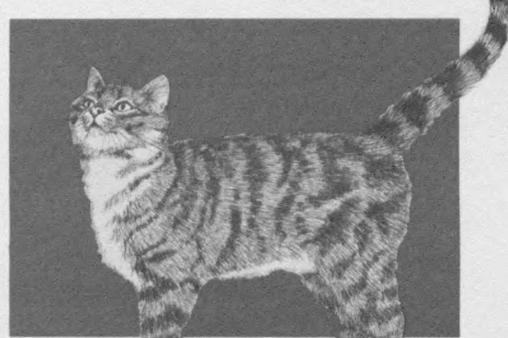

Perspectives On Cats

*A Newsletter for Cat Fanciers
From The Cornell Feline Health Center*

Winter 1985



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Feline Respiratory Disease

Edward Dubovi, Ph.D.

Feline herpesvirus-1 (FHV-1) and feline calicivirus (FCV) causes the majority of feline upper respiratory infections. Although, displaying similar symptoms, they do differ. These differences are related to the nature of the viruses and their interaction with the immune system.

Stress can negatively effect an animal's immune system, thereby making the animal susceptible to various diseases. This is particularly true with FHV-1 and FCV infections. Studies have demonstrated that FHV-1 (the virus that causes feline rhinotracheitis) becomes activated and readily replicates when a cat is environmentally stressed. Also, FHV-1 and FCV have evolved to take advantage of the mucosal (cells which line the nose, throat, and mouth) immune system's limitations. For unknown reasons, the mucosal system cannot maintain an extended protective barrier against viral infection as compared to the systemic immune system. However, if the cat was previously infected with the virus, the immune system responds immediately to limit the extent of the infection.

Feline Herpesvirus-1

FHV-1 is a classical herpesvirus which is restricted to the feline species. The virus has worldwide distribution with a high rate of infection in cats. Although there are several strains of the virus, they are very closely related. Therefore, a vaccine derived from one strain generally protects against all strains.

A susceptible cat contracts the FHV-1 virus from a chronic virus carrier cat that trans-

mits the virus into the nose, mouth, or eyes of the susceptible cat. Incubation time, before symptoms appear, is about 4 to 6 days. Early symptoms of the infection are depression, frequent sneezing, a clear nasal and ocular discharge, fever, and loss of appetite. Conjunctivitis, difficulty in breathing, hypersalivation, and coughing may develop as the disease progresses. Superficial ulcerations of the cornea occurs in some cats. Usually most symptoms will resolve in 10-20 days in an uncomplicated infection. However, a secondary bacterial infection can extend the illness.

During the infection, the cat develops antibody directed specifically against FHV-1. These antibodies will somewhat protect the animal from reinfection for the next few months. However, the mucosal immune barrier of the nose, throat, and mouth diminishes, and the cat may become reinfected with the virus. Generally the reinfection will be less intense, even to the point of exhibiting

Inside this issue ...

Feline Respiratory Disease	page 1
Become a Member	page 4
Holiday Hazards	page 4
What's the Fuss Over FUS?	page 5
1985 Christmas Wishlist	page 7
Honor Roll	page 8

no symptoms. This reduction in the severity of disease usually occurs following the infection of vaccinated cats. The goal of preventing serious FHV-1 induced disease can be achieved with vaccination, but complete protection is not a realistic expectation for currently marketed vaccines. In fact, a vaccinated cat can be a chronic carrier of the virus and be the source of a respiratory disease outbreak in a cattery.

FHV-1 has a short lifespan (about 24 hours) in the environment. Most detergents and alcohol will readily destroy the virus. If infected animals are kept at least 4 feet from susceptible cats, the infection will not spread provided that the infected cat secretions and cage materials are not transferred during routine care of the animals. With proper management, it would appear that the cycle of FHV-1 infections in a cattery can be broken and the virus eliminated.

However, the virus is able to establish a latent (dormant) state in the infected animal. Evidence suggests that once a cat is infected with FHV-1, the cat can carry the virus in its nose and throat for the rest of its life. Under natural conditions, such as pregnancy, transportation, boarding, and the introduction of new animals, which stress cats, the virus can become activated from the latent state. The mechanism by which the virus is activated is not known, but evidence suggest that the animal's balance of hormones is involved. Consequently, almost anything that changes the cat's routine can produce stress and activate the virus. Therefore, steps should be taken to minimize stresses and the contact of the stressed animal with others in its environment. For example, cats that have been shown should be isolated for several weeks following their return home.

Feline Calicivirus

FCV is equally successful as is FHV-1 in maintaining itself in the feline population, even though, it is a different type of virus. After exposure to the virus, it usually takes 3-5 days before symptoms develop. Symptoms can vary widely, depending on severity of the infection. Typically, the animal will show an

initial fever, loss of appetite, and reduced activity, followed by a clear discharge from the nose and eyes, sneezing, and conjunctivitis. Various sized ulcerations may appear in the mouth, with the most common site being the tip of the tongue. With more severe infections, the animal may develop difficulty in breathing and pneumonia. In uncomplicated cases, recovery is usually complete in 5-10 days.

In most cases, the cat will develop an immunity to FCV, and the virus is eliminated from the cat. However, the virus can remain in some cats, and these cats may shed the virus for years. Unlike FHV-1, the shedding of FCV is continuous and does not seem to depend on stress for reactivation. The reason for the persistence of the virus is not known, somehow it is able to evade the cat's mucosal immune system.

Cats need to be near each other to contract the virus. FCV is much more resistant to environmental changes, detergents, and

Perspectives On Cats

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The ultimate purpose of the Cornell Feline Health Center is to improve the health of cats everywhere, by developing methods to prevent or cure feline diseases, and by providing continuing education to veterinarians and cat owners. All contributions are tax-deductible.

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alcohol than FHV-1, consequently it can survive up to 10 days in the environment. A chronically infected cat can cause serious problems in a cattery. Dilute chlorine bleach solution (4 ounces of bleach to 1 gallon of water) will readily destroy the virus on contaminated surfaces.

Other Potential Respiratory Pathogens

Before the discovery of FCV and FHV-1, much of the respiratory disease in cats was thought to be a chlamydial infection, known as feline pneumonitis. The causative agent of feline pneumonitis is *Chlamydia psittaci* which is a different species than the common chlamydial agent of human infection. In cats, conjunctivitis seems to be the most consistent symptom of chlamydial infections, although other mild upper respiratory symptoms may be seen. Severe lower respiratory disease is rarely seen. Reoviruses, coronaviruses, mycoplasmas and bacteria appear to play a minor role in feline respiratory disease. However, bacteria does cause serious infections secondarily to FHV-1 and FCV infections.

Treatment

Usually infected cats are treated by veterinarians as outpatients. Recovery is more rapid with home care because the cat is not psychologically or physically stressed by an unfamiliar environment. Regardless of where the cat is treated, it should be kept in clean, warm, well-ventilated and lighted quarters, and a variety of foods should be offered to encourage the cat to eat.

Although there is no specific medication for FHV-1 or FCV infections, broad-spectrum antibiotics are usually given to control possible secondary infections, particularly mycoplasma and chlamydial infections. During the early stages of the disease, antihistamines may help decrease serous nasal secretions. Improvement should occur within 24-48 hours if antihistamines are to be beneficial. Corticosteroids may also aid in relieving nasal or conjunctival congestion, and may stimulate the appetite. However, they will lower the cat's resistance to infection and are usually given concurrently with antibio-

tics. A mild decongestant is administered if nasal discharges are excessive. Vaporization with steam may also provide respiratory relief for cats with excessive nasal discharges. The congested cat will breathe easier if nasal discharges are removed frequently.

The eyelids should be cleaned of any ocular discharges. An ophthalmic ointment or drops may be prescribed to prevent possible eye damage associated with the infections.

If the cat doesn't respond to treatment, then the presence of an immunosuppressive disease, such as feline leukemia or feline infectious peritonitis, becomes suspect. Appropriate diagnostic tests can confirm or rule out these diseases as possibilities.

Prevention

You can control the possibility of upper respiratory infections by following good management practices. Litter boxes should be scrupulously cleaned and disinfected with a dilute solution of chlorine bleach. Separate food and water dishes for each cat in the household will help prevent the spread of disease due to ocular or nasal secretions from an infected cat. Also, avoid stressing your cat, which can lower its resistance to disease.

Vaccination for FHV-1 and FCV will protect a cat from serious clinical disease, but will not protect it from reinfection. However, vaccines used in combination with good management can significantly reduce the incidence of serious respiratory infection due to FHV-1 and FCV.

Vaccines for FHV-1 are available in combination with FCV or as a triple vaccine (feline panleukopenia - feline herpesvirus - feline calicivirus). The duration of immunity produced by vaccination is not known. Therefore, revaccination at yearly intervals is recommended, and to provide maximum protection revaccination every 6 months is suggested. However, cats should not be vaccinated when pregnant. If you place your cat in a high-risk situation (eg. boarding), be sure that your cat is current on its FHV-1 and FCV vaccinations.

(continued on page 6)

Become a Member of the Cornell Feline Health Center

Here's the opportunity you've been waiting for -- to become a member of the Cornell Feline Health Center. This is the first time we have ever offered such an opportunity.

Your membership dues will directly support the Cornell Feline Health Center's vital work on developing methods of prevention or cures for fatal feline diseases and in disseminating information on feline health. You can now take an active role on the behalf of all cats.

Other benefits of being a member include:

★ Certificate of membership

This handsome certificate will indicate to all your friends and business associates your support for feline health.

★ Newsletter

The quarterly newsletter, *Perspectives on Cats*, will provide you with the most current

news on feline health, as well as activities of the Cornell Feline Health Center.

★ CFHC logo decal

Whether traveling to the pet store to pick up supplies or to the next cat show, this decal will let others know that you are a member of an organization that is dedicated to the health and preservation of all cats.

★ ★ ★

Membership dues are only \$15 per year. Truly a bargain, considering the positive impact your membership will have on the well-being of all cats.

Now's the best time to become a member. Also, memberships make great gifts for cat-loving friends and relatives. The attached envelope has been provided for mailing in your membership. (*Membership dues are tax-deductible.*)

Holiday Hazards

'Tis the season when holiday decorations abound, providing dangerous temptations to the inquisitive cat. Bright, shiny ornaments, tinsel, ribbons and bows are just some of the items which a cat may accidentally ingest while playing. Usually most of these items pass through the digestive tract without any complications, but occasionally intestinal blockage, perforation of the intestine, gastritis, or constipation can occur.

Vomiting, dehydration, swelling of the abdomen, and the absence of gas or bowel movements are danger signals indicating that your cat may have an obstructed intestine. Intestinal blockage can lead to death if treatment is delayed. In severe cases, where the blood supply is cut off to the bowel, immediate surgery is required to remove the strangulated bowel segment.



Although ribbons and tinsel seem relatively harmless, they can perforate the bowel. Trying to remove the string by pulling on it can create enough tension to cut or saw through the bowel. Safe removal of string or ribbon can be accomplished only by surgery.

Make the holidays safe for your cat by keeping decorations out of your cat's reach. You can also minimize your cat's temptation for decorations by providing a safe form of distraction (eg. catnip).

What's the Fuss Over FUS?

Feline urologic syndrome (FUS) is a synonym for a wide-range of problems (eg. inflamed bladder or urethra, urinary calculi, urethral obstruction) associated with the lower urinary tract of the male or female cat. Each problem can result from different causes. Therefore, it is not unusual if treatments and methods of prevention vary. Previously, it was reported that up to 10% of the feline population may be afflicted with FUS. However, Ralston Purina Company reports in a recent survey of 10,913 household cats an incidence rate of about 1% for diagnosed cases of FUS. Although the incidence rate may seem insignificant, the consequences of FUS can be deadly if urethral obstruction occurs.

Urolithiasis

Urolithiasis is the formation of urinary stones (uroliths or calculi) from less soluble substances in urine as a result of multiple congenital and/or acquired disorders. Urolith formation has two developmental phases: initiation and growth. Urolithiasis is not a single disease of FUS but is the consequence of one or more underlying abnormalities of the lower urinary tract that contributes to FUS.

Uroliths are polycrystalline concretions that typically contain greater than 90% organic or inorganic minerals and less than 10% organic matrix. Uroliths are comprised of organized crystal aggregates with a complex internal structure. Cross sections of uroliths frequently reveal a distinct center with laminations of mineral orientated outward from the center, corresponding to the initiation of the urolith as the center and the laminations as the evidence of growth. Uroliths are usually named according to their mineral composition such as calcium oxalate, calcium phosphate, magnesium ammonium phosphate, ammonium urate, uric acid, silica, or cystine; or by their organ location such as nephroliths (*nephros* is the Greek word for kidney), renoliths (*renis* is the Latin word for kidney),

ureteroliths, cystoliths (indicates the presence of stones in the urinary bladder lumen), urethroliths, or urethral plugs.

The majority of uroliths observed in male and female cats have occurred in the urinary bladder; on occasion, however, small uroliths formed in the bladder have passed through, or obstructed, the urethra of the male cat. Renoliths are less common than bladder uroliths in cats; ureteroliths have been rarely encountered. Quantitative analysis of several hundred naturally occurring uroliths from cats revealed that the great majority were composed primarily of magnesium ammonium phosphate, which is often called struvite.

The gross appearance and consistency of the feline urolith is unquestionably different from the feline urethral plug of the male cat. The urethral plug is a soft, paste-like, compressible substance comprised of varying quantities of minerals and matrix. The urolith has a rock-like consistency and assumes a variety of shapes. Many uroliths of cats have been shaped like wafers or discs.

The formation of uroliths in cats requires a sufficiently high concentration of urolith-forming minerals in the urine, a favorable urine pH for their crystallization to occur, and adequate time in the urinary tract. Urinary tract infection usually is not an important factor in their formation. However, the relationship of high mineral diets to the formation of uroliths is likely when congenital and/or acquired disorders of the lower urinary tract retains the urolith-forming minerals in the tract.

Many investigators have reported convincing data concerning experimental production of magnesium phosphate and magnesium ammonium phosphate uroliths in cats eating stone-forming (calculogenic) diets. Consumption, absorption, and excretion of comparatively high quantities of dietary magnesium appeared to have been important, although other factors

also may have played a role. Many of the calculogenic diets used in these investigational studies contained more magnesium than that found in many commercially prepared cat foods. Nonetheless, it does appear that the composition of diets may play a prominent role in formation of uroliths in cats, particularly the magnesium ammonium phosphate uroliths. Further studies that vary the mineral content, caloric density of the food, percentage of water, and/or the methods of food consumption by cats are being evaluated by investigators at several institutions. Many significant questions remain to be answered as to the relationship of diet to urolith formation.

Urethral Obstruction

Most investigators consider urethral plugs, the soft, paste-like, compressible substance comprised of minerals and mucus matrix, to be the primary cause of urethral obstruction. However, much controversy exists as to what triggers the formation of urethral plugs. Some claim that a virus is responsible, while others suggest that diet-related factors are responsible.

Recent radiographic studies of urethras and urinary bladders of obstructed male cats admitted to the University of Minnesota Veterinary Teaching Hospital have shed new light on this complex syndrome. The studies revealed that urethral obstruction may be associated with urethral plugs, urinary calculi, disease of the prostate gland, and tumors or masses that compress the urethra. The investigators conducting the studies have speculated that special secretory glands found only in the postprostatic urethra of male cats exist and that they produce at least a part of the mucus matrix that contributes to the urethral plugs of obstructed cats. The glands' secretory activity may be enhanced by infections, diets, and/or inflammatory disorders. However, the relationship of high mineral diets to the formation of urethral plugs is unclear.

Practical Tips for Cat Owners

Cat owners should be alert to the symptoms of FUS. If your cat displays symptoms such as straining at the litter box, bloody urine,

urinating in inappropriate places, vomiting, loss of appetite, and uremic odor to the breath, immediately contact your veterinarian. The type of lower urinary tract disease will determine the treatment prescribed for your cat.

Feeding a low magnesium diet (less than 20 mg. of magnesium per 100 calories) is advisable for cats that are predisposed to urolithiasis and/or urethral obstruction. For all cats, encouraging exercise and frequent urination, preventing obesity, decreasing confinement, keeping the litter box clean and easily available, and always having palatable water readily available will assist in preventing FUS.

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Feline Respiratory Disease

Conclusion

A combination of the following: a regular vaccination schedule, minimizing environmental stress to your cat, and using good management practices will help guard your cat against respiratory infections caused by FHV-1 and FCV. However, if your cat develops symptoms indicative of severe upper respiratory infections, see your veterinarian for supportive medical care. ■

Edward Dubovi is assistant professor and director of the virology section of the Diagnostic Laboratory at the NYS College of Veterinary Medicine.

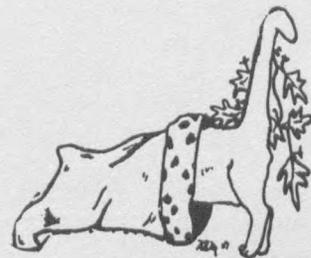
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1985 Christmas Wishlist



The holiday season is a time of giving. Please consider giving the gift of life to all cats. The following is a list of equipment which is needed to gain a better understanding of the cat's respiratory response to anesthesia and to continue our fight against fatal viral diseases. The form below is for your convenience to indicate which item you want your contribution to be used toward.

Hewlett-Packard Cup Monitor (\$8,500)

Cats do not always breathe well during anesthesia. This unit measures endotracheal carbon dioxide, which is a way of determining how well the cat is tolerating the anesthesia.

need to determine which protein of the whole virus will have a protective effect. The process is very complicated and requires accuracy. This instrument provides the necessary consistency and accuracy needed to transfer viral proteins.

Beckman Microfuge II (\$1,951)

This centrifuge would be extremely useful in our work on developing a recombinant vaccine for feline infectious peritonitis. The Microfuge II allows high speed centrifugation for extremely small samples.

High Speed Centrifuge-Sorvall (\$11,900)

This centrifuge provides the necessary high speeds required to clarify culture fluid from cell debris in the process of viral purification. This would aid us in the work on FIP.

Transfer Electrophoresis Transphor (\$660)

Since attempts to produce a vaccine for FIP using a whole virus has been futile, we

1985 Christmas Wish List

Yes, I want to give the gift of life. Please accept the enclosed contribution of \$ _____ for the purchase of :

Hewlett-Packard Cup Monitor

Transfer Electrophoresis Transphor

Beckman Microfuge II

High Speed Centrifuge - Sorvall

Given by: _____
(your name)

(street address)

(city) (state) (ZIP)

Please return this form to the Cornell Feline Health Center with your contribution.

Honor Roll

The following individuals have contributed \$100 or more to support the Cornell Feline Health Center's work on feline diseases. We are most grateful for their support. We also wish to thank those individuals that have also contributed during the last few months, but who are not listed on the honor roll.

Name

Laurence M. Addington

Kitty Angell

Betty & Benjamin Eisenstadt
Mr. & Mrs. T.R. Hendershot
Mr. & Mrs. John E. Hoerl
Mr. & Mrs. Jerome McCarthy
Nancy L. & Bruce W. Palmer
Iris Weiner & Elliot E. Porter

Mrs. Judy Post
Mr. Warren Richmond

Helen E. Shepard
Ila Kay Voris

Beverly Jane Widaseck
R.S.Wight & Ruth S. Wight

Funds given for:

In memory of Annabel
(Camuti Fund)
In memory of Don Herrmann
(Camuti Fund)
Feline Health Studies
In memory of Peanut
In memory of Snowflake & Bottles
In memory of Terrence
Feline Leukemia Fund
In memory of Fritz, Ginseng, Pheobe,
Bad Cat Bad
Buzz-Fuzz Harder Cardiomyopathy Fund
In memory of Cat, Killer
(FIP Fund)
Camuti Fund
In memory of Cream Puff, Blue Velvet,
and Sassafras (FIP Fund)
Equipment and supplies
In memory of Honeychile
(Buzz-Fuzz Harder Cardiomyopathy Fund)

The following cat clubs have shown their support by distributing CFHC literature at cat shows and/or made a monetary contribution.

Amarillo Cat Fanciers
Foot of the Rockies Cat Club
Illinois-Iowa Cat Fanciers
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Potomac Area Cat Enthusiasts
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Tennessee Valley Cat Fanciers, Inc.
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