# Clinical Considerations for Managing Chronic Enteropathy Patients: Why Improving GI Microbiome Health Matters

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## Q The intestinal microbiome is a complex ecosystem. What comprises a healthy microbiome versus an unhealthy one?

A I like to describe the composition of the healthy intestinal microbiome as a "good party" and dysbiosis as a "bad party" that takes place in the gut. Consider the following characteristics of each:

| Healthy microbiome (the "good party") | Dysbiosis (the "bad party") |
|---|---|
| Diverse "guests" (bacterial taxa) that buffer harmful bacteria | Less buffering against unwelcome "guests" (harmful bacteria) |
| Plenty of food for colonocytes in the form of short-chain fatty acids (SCFAs) produced by beneficial bacteria | No beneficial microbes producing SCFAs to feed colonocytes |
| Good, anti-inflammatory atmosphere rich in SCFAs, indole and secondary bile acids | Toxic, pro-inflammatory atmosphere due to the lack of beneficial microbes |
| No leakage thanks to protective SCFAs and indole | Intestinal leakage into the bloodstream |
| Healthy motility | Accelerated motility due to increased numbers of primary bile acids |
| Controlled proliferation of less-beneficial microbes | Proliferation of E. coli, Clostridium perfringens and Clostridium difficile |

## Q Culture and sensitivity testing of faecal samples is commonly conducted with chronic enteropathy (CE) patients to determine which antibiotic will eliminate the suspected pathogen. What is problematic about this approach?

A Veterinarians gain limited information from conventional faecal cultures. Because strict anaerobes cannot be detected using standard cultivation methods, only around 5% of the bacterial species in the faecal microbiome can be identified. A recent study compared faecal culture results from healthy dogs versus from dogs with chronic diarrhoea at three different commercial laboratories. The cultures failed to distinguish between diseased and healthy dogs and two of the three labs reported an abnormal faecal microbiome in more healthy dogs than dogs with chronic diarrhoea.[1]

## Q Given the role of dysbiosis in dogs with CE, which tools can positively affect the intestinal microbiome?

A Studies have been conducted to evaluate various tools and their value in managing canine patients with CE.

- **Diet:** In a study of dogs with food-responsive enteropathy (FRE), feeding a diet without animal protein resulted in a partial recovery of the faecal microbiota.[2]
- **Anti-inflammatory medication:** A study conducted on dogs with steroid-responsive enteropathy showed that steroid therapy eliminated clinical signs of disease after 8 weeks; however, normalisation of the faecal microbiome and metabolome was not noted until one year after treatment.[3]
- **Probiotics**: There has been some evidence that probiotics can reduce inflammation and foster the growth of beneficial bacteria such as *faecalibacterium*;[4] however, such results are probiotic-dependent and should not be generalised.
- **Prebiotics:** While most studies have been conducted in healthy animals, there is evidence that prebiotic fibres can improve stool quality and microbiome diversity.[5]
- **Faecal microbiota transplantation (FMT):** In one study, dogs with inflammatory bowel disease had a lower proportion of *Fusobacterium* (a beneficial bacterium that produces butyric acid, an SCFA) versus healthy dogs; however, this was altered with a single FMT.[6]
- **Antibiotics:** Antibiotics are not a good way to positively affect the microbiome. Broad-spectrum antibiotics such as metronidazole can create dysbiosis even in healthy dogs.[7] While dogs with CE may initially respond to both antibiotic and immunosuppressant (e.g., steroid) therapy,[8] a high percentage are likely to relapse within weeks when given antibiotics.[9]

## Q Are there other reasons that use of broad-spectrum antibiotics should be reconsidered in CE patients?

A Decisions to use antibiotics in companion animals are not without consequence. A recent study in Portugal looked at 20 households with humans, dogs and cats—all healthy. In 50% of the households, human/animal sharing of at least one gene for antimicrobial resistance (AMR) was documented.[10] A common belief is that tylosin is not used in humans and thus is safe for use in dogs; however, its administration is associated with AMR to erythromycin—a drug that is important to people.[11]

Antibiotic stewardship is an extremely important issue; as veterinarians, we must be careful about making decisions to use antibiotics in a patient. When we do, we should be aware that the decision could affect the pet's family and advise them accordingly.

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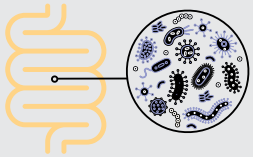
# Exploring the Gut Microbiome and its Role in Your Patients' Health

**The gastrointestinal tract is primarily known as the system responsible for digestion and nutrient absorption. But it also plays a remarkable role in overall health—both for humans and pets.**

## The gut is home to:

70% of the immune cells, protecting the body from harmful (pathogens) or foreign substances (antigens).[1]



A complex microbial ecosystem with trillions of microorganisms, known as the gut microbiome

## How is the Microbiome Linked to Health?

**The microbiome can impact a pet's overall health in many ways:**[2]

- Energy balance
- Metabolism
- Immune response
- Vitamin and mineral synthesis

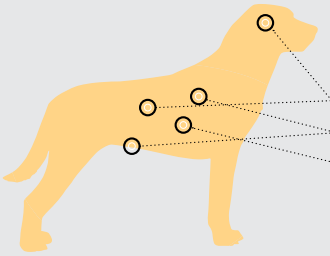
- Endocrine signaling
- Gut function
- Neurobehavioral development through the gut-brain axis

## Why is Microbiome Balance So Important?

Because the microbiota in the gut help support overall health, it is important to maintain a balance between beneficial and potentially pathogenic bacteria. An imbalanced or maladapted microbiota is called dysbiosis.

**What can lead to dysbiosis?**

| | |
|---|---|
| Antibiotics | Illness |
| Stress | Diet change |
| Age | Weaning |



**Dysbiosis is associated with a variety of health conditions:**[2]

- IBD
- Obesity
- Cardiovascular disease
- Immune-mediated conditions
- Neurodevelopmental conditions

## How Can You Help? Promote Microbiome Balance with Nutrition

### PROBIOTICS

Live microorganisms that, when consumed in adequate amounts, confer a health benefit on the host.[3]

Probiotics are strain-specific and dose-dependent, meaning that different strains have different effects and they must be given in specific amounts.

### PREBIOTICS

Soluble fibers that are selectively fermented by beneficial bacteria, resulting in increased microbial diversity and the production of short-chain fatty acids that nourish colonocytes.[4]

Products that contain both prebiotics and probiotics are called synbiotics.

### COLOSTRUM

Contains bioactives and antibodies that initiate a beneficial immune response and help to stabilize intestinal microflora.[5]

Studies show that when fed diets supplemented with bovine colostrum bio-actives, both kittens[6] and adult dogs[5] have stronger responses to vaccinations.

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### Explore the gut microbiome... and beyond

What comprises the gut microbiome? How can the brain influence gut microbiota? What other microbiomes exist beyond the gut? There are many aspects to this topic and the Purina Institute has them covered. Just click on one of 10 areas to take a deeper dive into each. Visit **https://www.purinainstitute.com/microbiome-forum/microbiome-fundamentals** or **scan the QR code to start exploring.**


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