, I suppose from a theoretical perspective, what would be the mechanism by which these could potentially benefit someone's gut when we're talking about fermented foods? Why is this become a thing that people are thinking is helpful food?

EIRINI DIMIDI: There's several different mechanisms through which we believe there may be helpful and I'm very careful here by saying may be helpful,

because the evidence here is close to nonexistent, and I can elaborate that later on. But the very first thing is that most of fermented foods are a source of life microorganisms. Now, what we mean by that a lot of people hear that they contain probiotics. Now, I'm not using that term because actually to for something to have probiotics, it needs to be produced in a very controlled way. And we need to prove that from clinical trials that it has a health benefit, which has not been proven with fermented foods yet, but they do have those life, active microbes that have the potential to be beneficial to us, just like probiotics have, some probiotics have the potential to be beneficial. Those microbes can increase the concentration of certain beneficial compounds through that fermentation process. So, for example, they may produce some short-chain fatty acids and then we consume, they can increase the concentration of certain vitamins, they can reduce the concentration of some of more toxic substances. So, for example, some [inaudible 00:34:25] I think that's, sorry if I'm mispronouncing that, and also they in some cases, which is more relevant to clinical conditions. For example, fermentation process in bread to produce sourdough, sourdough bread, sometimes it can reduce the concentration of oligosaccharides and some clinical conditions, such as IBS that may be better because in IBS these may not be well tolerated. So, sourdough bread may be better tolerated than normal bread. And in the same way, your fear may be better tolerated in people that have lactose malabsorption than normal milk. Because through the fermentation process, some bacteria there can produce the enzyme that helps break down the lactose in the milk with which kefir has been made. There's that aspect as well that these are the key mechanisms.

Now, I want to, when it comes to gut health, I want to emphasize that we really don't have a lot of evidence. As I said, we do have some evidence from lactose malabsorption and kefir.

There is some evidence for taking kefir while you're taking antibiotics to fight an H. pylori infection and how that may lead to a better outcome than taking the antibiotics without the kefir. So preventing, for example, the antibiotic associated diarrhea, which is also something that we see with certain other probiotics and they can help with. So, I know they're very trendy at the moment and we hear all about it. But we really, really don't have a lot of evidence to justify all the craziness that is happening. But there are several mechanisms that we think could be in place and they could have an effect. So, hopefully the next few years with everything that is going on and how much people want to know about this will actually maybe know more.

DANNY LENNON: That's incredibly important that you mentioned, but also probably quite eye opening for people who if they walk into any supermarket now where there's kombucha everywhere, we'll just presume that of course, it's a guarantee that this is going to improve my gut health. Whereas there's virtually nothing at least for kombucha and gut health specifically that say for general population. Yeah, because I mean, there's obviously like epidemiology of some of those foods, like say fermented yogurts or for Natto for other health issues. But when it comes to this promotion of gut health specifically, most of these kind of fermented foods, we're saying there's a kind of lack of evidence or just doesn't exist right now.

EIRINI DIMIDI: Yes, and thanks for actually saying that. And reminding me that I, with yogurt is slightly different. With yogurt, some probiotics that have been studied were in yogurts and that has been slightly investigated more. But again, probiotic yogurt from a probiotic yogurt is from another one is very different? You cannot just generalize and say yogurts are good, really depends which microorganism they have in there and for what condition or symptom we're talking about. But all the other more recent fermented foods that we keep hearing about

kefir, kombucha, sauerkraut, kimchi, all those, soya fermented, soya products, it's really, really limited evidence or none for some of them.

DANNY LENNON: Brilliant. So, maybe the last kind of area here that I wanted to ask you that was prebiotics. But kind of specifically in cases where there's either maybe been supplementation acutely with prebiotics, obviously, there are going to be containing a whole host of different vegetables. But if we look at that broad class and maybe there might be differences between different types of prebiotics, but just as a general overview, do we have much investigation in this area of how that influences, say chronic constipation specifically, or anything beyond that?

EIRINI DIMIDI: We do have a research on prebiotics, again, when we talk about supplements in a supplement form and usually it's prebiotic fiber. So, types of fiber that are fermented by our gut microbiota producing positive effects in the gut and that's the definition for prebiotics. When it comes to constipation. There's an interesting effect. We did show that when we pulled findings from a lot of studies together, we did find that prebiotics increase Bifidobacteria concentration in people with constipation compared to a placebo. So, we do see an impact in some types of bacteria in the gut. At the same time, when we looked at the symptoms, we didn't see an effect. So, though we can, it seems like there is a beneficial effect in the gut microbiota, but that doesn't translate in constipation and also in irritable bowel syndrome in an improvement in the symptoms. So, prebiotics are very healthy, especially when they are family foods, the types of fiber, they are good for our gut health in general, like feeding are good bacteria. But to move from that and say that we should be using them to manage symptoms, specifically that we don't have the evidence for that, actually the evidence suggests that it's not going to be effective. And in IBS, it has been shown that, yes, higher amounts of prebiotics can induce

some symptoms or make them worse, for example, flatulence and that makes sense, again, because of the gas production by the gut microbiota when they ferment the prebiotics.

DANNY LENNON: Yeah, I think that's a really great example that people could use as something when they're thinking about other claims and other areas that people make of why it's important to actually look for evidence on a certain outcome that you're trying to change that something could be plausible mechanistically. Or it could even impact well, those intermediate steps, like in this case, increasing the Bifidobacteria. But it's not actually changing one of the outcomes at the end that we want. So yeah, that's a learning lesson that people could apply across the board.

EIRINI DIMIDI: Yeah, it's really tricky, because I mean, it obviously has a beneficial effect in one bacteria that we looked at, but whether that's enough to make a whole recommendation for supplements, I'm not convinced, but it's definitely the basis for, you know, encouraging high fiber foods in somebody's diet. And that's the safe thing to say, of course, looking at the type, especially IBS, it seems to be very important. But yeah.

DANNY LENNON: Awesome, for sure. So, before I get to the very final question, we start wrapping up, is there anything that we haven't mentioned that you wanted to say or that I didn't get to or anything that we've left on open that you wanted to clarify for people before we start wrapping up?

EIRINI DIMIDI: You've covered almost everything. You've asked about all the key questions that someone would ask about constipation and diet. I would like to emphasize just because I was also very surprised when I looked it up. It's just we, when it comes to foods and diets in constipation, rather than supplements, we don't have a lot of stronger evidence and studies. So, something to bear in mind. And when it comes to IBS, obviously, there's a lot of

misconceptions or non-evidence treatments that we see advertised. And recent one that actually it's been proven to not work, because we have the evidence that they've tested and it doesn't work for sure. It's aloe vera, for example. So, aloe vera supplements, not very useful for IBS, I'm afraid. So, not worth the money.

DANNY LENNON: That's a one we can cross off the list. But given that lack of research that might be a call out to those of you who are thinking of doing a PhD and are looking for a research topic to propose to someone, here's an area we need. So, Eirini before I get to my final question, if people are looking to find you on the internet, or on social media, where are some places they can go and find you and more about your work?

EIRINI DIMIDI: I have a Twitter account. It's @EiriniDimidi. So, my first and my last name. I don't post very often, but I do now and then especially highlighting key research, both other people's and my research that is coming out. And I do have an Instagram account, but it's in Greek. So, if you have any Greek listeners, then the handle is @dr.eirini.dimidi. Again, it's been a while since I've posted there, I'm not very active on social media. I know I probably need to work on that. But I'm taking one day at a time.

DANNY LENNON: You're doing actual real science.

EIRINI DIMIDI: Well, that's also an important part of, you know, it's about making the science but then talking about it and letting people find out about it and communicating it. But in Twitter, I tend to be a little bit more active these days.

DANNY LENNON: Great. And for everyone listening, I will link to those in the show notes this episode. And I'll also link up to any studies that Dr. Dimidi has published as relevant to what we've just discussed today. So, all be linked up. And I encourage you to go and read the full text to those. So, with that, that brings us to the final

question that we always end the podcast on. Can be to do with something completely separate from anything nutrition related. And it simply if you could advise people to do one thing each day that would have a positive impact on any area of their life, what might that one thing be?

EIRINI DIMIDI: Because we're talking about functional bowel disorders, which are disorders of the gut-brain axis. One thing I'll say is that we focus a lot on our physical health. And that makes sense in these disorders because we hit those symptoms, we feel them they are there and we need to focus on that. But we also need to have a big focus on mental well-being. So, whatever that is for each one of you and each one of us, it could be things something we like, it could be exercise, which has been also shown to be effective in improving symptoms in these conditions. Could be yoga, it has also been shown, it could be anything, but doing something every day that is about taking care of mental health and well-being I would say that's the one thing I would advise.

DANNY LENNON: I love it, fantastic and a brilliant way to round this out. So, with that, Eirini let me say thank you so much for taking the time to come and talk to me. And for all the work that you've done, that's been incredibly informative for me, and I'm sure for people listening now as well. So, thank you so much.

EIRINI DIMIDI: Thank you for having me, I really enjoyed this.

DANNY LENNON: So, there we go. That was Dr. Eirini Dimidi of King's College, London. I hope you enjoy this conversation and you took something useful from and it's highlighted some interesting research that you may not have came across yet or at least has gone into a bit more depth and been able to explain some of those concepts. Like I mentioned, you can work your way through all the primary research in this area by going to the show notes page for this episode. And there I have listed a number of papers that

are directly related to this topic. So, that is at sigmanutrition.com/episode412. You can find that all there. And then whilst you're on the website, have a look around at the other free information we have there from our sigma statements, which are long form written pieces to the sigma synopsis email newsletter, which I send out for free once a week, which is basically a bullet point list of useful information, including new research papers that came out, new articles and so on. And that is it. If you have enjoyed this episode, then please let me know, you can post around on social media, wherever you are, feel free to tag me. If you're on Instagram or Twitter, you can find me by searching my name there pretty easily. And that is it. Thank you for listening in. We will be back with another evidence based nutrition episode next week. And until then, thank you for listening. Stay safe and take care.