



SF SPCA Shelter Medicine Ringworm Protocol

Here is a step-by-step explanation of what to do from when an animal is first suspected to have ringworm to the completion of ringworm treatment.

The Four Steps to Diagnosing and Treating Ringworm are:

- 1:** Wood's Lamp test and direct examination of hairs
- 2:** Plating a DTM culture
- 3:** Starting medical treatment for a ringworm suspect
- 4:** Daily and weekly upkeep of ringworm patients

Step 1: The Wood's Lamp test

The Wood's Lamp

The first step in diagnosing a patient with ringworm is using the Wood's lamp test. The battery operated lamps do not produce enough light to see many positive lesions. Only use the plug in lamps. Turn on the Wood's lamp and let it warm up for 5-10 minutes. Once the lamp has warmed up, turn off all overhead lights and get to the darkest place possible in the room.

The Wood's Exam

Shine the light over the suspected lesion, for about 5 minutes and examine the hairs. In a positive Wood's lamp test, the individual hairs should glow a bright florescent green. It is very important that the actual hairs glow and not the skin. A negative Wood's lamp test *does not* necessarily mean that the animal does not have ringworm. A positive Wood's lamp test is a good indication that the animal has ringworm, but more tests are needed to confirm and identify the ringworm.

The Wood's lamp test gives a good direction as to where to house the animal in the shelter ringworm wards. In both cases the animal will need to be isolated from the shelter population until a DTM culture verifies a positive or negative ringworm infection. Ideally, a Wood's negative animal will go into an observation ward, with other Wood's negative animals. Try to avoid placing Wood's negative animals in a ringworm positive ward. An animal with a Wood's positive test and a highly suspicious lesion can be moved

directly into an active positive ringworm ward. If an animal is in an observation ward and their DTM starts to turn positive, immediately move them to a positive ward.

Direct Examination of hairs

Once a suspicious lesion has been identified and examined under the Wood's lamp, direct examination of the hairs can be done using the microscope. If fluorescent hairs are observed, pluck and place the glowing hair on a slide with a drop of mineral oil. Let sit for 5 minutes and then examine the hair using the microscope. Infected hairs appear swollen and frayed with an irregular outline. If during the Wood's examination of a suspicious lesion, nothing fluoresces, pluck a few hairs from the lesion and examine them with mineral oil under the microscope. Different types of ringworm that do not fluoresce will still be positive upon direct examination. This is another good tool to determine housing of a possible ringworm animal, but does not fully diagnose ringworm.

Step 2: Plating a DTM culture

The Plate

Ideally bring the Derm-Duet culture to room temperature before plating the sample, but if short on time, it is OK to plate a culture directly taken from the refrigerator. If using the round Derm-Duet DTMs, tape must secure the lid to the base on two sides to decrease possible contamination.

The name of the animal and the date when the culture was plated is written on the bottom of the base of the culture and always include your initials. The DTMs are stored upside-down in the incubator, so by labeling them on the bottom, it is easier to remember to keep them upside-down when taking them in and out of the incubator.

Sampling

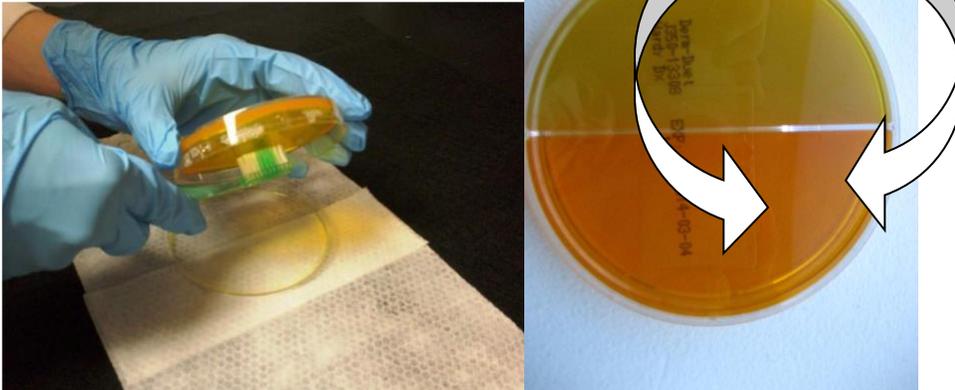
The DTM is plated by using the toothbrush sampling method. There are individually wrapped toothbrushes located in the cabinet under the incubator. A separate toothbrush is used for each individual DTM, never re-use a toothbrush.

If the animal has an apparent lesion Brush the animal from head to tail tip 15 times avoiding the lesion and paying special attention to the feet and face (if there are not lesions already there). After 15 brushes from all over the cat,

brush the suspected lesion about 5 times, ensuring that there has been some hair collected in the toothbrush.

If the animal does not have a lesion but is fostered with, housed with or part of a litter where one member has apparent ringworm lesion, all members who have been exposed **MUST** have a DTM sample taken. To take a sample of an animal with no lesion, brush the animal 20 times with the toothbrush over the whole body paying special attention to the feet ears and face.

Once the toothbrush samples have been collected, set up a clean area to inoculate the culture by placing an Acell wipe on the surface where the DTM will be plated. This avoids any environmental contamination that might get on the plate. Hold culture plate upside-down with the medium side up. Gently stab the tips of the toothbrush into the media, starting at 12 o'clock on the darker, more opaque side of the media and systematically move to the 6 o'clock position. Repeat on the lighter side of the culture plate and cover the whole plate in a consistent pattern.



Once a DTM is fully plated, store upside-down in the appropriate bin in the incubator.

Step 3: Starting medical treatment for a ringworm suspect

The Dips

Every animal that enters the ringworm program, must start Itraconazole treatment and receive bi-weekly lime-sulfur dips until treatment is completed. Lactating moms and their nursing kittens can receive lime-sulfur

dips. Moms will most likely groom the dip off the kittens, which may cause her to become sick, so separate her from the kittens for 15-20 minutes while the kittens dry. Provide extra heat support for the kittens while they are separated from mom. The animals are dipped on Saturday/Sunday and Thursdays when the SPORE volunteers are here.

How to Make the Dip

To make the lime-sulfur dip, mix 8oz of lime-sulfur concentrate for every gallon of warm water. The ‘Solo 1L Pump Sprayers’ have been found to be the easiest and most thorough way of administering the lime-sulfur dip to both dogs and cats. Wiping down the animal using a rag and bucket of lime-sulfur dip is another way of doing it, just be sure to get the under and over coat fully saturated-the dip must reach the skin. If using the sprayer, fill the sprayer with the dip and be sure to test the sprayer to make sure that it is on a strong-mist setting. Take the animal out of the housing cage while remaining in the isolation ward, and place on a towel or in a bucket. Spray or wipe the animal from neck down. Saturate the animal thoroughly and rub sulfur-dip deep into coat, then take a rag or towel and gently apply to face, head and ears (both outside and inside) taking caution to avoid the eyes. Wrap a towel around the animal and give them a good squeeze before returning the animal to their cage. Always provide heat support via heat lamp or wall heater. The lime-sulfur dip must air dry on the coat. Indicate on the ringworm treatment sheet that the lime-sulfur dip was given.

Itraconazole

The itraconazole that is currently being used is Itrafungol, which comes in the concentration of 10mg/ml. The standard dosage for Itrafungol for ringworm treatment is 5mg per kilogram for 21 days /doses. Due to the rapid growth of kittens and the longevity of ringworm treatment, kittens must be weighed weekly to accurately adjust their Sporanox dosage.

- If the animal is *over 6 months*, the Itrafungol is given the first 21 consecutive days of treatment
- If the animal is under 6 months, the Itrafungol is given with a ‘week on/ week off’ pulsing schedule for a total of 21 doses. This means they are given the oral medicine the first, third and fifth week of treatment.

If dealing with a young animal, like a kitten, the first thing to do is weigh the animal to calculate the dosage of itraconazole. Currently they are

weighed on Sundays, when they are taken out to clean their enclosures. When dealing with dogs and puppies, see a doctor for the accurate itraconazole or terbinafine dosage.

Terbinafine

Terbinafine is another anti-fungal drug that is starting to be used more and more in shelters for the treatment of ringworm. Terbinafine is used at 30mg/kg once daily for 3 weeks only and is used along with the topical treatment of the lime-sulfur dips. If the animal is still under treatment after the 3 weeks of oral meds are completed, they still receive lime-sulfur dips bi-weekly until completion of treatment. Nursing moms cannot have terbinafine and must be kept on Itraconazole until puppies are weaned. We currently carry 250mg terbinafine tablets. This makes terbinafine the ideal choice for dogs with ringworm. Until we are more comfortable using terbinafine, always consult with the shelter veterinarian before starting an animal on terbinafine.

Step 4: Cleanliness and Organizing

What to wear

Gowns, gloves and booties must be worn in the ringworm wards. One gown/glove per cage/kennel. Gowns and gloves are never stored, always use a fresh gown and glove. Gowns and gloves are changed between each cage or kennel. Booties must be changed between kennels and are thrown away after one wear.

Daily and weekly upkeep of ringworm patients

Each day the DTMs in the incubator should be checked and recorded in the DTM log. This tracks the growth and color change of the cultures. If the first DTM of an animal has no growth in 7 days and the animal has no apparent lesions, the animal can be cleared from ringworm isolation. Once a DTM has matured and a fairly good amount of dematophyte growth is observed, a tape-prep cytology needs to be performed. For most cases a mature DTM is anywhere from 10 to 14 days old.

To obtain a tape-prep cytology sample, first place a drop of methylene blue on a slide. Take a piece of clear cytology tape and gently press the tape onto a fuzzy growth on the green side (RSM) of the Derm-duet culture. Gently press the tape onto the slide, evenly, covering the drop of methylene with the tape. After the tape is on the slide, wipe away the excess blue stain.

Examine the slide with a microscope to identify the species of ringworm. Once identified, record in the DTM log and discard the DTM. If unable to

positively identify the species, mark in the log that a cytology was done and was negative. Return the DTM to the incubator and try again 2-3 days later.

Weekly Sampling; Confirming Cure

Every week a DTM must be plated on all active ringworm patients. This is done by the SPORE volunteers on Saturday/Sunday during the big clean. After having a positive first DTM culture, an animal remains in ringworm isolation until they have two consecutive negative (can be p-score 1) ringworm cultures. Once they have had a negative DTM or one with a p-score of 1 for 7 days they should be moved into a “clean” ward, with the other “1st negative” DTM patients. Another DTM is plated and the first one is kept for a full 14 days. If the first DTM is negative or has had 14 days limited dermatophyte growth (p-score of 1) and the second DTM has had 7 days of no growth, then the animal is finally cleared of ringworm!

Pathogen scoring (P-score) of the DTMs

“P-score” or “Pathogen score” refers to the number of colony forming units (cfu) growing on the plate and is used in decision making for treatment and for monitoring the response to treatment.

P-1: less than 4 colonies on the plate

P-2: 5-9 colonies on the plate

P-3: more than 10 colonies, too many to count colonies or a “swarmed plate”

P-1 animals do not indicate a ringworm infection, but rather a fomite carrier, these cats should be examined with the wood’s lamp again and if they do not have any lesions they should receive a lime-sulfur dip and placed in non-contagious housing. If a lesion is seen upon the second exam, the animal is placed in ringworm isolation and begins treatment.

P-2 animals are also very likely to be fomite carriers without a true infection or possibly in the very early stages of their ringworm infection. These cats also require a second examination with a wood’s lamp and if they do not have any lesions then they are dipped with lime-sulfur and placed in non-contagious housing. If a lesion is seen upon the second exam, the animal is placed in ringworm isolation and begins treatment.

P-3 animals are truly infected animals and should be in a ringworm isolation space and started on treatment.

As the animals go through out treatment, their p-scores should go down from 3 to 1. An animal can enter first negative with a p-score of 1 or 2, as long as there are no active lesions present. An animal can only clear first negative and graduate with a p-score of 1 or a negative growth plate.

Cleaning Wards

Weekly, all of the ringworm wards should be scrubbed down and thoroughly cleaned. The SPORE volunteers are here to help us with this on Saturdays and Sundays. First, box up and remove the animals from the kennel and bring to lab in the order of least infected to most affected. This order is determined by reviewing the DTM plates from the previous week. Throw away all bedding, litterboxes, gowns and disposable toys. Clean all surfaces with a four part cleaning process. First do a hard clean with a general cleaner, followed by a rinse and then apply the disinfectant (Accel 1:16) let sit for complete 10 minute contact time and then followed by a final rinse. Remove all bowls and any washable toys and place in a bucket filled with a parvocide dilution (8oz per gallon or 1:16) of Acell. Set up the kennel with new bedding, new litterboxes, new bowls, and new toys. Now the animal can be returned to the clean, spore-free environment.