

WHY SO MUCH DARN GI DISEASE?

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Gastrointestinal (GI) disease is common in pet ferrets and is frequently accompanied by weight loss and wasting. Unique anatomy and physiology, including rapid GI transit time and short, simple GI tract makes the ferret predisposed to GI. Ferrets are used as a laboratory model for a number of human disorders involving the GI tract, including gastric and intestinal ulcers, gastric carcinoma, and *Helicobacter* gastritis. Etiologies are many, can be multi-factorial, and can include foreign body-related disease, bacteria, virus, neoplasia, inflammatory conditions, stress, and dietary change. Gastrointestinal disease, in particular diarrhea, can be secondary to the stress of other primary non-GI related diseases. Some practitioners report improvement in some refractory cases with diet modification, which suggests dietary allergen or intolerance. A thorough workup is critical for distinction between etiologies typically producing similar clinical signs and symptoms.

SPECIFIC GI DISEASES IN THE FERRET

It is beyond the scope of these proceedings to describe all causes of GI disease in ferrets in detail. Keep in mind that many cases involve more than one disease process and can be complicated by psychological stress. Therefore, ANY disease process could contribute to diarrhea in the ferret. A few specific disease syndromes are described below:

Inflammatory Bowel Disease

A number of years ago, this syndrome was proposed as a disease etiology in the pet ferret. Since then, a great deal of work has focused on the disease in humans. Proposed risk factors and underlying etiologies are numerous, and include specific bacterial pathogens, including *Helicobacter* sp abnormalities in normal GI flora, food-associated mycotoxins, and a number of epidemiologic factors, including less exposure to soil, helminths, and consumption of highly processed diets. The etiology of inflammatory bowel disease in ferrets is also unknown; and the author was unable to find studies using the ferret as a laboratory model for this disease. Studies in mice are ongoing, and thus far tantalizing but inconclusive.

Helicobacter mustelae

The ferret is a model for human *Helicobacter* gastritis, ulceration, and *Helicobacter*-related gastric neoplasia. The ferret practitioner can take advantage of tremendous amounts of research into diagnosis and treatment of this disease in humans, effectively making the human a model for *Helicobacter* gastritis in ferrets. The prevalence of this disease in pet ferrets in the US is thought to be near 100%. While all ferrets may harbor the organism, apparently only a subsection develops *Helicobacter*-related disease. It is uncertain what factors may trigger *Helicobacter* gastritis, and in severe cases, ulceration and neoplasia. In humans, risk of disease is

linked with poor sanitation, overcrowding, and exposure to other humans with the disease. Development of gastric ulceration secondary to *Helicobacter* may be linked to a number of factors. One paper showed that eradication of *Helicobacter* sp in humans reduced the risk of development of gastric and duodenal ulceration due to administration of nonsteroidal anti-inflammatory drugs (NSAIDs).

Disease in ferrets can feature varying degrees of the following: GI pain, in particular gastric pain, dysphagia and teeth grinding, especially associated with eating, weight loss, anemia, hypoproteinemia, and depression. Some ferrets with *Helicobacter* gastritis present for perceived oral pain. Pain is evident during chewing; in ferrets with *Helicobacter* ulceration, pain is a direct result of food entering the stomach, which the ferret apparently anticipates during chewing. Ferrets with chronic disease related to *Helicobacter* often present with weight loss and anemia. Anemia can be severe, and in some cases, transfusion is indicated. Other ferrets are found dead, or present moribund; these animals often have experienced ulceration and perforation with septic peritonitis. Interestingly, the author has encountered ferrets at abdominal surgery with adhesions involving the gastric pylorus, suggesting earlier perforation and healing.

Many ferrets with disease highly suggestive of *Helicobacter* gastritis also have diarrhea. While enteritis may be a direct result of the organism, it may also be linked to stress.

Stress and GI Disease

The role of stress is not well described in ferrets; however, ample anecdotal reports of stress-related enteritis ranging from slight soft to liquid stool illustrate the importance of careful history in ferrets presenting for diarrhea. The author has had many cases of diarrhea occurring shortly after a stressful event, most commonly addition or loss of a cage mate. In these cases, enteritis resolves spontaneously, often within 2 to 5 days.

Gastroenteritis and Insulinoma

While not directly connected, stress of hypoglycemia could, in theory, produce GI disease. However, a commonly observed syndrome is worsening of insulinoma symptoms in ferrets experiencing GI disease. GI disease can produce malabsorption (most significantly of glucose and protein) and varying degrees of decreased appetite to anorexia, both likely to result in dysregulation of insulinoma. In some cases, the previously well-regulated patient becomes symptom-free once GI disease is resolved. For this reason, ferrets with insulinoma must be evaluated carefully for other concurrent or underlying illness that might complicate regulation.

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