A CLINICIAN'S BRIEF SUPPLEMENT

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Clinician's Forum

Expert views from a roundtable discussion on the gastrointestinal microbiome

Probiotics & Beyond: Clinical Decision-Making in Balancing the Microbiome

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The GI microbiome is an area of growing interest in human and veterinary medicine, with increasing recognition of how microbial health affects systemic health. Clinical decisions such as antibiotic use and diet selection can significantly impact the microbiome, making it increasingly important for veterinarians to understand concepts like dysbiosis and how to navigate pro-, pre-, post-, and synbiotics.

Dr. Harris: What is the GI microbiome, and why is it clinically relevant?

Dr. Chow: The microbiome is a collection of microbes within any organ system. The GI tract is one of the largest organ systems in the body, and it has numerous interactions with other organ systems like the gut–brain axis, gut–kidney axis, et cetera. When we have an imbalance in the population of microbes in the GI tract, we call that dysbiosis. We are increasingly recognizing that antimicrobials, as well raw diets and even certain fresh food diets, can disrupt the gut microbiome and contribute to dysbiosis, as can proton pump inhibitors, which are often overused or inappropriately prescribed. A lot of these things that can affect the GI microbiome and cause dysbiosis can affect gut health and have implications for the rest of the body as well.

Dr. Torres-Henderson: The microbiome is so diverse, and it isn't the same across every patient. We're still in the infancy of understanding the microbiome, yet we're trying to manipulate it, and we may not fully understand the exact impact. We're seeing we can do the exact same thing in 2 different patients yet get 2 completely different outcomes. Even though we know there are ways to measure dysbiosis, we don't always understand

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what is abnormal for an individual patient. That's what makes the microbiome so interesting but also challenging. When 2 different patients have different results from similar interventions, it can be hard to know what to do as a clinician.

Dr. Jablonski: A balanced gut microbiome has many beneficial effects, including immune system modulation, maintenance of gut barrier integrity, defense against intestinal pathogens, provision of vitamins and nutrients, and fermentation of dietary carbohydrates into short-chain fatty acids, which have a lot of beneficial health effects. A complex community of microorganisms exists, and they also have a lot of beneficial effects on the host, and that's important to understanding why the microbiome and the prevention and treatment of dysbiosis are clinically relevant.

Dr. Whittemore: It's important to look at the microbiome—and what may be impacting the microbiome—with a broad lens. The things that are shaping an individual patient's microbiome and setting up a predilection for health or certain types of diseases are extremely diverse and need to be looked at comprehensively. We don't just have diet, but we have geographic factors, antibiotic exposure, and all the other medications the patient might be receiving such as NSAIDs and proton pump inhibitors. Other things that can be overlooked include the patient's environment, including the owner's microbiome and their exposure to antibiotics or nursing homes, et cetera. There's increasingly strong data showing shared changes in the microbiome between people and their pets, so when we're trying to help animals in these circumstances, we're still hindered by profound ignorance regarding which things are most easily manipulated to have profound and long-lasting impacts. Because of that and because very small things can have long-standing effects, a lot of my practice is not just trying to address dysbiosis but to prevent it. We can try to bring patients back closer to a healthy state, but based on data from humans and studies I've done, we know that the microbiome and metabolomic changes can be lifelong in spite of our best efforts.

Dr. Harris: Can you help us better understand dysbiosis and dysbiosis index?

Dr. Chow: Dysbiosis is a disruption in the microbiome balance. You may get overgrowth of certain organisms, but you may also get a depletion in other organisms that are just as important, including short-chain fatty-acid producers. This can have negative impacts, which is why we focus so much on dysbiosis and exploring its implications. Dysbiosis is something we see frequently—not just in acute GI patients but also in chronic GI patients. Dysbiosis index is a way to measure the level of imbalance in a patient's microbiome. It has been validated at the Texas A&M GI Laboratory and uses 9 key organisms as a way to measure how balanced the microbiome is; anything <0 is normal. Zero to 2 for dogs or 0 to 1 for cats indicates a moderate shift, and above that indicates a major shift in the microbiome, but it also depends on the underlying disease process. We know patients with certain conditions like acute gastroenteritis and acute hemorrhagic diarrhea syndrome often experience only temporary disruptions to their gut microbiome, including a significant decrease in key microbes such as *Peptacetobacter hiranonis*, which is a bile-acid–converting bacteria. But we know that this imbalance will generally resolve or normalize on its own within a couple of weeks. There was a recent study published in JAVMA supporting this finding and showing only transient dysbiosis in these cases.[1] Yes, they become dysbiotic, but generally, those with supportive care or no treatment or even those that received fecal microbiota transplantation normalized, whereas the dogs that were given antibiotics continued to have more prolonged dysbiosis. We've had numerous studies on antibiotic use and subsequent dysbiosis. Dysbiosis index is a helpful way of trying to objectively measure whether a patient is dysbiotic, but you also need to interpret it on a patient-to-patient basis and determine whether the dysbiosis is something we need to worry about in the longer term or if we have reason to suspect it is more transient.

Dr. Whittemore: Dysbiosis index is based on a set number of bacteria, but the microbiome is broader than just bacterial groups. So when we rely solely on dysbiosis index or even on broader bacterial microbiome studies, we're missing a lot of information. Without understanding how the virome, archaic bacteria, fungi, protozoa, and other microbial players interact, we're essentially wandering around in the dark—just as you would be if you assumed that all infections are bacterial. It is really important to look at the broad picture and recognize not just what we know but all the things we don't.

Dr. Jablonski: Dysbiosis refers to changes in microbial structure, function, and/or diversity. Based on the bacterial players we're dealing with, we can assume, to some degree, which functions may be impacted. When

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>
> ***—Dr. Chow***

it comes to our understanding of the microbiome and dysbiosis, understanding microbial function is a big part of that. Dysbiosis isn't just shifts in which microbes are there and the diversity of the microbial population but also the functions affected.

Dr. Torres-Henderson: Dysbiosis index has helped me set expectations with clients. Rather than it being a positive or negative test result, it is much more nuanced. I tend to reach for it in cases in which we've really been struggling to find a permanent solution—when we've tried several diets or medications, et cetera. Dysbiosis index can give us a measurement to share with clients to give them some idea of the severity of what is going on, and for patients with a higher dysbiosis index, perhaps our goal is not going to be to completely resolve signs but rather to improve the most significant signs that affect quality of life. It's helped some families really accept where they're at in their dog's disease process, because, otherwise, they just keep searching for the right diet or some magic supplement. And maybe the information obtained from the dysbiosis index can help us avoid trying things that could potentially make the dysbiosis index even worse. What you do in those early disease stages—or what you do to a clinically healthy patient—can really influence the clinical signs and disease processes we might deal with down the road. It's common to see chronic enteropathy patients that have been on antibiotics long-term end up with dysbiosis. That's why I generally encourage practitioners to avoid using antibiotics for diarrhea, as it can make things worse in the long run and complicate management.

Dr. Harris: What are important considerations when it comes to probiotics, prebiotics, and postbiotics?

Dr. Torres-Henderson: With probiotics, it's important to consider 2 things: which microorganisms are in the product and the amount of those microorganisms in the product. These are live microorganisms, but they also need to be present in adequate amounts. You'll hear people say, "Oh, I gave a spoonful of yogurt to my pet and that's going to be their probiotic." While there might be some live microorganisms, is that going to be an adequate amount to make an impact? We want to ensure there will be a health benefit to the host. When we talk about prebiotics, we're referring to substances that bacteria use to enhance or support the gut environment. Prebiotics are often fermentable fibers that bacteria use to produce short-chain fatty acids, which are then used by the enterocytes or colonocytes to help maintain intestinal health. These fatty acids also help modulate the pH within the gut, which, in turn, can inhibit the growth of pathogenic microorganisms. So when we think about those fibers or prebiotics, they can be quite beneficial, because they're supporting the good microbes and potentially inhibiting the growth of the more pathogenic microbes. One thing to be aware of with prebiotics, again, is to consider the individual patient. With fermentation, we're going to get some gas production; this is where I see certain patients respond very differently to prebiotic fibers. Some are fine with higher amounts of fermentable fiber; others have excess gas production and may be uncomfortable. It's not always just, "Give this and it'll work." Postbiotics are nonviable yet biologically active compounds that confer a health benefit to the host. They are essentially metabolic byproducts or remnants.

Dr. Whittemore: Postbiotics may be a purified part of the microorganism, whether it's bacteria or yeast, et cetera. When thinking about postbiotics, it's important to focus on what Dr. Torres-Henderson said, which is that they need to have a health benefit, as opposed to just being a bunch of dead bacteria, because some product manufacturers don't ensure this. They may engage in a practice called overstocking, in which they will put in a massive amount of microorganisms to offset postpackaging microbial death. The danger with that is that, even if a live bacteria has a health benefit, sometimes exposure to the same organism in a dead form or residue of it is proinflammatory and can cause harm. So we have to differentiate a postbiotic from random dead bacteria; we can't just say, "More is better."

Dr. Chow: I have patients that are a set of 2 cats in a family. One came in for diagnosed chronic inflammatory enteropathy based on biopsies, and the other cat was not biopsied, but both cats had chronic diarrhea. It turns out the owner had massively overdosed probiotics between the 2 cats, because she couldn't make sure that both cats would eat it. So she would just put extra in the food to the point where it probably ended up being 7× higher than the recommended dose. The moment I scaled it back to the therapeutic dose between the cats, their diarrhea went away. So more isn't always better, and I definitely do think that excessive amounts of probiotics can cause harm.

Dr. Harris: How would you guide practitioners to evaluate the numerous GI products on the market, especially in the probiotic space? What should practitioners be looking at quality- and efficacy-wise?

Dr. Jablonski: There are a lot of products that don't specify what organisms they contain or what the expected colony-forming units are, so that can be a huge tip-off that you're not dealing with a product that is going to meet minimum standards. You can avoid that by using reputable companies. In veterinary medicine, the limited evidence we have would suggest that a multistrain probiotic is preferable to a single-strain probiotic. So, using a multistrain probiotic from a reputable company that, if possible, has evidence to

support its benefit and avoiding ones with incomplete information on the product label are key points to consider. We also often try to avoid products with any flavorings. It's also worth considering using a synbiotic, which is a combination of probiotics and prebiotics, for the added beneficial prebiotic effects.

Dr. Whittemore: There are a lot of intricacies when it comes to the use of probiotics, which can make product selection challenging. That's why we should lean into the science. If there are robust studies that show that a specific product works for an intended application, then that's the product to use. When I don't have that data to rely on, I explain that to clients. Even if you're using a strain that's been shown to have benefits under certain circumstances, that doesn't mean that the product you selected doesn't have slightly different properties. For example, if the microbes were grown in a different environment or stabilized in a different way from that of in published studies, then what it produces metabolically can be completely different. Just because a product contains a specific bacterial strain doesn't guarantee it will deliver the intended benefits, so I start by choosing a product with data to support it.

Dr. Chow: Every patient is different and may respond differently to a given product. We have some literature to support certain bacterial strains or products for certain conditions, but ultimately, you can have 2 patients that have the exact same disease process and histopathologic changes, and they can respond differently to different management strategies and products. I've found that a lot of my clients tend to experiment with different products by the time they see me. I've seen some patients that have responded really poorly to a given product while others have responded extremely well to the same product. My product selection and management strategy is based on patient presentation and what has already been trialed in each patient. I'll either try a probiotic, fiber, novel- or hydrolyzed-protein diets, or various diet trials, including altering fat or fiber content. Patient history, including diet, supplement and medication history, and responses to those various things, is extremely important. I just try to make the best educated guess to trial and error my patients because it's just so different for every patient.

Dr. Whittemore: Because there's so much marketing out there, clients have often tried a million different things from random online sources, and they may have absolutely nothing viable in them. Worse, they may contain contaminants or pathogenic bacteria. In the old days, I used to say, "Well, you can use that but with the understanding that it may well be a placebo," but with everything we know about contamination and overstocking now, I can't say that anymore. Now I say, "If we're considering using a product from a company that doesn't perform consistent testing to ensure quality and safety, it could actually cause harm. I'd rather you give an empty gel cap than something that could potentially make things worse."

Dr. Torres-Henderson: In the nutrition department, many of our cases are on a variety of supplements, and a lot of nutritionists will turn to Consumer Laboratories to help with quality assurance for supplements that we might be using in the formulation of our home-prepared diets. Consumer Laboratories is an independent resource that can potentially help us assess the quality of some supplements. It's not uncommon for patients to have multiple concurrent interventions already onboard. In these situations, it can be helpful to pause everything, reduce variables, and be strategic about reintroducing each product back in, asking, "Why am I adding this? And what effect am I hoping to see?"

Dr. Chow: The effect you see from any given product is going to come down to the quality of the product, including its microbial population and CFUs, but the effects will also be impacted by individual patient factors. In terms of microbial strains, we have some studies on *Saccharomyces boulardii*, a single-strain yeast that seems to be increasing in popularity, not just with practitioners but also with owners. I try to keep an open mind regarding what could benefit my patients. And it's the same theme with fiber. If one doesn't work, that doesn't mean another product won't work. We also have some papers on synbiotics showing they may work in certain patients with acute gastroenteritis, so sometimes we are left to rely on trial and error.

Dr. Whittemore: When we consider what strains of microbes we should be selecting, human data overall show that multistain products are more efficacious

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CFU = colony-forming unit

than single-strain options.[2] Multistrain products impact different parts of the microbiome, and they work together to alter the metabolome rather than trying to have 1 strain do it all. There are no head-to-head studies directly comparing multistrain with single-strain products for different indications in dogs and cats. That said, if we look at the data for acute self-limiting gastroenteritis and the data for antibiotic-associated GI signs, clinically and statistically significant results have been correlated with multistrain products with higher CFUs in both of those areas, with single-strain, low-potency commercial products not having the same demonstrated efficacy. There are still a lot of questions regarding which particular strains, combinations of strains, and growth conditions are most efficacious. There is some moderately strong data in humans showing the benefits of *Saccharomyces* spp yeast as well as single-strain *Lactobacillus* spp probiotics, but most of the data lean toward multistrain being an overall best option.

Dr. Harris: What clinical insights can you share for the products you use in clinic? Do you have experience with using the Nutramax Laboratories Proviable products in your patients?

Dr. Torres-Henderson: The newer Proviable Fiber Supplement has been an exciting new option. My entire hospital has really taken to using it, and it really helps in a broad range of patients. I love that it's a mix of soluble and insoluble fiber. It contains fermentable fiber, but I have not noticed excess gas production being a problem. And I love that most dogs and cats will eat it, which is a major plus. Its palatability has been especially helpful. So we use that one quite a bit. I really like using the Proviable-Forte Kit with paste as well, and I encourage our urgent care to consider using it in cases of acute noninfectious diarrhea.

Dr. Whittemore: I love how helpful Proviable Fiber Supplement can be in my patients on liquid diets. They often get scalding diarrhea, but using Proviable Fiber can really help with that. It suspends well for administration through a nasogastric tube, limiting the risk for clogging. I've also had good experience with Proviable-Forte. Although the paste is flavored, it's a synthetic flavor, so I don't have to worry about triggering food-sensitive patients. I have a strong personal opinion that metronidazole should be a controlled drug. Given the positive results I've experienced with Proviable-Forte in my clinic, our ER department has entirely stopped using antibiotics for self-limiting gastroenteritis. Instead, they reach for the Proviable-Forte Kit.

Dr. Jablonski: I've used Proviable-Forte for a long time as an unflavored probiotic option in certain clinical scenarios and have been happy with it.

Dr. Chow: A lot of primary vets in my area use Proviable-Forte, and I've seen good results with it for both acute and certain chronic enteropathy patients. I love Proviable Fiber Supplement. I've not had the experience of putting it through a nasogastric tube, but I'm looking forward to needing it, because up until now, the way I got around it was by putting psyllium in gel caps and administering it to hospitalized patients if they developed diarrhea. That has also been my get-around for outpatients that won't eat it in the food.

Dr. Torres-Henderson: The Proviable-Forte capsules have been great, even for patients that are difficult to administer medication to. I love that I can sprinkle it onto a little piece of bread, roll it into a ball, and the patient will often gobble it right up. So it's a nice, palatable option, avoiding potential triggers for patients.

Dr. Harris: For what cases are you selecting these products? When do you reach for probiotics, prebiotics, postbiotics, or synbiotics?

Dr. Jablonski: One clinical scenario is a dog with chronic diarrhea that has had some improvement in response to an antibiotic trial. Cases like that suggest the patient has responded well to microbiota modulation, but we generally prefer to support microbial health with alternatives to antibiotics. When patients have that history, it will often prompt me to try psyllium, Proviable Fiber Supplement, or a multistrain probiotic instead. It's quite common for dogs that were initially responsive to antibiotics to have their clinical signs return after the antibiotic is stopped, or

Selection Considerations for Probiotics[a]

- Scientific data to support efficacy
- Inclusion of prebiotics
- Type of microorganism(s)
- Presence of multiple bacterial strains with high colony-forming units
- Trusted manufacturer with rigorous quality evaluations
- Ease of administration for clients
- Lack of additional flavorings
- Cost

[a]These considerations were developed with the help of roundtable expert Jacqueline Whittemore, DVM, PhD, DACVIM (SAIM).

sometimes their signs will return while they are still taking the antibiotic. If the patient is still on the antibiotic, I'll often start prebiotics or probiotics as we transition them off the antibiotic.

Dr. Chow: It's taken me years to convince my emergency department to stop using metronidazole for acute gastroenteritis. Acute gastroenteritis often resolves within a week, regardless of what you do, and fiber enrichment may help accelerate that improvement. Traditionally, we've used a lot of psyllium, but Proviable Fiber has been a great option for fiber supplementation. When I'm considering how to proceed in chronic enteropathy patients, it comes down to diet history, supplement history, and response to anything that has been previously trialed. I very much try to do one thing at a time so I can ascertain what works and what doesn't. I've also found that a lot of antibiotic-responsive diarrhea patients also tend to be fiber-responsive, and a lot of the large-bowel ones tend to be very fiber-responsive. Because of the good clinical responses I've seen to fiber, that may sway me to recommend fiber first. Probiotics are always an option, especially if they've never been used in that patient or if the patient has been given a product that has reasons to doubt its quality. In those cases, I may try a multistrain product that has been proven to be potent, but it's very much trial and error—trying one thing at a time and seeing what works. For some patients, depending on their diet history, I may prioritize a diet trial and, for example, alter fat or fiber content or protein sources as a first step. Particularly for a lot of my chronic enteropathy patients that may have a significant history of dermatologic disease, the protein source could be important. It's very individualized, but that is my general approach.

Dr. Whittemore: If I have a patient that has developed signs of chronic enteropathy and I don't see evidence of antibiotic exposure in the patient history, I tend to start with diet change, because studies have shown ≤88% of patients can be responsive to a diet change or fiber or a diet change plus fiber.[3] One of the first studies I did with probiotics was a blinded, crossover study in cats, with the cats serving as their own control.[4] We had 8 cats per group, and the cats received either clindamycin or clindamycin and Proviable-Forte. After a 6-week washout period, they flipped to the opposite treatment protocol. When I looked at the data, what really surprised me was that 6 of the 8 cats that had initially been in the antibiotic-only group had chronic enteropathy at the conclusion of the 6-week washout period. These cats had either persistently increased fecal scores or a marked jump in the amount of calories required in order to maintain the same body weight. Seeing firsthand how dysregulating antibiotic exposure is really changed how I look at cases. If I determine from the patient history that clinical signs started after antibiotics, then I will go with probiotics before diet change. I had a compelling case of a dog that developed protein-losing enteropathy from antibiotics given for bladder stones. Through the use of probiotics, we were able to put the dog into remission. So, again, patient history can help determine whether a diet or probiotic should be chosen as an initial intervention.

Dr. Torres-Henderson: I had a similar study comparing cats given antibiotics plus placebo with cats given antibiotics plus a probiotic. We didn't crossover, but all the cats developed some GI signs with the antibiotics. It really changed my perspective on using antibiotics in cats. I *knew* they developed GI signs, but when you're seeing it firsthand, it really has an impact. Even though the fecal scores were abnormal, we had 3 or 4 cats in the placebo group that had a fecal score of 7. We didn't have any cats in the probiotic group with that severity, and I realized that makes a difference clinically and comfort-wise in those patients. We collected fecal samples for a couple months after study completion and saw that these cats' microbiomes did not return to baseline for several weeks or even months following administration of antibiotics. Going into this study, I think I underestimated the impact of antibiotics. This study took place a while ago, but it really did change how I practice medicine. It cemented for me the value of probiotics when antibiotics are being administered. That being said, for patients with chronic enteropathy, I will often start by doing a fiber trial, but I have a biased population in that my patients are often on a home-prepared diet. One thing that's often unique about home-prepared diets as compared with commercial diets is that they are often very low in fiber, so we are often starting with fiber as our first step. When patients come to us, they're also usually on a variety of things, and that makes it hard to know what's working and what's not. So I am a fan of simplifying and minimizing variables, because then I can add one thing at a time.

Dr. Whittemore: I'll be interested to see your follow-up data on the microbiome findings, because the cats' microbiomes and fecal metabolites in our study got more and more deranged.[5] Even >600 days after antibiotics, they were moving further from health. You can mitigate it somewhat, but you can't undo antibiotic effects on the gut.

Dr. Jablonski: Several studies have shown dysbiosis is associated with acute diarrhea in dogs, and as Dr. Chow mentioned, there's a study that showed that nutritional management or nutritional management plus psyllium as a prebiotic led to faster times to clinical remission as compared with nutritional management plus metronidazole in acute diarrhea cases.[6] So, because prebiotics can be helpful in dogs with acute diarrhea, we also

use them in dogs with chronic disease that have been stable but are having an acute flare. We will use a pre- or probiotic to help get them through that flare, especially if it's accompanied by large-bowel signs, because, oftentimes, we prefer not to change their diet in a flare setting like that if they've been stable on a given diet.

Dr. Whittemore: It's interesting how times have changed. I actually did my first probiotic study to get veterinarians to stop using yogurt. I wanted to prove probiotics didn't do anything so owners would stop harassing their cats. Not only did I find the exact opposite, disproving my own bias, but, like Dr. Torres-Henderson, I was shocked at how sick antibiotics made the cats. It made me really reflect about how often trainees and students—and even myself—would perceive owners as being difficult when they were non-compliant with antibiotic administration because they said it made their pet sick. When you see how sick you can make a healthy animal with an antibiotic, it really makes you step back and have a different viewpoint.

Dr. Torres-Henderson: That's the key, though. As veterinarians, there are times when we don't make the right call, whether it's in research or in practice, and the important thing to remember is we're not going to have the perfect management plan every time. The most important thing is to be able to justify why we are doing what we're doing. Then if plan A doesn't work, we need to come up with a rationale for what plan B is going to be. I think that's the gift of being a veterinarian—learning to sit with the idea that our treatment plans won't always be perfect. Treating these patients is hard, and we strive for perfection and we never want to make a mistake, but we know that's not possible. So how do we comfort ourselves when we maybe made the wrong call? We have to know that we made this call for these reasons, and we have to know that it was the best option with the information we had at the time. So, in this example in which we talk about how we think differently about our antibiotic use these days, we honor the patients of the past by shifting our recommendations as we learn more and gain a deeper understanding of how these disease states work.

Dr. Harris: What's the future of modulating the microbiome beyond pro-, pre-, and postbiotics?

Dr. Chow: Fecal microbiota transplantation (FMT) is being looked at more, with most of our information coming from human medicine, but we've definitely seen positive results associated with the use of FMT in certain conditions. I usually use FMT in chronic enteropathy patients when other more conventional therapies such as diet, probiotics, and immunomodulation may not have worked. Although it's considered more of an adjunct therapy rather than a primary therapy in these chronic patients, I've used it as the primary therapy in cases that are very clearly antibiotic-induced dysbiosis. In these particular cases, I've seen just 1 to 2 FMT treatments lead to significant improvement or even sustained resolution. There are different ways to perform FMT, but we don't really know what the best approach is yet. We are still very much in the early stages of understanding FMT uses, but we do have a growing number of FMT studies in veterinary medicine that are very encouraging and published clinical guidelines for FMT.

Dr. Whittemore: One challenge is that the FMT donor greatly affects the outcome. That makes it tricky to compare studies or achieve consistent results, because each donor can have different impacts on the patient. That's why I suspect postbiotics and tailored prebiotics may become more valuable in veterinary medicine down the road, but it's too early to know.

Dr. Harris: How realistic is it to envision a future in which microbiome science allows us to screen patients and prevent disease, rather than simply reacting and treating?

Dr. Jablonski: One thing about GI disease that we've alluded to is that the etiology is likely multifactorial. For some conditions, there may be a genetic basis to the disease. With the recent advances in genomics technology, the hope would be that we may be able to identify some causative genetic variants for certain conditions and perhaps be able to prevent disease or identify at-risk patients. Additionally, if we can find early biomarkers of disease, perhaps we can intervene earlier and delay or lessen the development of disease.

Probiotic Applications[a]

- Self-limiting gastroenteritis
- Infectious gastroenteritis
- Antibiotic-associated GI signs
- Non-food–responsive chronic enteropathy
- Chemotherapy-induced adverse GI signs
- Dietary changes or indiscretion
- Stress gastroenteritis secondary to environmental changes
- Chronic kidney disease

[a]These applications were developed with the help of roundtable expert Jacqueline Whittemore, DVM, PhD, DACVIM (SAIM).

FMT = fecal microbiota transplantation

Dr. Torres-Henderson: I hope we continue to make strides in the area of prevention and develop a better understanding of what strategies can be used to keep our patients from going down the trajectory of chronic GI disease. A lot of that starts with the general practitioner. Whenever possible, I avoid the use of antibiotics for diarrhea, as this can disrupt the microbiome. Additionally, monitoring for signs such as pica or grass eating may indicate the need for a dietary change. Starting a highly digestible, limited-ingredient, or hydrolyzed therapeutic diet early, even in young dogs and cats, may help alter their trajectory and reduce the risk for chronic dysbiosis later in life. An important takeaway is to realize there's a lot of power in those early years.

Dr. Chow: It would be great if, someday, we could have screening tools to figure out what disease processes a patient may be predisposed to and potentially be facing in 5 to 10 years. But I agree; a thorough history can potentially be our first screening tool. I can't count how many times a patient has been presented for something unrelated to the GI tract, but once I start digging into their history, it becomes clear there actually may be GI issues. It comes down to probing, asking questions, and taking a detailed history.

Dr. Torres-Henderson: AI can be a resource for us, and having history forms that can be filled out before they come to us or while they're in the waiting room can be so helpful in getting that information up front and informing the practitioner ahead of time. That way they can have a strategic conversation in that 15-minute appointment, even if it's just saying, "Hey, I want to highlight some things that were brought up in this history form. We'd like to set a follow-up appointment to look at some of these things," then maybe scheduling that patient for an extended appointment where you can discuss the concerns in depth and focus on client education. But it's also about how to use your tools so they can best work for you; for example, what about leveraging the other team members? Technicians and CSRs can be a part of this process, too, which can help with their own job satisfaction when they can add that value to the team. It doesn't always have to be the veterinarian having these conversations, so I think those team members can be another resource.

Dr. Whittemore: I agree. Assistants and technicians can catch clinical signs like grass eating and motion sickness and highlight them for the veterinarian. I see motion sickness preceding the development of other more classic GI signs in patient histories all the time. The other big flag is a history of a finicky appetite, when the client says, "He gets bored with his food." That's an immediate trigger for me to talk more about the pet's gut health. It doesn't take much to catch those things on a patient history. We need to be careful not to blow them off just because the owners present it as just part of their personality. A lot of the time they don't realize it's a manifestation of illness. ●

Key Takeaways

- Dysbiosis, an imbalance in the gut microbiota, can be triggered by a variety of factors, including diet, medications, and disease processes, and may have a wide range of clinical impacts.
- Strategic use of prebiotics, probiotics, and other microbiome-modulating tools such as fiber offers a promising way to support gut health and improve patient outcomes.
- When implementing microbiome-modulating strategies, introducing one change at a time should be considered to allow for better assessment of effects.
- Responses to interventions can vary widely among patients, underscoring the need for individualized approaches.
- Selecting microbiome-modulating products with demonstrated quality and formulation transparency, such as Proviable-Forte and Proviable Fiber, can help ensure consistency in patient care.

References

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