How and why does environmental stress cause diarrhea and other GI upset in veterinary patients?

The gastrointestinal (GI) tract of an animal is a complex ecosystem inhabited by a number of different microorganisms that can directly influence the host's health. These resident microorganisms range from harmless to opportunistically bad “bugs”—bacteria, viruses and other organisms that are engaged in a battle for dominance. When the animal is healthy, the beneficial bacteria protect the gut and outnumber their potentially bad counterparts. When the animal is subjected to stress, the delicate balance between good and bad bacteria can be upset, resulting in dysbiosis.

The microorganisms in the gut are highly sensitive to changes in the intestinal microenvironment. The bacteria, E. coli, for example, is able to sense the presence of epinephrine when the body is stressed, and responds by becoming stronger and more virulent. Other stress-related changes in the chemical environment of the intestine also can cause certain bacteria to proliferate and others to decline.

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If you think of the microbiome as a teeter-totter, there’s a tipping point at which the opportunistically bad bacteria overpower the good bacteria. The host’s defenses are weakened, and stress-associated dysbiosis occurs. When bad bacteria proliferate and interact with the cells lining the intestine, the animal can develop diarrhea and other signs of GI upset.

Why do some patients develop diarrhea when subjected to stress and others don’t?

While the reasons are not well understood, there are differences in susceptibility to stress-associated dysbiosis between individuals. Age and robustness are likely factors. Young animals whose immune systems are less well-developed and older animals with compromised immunity are more likely than healthy adults to develop diarrhea when undergoing a stressful event, such as spending a week at a multi-animal boarding facility. Temperament and breed are also factors. For example, stress diarrhea is common in military working dogs and high performance sled dogs.

What steps are recommended to avert stress diarrhea? If probiotics are used, should they be fed prior to stress exposure or when symptoms develop?

While there is some evidence that probiotics can have a beneficial effect if given when stress diarrhea symptoms appear, I think that a better effect may be achieved if the probiotic is given 3 to 5 days before the animal is exposed to a stressful stimulus. This gives time for the probiotic bacteria to colonize and to reinforce the gut’s defenses before exposure to the stressor.

It’s also important to remember that there is significant variability in probiotic quality. A study by Weese determined that only two probiotics out of 25 studied actually contained both an acceptable label which properly described its contents and viable bacterial growth that met or exceeded its label claim. Therefore, it’s essential to consider quality control and efficacy when selecting and administering a probiotic to veterinary patients. The evaluation of high-quality probiotics in controlled trials is essential to establish sound recommendations on treatment and prophylaxis.
Both probiotics and prebiotics can influence the composition of the gut microbiome, which is the collective bacteria or microflora in the digestive tract. However, they work in different ways and in different areas.

What probiotics and prebiotics do
Most of the immune cells in the digestive tract are located in the small intestine. Probiotics are live bacteria that can interact with these cells to stimulate immune function. They also replenish good bacteria whose levels may have decreased due to stress, sudden diet change, aging, or other factors in dogs and cats. Probiotics can benefit both the upper and lower digestive tracts.

Prebiotics, meanwhile, are a special type of soluble fiber that feeds, and can help encourage the growth of, beneficial bacteria, which live primarily in the large intestine.

Probiotics proven to help with stress diarrhea management
The beneficial effects of Purina® Pro Plan® Veterinary Diets FortiFlora® Canine and Feline Probiotic Supplements, which contain the probiotic Enterococcus faecium SF68, have been studied in dogs and cats exposed to a number of natural stressors. These include growth (puppies and kittens) and life in an animal shelter, as well as naturally occurring diarrhea in canine athletes. In each of these cases, dogs and cats benefited from being fed SF68.

• Puppies1 and kittens2 had increased fecal levels of the beneficial bacteria Bifidobacteria.
• Shelter cats had fewer episodes of diarrhea lasting two or more days.3
• Shelter dogs with diarrhea had better, faster-improving fecal quality when given SF68 and metronidazole than dogs treated with metronidazole alone.4

Prebiotics, which are live bacteria, replenish good bacteria that have been diminished by stress; and promote natural defenses in the small intestine. Meanwhile, prebiotics feed the growth of beneficial bacteria, which live mostly in the large intestine. Probiotics and prebiotics work synergistically to help bolster overall gut health.

Prebiotics contained in therapeutic and well-pet diets
Prebiotics are included in several Purina® formulas. These include Purina® Pro Plan® Veterinary Diets DCO Dual Fiber Control® Canine Formula and EN Gastroenteric® Canine Dry Formula, which contain the prebiotic aleurone, a prebiotic fiber sourced from wheat bran. Purina® Pro Plan Veterinary Diets EN Gastroenteric® Canine Canned Formula contains the prebiotic inulin, which is derived from the chicory root. Fermentation by the colonic bacteria of prebiotics will generate short-chain fatty acids including butyrate. Butyrate is a short-chain fatty acid that is the preferred fuel of colonocytes and promotes digestive health.

Gut Check:
The World of Probiotics and Prebiotics


Without a doubt, dogs are creatures of habit. Any change in their routine—including the disruption of a kennel stay—can cause anxiety, and anxiety can trigger stress-induced diarrhea. Even calm, emotionally stable dogs can be stressed in a new environment and suffer consequences.

Establish a routine
When dogs arrive at our kennel, we do everything we can to make the transition as smooth and comfortable as possible. Kennels are full of new sights, sounds and smells, making it almost impossible to prevent some degree of anxiety.

Our goal is to quickly establish a new routine with a reliable schedule for feeding and trips outside. Knowing what to expect really helps dogs acclimate to a new environment. And the longer pets stay in our kennel, the better they understand the routine and the more comfortable they are.

Respond to GI issues with probiotics
Stress-induced diarrhea, when it occurs, is usually a short-lived problem at our kennel. Every pet is monitored for signs of abnormal stool, and all dogs or cats that show signs of diarrhea or other forms of GI upset receive a daily supplement of Purina® Pro Plan® Veterinary Diets FortiFlora® for the rest of their stay. The viable, non-pathogenic bacteria found in probiotics such as FortiFlora help stabilize microflora imbalance in the gut caused by stress. Clients are welcome to provide their own pet food, but dogs that develop diarrhea are also transitioned to Purina® Pro Plan® Veterinary Diets EN Gastroenteric® Formula because it contains a prebiotic and is highly digestible. If diarrhea persists for more than a couple of days despite treatment with a probiotic and a highly digestible diet, we notify the owners and seek permission for a veterinary examination to rule out more serious causes.

Avoid problems with repeat offenders
Some pets that have boarded at our facility multiple times have a history of developing stress diarrhea. In these cases, we recommend the owners administer FortiFlora a few days prior to their pet's stay and continue until they go home. Taking a proactive approach can prevent GI upset from occurring.

Monitoring for Signs of Abnormal Stool

The kennel staff at Amherst Animal Hospital is trained to monitor each pet’s stool for any inconsistencies or abnormalities. These signs include:

- Changes in frequency of stool
- Changes in volume of stool
- Straining during defecation
- Blood in the stool
- Mucus in the stool
- Loose or watery stool

If signs appear, the attending veterinarian is notified and FortiFlora is administered.

Key Takeaways

- Stress can cause the delicate balance between good and bad bacteria in the gut to be upset, resulting in dysbiosis.
- Probiotics are live bacteria that can interact with immune cells to replenish good bacteria, while prebiotics are a special type of soluble fiber that feed beneficial bacteria and help encourage their growth.
- Feeding a probiotic prophylactically to a pet that is boarding or undergoing another type of stressful event can help prevent GI upset from occurring.
The Difference Is in Our Science.
And in Your Patients.

Promotes a strong immune system

The probiotic in Fortiflora is proven to promote intestinal health & balance

Helps nutritionally manage diarrhea associated with stress, antibiotic therapy and diet change

Fortiflora® is a breakthrough probiotic supplement that helps support digestive health and is proven to promote intestinal health and balance. Each packet contains guaranteed amounts of live cultures, is easy to feed and adds a taste pets love to any meal.

Questions? Contact your Purina Veterinary Sales Consultant (PVSC) or the Purina Veterinary Resource Center at 1-800-222-VETS (83787) 8:00 AM - 4:30 PM CST, MON - FRI.

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