

Ferret Gastric Ulcer / Helicobacter FAQ

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Gastric ulcers and Helicobacter mustelae

Dr. Bruce Williams, DVM, writes in August 1996 (notes in square brackets [] added by Pamela Greene):

This bacterium, first described in 1990, has rapidly become the most important disease-causing agent of the pet ferret. *H. mustelae* has the ability to cause two distinct forms of gastric disease - peptic ulcer disease (presumptive) and chronic atrophic gastritis.

Helicobacter mustelae is extremely widespread in the pet ferret population. Several studies using random source ferrets have shown that almost every ferret carries this bacterium. As the bacterium is passed by a fecal-oral route, kits generally are infected by the mother within the first two weeks of life. [There is some evidence that a stressful event or condition may cause *H. mustelae* to flare up and become a problem, after which removing the stress will not clear up the disease on its own.]

H. mustelae appears to be able to cause two distinct syndromes in the stomach of affected ferrets - chronic atrophic gastritis and peptic ulcer disease. Chronic atrophic gastritis is a common finding in ferrets over four years of age. In these animals, the bacterium causes gastritis via two mechanisms - a) the stimulation of a marked lymphoplasmacytic inflammatory response, resulting in loss of glandular epithelium most prominently in the pylorus, and b) the ability to increase the pH of the stomach. While clinical signs and disease progression may vary markedly between individuals, the progressive damage to the gastric mucosa most commonly results in clinical signs in animals of four years or more.

Additionally, although a definitive cause-and-effect relationship has not yet been conclusively proven between the presence of *Helicobacter mustelae* and gastric ulcers, evidence connecting the two is beginning to mount. Cytotoxins liberated by several species of *Helicobacter* have the ability to directly injure gastric mucosal epithelial cells. Additionally, recent evidence has shown that ferrets infected with *H. mustelae* have elevated levels of plasma gastrin at 30 and 60 minutes following feeding. For these reasons, any treatment of gastric ulcers in ferrets should be combined with concomitant antimicrobial therapy for *Helicobacter mustelae*.

Treatment for gastric helicobacteriosis should be strongly considered in any ferret with vague gastrointestinal signs including inappetance, loose stools, or intermittent vomiting. [Also weight loss, black "tarry" stools, and grinding the teeth. Remember that not all ferrets will show all these symptoms.]

Gross lesions: Endoscopy or gross necropsy is generally unrewarding in cases of chronic atrophic gastritis. Surgical biopsy of the pyloric region of the stomach is highly recommended for definitive diagnosis of *H. mustelae* infection. The gross aspects of gastric ulcers have been previously described (above). *H. mustelae* infection is also the most common cause of mesenteric lymph node enlargement in ferrets, due to the profound inflammatory response which it initiates in the pyloric

stomach.

Microscopic lesions: Silver stains are the stain of choice to demonstrate the presence of the bacteria in the superficial mucus and in extracellular locations within the gastric glands. The pyloric stomach is the preferred biopsy site, although low numbers of bacilli may also be seen in the fundus and duodenum in severely infected animals. In affected animals, varying degrees of lymphoplasmacytic gastritis and loss of gastric glands may be seen, with the most severe damage occurring in the pylorus.

Additional references:

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2. Fox JG et al. Gastric colonization of the ferret with Helicobacter species: Natural and experimental infections. Rev Infect Dis 13(suppl 8): S671-680, 1991.
3. Fox JG et al. Role of gastric pH in isolation of Helicobacter mustelae from the feces of ferrets. Gastroenterology 104:86-92, 1993.
4. Gottfried MR et al. Helicobacter pylori-like microorganisms and chronic active gastritis in ferrets. Am J Gastroenterol 85:813-818, 1990.
5. Otto G et al. Eradication of Helicobacter mustelae from the ferret stomach: an animal model of Helicobacter pylori chemotherapy. Antimicrob Agents Chemother 34:1232-1236, 1990.
6. Perkins SE; Fox JG; Walsh JH. Helicobacter mustelae-associated hypergastrinemia in ferrets (Mustela putorius furo). Am J Vet Res 1996 Feb; 57(2):147-50"

Bruce Williams, DVM, DACVP

[Dr. Williams is available to help with diagnoses and answer questions.](#)

Treatment

Dr. Bruce Williams, DVM, writes in August 1996:

There are numerous treatments for H. mustelae in ferrets, most of which have been derived from the treatment of H. pylori, a common bacterium in man, which has been definitively linked to the development of gastric ulcers in man.

The most commonly accepted treatment is a combination of Amoxicillin at 10-20 mg/lb twice daily [or 20 mg/lb for 5 days, then 10 mg/lb for the rest of the time -- from another article by Dr. Williams], metronidazole (Flagyl) at 30 mg/kg once daily, and Pepto-Bismol (1/15th of a tablet [or .5 to .75 cc of the liquid] once daily [or up to every 6 hours -- from another article]). This "triple therapy" has been shown to be effective in man, and to a large part effective in ferrets, but must be continued for 4-6 weeks. Unfortunately, ferrets CAN'T STAND the taste of either Flagyl or Pepto-Bismol, and client compliance with therapy is often a problem.

[A compounding pharmacist can prepare the medication in Flagyl (metronidazole) or Pepto Bismol in a different suspension to minimize or mask the taste. Call 1-800-331-2498 to locate the nearest compounding pharmacist.]

A recently published protocol for treating ferrets is a combination of chlorythromycin (Biaxin) at 50 mg/kg once daily, and Amoxicillin at 35 mg/kg once daily, or 20 mg/kg twice daily. This therapy is only continued for two weeks, and supposedly has great efficacy and causes minimal resistance in the organisms.

Other antibiotics, such as chloramphenicol, Baytril, gentamicin, or sulfa drugs such as DiTrim are of

no use in this condition.

Finally, it has been asked whether all ferrets in a household need to be treated. Because Helicobacter is shed in the feces of infected animals, it is very easy for cleared animals to become reinfected. In large facilities, treating all animals, especially with Biaxin is cost prohibitive. In most cases, temporary respite from the ravages of Helicobacter can result in marked clinical improvement in most animals. While you may clear some animals, the majority are often reinfected, or simply maintain the infection at a low level. My recommendations would be to treat only the animals showing clinical signs.

A bit of exciting news - I am currently working with a company who is developing a blood test for Helicobacter mustelae and plans to make it both commercially available and economical. Shortly, you will be able to diagnose Helicobacter infection from a blood sample rather than an invasive biopsy of the stomach. We are hoping to have it available within a few months. More later on this....

Bruce Williams, DVM, DACVP

[Dr. Williams is available to help with diagnoses and answer questions.](#)

Signs and treatment

Dr. Mike Dutton, DVM, writes:

Black, tarry stools equals stomach/duodenum ulcers. Most common cause of stomach ulcers is Helicobacter bacteria infection. Treatment for Helicobacter is:

- 1) Amoxicillin antibiotics - 2 to 4 times daily.
 - 2) Pepto Bismol - 1 ml 4 times daily
 - 3) force feed - pedialyte is not enough. It is like drinking Gatorade. You will lose weight. Use Duck Soup, or a/d (available at the vet's), or pureed ferret kibble. Aim for 6 to 12 milliliter (1 ml = 1 cc) every 3-4 hours.
 - 4) since ulcers - use sucralfate 4 times daily
 - 5) a recent trial study showed that Biaxin (brand name) in conjunction with Amoxicillin more quickly clears the infection.
 - 6) keep warm - rectal temperature should be around 102 degrees F.
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And now...

Next: [none]

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Last modified: 27 Feb 1998. [Comments and suggestions are welcome!](#)

[I am not a ferret expert and cannot guarantee the accuracy of this information.](#)