



Client # \_\_\_\_\_

Patient Name \_\_\_\_\_

**Kitten Vaccination Protocol:**

- 9 Weeks:    Comprehensive Physical Exam  
              FVRCP Vaccine (Feline Viral Rhinotracheitis, Calicivirus, Panleukopenia, Chlamydia)  
              Intestinal Parasite Test and Basic Deworming  
              Bordetella Intranasal Vaccine  
              Heartworm and Flea Prevention Sample  
              Nutritional Counseling  
              Dental Counseling
- 12 Weeks:    Comprehensive Physical Exam  
              FVRCP Vaccine (2rd Booster)  
              Leukemia Vaccine  
              Rabies Vaccine  
              FELV and FIV Testing  
              Intestinal Parasite Test and Basic Deworming (if needed)
- 15 Weeks:    Comprehensive Physical Exam  
              FVRCP Vaccine (3th Booster)  
              Leukemia Vaccine (2<sup>nd</sup> Booster)  
              Intestinal Parasite Test and Basic Deworming (if needed)  
              Schedule Spay/Neuter Surgery

**We recommend Spay/Neuter by 6 Months of Age.**

Kittens can be declawed at twelve weeks of age. CMAH will only do removal of the front claws. It is recommended to declaw kittens before the age of 6 months.

Annual exams and vaccinations should be scheduled one year from the date the rabies vaccination was administered.

**Kitten Package Contents:**

Vaccine Protocol  
Recommendations for New Owners  
Socialization  
Playing and Behavior Characteristics  
House Training / Litter Box  
Parasites: Roundworms, Hookworms, Tapeworms, Whipworms  
Rabies  
Coccidia  
Leukemia and Why Vaccination is Important

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Signature of Client

Print Name

Date

*This Signed Copy Goes In Client Chart.*

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Staff Member



## **Kitten Package**

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## **Kittens – Getting Off To a Good Start**

How best should I introduce my new kitten to my home?

Your interaction with your new kitten begins on the ride home. Cats should always be transported in some kind of carrier in the car. By teaching your kitten to ride in a confined location you are providing safety as well as starting a routine that you can maintain for future car rides. Upon arriving at home, place the kitten in a small, quiet area with food and a litter box. If the kitten is very tiny, a small litter box with low sides may be necessary at first. If possible, duplicate the type of litter material used in the previous home (See our handout on 'House-training – using the litter box').



Set up a safe and secure area where you can leave your kitten when you are not available for supervision. This location should have a food bowl, water bowl, litter box, play toys, a scratching post and a resting area; be sure it is big enough to accommodate all these things. Since it is advisable to feed your kitten multiple small meals throughout the day, you may choose to also provide a feeding area in this room. Make sure to inspect the area for nooks and crannies where a kitten might hide or get stuck. All kittens and cats will need time to investigate their new surroundings. For a new kitten this is a more manageable task if you limit the available space initially. Be sure that any area where your kitten is allowed to roam has been effectively cat-proofed, which includes anywhere the kitten can jump or climb. Potentially dangerous items such as electric cords and items that might be chewed or swallowed (such as thread, rubber bands, paper clips, children's toys) should be booby trapped or kept out of reach (See our handout on 'Controlling undesirable behavior in cats'). After your new kitten has had some quiet time in a restricted location, slowly allow access to other areas of the home under your supervision.

Kittens are natural explorers and will use their claws to climb up onto anything possible. In the first few weeks, slow access to the home will allow exploration as well as the ability to monitor the kitten's behavior.

### **What should I do if I have other pets?**

Although some kittens may show fear and defensive postures toward other pets in the home, most young kittens are playful and inquisitive around other animals. Therefore, it is often the existing pets that can pose more of a problem. If you know or suspect that your adult dog or cat might be aggressive toward the kitten, then you should seek professional behavior advice before introducing the pets to each other.

The kitten should be given a safe and secure area that provides for all of its needs (as above) and introductions with the existing family pets should be carefully supervised. At the first introduction there may be no immediate problems, and reinforcement of desirable responses may be all that is required.

If there is some mild anxiety on the part of your dog then introductions should be controlled, gradual, supervised and always positive. Your new kitten could be placed in a carrier or on a leash and harness so that it will not provoke your dog. Then using a leash for control, favored rewards and training commands, encourage your dog to sit or stay calmly in the presence of the cat. Dogs that are not well trained to settle on command may need their training reviewed and improved before introduction. Alternatively a leash and head halter could be used for more immediate control and safety. Calm investigation should then be encouraged and reinforced. (See our handout on using a head halter). Any initial anxiety on the part of the dog or kitten should soon decrease and, if the dog is prevented from rough play and chasing, the kitten should quickly learn its limits with the dog, including how to avoid confrontation by climbing or hiding. Initially it would be best to keep a dog and a kitten separated unless supervised. If, after some cautious initial introductions, there were still the possibility of aggression or injury then a behavior consultation would be advisable.

Most adult cats are fairly tolerant of kittens, so that keeping the kitten in its own area, and then allowing introductions when the cats are eating or playing, should help to decrease any initial anxiety. A leash and harness or a crate can be used to control one or both of the cats during initial introductions. A synthetic cheek gland scent, either as a spray or diffuser, may also be useful for easing introductions. Most cats and kittens will soon work out their relationship on their own, without injury. However, if there is a threat of aggression, then details of a gradual introduction program can be found in our handout 'Feline aggression: territorial and fear aggression to household cats'.

### **How can I prevent problems from developing?**

The key to preventing behavior problems is to identify and provide appropriate outlets for all of the needs of the kitten. This is especially important for the indoor cat since all of its play, predation, exploration, scratching, elimination



and social needs will need to be channeled into acceptable indoor options. Sexual motivation can be reduced by neutering. Most of the physical activity of an outdoor cat would be focused on the hunt or on predatory and social play. Interactive play should therefore be designed as substitutes. To provide multiple predatory play sessions, use wands and movable toys or small light toys of plastic, fabric, feathers or fleece, that can be batted, chased and retrieved. Feeding can be broken up and made more interactive by feeding multiple small meals, some of which can be given in foraging toys, stuffed into feeding toys, or hidden inside bags and boxes. A cat's interest in exploration might be addressed by providing new toys that can be batted and chased, and new areas to explore such as paper bags and cardboard boxes. Interest might be stimulated and maintained by hiding food treats or catnip in the toys, exploration and climbing areas. In addition to social play session with owners, highly social and playful cats may also benefit from having a second social and playful cat in the home. A comfortable blanket or

rug for napping, counters, shelves or play centers for perching, posts for scratching, and a proper litter area for elimination round out most of the cat's needs. One important rule of thumb is that each cat is different; you must choose the types of play and toys that are most appealing to your cat and most appropriate for your household. (For more information, see our handout on play and investigative behavior).

### **Can I prevent my cat from becoming overly fearful?**

Most kittens are highly social, but sociability and social play might begin to wane after two months of age. Therefore as soon as the kitten is obtained you should make every attempt to introduce the kitten to a wide variety of people (various ages, races, and infirmities) a wide variety of environments, other pets, and as many new stimuli (e.g. noises, car rides, elevators) as possible. One way to help insure a positive relationship with each new person, pet, place and event is to give the kitten one of its favored treats or toys with each new meeting and greeting (See our handout on kitten socialization and fear prevention).

### **How can I teach my cat to enjoy handling?**

Depending on the personality and early experiences as a kitten, your cat may enjoy, accept, or dislike certain types of handling, from petting to bathing. In order for the cat to learn to accept and enjoy a variety of types of physical contact from humans, it is critical that the human hand only be associated with positive experiences and that all physical punishment is avoided. Begin with those types of handling that the cat enjoys or is willing to accept, and provide small treats at each of the first few sessions. Once the cat learns to associate food with these sessions, slightly longer or more intense sessions can be practiced. This type of handling can be used to help the cat become accustomed to, and perhaps enjoy, patting, grooming, teeth brushing, nail trimming, and even bathing. Over time you can introduce a brush or comb so that you can help keep your cat's coat clean and free of mats. Regular grooming will also help decrease hairball formation. Never force this type of handling upon your cat, as any negative experience will only make the problem worse and the cat more resistant to further handling.

It is important to remember that physical discipline is inappropriate. It can scare your cat and make him or her afraid of being picked up or held. To help with problems you might encounter, please see our handout on controlling undesirable behavior in cats.

### **Are there other things I should train my cat to do?**

It can be very useful and enjoyable to train your cat to a few simple commands such as to "come" when he is called. This can be accomplished by starting early. Take either a food treat or the cat bowl and show it to your kitten while slowly moving away from the kitten and at the same time saying his name and the word "come". As the kitten follows and comes to you, give him the treat or food. With each repetition start a bit further away. Always reward the kitten when he gets to you with praise and a food treat. Remember not to proceed too quickly and make sure the kitten is successful each time. As the kitten learns the task, gradually phase out food rewards to a more variable schedule but always use praise and petting. Over time, your kitten should eagerly come when called. Similarly the pet can be encouraged to sit or give a paw. Use food lures to

encourage the behavior and, when the pet responds consistently, add an appropriate word just before the cat displays the behavior.

Training your cat to accept the carrier without distress and fear will also come in handy over its lifetime. Using food rewards, delectable food, and play toys, you can entice the kitten to enter and explore the carrier. When the cat has voluntarily entered the carrier, the door can be briefly closed and then re-opened. Each time, try to leave the kitten in a bit longer before allowing him to exit. Be sure to never allow the kitten out when it cries or scratches at the crate or he will associate those behaviors with escape. Instead wait until the kitten is calm and quiet, praise him and allow him to exit. Do not keep him in longer than he can be good during the initial training; gradually increase the time inside. If car travel will be frequent, short trips can be taken for practice to get the kitten used to traveling in the car. In some cases a very large cat crate can be used as a safe haven for your kitten and can also accommodate litter box, food and water. Feliway™ might help some cats to more quickly adapt to their carrier.

In summary, a cat can become very demanding of attention, play and affection. Begin early to teach your kitten how to ask nicely for interaction. Obnoxious behavior such as swatting, excessive vocalization, biting and pouncing should not be tolerated. If your kitten begins to exhibit these behaviors, quickly and quietly leave the area and cease all interactions. Once the kitten is calm and quiet, call him over and resume interactions. The goal is for the kitten to learn that calm, quiet responses get your attention, not wild or aggressive ones. For this to be effective you must be certain that you make time each day for appropriate interactions with your cat that include play, petting, grooming and naturally meeting his needs for food, water and a clean litter box.



### **Kitten – Play and Investigative Behaviors**

Kittens have a reputation for being playful - why is play so important to them? Play is a very important part of the feline world and kittens need the opportunity to play in order to learn vital adult skills both for communication and for hunting. From a very early age, they play with their littermates and with objects that they find in their environment. Indeed, play provides the ideal opportunity for kittens to investigate the world around them. Young kittens play using chasing and pouncing behaviors that seem to have their origin in predation.

"Predatory play is an integral part of feline play behavior and early learning."

Predatory play is an integral part of feline play behavior and early learning. This play in a kitten is often aggressive and intense. During kitten development three different forms of play are used. Up to the point of weaning, most of the kitten's playful interactions have been with the queen or with littermates and this is described as social play. At the time of

weaning, kittens will begin to show more interest in objects in their environment and will begin to act out the behavioral sequences associated with hunting, by chasing and stalking moving objects as well as those that can be swiped, batted and propelled with a paw. This so called object play is believed to be important in the development of eye-paw coordination and hunting skills, and the presence of an experienced hunting mother is believed to increase the kitten's opportunity to observe the appropriate behaviors and develop its own hunting prowess. Locomotory play is fully developed at 10-12 weeks of age, and is important in the development of balance and agility. Since play is such an important component of kitten development, proper play and exercise should be encouraged.

### **I have a 6-week-old kitten and he is very playful - how can I channel his play onto toys rather than the curtains and furniture?**

The image of young kittens hanging from the curtains is a very popular one for cartoonists, but it is not amusing for owners when their new pets are ripping their home apart and causing mayhem. The playful nature of your kitten is perfectly normal, and the important lesson for him to learn at this age is that play is only acceptable in certain situations and contexts. Obviously kittens cannot read labels or instruction booklets and therefore they need to be shown how to play with toys that you provide for them. However you can maximize their interest in the toys by ensuring that they cater to basic feline needs and have features that will naturally catch your kitten's attention and imagination.

### **What is the best way to play with my kitten?**

Kittens use multiple objects as prey items when they play. This play behavior consists of stalking, pouncing, jumping, biting and clawing. They often prefer small objects that can easily be moved with their paws or grasped in the mouth. Avoid objects that are so small that they could be ingested and cause intestinal blockage. Some kittens like to play with objects like string or yarn. If these items are accidentally swallowed, they can cause severe intestinal damage, and you should only allow your kitten to play with them under supervision.

Avoid using your hands as you play with your kitten. This can be dangerous and lead to human injury. The moving hand can become an appealing play object and attempts at correction could aggravate the situation. Although a young kitten may not inflict damage, as it ages and continues to use the owner's body for play, serious injuries can result.

Simulated prey stimulates cats, so that wands and toys that can be pulled along or dangled in front of the cat are generally most effective. Fishing rod type toys and long





wands with prey type toys (feather toys, catnip mice) on the end can be used to encourage play without contact with the owner's body. Young kittens will often fetch small fleece toys, or bat them across the floor.

### **Why is my kitten always getting into mischief?**

Another important part of the development of young animals is the need for exploration and investigation of new objects and new environments.

"...cat's needs to play and investigate."

These behaviors can lead to damage to the home as well as injury to the kitten. Preventing these problems is quite simple; you accept your cat's needs to play and investigate. When you are not around or available to supervise, the cat can be provided with a variety of toys that can be batted, chased or pounced upon. Toys stuffed with catnip, toys that release food when manipulated, battery operated or mechanical toys that the cat can paw or chase, and toys that can be dangled from doors or play centers are just a few of the self-play toys that are enticing to some cats. Your cat should also be provided with suitable opportunities and outlets for scratching, climbing, perching and relaxing (See our handout on 'Scratching Behavior in Cats' for a more detailed discussion). These could include posts and toys designed for scratching; shelves, counters, windowsills and play centers for perching; and paper bags, cardboard boxes or hidden treats for exploration. Motorized play toys can help keep your cat occupied in chase and predation games. Cats that chew and scavenge might be provided with higher bulk foods, chew toys, dental foods, dental toys or even a small herb garden to try and satisfy this need (See our handout on 'Chewing and Sucking Behavior in Cats').

### **How can I prevent damage when I am not available to supervise?**

When the cat cannot be supervised, leave it in a cat-proof area, with soft comfortable bedding and a litter box for elimination. Be certain that your kitten has had sufficient play and attention before confinement. Although a large dog kennel or cat crate may be an acceptable form of confinement for short departures, most cats can be confined in one or a few rooms that have been effectively cat-proofed. This allows the cat some freedom while preventing damage and injuries. Child locks and secure containers can be used to keep your cat out of cupboards or garbage cans. Any of your possessions or household objects that might be clawed, pounced on, explored, or knocked flying, should be either kept out of the cat's reach or booby-trapped. Remember that with their excellent ability to jump and climb, damage prevention may also be needed far above floor level.

"Booby-trapping can be used to teach your cat to "stay away" from specified areas..."

Booby-trapping (see below) can be used to teach your cat to "stay away" from specified areas by making the sites unpleasant. Before making an area unpleasant, be certain that some of the confinement area offers appropriate and sufficient outlets to meet your cats innate needs. The kitten should be provided with a post for scratching, some ledges or shelves for climbing and perching, and a few play toys that can be swatted, batted, or chased. Cat toys on springs and those that are hung from doors or play centers, ping-pong balls, whole walnuts, or catnip mice are often fun for cats to chase and attack. Cat

play centers can be purchased or constructed to provide areas for perching and scratching in a relatively small compact area. Some cats like to explore new objects, so a few empty boxes or paper bags (never plastic) will keep some cats entertained until the owner has time to play. Motorized cat toys, cat puzzles and food filled toys (see our handout on 'Behavior Modification – Working for Food – Dogs and Cats') may also be appealing. See our handout 'Undesirable Behavior in Cats' and 'Chewing and Sucking Behavior in Cats' for additional help. Sometimes the best solution is to get a second cat for companionship and play. Be certain that the second cat is young, sociable and playful.

Although some people think of confinement, cat-proofing and booby-trapping as unnecessary or cruel, they are precautionary measures to keep the cat safe and prevent damage to the household when the owners are not available to supervise. Common owner complaints such as chewing on plants, scratching, climbing or playing in inappropriate locations, or elimination outside of the litter area, are just a few of the potential problems that can best be prevented with a little planning and forethought. Then, when a family member is home and available to supervise, your cat can be given more freedom to explore and become accustomed to those areas of the home where problems might otherwise occur.

### **What problems are associated with play?**



"There are a number of behavior problems that arise out of over-exuberant and inappropriate play."

There are a number of behavior problems that arise out of over-exuberant and inappropriate play. Some examples are cats that rambunctiously tear around the household, those that swat at or pounce on the owners (sometimes escalating into bites and injuries), and those that grasp, nip, bite or swat at the

owners throughout the night. For suggestions on how to deal with these problems, see our handout on 'Aggression in Cats – Play Predation'.

### **How can over-exuberant play and play attacks toward people be prevented?**

Before any attempts at stopping or interrupting the behavior are attempted, provide sufficient opportunities and outlets for play. Choose play toys and activities that are appealing to the individual cat. Since play that is initiated by the cat could potentially escalate into overly aggressive play, the owner should select play toys and initiate all play sessions. Sessions initiated by the cat should be ignored or interrupted using a distraction device, such as the ones in our handout on 'Behavior Management Products'.

## **What type of play should I expect from a kitten?**

Stimulating play is important for your kitten, especially during the first week. Stalking and pouncing are key play behaviors in kittens and have an important role in proper muscular development. If given a sufficient outlet for these behaviors with toys, your kitten will be less likely to use family members for these activities. The best toys are lightweight and movable, such as wads of paper, small balls and ribbon. Kittens should always be supervised when playing with ribbon or string to avoid swallowing. Any other toy that is small enough to be swallowed should also be avoided.

## **Can I discipline a kitten?**

Disciplining a young kitten may be necessary if his/her behavior threatens people or property, but harsh punishment should be avoided. Hand clapping, as well as the use of shaker cans or horns, can be intimidating enough to inhibit undesirable behavior. However, remote punishment is preferred.

Remote punishment consists of using something that appears unconnected to the punisher to stop the problem behavior. Examples include using spray bottles, throwing objects in the direction of the kitten to startle (but not hit) him/her and making loud noises. Remote punishment is preferred because the kitten associates punishment with the undesirable act and not with you.

## **When should my kitten be vaccinated?**

We have the ability to prevent many feline illnesses—including fatal diseases—through the use of vaccines. In order to be effective, these vaccines must be given as a series of injections. Ideally, the vaccines are given at around eight, 12 and 16 weeks of age. However, this schedule may vary depending on several factors.

The routine vaccination schedule will protect your kitten from five diseases: distemper, three respiratory organisms and rabies. The first four are included in a combination vaccine that is given at six, eight, 12 and 16 weeks old. The rabies vaccine is given at 12 weeks of age.

The leukemia (FeLV) vaccine is appropriate for any cat, but is a necessity if your cat does or will go outside or if you have another cat that goes in and out. This deadly disease is transmitted by contact with other cats, especially when fighting occurs. A vaccine is also available for protection against feline infectious peritonitis (FIP), an uncommon disease that is most likely to occur in groups of cats.

## **Why does my kitten need more than one vaccination?**

When a kitten nurses his/her mother, he/she receives a temporary form of immunity through the mother's milk. This immunity is in the form of proteins called antibodies. For about 24 to 48 hours after birth, the kitten's intestine allows absorption of these antibodies directly into the blood stream. This immunity is of benefit during the first few

weeks of the kitten's life, but eventually the immunity fails and the kitten must be able to make his/her own long-lasting defense against disease. Vaccinations are used for this purpose.

As long as the mother's antibodies are present, vaccinations do not have a chance to stimulate the kitten's immune system. The mother's antibodies interfere by neutralizing the vaccine. Many factors determine when the kitten will be able to respond to the vaccinations. These include the level of immunity in the mother cat, how many of the antibodies have been absorbed and the number of vaccines given to the kitten. Since we do not know when an individual kitten will lose the short-term immunity, we give a series of vaccinations. We hope that at least two of these will fall in the window of time when the kitten has lost immunity from his/her mother but has not yet been exposed to disease.

A single vaccination, even if effective, is not likely to stimulate the long-term immunity. The rabies vaccine is an exception to this, since one injection given at the proper time is enough to produce long-term immunity.

### **Do all kittens have worms?**

Intestinal parasites are common in kittens. Kittens can become infected with parasites before they are born or later through the mother's milk. The microscopic examination of a stool sample will usually help us to determine the presence of intestinal parasites. We recommend this exam for all kittens.

Even if we do not get a stool sample, we recommend the use of a deworming product that is safe and effective against several common worms in the cat. We do this because our deworming medication has no side effects and because worms do not pass eggs every day, so the stool sample we have may not detect worms that are really present.

Deworming is done immediately and repeated in about three weeks. It is important to repeat this treatment because the deworming medication only kills adult worms. Within three to four weeks, the larval stages will have become adults and will need to be treated.

Cats remain susceptible to reinfection with hookworms and roundworms; therefore, periodic deworming throughout the cat's life may be recommended for cats that go outdoors.

Tapeworms are the most common intestinal parasite of cats. The eggs of the tapeworm live inside fleas. Kittens become infected with these worms when fleas are accidentally ingested upon licking or chewing the skin. The flea is digested within the cat's intestine

and the tapeworm hatches, anchoring itself to the intestinal lining. Therefore, exposure to fleas may result in a new infection that can occur in as little as two weeks.

Cats infected with tapeworms will pass small segments of the worms in their stool. These segments are white in color and look like grains of rice. They are about 1/8-inch long and may be seen crawling on the surface of the stool. They may also stick to the hair under the tail. If this occurs, the worms will dry out, shrink to about half their size and become golden in color.

Tapeworm segments do not pass every day or in every stool sample; therefore, inspection of several consecutive bowel movements may be needed to find them. We may examine a stool sample in our office and not find them, but you may find them the next day. If you find them at any time, please notify us so we may provide the appropriate treatment.

### **What about heartworms?**

Heartworms are important parasites, especially in certain climates. They can live in your cat's heart and cause major damage to the heart and lungs. Heartworms are transmitted by mosquitoes, so your cat does not have to be in contact with another cat to be exposed. Obviously, cats that go outdoors are more likely to contract the disease; however, about 25 percent of cats diagnosed with heartworms are reported by their owners to be indoor-only. This simply means that mosquitoes that come into the house are just as dangerous as the ones outdoors.

Currently, there is no treatment for heartworms in cats, but preventative medication is available.

### **What should I feed my kitten?**

Diet is extremely important in the growing months of a cat's life and there are two important criteria that should be met when selecting food for your kitten. We recommend a **NAME-BRAND FOOD** made by a national dog food company (not a generic or local brand) as well as a formula **MADE FOR KITTENS**. This should be fed until your kitten is about 12 months of age.

We recommend that you only buy food with an Association of American Feed Control Officials (AAFCO) certification. Usually, you can find this information very easily on the label. AAFCO is an organization that oversees the entire pet food industry. This organization does not endorse any particular food, but will certify that particular foods meet the minimum requirements for nutrition. Most commercial pet foods will have the AAFCO label, whereas generic brands often do not. In Canada, look for foods approved by the Canadian Veterinary Medical Association (CVMA).

Feeding a dry, canned or semi-moist form of cat food is acceptable. Each has advantages and disadvantages. Dry food is the most inexpensive and preferred brands of dry food are just as nutritious as other forms. As a rule, most veterinarians will recommend dry food for your kitten. Semi-moist and canned foods are considerably more expensive than dry food. They often are more appealing to the cat's taste; however, they are not more nutritious. If you feed a very tasty food, you are running the risk of creating a cat with a finicky appetite. In addition, many semi-moist foods are high in sugar.

Table food is not recommended. Because human food is generally very tasty, cats will often begin to hold out for these special treats and not eat the well-balanced cat food. If you choose to give your kitten table food, be sure that at least 90 percent of his/her diet is good quality commercial kitten food.

We enjoy a variety of food in our diet. However, most cats actually prefer not to change from one food to another unless they are trained to do so. Do not feel guilty if your cat is happy to just eat one food day after day, week after week.

Commercials for cat food can be very misleading. If you watch carefully, you will notice that most commercials promote cat food on one basis—taste. Nutrition is rarely mentioned. Most "gourmet" foods are marketed to appeal to owners who want the best for their cats; however, they do not offer the cat any nutritional advantage over a good quality dry food and they are far more expensive. If your cat eats a gourmet food for a long period of time, she will likely not be happy with any other foods. Therefore, if your cat needs a special diet due to a health problem later in life, he/she will probably be very unlikely to accept it.

### **How do I ensure that my kitten is well socialized?**

The socialization period for cats is between two and 12 weeks of age. During that time, the kitten is very impressionable to social influences. If he/she has good experiences with men, women, children, dogs and other cats, he/she is likely to accept them throughout life. If the experiences are absent or unpleasant, he/she may become apprehensive or adverse to any of these people or animals. Therefore, during the period of socialization, we encourage you to expose your cat to as many types of social events and influences as possible.

### **What can be done about fleas on my kitten?**

Fleas may not stay on your kitten for long; occasionally, they will jump off and seek another host. Therefore, it is important to kill fleas on your new kitten before they can become established in your house. Many of the flea control products that are safe on adult cats are not safe for kittens less than four months of age. Be sure that any flea product you use is labeled safe for kittens.

If you use a flea spray, your kitten should be sprayed lightly. Flea and tick dip is not recommended for kittens unless they are at least four months of age. This trick to spraying a kitten will make the outcome safer and more successful: When a kitten is sprayed, the fleas tend to run away from the insecticide. If you spray the body first, many fleas will run to the head where they are very difficult to kill. The best method is to spray a cotton ball, then use that to wipe the flea spray onto the kitten's face, from the nose to the level of the ears. This will keep you from getting the spray in the eyes and will cause the fleas to run toward the body. Wait about two minutes, then spray the back of the head and the body. Leave the spray on for about three minutes, then wipe off the excess. This will permit you to kill the most fleas while putting the least amount of insecticide on the kitten.

For long-term flea control in kittens, we recommend using one of three products on a monthly basis. All are safe to use in kittens over eight weeks of age.

- Program is an insect growth inhibitor that kills fleas in the egg and larvae stage, helping to prevent mature fleas. It is available in a monthly tablet or six-month injectible for cats.
- Revolution is a monthly topical treatment that prevents adult fleas and ear mites, as well as round, hook and heartworms.
- Vectra is another monthly topical that kills adult fleas and prevents development of immature flea stages like eggs and larvae.

### **Can I trim my kitten's nails?**

Kittens have very sharp nails. They can be trimmed with your regular fingernail clippers or with nail trimmers made for dogs and cats. If you take too much off the nail, you will get into the blood vessel or quick, causing bleeding and pain. If this happens, neither you nor your cat will want to do this again. Therefore, a few points are helpful:

- If your cat has clear or white nails, you can see the pink of the quick through the nail. Avoid the pink area and you should be out of the quick.
- If your cat has black nails, you will not be able to see the quick, so only cut a very small amount of the nail at a time until the cat begins to get sensitive. The sensitivity will usually occur before you are into the blood vessel. With black nails, it is likely that you will get too close on at least one nail.
- If your cat has some clear and some black nails, use the average clear nail as a guide for cutting the black ones.
- When cutting nails, use sharp trimmers. Dull trimmers tend to crush the nail and cause pain even if you are not in the quick.
- You should always have styptic powder available. If you have cut into the kitten's quick, this powder will help to stop the bleeding. Styptic powder is sold in pet stores under several trade names, but it will be labeled for use in trimming nails.

### **What are ear mites?**

Ear mites are tiny parasites that live in the ear canal of dogs and cats. The most common sign of ear mite infection is scratching of the ears. Sometimes the ears will appear dirty because of a black material in the ear canal. This material is sometimes shaken out.

The instrument we use for examining the ear canals, an otoscope, has the necessary magnification to allow us to see the mites. Sometimes, we can find the mites by taking a small amount of the black material from the ear canal and examining it with a microscope.

Although they may leave the ear canals for short periods of time, ear mites spend the vast majority of their lives within the protection of the canal. Transmission generally requires direct ear-to-ear contact.

Ear mites are common in litters of kittens in which the mother has ear mites. Ear infections may also cause the production of a dark discharge in the ear canals. It is important that we examine your puppy to be sure the black material is due to ear mites and not infection.

### **Why should I have my female cat spayed?**

Spaying is the removal of the uterus and ovaries. This offers several advantages. The female heat period results in about two to three weeks of obnoxious behavior that can be quite annoying if your cat is kept indoors. Intact male cats will go to great lengths to mate with females who are in heat, and despite your best efforts, accidents often happen. Your cat will have a heat period about every two to three weeks until she is bred. Spaying means that your cat's heat periods will no longer occur and unplanned litters will be prevented.

It has also been proven that as the unspayed female gets older, she has an increased chance of developing breast cancer and uterine infections. Spaying your cat before she has any heat periods will virtually eliminate this possibility.

Your cat can be spayed any time after four months of age.

### **Why should I have my male cat neutered?**

Neutering is the removal of the testicles. This offers several advantages. Male cats go through significant personality changes as they mature. They become very possessive of their territory and mark it with their urine to ward off other cats. The intact male cat's urine develops a very strong odor that will be almost impossible to remove from your house. They will also constantly try to enlarge their territory, which means one fight after



another. Fighting can result in severe infections and abscesses and will often provoke rage in your neighbors.

We strongly encourage you to have your cat neutered around four months of age. If he should begin to spray his urine before that time, he should be neutered immediately. The longer he sprays or fights, the less likely neutering will prevent that behavior in the future.

### **My kitten is already becoming destructive. What can I do?**

There are many options to consider for destructive behavior, like scratching. While declaw surgery is elected in many cases, several alternatives also exist.

- **Environmental control:** Environmental control means changing the layout in the room where your kitten lives, such as temporarily covering furniture with double-sided sticky tape or aluminum foil to deter unwanted behavior.
- **Behavior modification:** Behavior modification consists of training cats and kittens to avoid certain scratching sites while teaching them to enjoy scratching on appropriate surfaces like cat trees, scratching posts or cardboard planks.
- **Environmental enrichment:** Enrichment is important, especially for indoor cats. The goal is to "create an environment of plenty" for your cat in order to increase activity, decrease mental stagnation and prevent many behavior issues. That means plenty of room, litter boxes, food, water and things to do.
- **Nail trimming:** Your cat's nails may be clipped according to the instructions above. However, the nails will regrow and become sharp again in about four to seven days. Therefore, to protect your property, it will be necessary to clip them one to two times per week.
- **Nail Caps:** Soft Paws, sold in most pet supply stores, are small vinyl caps that adhere to your cat's claws. These are generally made of smooth plastic and attach to the end of the nail with a special glue. The nails are still present, but the caps prevent them from causing destruction. After two to four weeks, the nails will grow enough that the caps will be shed. At that time, you should be prepared to replace them.
- **Surgical declawing:** This is the removal of the nail at its base. This is done under general anesthesia and there is very little post-surgical discomfort, especially when it is performed on a kitten. Contrary to some beliefs, this surgery does not cause lameness or psychological damage. In fact, a declawed cat will not realize the claws are gone and will continue to "sharpen" the claws as usual without inflicting damage to your furniture. This surgery can be done as early as 12 weeks of age or anytime thereafter. It can also be done at the same time as your cat's spay or neuter. Once declawed, your cat should always live indoors since the ability to defend him/herself is compromised.

### **Can you recommend something for pet identification?**

The latest in pet retrieval and identification is microchipping. This tiny device is implanted with a needle, so the process is much like getting an injection. Our scanner, as well as scanners at humane societies and animal shelters across the country, can detect these chips. A national registry permits the return of microchipped pets throughout the United States and Canada.

## Roundworms: Cats & Kittens



There are two species of roundworms affecting cats and kittens: *Toxocara cati* and *Toxascaris leonina*. Both are treated with the same medication protocol so when eggs are seen on a fecal flotation exam it is not necessary to determine which species is present. *T. leonina* can infect both dogs and cats so identifying this roundworm might be helpful in indicating which pets in the household are at risk for further contagion.

### How Infection Occurs

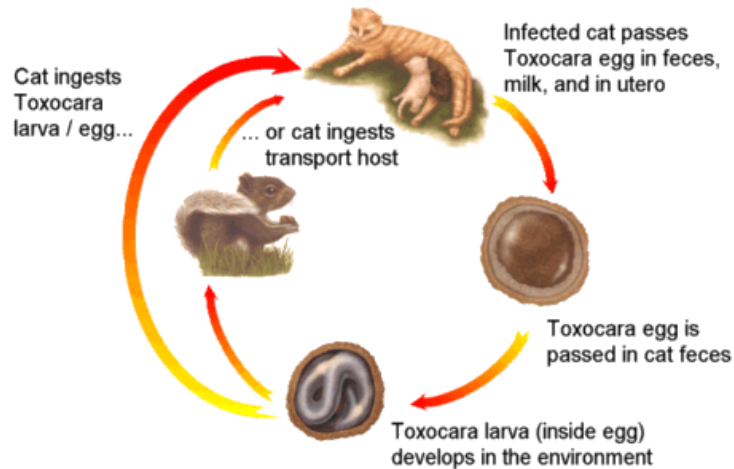
In cats, there are three ways by which infection with *Toxocara cati* occurs:

- Consuming infective worm eggs from soil in the environment, generally through normal grooming.
- Nursing from a mother cat that was herself infected in late ate pregnancy; most kittens are infected this way.
- Consuming a prey animal – usually a rodent - that is carrying developing worms.



### Life as a Roundworm

*Toxocara cati* has one of the most amazing life cycles in the animal kingdom. It is crucial to understand this life cycle if effective treatment is to be pursued.



**Step One:**  
*Toxocara* eggs are passed in the host's feces. If a fecal sample is tested, the eggs can be detected. The embryonic worm develops in the outdoor environment inside its microscopic egg for one month before it

becomes able to infect a new host. If environmental conditions are favorable, it takes about a month for the egg to become infective but *Toxocara* eggs are famous for weathering harsh environmental conditions. Eggs can remain infective for months to years.

**Note: Fresh feces are not infectious.**

**Step Two:** The egg containing what is called a second stage larva is picked up orally by a cat or by some other animal. The egg hatches in the new host's intestinal tract and the young worm burrows its way out of the intestinal tract to encyst (enclose) in the host's other body tissues. If the new host is a cat, the life cycle proceeds. If the new host is a member of another species, such as a rodent, the larvae wait while encysted until the new host is eaten by a cat. These prey animals that carry worm larvae are called paratenic hosts. The cat is called the definitive host.

**Step Three:** These second stage larvae can remain encysted happily for years. If the host is a cat, though, most larvae waste no time encysting and continue their migration straight to the lungs. The majority of the incoming larvae have reached the cat's lungs by the third day post-infection. Those larvae that do stay behind encysted do so in the cat's liver. Once they get to the lung, they develop into third stage larvae and burrow into the small airways, ultimately travelling upward towards the host's throat. A heavy infection can produce a serious pneumonia. When they get to the upper airways, they generate coughing. The worms are coughed up into the host's throat where they are swallowed, thus entering the intestinal tract for the second time in their development.

If the host is a nursing mother, second stage larvae can migrate to the mammary gland instead of the lung. Kittens can thus be infected by drinking their mother's milk. Larvae that had encysted in the liver and gone dormant will re-awaken during the host's pregnancy, continuing their migration just in time to infect the nursing kittens. In this way, a well dewormed mother cat can still find herself infecting her kittens.

**Note: When cats are dewormed, this affects only worms in the intestinal tract. It does not affect encysted larvae. It is difficult to prevent mother-to-kitten transmission and routine deworming is not adequate.**

**Step Four:** Once back in the intestine, the larvae complete their maturation and begin to mate. The first eggs are laid about one week after the fourth stage larvae have arrived in the intestine and about 4 to 5 weeks after infection has first occurred. From here the cycle repeats.

### **Why is Infection Bad?**

Roundworm infection can have numerous negative effects. It is a common cause of diarrhea in young animals and can cause vomiting as well. Sometimes the worms are vomited up, which can be alarming because they can be quite large with females reaching lengths of up to seven inches. The worms consume the host's food and can lead to unthriftiness and a classical pot-bellied appearance. Heavy infections can lead to pneumonia as the worms migrate and, if there are enough worms, the intestine can become obstructed.

It should also be noted that human infection by this parasite is especially serious (see below). It is important to minimize the contamination of environmental soil with the feces of infected animals so as to reduce the exposure hazard to both humans and other animals. A classical source of infection is a child's outdoor sandbox in which outdoor cats may defecate.

### **How do we know if our Cat is Infected?**

You may not know and this is one of the arguments in favor of regular deworming. Regular deworming is especially recommended for cats that hunt and might consume the flesh of hosts carrying worm larvae. Kittens are frequently simply assumed to be infected and automatically dewormed.

Of course, there are ways to find out if your pet is infected. If a cat or kitten vomits up a worm, there is a good chance this is a roundworm, especially in a kitten. Roundworms are long, white and described as looking like spaghetti. Tapeworms can also be vomited up but these are flat and obviously segmented. If you are not sure what type of worm you are seeing, bring it to your vet's office for identification.

Fecal testing for worm eggs is a must for kittens and a good idea for adult cats having their annual checkup. Obviously, if there are worms, they must be laying eggs in order to be detected, but by and large fecal testing is a reliable method of detection.



*Toxocara egg*

### **How do we Get Rid of Roundworms?**

Numerous deworming products are effective. Some are over the counter and some are prescription. Many flea control and/or heartworm prevention products provide a monthly deworming, which is especially helpful in minimizing environmental contamination. Common active ingredients include:

- Febantel (active ingredient in Drontal® and Drontal Plus)
- [Pyrantel pamoate](#) (active ingredient in Strongid®, Nemex®, Heartgard Plus® and others)
- Piperazine (active ingredient in many over the counter products)
- [Fenbendazole](#) (active ingredient in Panacur®)
- [Selamectin](#) (active ingredient in Revolution®)
- Emodepside (active ingredient in Profender®)

There are two important concepts to keep in mind about deworming. Medications essentially anesthetize the worm so that it lets go of its grip on the host's intestine and it passes out with the stool. Once it has been passed, it cannot survive in the environment and dies.

*This means that you will likely see the worms when they pass so be prepared as they can be quite long and may still be alive and moving when you see them.*

The other concept stems from the fact that larvae in migration cannot be killed by most deworming products. After the worms are cleared from the intestine, they will be replaced by new worms completing their migration. This means that a second, and sometimes even a third deworming is needed to keep the intestine clear. The follow-up deworming is generally given several weeks following the first deworming to allow for migrating worms to arrive in the intestine where they are vulnerable.

*Do not forget your follow-up deworming.*

*At this time the emodepside product is the only one that with one treatment can attack immature worms still in the process of migration as well as the intestinal adults with one treatment. All other dewormers require repeat deworming.*

### **What about *Toxascaris Leonina*?**

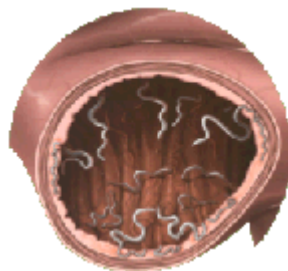
The life cycle of *Toxascaris leonina* is not nearly as complicated. They do not migrate through the body in the way that *Toxocara* does. Instead, the *Toxascaris* second stage larva is consumed and simply matures in the intestine, a process that takes 2 to 3 months. Unlike *Toxocara*, *Toxascaris* can complete its life cycle in many host species besides the domestic cat. There is no encysting or arrested development as with *Toxocara*.

Note: *Toxascaris leonina* can infect both dogs and cats alike.

(*Trichuris Vulpis* and relatives)



This worm is one of the "big four" intestinal parasites with which our canine friends must contend: [roundworms](#), [tapeworms](#), [hookworms](#), and whipworms. The whipworm that affects dogs (*Trichuris vulpis*) is substantially smaller than the other worms (a mere 30-50 mm in length, about two inches maximum) and is rarely seen as it lives in the cecum (the part of the large intestine where the small and large intestine meet). The head (or more accurately, the digestive end of the worm) is skinny versus its stout tail (or reproductive end), which gives the worm a whip shape, hence the name.



In the host's digestive tract, food passes from mouth to esophagus to stomach to small intestine to large intestine to rectum and then to the outside world. This means the large intestine is one of the last stops for nutrients and by this point in the journey, nutrients have largely been broken down and absorbed. The large intestine, also called the colon, serves to absorb water, store fecal material, and provide a home for a spectacular number of bacteria that are able to digest leftover food. The large intestine is the home of the whipworm. The adult worms bite the tissue of the intestine, actually embedding their heads inside, and suck blood there



*Whipworm egg isolated from a stool sample. Note the characteristic double plug appearance.*



*Whipworms developing in the soil. Note the characteristic plugs on either end of the egg.*

Eggs are laid inside the large intestine and pass with the stool. Once in the outside world, the eggs require about 2 to 4 weeks to form embryos and become capable of infecting a new host. (This means that contaminated soil is the source of infection, not fresh feces.)

The new host is infected by consuming the egg, usually during grooming. The egg hatches in the small intestine releasing a larva. The larva dives into the local glandular tissue and after about a week emerges into the small intestine and is carried downstream into the large intestine with the digested food. Once in the cecum or large intestine, its permanent home, it embeds in the tissue there, and after a total 74 to 87 days from the time the egg was swallowed, the young whipworm is ready to mate.

A few whipworms generally do not pose a problem for the host but if large numbers of worms are embedding themselves in the large intestine tissue, tremendous inflammation can result leading to a bloody, gooey diarrhea. Usually there is not enough blood loss to be dangerous but the diarrhea readily becomes chronic and hard to control. A second syndrome of infection has emerged but is not well understood, this being symptoms mimicking those of Addison's disease ([hypoadrenocorticism](#)). Here, a waxing and waning weakness with inability to conserve salt ultimately creates a dehydration crisis. The syndrome mimics Addison's disease in every way except that testing for Addison's disease will be negative and deworming yields a complete recovery.

Because female whipworms only periodically lay eggs (whereas other female worms lay eggs continuously), a fecal sample tested may easily be negative for eggs. This makes confirmation of a whipworm infection a challenge. It is common to deworm for whipworms if the symptoms are suggestive of them even if the fecal test is negative. Most common deworming agents do not work on whipworms so something special must be selected. The most common products are [fenbendazole](#) (Panacur®), and febantel (Drontal Plus®). Because of the long maturation cycle of young worms, a second deworming some 75 days or so after the first deworming is needed to fully clear the infection (easy to forget). Often another deworming in between these doses is recommended to further control the whipworm numbers.

More recently, regular [heartworm](#) prevention products have been developed to remove and control whipworms: Sentinel and Interceptor both will cover whipworms and their regular use covers the second deworming as well. Heartgard products do not carry a high enough dose of [ivermectin](#) to kill whipworms, though at other doses ivermectin could be used with appropriate cautions.

Soil contaminated by whipworm eggs is contaminated for years. It is virtually impossible to remove the eggs from the soil or kill them. Happily, however, this is one pet intestinal parasite that is not readily transmissible to humans.

### **Feline Whipworm Infection**

There are species of whipworms that can infect cats: *Trichuris serrata* in North America and *Trichuris campanula* in Europe. Cats are clean animals and fastidious around feces, and they rarely get infected. When they do, worm numbers are so small that symptoms hardly ever occur. Whipworms are more of an interesting incidental finding in cats when whipworm eggs happen to come up on a routine fecal check. In other words, feline whipworm infection is generally not considered to be much of a problem.



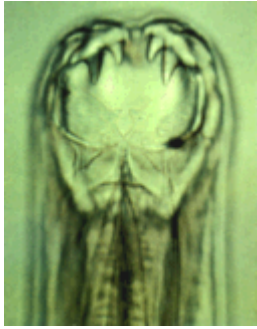
### **Hookworms**

The hookworm (*Ancylostoma caninum*, *Ancylostoma braziliense*, *Uncinaria stenocephala*) is one of the classical internal parasites of puppies, the others being [roundworms](#), [tapeworms](#), and [coccidia](#). Hookworm infection has several features that are of interest to the caretakers of dogs:

- Hookworms (particularly *Ancylostoma caninum*) suck blood.
- Hookworms can be transmitted to unborn pups.
- Hookworms can infect humans.



Before elaborating on these aspects of hookworm infection, it is important to understand the life cycle of the hookworm, encompassing how infection happens, how the parasite lives, etc.



adult hookworm  
(note teeth)

### Life Cycle of the Hookworm

The adult hookworm lives in the small intestine of its host. It hangs on to the intestinal wall using its six sharp teeth. Unlike other worms that just absorb the digested food through their skin as it passes by; the hookworm feeds by drinking its host's blood. The adult worm lives and mates within the host and ultimately, the female worm produces eggs. Hookworm eggs are released into the intestinal contents and passed into the world mixed in with the host's stool.

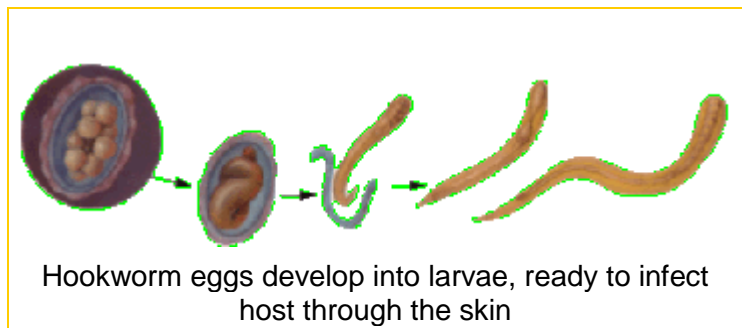


The egg hatches in the environment and develops from a first stage larva (the hatchling) to a second stage larva and finally a third stage larva, which is ready to infect a new host.



Hookworms living  
inside the intestines

The larva can infect its new host in several ways. One way is to penetrate the host's skin directly through the feet or belly or whatever part of the skin is touching the ground. Another way for the larva to gain entry to the new host is to be present in soil that is licked and swallowed by the host as it cleans itself.



Once the larvae are inside the host, they make their way to the intestine where some worms simply stay and mature into adulthood. Other individuals are bolder, tunnel out of the intestine, and migrate to the lung tissue. In the lung, the larvae develop into fourth stage larvae and when they are ready they break out of the lung, climb up the trachea, get coughed into the throat and swallowed. Once back in the intestine, these well-

traveled worms will complete their maturation to adulthood, rejoining friends that never left the intestine on a migration.

Not all the worms that begin this treacherous migration complete it. As they emerge from one tissue to move on to the next, some fall into a state of arrest where they go dormant and encyst. These larvae remain inactive periodically emerging and continuing their migration.

The adult worms live by sucking blood from the intestine. Their eggs are passed by the host into the environment where a new host picks them up. The developing larvae may migrate widely through the new host's body before settling down to complete their maturation.

Now let us return to the points we want to emphasize.

### **Hookworms Suck Blood**

Hookworm infection can be looked at as a natural check in the canine population as it is frequently lethal to young puppies. A young puppy is growing and that includes making enough new blood to serve not only its needs but also the needs of its growth. Growing requires a tremendous red blood cell production from the puppy's bone marrow, yet in the hookworm-infected puppy this process is being sabotaged by numerous tiny vampires within. The puppy may be effectively bled to death.

Infected puppies are commonly pale, weak, and have long-standing deficiencies. They may or may not have diarrhea.

Treatment involves deworming with one of several products: mebendazole (Telmintic®), fenbendazole (Panacur®), or pyrantel pamoate (Nemex®, Drontal®, Strongid T®). Deworming should be repeated in approximately 30 days. These products are not absorbed into the host's body from the GI tract and can only kill the worms living within the GI tract. The point of the second deworming is to kill worms in the process of migration at the time of the first deworming, allowing them an additional month to complete their migration. We currently do not have a deworming strategy effective against the encysted larvae in other areas of the host's body.

Simply killing the worms will not be sufficient to save the life of a severely affected puppy. Like any other blood loss, a transfusion may be needed to keep the puppy alive until it can replace its own lost red blood cells. An iron supplement is frequently needed as well.

### **Can We Prevent Transmission from the Mother?**

The answer is yes but daily deworming is required through the second half of pregnancy and into the nursing period. A regular single deworming will not be effective in protecting the litter. A special protocol using fenbendazole (Panacur®) has been found to be effective in preventing both roundworm and hookworm infection in unborn puppies.

Ask your veterinarian about this method if you are contemplating breeding a female dog. Female dogs using Proheart6 for heartworm prevention are believed to pass fewer hookworm larvae on to their pups.

## Hookworms Can Infect Human Beings



Cutaneous Larva Migrans (CLM) occurs as red, inflamed lesions in the skin where the larvae of canine hookworms burrow under the skin



Contaminated soil is an important hookworm source when it comes to a human disease called cutaneous larva migrans. Running barefoot

through the park or beach may seem pleasant but if the soil has been contaminated with canine fecal matter, the eager infective larvae may be waiting

to penetrate your skin.

Hookworm infection in the skin is intensely itchy but usually treatable. The local restrictions on bringing dogs to local beaches and the strict clean-up laws reflect concern for hookworm (and roundworm) infection in people.

Humans can also become infected by eating improperly washed vegetables, which may harbor contaminated soil. Humans have been found with hookworm intestinal infection. This would be a challenging diagnosis as it is not usually expected but the good news is that it is treated fairly easily when it is discovered.

Please visit the CDC's hookworm fact sheet at:

[http://www.cdc.gov/ncidod/dpd/parasites/hookworm/factsht\\_hookworm.htm](http://www.cdc.gov/ncidod/dpd/parasites/hookworm/factsht_hookworm.htm)

## Decontaminating the Environment

Many people are concerned about how to decontaminate the backyard or property that has housed an infected dog. The good news is that unlike roundworms that are extremely hardy in the environment, hookworm eggs deplete their energy reserves in a few months and die. Further, hookworm eggs do not survive freezing temperatures. If you use bleach to clean an area, the protective coating is removed from the hookworm egg and the egg will become dehydrated and will die. Borates raked into the soil will also kill hookworm eggs but will kill grass and vegetation as well.

## Prevention

Most heartworm preventives will also prevent hookworm infection.

## Feline Hookworms

There are two species of hookworms in cats: *Ancylostoma tubaeforme* and *Ancylostoma braziliense*, the former being the most aggressive blood sucker. The story is pretty much the same for cats with a few exceptions:

- Kittens cannot be infected before birth nor can they be infected by nursing. Cats are generally infected by larvae invading the skin or by eating an infected prey animal.
- Dogs can become infected by eating an infected vertebrate host and so can cats but there is an important invertebrate can infect a cat: the cockroach. A scuttling bug can be a tempting toy for a cat but eating the cockroach can transmit hookworm larvae.
- The Companion Animal Parasite Control Council recommends deworming kittens beginning at age 3 weeks with pyrantel pamoate.
- There are numerous products approved for the treatment of feline hookworm infection: ivermectin, milbemycin oxime, emodepside (active ingredient in Profender®), selamectin, and moxidectin.

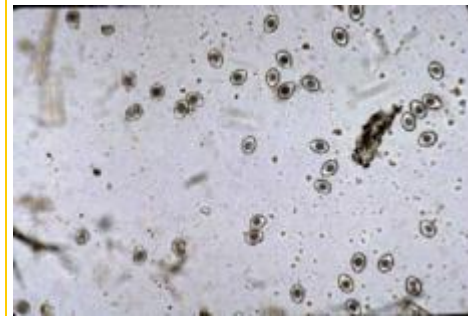
## Coccidia

### What on Earth are Coccidia?

Coccidia are single-celled organisms that infect the intestine. They are microscopic parasites detectable on routine fecal tests in the same way that worms are, but coccidia are not worms and are not susceptible to deworming medications. They are also not visible to the naked eye. Coccidia infection causes a watery diarrhea that is sometimes bloody; it can be a life-threatening problem, especially to a young or small pet.

### Where do Coccidia come from?

Oocysts (pronounced o'o-sists), like those shown above, are passed in stool. In the outside world, the oocysts begin to mature or sporulate. After they have adequately matured, they are infective to any host (dog or cat) that accidentally swallows them.



*There are many different species of coccidia but for dogs and cats, the most common infections are with coccidia of the genus Isospora (pictured here). The information presented here pertains to Isospora species.*

To be more precise, coccidia come from fecal-contaminated ground. They are swallowed when a pet grooms/licks the dirt off. In some cases, sporulated oocysts are swallowed by mice and then the host is infected after eating the mouse. Coccidia infection is especially common in young animals housed in

groups, such as shelters, rescue areas, kennels, etc. This is a common parasite and is not necessarily a sign of poor husbandry.

### **What Happens Inside the Host?**

The sporulated oocyst breaks open and releases eight sporozoites. Each of these sporozoites finds an intestinal cell and begins to reproduce inside it. Ultimately, the cell is so full of what are called merozoites at this stage that the cell bursts, releasing merozoites that seek out their own intestinal cells so the process begins again. It is important to note how thousands of intestinal cells can become infected and destroyed as a result of accidentally swallowing a single oocyst.

As the intestinal cells are destroyed in larger and larger numbers, intestinal function is disrupted and a bloody, watery diarrhea results. The fluid loss can be dangerously dehydrating to a young or small pet.

### **How are Coccidia Detected?**

A routine fecal test is a good idea for any new puppy or kitten whether there are signs of diarrhea or not as youngsters are commonly parasitized. This sort of test is also a good idea for any patient with diarrhea and is recommended at least once a year for healthy dogs and cats as a screening test. The above photograph shows coccidia oocysts seen under the microscope in a fecal sample. Coccidia are microscopic and a test such as this is necessary for diagnosis. Small numbers of coccidia can be hard to detect, so just because a fecal sample tests negative, this doesn't mean the pet isn't infected. Sometimes several fecal tests are performed, especially in a young pet with a refractory diarrhea (one that won't go away); parasites may not be evident until later in the course of the condition.

### **How is Coccidia Treated?**

The most common medicines used against coccidia are called coccidiostats. They inhibit coccidial reproduction. Once the numbers stop expanding, it is easier for the patient's immune system to catch up and wipe the infection out. This also means, though, that the time it takes to clear the infection depends on how many coccidia organisms there are and how strong the patient's immune system is. A typical treatment course lasts about a week or two, but it is important to realize that the medication should be given until the diarrhea resolves, plus an extra couple of days. Medication should be given for at least 5 days total. Sometimes courses as long as a month are needed. In dogs and cats, sulfa-based antibiotics are the most commonly used coccidiostats.

The use of sulfa drugs in pregnancy can cause birth defects. Sulfa drug use can also lead to false positive test results for urine glucose.

There is another medication that is worth mentioning called [ponazuril](#), a large animal product. This medication is actually able to curtail a coccidial infection in five doses or less and has been used in thousands of shelter puppies and kittens with no adverse effects. This product would seem to be superior to the usual sulfa drugs, but the problem that keeps it from becoming a mainstream treatment is the fact that it is available only as a paste for horses and must be diluted down to create an appropriate small animal

formula. The large volumes of product yielded are not cost effective if only occasional patients are treated for this parasite. Ponazuril is thus most commonly used in kennels, catteries, and animal shelters though one may be pleasantly surprised to find it in stock at a regular veterinary office.

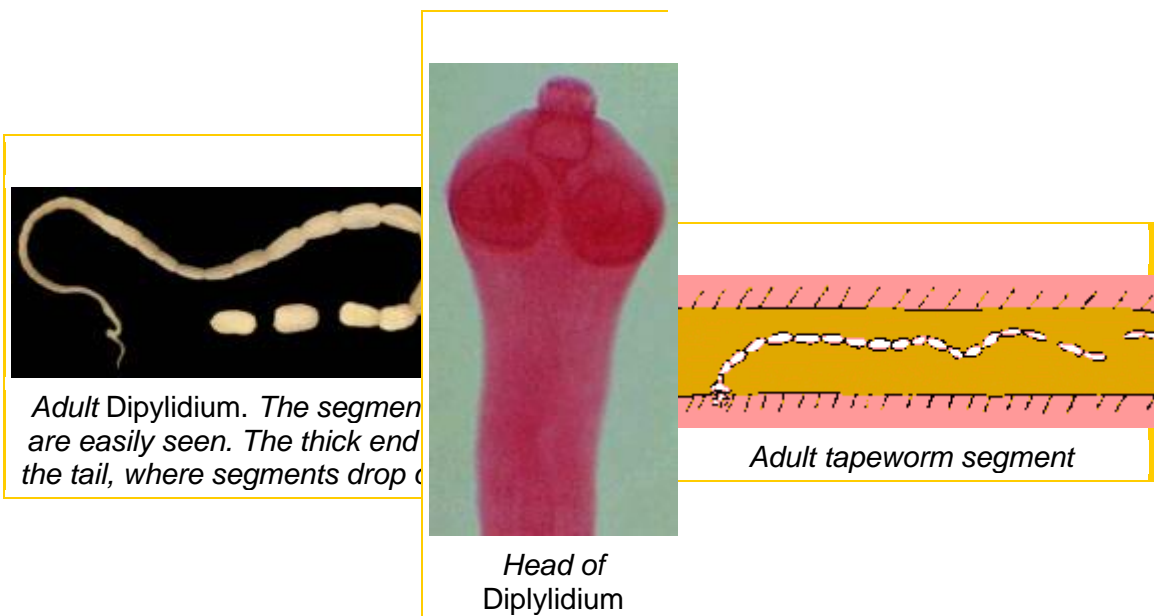
### Can People or other Pets Become Infected?

While there are species of coccidia that can infect people ([Toxoplasma](#) and [Cryptosporidium](#), for example), the *Isospora* species of dogs and cats are not infective to people. Other pets may become infected from exposure to infected fecal matter but it is important to note that this is usually an infection of the young (i.e. the immature immune system tends to let the coccidia infection reach large numbers whereas the mature immune system probably will not.) In most cases, the infected new puppy or kitten does not infect the resident adult animal.

### Tapeworms

(Common tapeworms, *Dipylidium caninum*)

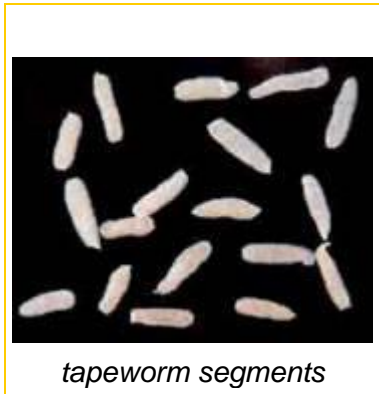
The adult *Dipylidium caninum* lives in the small intestine of dogs or cats. It is hooked onto the intestinal wall by a structure called a rostellum, which is sort of like a hat with hooks on it. The tapeworm also has six rows of teeth it uses to grab on to the intestinal wall. Most people are confused about the size of a tapeworm because they only see its segments, which are small; the entire tapeworm is usually 6 inches or more.



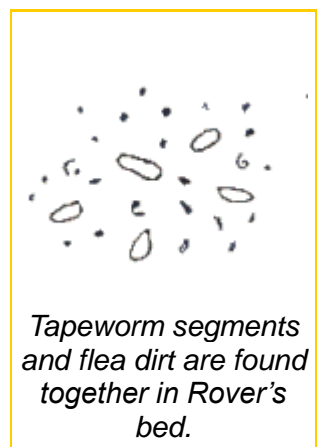
Once docked like a boat to the host's intestinal wall, the tapeworm begins to grow a long tail. The tapeworm's body is basically a head segment to hold on with, a neck, and many tail segments. Each segment making up the tail is like a separate independent body, with an independent digestive system and reproductive tract. The tapeworm absorbs nutrients through its skin as the food being digested by the host flows past it. Older

segments are pushed toward the tip of the tail as new segments are produced by the neckpiece. By the time a segment has reached the end of the tail, only the reproductive tract is left. When the segment drops off, it is basically just a sac of tapeworm eggs.

The sac is passed from the host's rectum and out into the world, either on the host's stool or on the host's rear end. The segment is the size of a rice grain and is able to move. Eventually the segment will dry up and look more like a sesame seed. The sac breaks and tapeworm eggs are released. These eggs are not infectious to mammals. The tapeworm must reach a specific stage of development before it can infect a mammal.



Larval fleas are generally hatching in this vicinity and these larvae are busy grazing on organic debris and flea dirt (the black specks of digested blood shed by adult fleas to nourish their larvae). The flea larvae do not pay close attention to what they eat and innocently consume tapeworm eggs.





- 1) Tapeworm segment breaks, releasing eggs
- 2) Eggs are eaten by grazing flea larva
- 3) Flea larva pupates

As the larval flea progresses in its development, the tapeworm inside it is ready to infect a dog or cat. The flea is infectious to its mammal host at this time. The flea goes about its usual business, sucking its host's blood, when to its horror it is licked away by the host and swallowed.



*Rover licks himself and swallows fleas*

is also progressing in its development. By the time the flea is ready to infect a dog or cat, the young tapeworm is only a stage of development. The flea goes about its usual business, sucking its host's blood, when to its horror it is licked away by the host and swallowed.

Inside the host's stomach, the flea's body is digested and the young tapeworm is released. It finds a nice spot to attach and the life cycle begins again. It takes 3 weeks from the time the flea is swallowed to the time tapeworm segments appear on the pet's rear end or stool.

Controlling fleas is essential to prevent recurring infections with this species of tapeworm.

## FAQ

### Why is it Called a Tapeworm?

This creature gets its name because its segments and body are very flat and look like a piece of tape.

### What do they look like?

Inside a pet, the adult tapeworm can be a half a foot long or more. It is made of small segments, each about the size of a grain of rice. The tapeworm's head hooks onto the pet's intestine with tiny teeth and the worm absorbs nutrients through its skin. Each segment contains a complete set of organs but as new segments grow in at the neck area and older segments progress to the tip of the tail, the organs disintegrate except for the reproductive organs. When the segment drops off from the tail tip, it is only a sac of eggs.

This segment is white and able to move when it is fresh and, at this time, looks like a grain of white rice. As the segment dries, it looks more like a sesame seed.

### Where do they Come from?

There is no other way for a pet to get *Dipylidium caninum* except from fleas.

Many people who had thought their pet could not possibly have fleas find out about the infestation this way. The tapeworm segment breaks open, releasing its eggs. A larval flea consumes the egg along with the flea dirt that it normally eats. As the larval flea matures, so does the baby tapeworm. When a grooming dog or cat licks the flea and swallows it,



the dead flea is digested in the dog's stomach, releasing the baby tapeworm. The tapeworm is passed to its new home in the dog or cat's small intestine, where it attaches and lives its life.

This parasite does not harm the pet in any way as there are plenty of nutrients passing by to serve both the host and its tapeworm (tapeworms require very little nutrients.) Still, high performance dogs, who need every calorie working for them, may show a decrease in performance because of a tapeworm infection.

There is another type of tapeworm that may be confused with *Dipylidium caninum* and that is the *Taenia* genus of tapeworms. This tapeworm has a segment that looks different and has a different mechanism of infection.

### **How do you Know if your Pet has them? Why do they Sometimes Fail to Show up in a Fecal Test?**

Because the eggs are passed by the pet in packets (segments), they often do not show up on the fecal exam; the packet must break open for the eggs to be seen. Consider that the pet has tapeworms if segments are seen under its tail, around its anus, or on its feces. Segments can be passed in small groups connected to each other, leading the owner to describe a worm that sounds larger than a grain of rice. Tapeworm segments are also quite flat.

Some people will mistake maggots in the stool for tapeworms. Maggots are not seen in freshly passed stool and are not flat.

### **Can People get them?**

Theoretically, yes, people can get them but they must be infected the same way dogs and cats are: by swallowing an infected flea.

### **How do we Get Rid of Them?**

Tapeworms are killed by different medications (one is called praziquantel), which is administered by injection, tablet, or topically. The tapeworm is killed and digested with the pet's food. It is not passed in the stool later.

### **Why do some Veterinarians Recommend Two Treatments and others only Recommend One Treatment?**

Only one treatment is needed to kill the tapeworms in the body; however, many clinics recommend a second injection in three weeks. The reason for the second injection is this: If the owner finds out at the time of their office visit that they need to control fleas to control tapeworms, they will need at least a month or so to control the fleas.

After the first treatment is given, there is no reason why the pet cannot immediately get reinfected. It probably will reinfest itself at some point. By seeing the animal in three weeks and giving another treatment after the fleas are controlled, there is a good chance

that the tapeworms will not be back three weeks later. It takes three weeks from the time the pet swallows the tapeworms to the time segments can be seen by the owner.

On the other hand, who knows when the pet will swallow another infected flea? Our recommendation is that a single treatment be administered whenever segments are seen.

### **If One Pet Has Tapeworm Segments, can it be Assumed that they all Do?**

No, just because one pet in the household has swallowed an infected flea does not mean they all have. Our recommendation is to deworm only the pets who have obvious tapeworms.

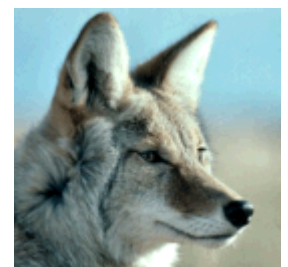
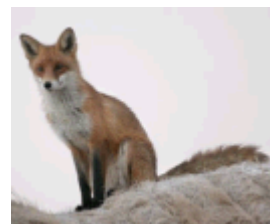
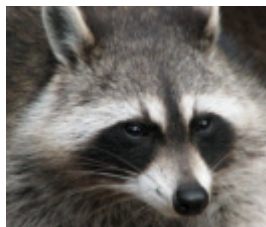
### **Why Might a Pet Continue to get Tapeworm Infections?**

While many people would like to blame the medication as ineffective, the truth is that there must be an on-going flea population in the pet's environment. The key to eradicating *Dipylidium caninum* is flea control.

## **Rabies**

Descriptions of rabies go back thousands of years as rabies has classically been one of the most feared infections of all time. It is caused by a bullet-shaped rhabdovirus that is relatively unstable in the environment; establishing infection requires direct contact with infected mucous membranes. In most cases, disease is transmitted via bite wound. Only mammals are susceptible to infection, and wildlife is the primary animal group where infection occurs. When wildlife comes into contact with humans or domestic animals, rabies becomes a public health problem. Despite vaccination being readily available, every year the U.S. reports hundreds of dog and cat deaths from rabies, not to mention several human deaths. Worldwide some 55,000 human deaths from rabies occur and rabies remains an important and nearly untreatable illness even now in the 21st century.

Rabies is nearly untreatable once symptoms begin despite all the resources of modern medicine and it is important to take its threat seriously. It is because of rabies that most municipalities have dog licensing requirements in order to ensure that the community's dogs are vaccinated.



The most common wildlife species to spread rabies to domestic animals and humans in

the Northern Hemisphere are the skunk, bat, raccoon, fox, and coyote. It should be noted in particular that wildlife, bats especially, are able to gain access to indoor areas and potentially infect pets and people.

**MANY PEOPLE DO NOT REALIZE HOW FAST DEATH OCCURS FROM RABIES.**

While it may take a long time for the virus to incubate, once even mild symptoms begin, death occurs within 10 days.

Virus in the infected animal's saliva enters the victim's tissues during the bite. The virus attaches to the local muscle cells for a couple of days before penetrating to local nerves and beginning its slow ascent to the brain. Once in nervous tissue, the virus is not accessible to the immune system and may safely proceed, although the journey is slow taking up to one year (average time between bite and detectable virus in the brain is 20 to 30 days). Virus ultimately reaches the brain and in two to three days more is evident in all body secretions including saliva. At this point, the disease becomes transmissible and symptoms begin.

**IT CAN TAKE UP TO A YEAR FROM THE TIME OF THE INITIAL BITE BEFORE SYMPTOMS BEGIN TO SHOW. ONCE SYMPTOMS SHOW, TREATMENT IS NEARLY IMPOSSIBLE.**

*PRODROMAL STAGE* (the first 1.5 days after symptoms have started)

A change in personality is noted. Friendly animals become shy, etc. The larynx begins to spasm and a voice change may be noted (especially true in rabid cattle). Most infected animals will actively lick or scratch the site of the original bite.

*EXCITATIVE STAGE* (Next 2-3 days)

Classically, this would be the "mad dog" stage. The animal has no fear and suffers from hallucinations. If confined, the animal often attacks the bars of the cage.

*PARALYTIC OR DUMB STAGE* (Next 2 days)

Weakness/paralysis sets in. The larynx is paralyzed resulting in an inability to swallow, thus drooling and "foaming at the mouth" result. The animal dies when the intercostal muscles (which control breathing) are paralyzed. It is from animals in this stage where most human exposure occurs. There is no treatment for animals or humans once clinical signs appear.

Once the virus has been released to body secretions, it is again accessible to the immune system; however, the patient dies before an adequate immune response is mounted.

The classical symptoms of rabies described above may not be obviously recognizable, making diagnosis difficult if not impossible in a living animal. Long quarantines are often needed to determine if infection has occurred.

When human exposure to the animal in question is involved, what happens depends on an assortment of criteria. If the animal in question is dead, its brain can be tested for rabies. There is no test for rabies in a living animal but since we know that death follows quickly after the virus becomes contagious, a living animal can be confined for 10 days.

If the animal is still alive 10 days after biting a person, then the bite could not have transmitted rabies.

In order to raise awareness of rabies, a World [Rabies Day](#) is scheduled annually to call attention to this problem. More information about rabies in both humans and animals can be found on that website.

## Prevention

Happily, rabies prevention is accomplished with vaccination and limiting exposure to wildlife. The standard killed-virus vaccines are available for both dogs and cats and, after the initial dose, which is good for one year, subsequent doses are generally good for three years. Because of an association with tumor development in cats with killed virus vaccine, a recombinant product is now available that uses a portion of rabies viral DNA cloned into a harmless canarypox virus. This vaccine is just as effective as the traditional vaccines but must be administered annually. Rabies vaccination protocols are typically controlled by municipal regulations. Most communities legally require vaccination of all dogs. The American Association of Feline Practitioners recommends rabies vaccination for all cats.

For pets not current on rabies vaccination that have been exposed to biting wildlife, the Texas Post-Exposure Rabies Prophylaxis Protocol has been particularly helpful. In this situation, the pet should be vaccinated for rabies as soon as possible after the wildlife bite with booster vaccines given 3 weeks post-bite and 8 weeks post-bite. The pet should be strictly isolated for 90 days (note that in California, the law requires a 180-day isolation period). This protocol has been extremely successful in preventing rabies symptoms and contagion when normal rabies vaccination had lapsed.



## The Law Regarding Animal Bites (Against Humans)

In my area (Los Angeles), if the biting animal has been legally vaccinated against rabies, only routine first aid may be necessary; bacterial infection of the wound may still be possible. If the animal has not been currently vaccinated, it must be confined for 10 days at the owner's expense for observation and then vaccinated at the end of that period.

The purpose of the ten-day period is to determine if rabies virus could have been in the

animal's saliva at the time of the bite. An animal infected with rabies and shedding virus will certainly be dead within ten days.

If the biting animal is known to have been exposed to wildlife, the situation is different. A vaccinated animal must be re-vaccinated within 48 hours and confined for observation for 30 days. Unvaccinated animals must either be confined for 6 months or be euthanized and tested for rabies. All bites that break the skin are reportable to the health department. All dogs must be vaccinated against rabies. Wildlife/pet incidents leading to bites on the pet are of no concern to public health officials as long as no humans have been bitten.

LAWS REGARDING BITING DOGS AND RABIES VACCINATION ARE HIGHLY REGIONAL. CHECK WITH YOUR LOCAL ANIMAL REGULATION DEPARTMENT OR VETERINARIAN TO FIND OUT WHAT YOU NEED TO KNOW.

### **If you are Exposed**

A fresh bite wound should be washed out with water quickly as this may wash out viral particles. The time it takes for the virus to reach the brain depends on the amount of virus present in addition to the proximity of the wound to the head.

If the animal is dead, the head of the biting animal is submitted to the health department for fluorescent antibody testing for the rabies virus. This process takes a matter of hours so that any bite victims can know right away if they will require rabies treatment. If the biting animal is living, its vaccination status should be confirmed as soon as possible and it will need to be confined. The bite wound should be reported to the health department as soon as possible.

Hyperimmune (antibody rich) serum is flushed into the wound in hope of inactivating the virus before it may penetrate to the nerves. The patient receives a vaccination on a regular schedule for about a month. In this way, when the virus comes out in secretions, a strong immune response is waiting to put down the infection.

For complete details, the [CDC has information on post-exposure rabies](#).

ANYONE PURSUING A CAREER WITH ANIMALS SHOULD CONSIDER VACCINATION AGAINST RABIES.

Veterinarians, for example, have a rabies exposure risk more than 300 times that of the general population.

### **Quarantines when Traveling**

Great Britain, Hawaii, and several other island areas have successfully eradicated rabies from their territory. These places are EXTREMELY cautious about allowing potential carriers of rabies in. Because of the long incubation period of rabies, a long quarantine is needed; however, this must be balanced by the expense associated with quarantine and an owner's reluctance to be separated from his or her pet. Most places that have eradicated rabies have special protocols for avoiding or minimizing quarantine. Typically, a microchip is implanted in the pet for identification purposes, a rabies antibody titer (a measurement of vaccine-induced protection) must be performed at an approved laboratory, and rabies vaccine documentation is necessary.

For listings of what each state requires for entry, the [USDA](#) has prepared a Web site with the most recent regulations at:

For [travel to another country](#) it is best to check with that country's consulate but guidelines are also available at USDA.

### **Other Links**

The [CDC's rabies home page](#) has, in addition to basic information, a children's education area that is particularly helpful for families who go camping.

### **Feline Leukemia Virus (FeLV)**

Authored by: Becky Lundgren, DVM

Feline leukemia virus, a retrovirus, is a common infection of cats. It is the cause of more cat deaths, directly or indirectly, than any other organism and is widespread in the cat population.



### **Disease Transmission**

Feline leukemia virus infection (FeLV) can be transmitted several ways:

1. by the saliva of infected cats contaminating the eye, mouth, and nose membranes of non-infected cats via licking.
2. by passing infected blood to non-infected cats.
3. from mother to fetuses (developing kittens) during pregnancy.

### **Disease**

Most infected cats eliminate the virus and become immune. In those cats that do not develop immunity, the virus spreads to the bone marrow.

Proliferative and degenerative diseases may occur in any of the tissues invaded by the virus, or the virus may be indirectly responsible for other illnesses because of its immunosuppressive effect. A large percentage of the cats that are exposed to the virus will have latent (hidden) infections and will be capable of transmitting the disease in saliva, tears, and urine. Some of these latent carriers will become clinically ill when stressed.

### **Diagnostic Tests**

Necessary diagnostic tests may include blood chemistry, hematology, radiography, bone marrow aspiration, ophthalmoscopy, and specialized antibody tests.

## **Treatment**

There is no effective treatment for the myeloproliferative (bone marrow) form of leukemia. Treatment is mainly supportive, and may require blood transfusions, prednisone, and anabolic steroids.

FeLV cancer (lymphoma) has a better response to therapy than the myeloproliferative diseases do. Treatment may include chemotherapy, glucocorticoids, interferon, Protein A, and supportive treatment.

## **Prognosis**

Eighty-five percent of cats with FeLV infection die within 3 years of the diagnosis.

## **Prevention Of FeLV**

There are several preventive measures that can be taken to decrease the risk of contracting FeLV.

1. Adult cats can be FeLV tested, and then vaccinated if they are negative. FeLV vaccination of infected cats does not affect the carrier state, the capacity to infect other cats, or the development of disease in the infected cats. Booster vaccinations with recombinant vaccine are generally used in adult cats only if they have continuing risk of exposure. Killed, adjuvanted vaccines should be used only if the cat has been tested and is FeLV negative.

Cats are most vulnerable to the virus as kittens. Kittens should be vaccinated with a recombinant vaccine. Leukemia is almost-entirely preventable with just two kitten vaccines and a booster one year later. After that, even if the cat is exposed, the vaccines will help protect it -- plus the cat will naturally be more resistant to infection because of its age. Kittens may be tested at any age. However, infection in newborn kittens may not be detected until weeks to months after birth. Therefore, several FeLV tests during the first six months of life may be necessary to feel completely "safe" about a negative test result.

All kittens or adult cats that test negative by the first ELISA screening test, but with a known or suspected exposure to FeLV, should be retested. Although the majority of cats will test positive within several weeks, final retest of negative cats should be no sooner than 90 days post-exposure.

2. In large catteries, a test and removal program can be instituted.
3. Multi-cat households with FeLV positive cats should be maintained as a closed colony. (No new cats should be brought into the household to prevent the spread of infection to the new arrivals.)

### **Notes:**

Retroviruses are unstable, live for only minutes outside the cat's body, and are readily destroyed by most disinfectants.

Because the feline leukemia virus is so unstable, a new, healthy cat can be brought safely into a "contaminated" house within days of the departure of a FeLV infected cat.