

DERMATOPHYTE TREATMENT IN A NUTSHELL

Sandra Newbury DVM
Director of Animal Medical Services, Dane County Humane Society

Karen A. Moriello DVM DACVD
School of Veterinary Medicine
University of Wisconsin-Madison

The following content is intended to be informational. We do not assume responsibility or liability for patient care or outcome.

Ringworm is an infectious disease with zoonotic potential. Humans can get ringworm too.

This handout is intended to help shelters work with veterinarians to design cost effective systems to screen, treat, and monitor for dermatophyte infections.

How is Ringworm Diagnosed?

Ringworm CANNOT be diagnosed based solely on whether or not the cat has skin lesions (any abnormality of the skin or hair). The skin lesions of ringworm can mimic many other non-contagious, non-infectious diseases. You must screen and culture cats to determine if ringworm is present. **YOU CANNOT RELY ON CLINICAL SIGNS TO SAY WHETHER OR NOT A CAT IS INFECTED.** Ringworm can only be diagnosed based upon the findings of a fungal culture and examination.

Screening of Cats: Screening is best done at the time of admission. It is a two-step process and will only add a few minutes to your admission time.

Step 1: Cats should be examined for skin lesions and examined with a Wood's lamp. Wood's lamp examinations require some training, but briefly you are looking for BRIGHT LIME GREEN hairs. Any other color is suspect and should be considered a "negative." Doxycycline and Terramycin give a yellow glow when smeared or crusted on the fur. The examination of the skin is a good thing because it will also help you identify other things such as fleas, ticks, lice, wounds, Cuterebra, etc.

Step 2: Cats are screened for ringworm via toothbrush fungal cultures. A new clean toothbrush is aggressively combed over the cat's body with special attention being given to the face, feet and inside of the ears. If skin lesions are present, culture these areas last. The toothbrush bristles are then stabbed onto the surface of a fungal culture plate to inoculate the growth medium.

Suspect Cats: While you are waiting for final results of the fungal culture, separate cats with lesions from the general population. Start treatment for suspect cats with

lime sulfur rinses. This will not harm the cat and will protect the general population, environment, and staff in the event the cat is culture positive.

Limited Resource Situations: It is COST EFFECTIVE to screen all cats for ringworm. This can easily be done by culturing in house. If resources are limited target the following populations:

- All long haired cats
- All cats from hoarders or cruelty / neglect case homes
- All cats with skin lesions of any kind
- All cats with Wood's Positive Examinations
- All kittens

This will not identify all positive cats, but is better than not screening. In addition, consider dipping all cats upon admission with lime sulfur. One dip will NOT permanently stain the coat. **Lime sulfur dip on admission** may have a protective effect when cats are admitted to a contaminated environment. Lime-sulfur dip at admission is also likely to reduce contamination to the environment.

How Are Fungal Cultures Interpreted?

- YOU CANNOT LOOK AT A PLATE AND SAY "IT'S POSITIVE".
- All suspect colonies must be identified microscopically.
- Most laboratories or clinics use Dermatophyte Test Medium (DTM). On DTM, suspect colonies are pale white and the medium around the colony turns red as it grows. All this means is "hey, i'm red... look at me!"
- Visual "IDs" are not accurate as many non-pathogens and common molds are pale and also produce a red color change.

What does CULTURE POSTIVE really mean?

- Culture positive means that spores were found on the cat's hair coat and/or skin.
- Culture positive results cannot be ignored but it does not necessarily mean the cat is "INFECTED". So don't panic every time you get a "positive test" result!!
- Cats can be 'dust mops' and carry spores on their haircoat because they walked through or were in a 'contaminated environment'.
- Culture positive can also mean that the cat IS INFECTED.
- **Culture positive means you need to take some type of action.**

What to Do If You Get A Positive Test Result

When you get a "positive test result", you need to do SOMETHING, the question is what? The first thing you need to know is how much growth was identified? It is very helpful to know how many fungal culture colonies are on the plate. We call this a "Pathogen Score" or P-Score. It is a shorthand method of communicating how much growth was seen on the culture and it gives you a clue as to what action is needed. The second thing you need to know is "what does the cat look like **NOW**?" In other words, the cat needs to be re-examined.

Using the Number Of Fungal Culture Colonies (P-Score) To Help Determine Treatment

Pathogen Score: The need to treat for true infection depends on how heavily contaminated or infected the cat is based on culture results (pathogen score) and a thorough check for skin lesions.

- Pathogen score of 1 means less than 4 colonies growing on the culture plate.
- Pathogen Score of 2 means that there were less than 9 colonies on the plate and the whole plate was not completely covered.
- Pathogen Score 3 means the culture plate was completely covered.

General Guidelines:

- Any P-score (1-3) and skin lesions: Treat systemically and topically.
- P score of 1 and cat has NO SKIN lesions after careful examination: re-culture and then dip with lime sulfur. If the cat is a "Dust Mop" haircoat carrier, the second culture will be negative. We call this a "Dip and Go."
- (To be extra careful, you could wait for the second culture results prior to placing for adoption.). Cats with P-scores of 1 are either "Dust Mops" or had lesions that were too small to see yet or were in hard to find or difficult to culture places (deep in ear canal).
- P score of 2: VERY CAREFUL examination of cat with a Wood's lamp, especially inside the ears, on face, on tail and feet. Examination should take at least 5 minutes. If no lesions are found, treat as a "DIP AND GO". (Re-culture and then dip with lime sulfur).
- P-3 cats: Treat topically and systemically regardless of whether or not they have lesions. It takes a lot of spores to get a P-score of 3.

Systemic Treatment Options:

Griseofulvin is effective but not recommended because it can cause serious life threatening side effects. Also, it is becoming increasingly difficult to obtain. Ketoconazole is **not** recommended in cats for two reasons. First, it does not work well against *Microsporum canis*. Second, it makes them sick and liver toxicity is a problem. Terbinafine (Lamasil) is effective but very expensive and needs to be used at a dose of 40 mg/kg. Fluconazole has recently gone generic and is inexpensive and can be used. It needs to be used at 10 mg/kg once a day. Our recommended drug of choice for systemic therapy is ITRACONAZOLE. It is very effective, rapidly absorbed, has a long half-life in the skin (residual effect when discontinued), is safe and very effective.

Program (lufenuron): This is an ineffective treatment. Controlled studies have shown without a doubt it is ineffective!

Recommended Treatment Protocol:

Itraconazole 5-10 mg/kg orally once daily or 25 mg/adult cat for 21 days along

with twice weekly lime sulfur dips at 8 oz/gal. Continue until cured, see below.

How to Dip

- Lime-sulfur should be used at 8 ounces to the gallon (the higher dilution of the two given on the bottle). We have not found it to be necessary to put e-collars on the cats after treatment. Do not rinse off the solution. Do not pre-wet the cat.
- When mixing the dip it is important to put 8 ounces of the lime sulfur in the mixing container FIRST and then add the warm water. This will give you the correct dilution.
- The lime-sulfur treatment is very important to reduce ongoing environmental contamination. Lime-sulfur can be applied with a garden rose sprayer with nice warm water. We use a half-gallon sprayer.
- Keep the nozzle of the sprayer very close to the cat's skin so the spray just flows over them like a shower. Let the solution 'coat' the hairs. You must soak the cat to the skin. Use rags to gently sponge on dip around the face and inside their ears, on their little noses, etc. These areas are most important and tend to be the most difficult to resolve. Fractious cats can be sprayed through a wire carrier.
- You can make a portable dip sink by using a laundry sink and draining into a bucket.

It is OK to Soak the Babies. But, Keep Them Warm.

- Lime sulfur may be safely used in pregnant queens and nursing moms.
- It may be best to shave nursing moms in order to limit exposure for the kittens.
- Wipe lime sulfur off the teats before retuning mom to the kittens. Kittens are so fragile. We have dipped kittens as young as two to three weeks of age to protect them from becoming infected.
- **It is very important to keep the kittens warm!** Continue to protect them from becoming cold until they are completely dry.

Itraconazole for Kittens?

- Ringworm cannot be transmitted until after birth.
- Since the incubation will be 2-4 weeks you won't often see ringworm in kittens less than 4 weeks of age.
- Itraconazole is safe in kittens 3 weeks of age but dose carefully according to weight and change dose at regular intervals as the kittens grow.

Practice Tips from the Ringworm Wars

- We dose the itraconazole at 25 mg / adult cat and use closer to 10 mg/kg in kittens so they will not grow out of the dose in the three weeks we are treating.
- Itraconazole: can be mixed into butter or canned food (To make sure they eat it, give a medicine meatball before feeding so they are hungry).

- **Clipping** is something that is often recommended but we have not usually found that necessary in short or medium haired cats. In a long-haired cat with a high pathogen score or that seems unkempt, unwilling or unable to groom, clip the whole cat with a #7 or #10 blade (not a surgical blade).
- Be sure to alternate between two clippers or take breaks to allow the clippers to cool to avoid thermal injuries. Clipping can also be helpful for cats whose coats get clumpy and soaked from the dipping process.

Monitoring Treatment:

Ringworm is like many diseases, you need to monitor treatment to make sure it is working and to know when you have cured the cats. This is done via weekly fungal cultures. The “old” recommendation was to start monitoring after 4 weeks of treatment. The “new cutting edge” recommendation is to start monitoring treatment once weekly. In a study we did, it turned out that cats were curing faster than previously recognized when we monitored them once weekly and that it was more cost effective to do weekly fungal cultures from week one. Cats needed less treatment and were housed for fewer days. Kittens got adopted faster too. The best way to keep track of culture data is to create a small fungal culture log on each cat’s record. The following works well in our treatment program:

Cat’s Name:

Date	What Grew	Final (Y or N)	Wk 1	Wk2	Wk 3	P score

The first “date” entry is the ID culture or when the cat was found to be infected. After that, enter the dates of the weekly cultures. Record the P scores or the number of fungal culture colonies. If the cat is responding to treatment, you will see this score decrease along with lack of identification of any pathogens. Under “what grew” there are three possible answers: no growth (ng), contaminant © , or the pathogen (usually M. canis). Take fungal cultures weekly starting at week one. If you are using the itraconazole and lime-sulfur protocol, continue treatment until two consecutive negative cultures have been obtained. Remember, cultures reveal what was happening on the cat’s skin on the day of culture. Hold all cultures for 21 days. The cat is cured if it has two consecutive negative weekly cultures. In most cases, expect to treat the cat for at least 30 days if you use the itraconazole and cats until you have THREE NEGATIVE cultures a week apart; hold cultures for 21 days.

More Tips from the Trenches:

- Cats may 'cure' before they re-grow their hair.
- Lime sulfur does turn the coat yellowish, but this is very temporary. **DO NOT USE THIS AS AN EXCUSE TO AVOID LIME SULFUR!**
- Warning: cats can still look just awful and be culture negative when you are treating effectively; if you are NOT treating effectively, you can get cats that LOOK all better but are still culture positive. **YOU CANNOT RELY ON CLINICAL SIGNS TO SAY WHETHER OR NOT A CAT IS CURED.**

Always advise adopters of the risk of ringworm infection for people and animals and the fact that they should isolate newly adopted cats. If a cat has no lesions and is to be adopted out before results are final, tell them you have taken a culture and you will let them know of the culture results.

Additional recommendations:

- Treat for fleas and any other external parasites at admission. This prevents these parasites from spreading the disease from cat to cat and minimizes skin trauma that predisposes to ringworm.
- Segregate kittens and immune compromised cats from healthy young adult cats (and from each other) for the protection of all concerned.
- Make sure all humans get diagnosis and treatment for all lesions and cover all lesions while working with animals.

Keeping the environment clean

- Spores are primarily hair-borne; so they go where hair and dust go (via floating, drifting, being carried on clothing, etc.).
- Minimize how much you stir up spores through sweeping, flailing bedding about etc.
- Use electrostatic cleaners such as Swiffers or damp mopping in preference over sweeping where possible. You do not generally very careful about not contaminating clothing or hands.
- Take fungal cultures of ductwork using a Swiffer before you invest in duct cleaning. You only need to clean if the culture is positive. Professional cleaning of ductwork may not be necessary.
- The most effective way to keep the environment clean and to decontaminate the environment is to use the triple cleaning technique:
 1. Mechanical removal of hair, dirt, etc.
 2. Wash the area three times with detergent (Spic and Span or equivalent). Rinse thoroughly.
 3. Disinfect with 1:10 bleach where possible, allowing the area to be 'wetted' for 10 minutes.
 4. The MOST important steps are 1 and 2 good old fashioned cleaning! Think of spores like dust.
 5. Bottom line: Good old fashioned housecleaning works well to

keep an environment spore free.

(See last page for information about supplies)

Where Can I Get?

Itraconazole-Your veterinarian can order this drug. DO NOT ORDER GENERIC ITRACONAZOLE. At this time we are not sure if this is really "itraconazole".

Lime Sulfur, LymDyp, DVM Pharmaceuticals. The manufacturer distributes its products only to veterinarians. Your veterinarian will need to order this product for you.

Wood's Lamp
Long wave Wood's Lamp UVL-56 Lamp 365 nm
Fischer Scientific
#95-006-02
cost about 107.00

Fungal culture Plates
www.bactilab.com
Bacti-Labs
PO Box 1179

Mountain View California
800-227-7300
Order: Sab-Duets (K-800). These contain easy open plates with DTM on one side and plain Sabouraud's media on the other.

Help with Identification of Organisms?

See www.doctorfungus.org