Sandra Newbury, DVM
Koret Shelter Medicine Program
Center for Companion Animal Health
U C Davis School of Veterinary Medicine
www.sheltermedicine.com
Adjunct Assistant Professor of Shelter Animal Medicine
Department of Pathobiological Sciences
University of Wisconsin-School of Veterinary Medicine

Ringworm 101 for Shelters
Dedicated to volunteers everywhere but especially to...

- Sue Meyer who passed away this year.

- Sue was among the first to volunteer when Karen Moriello and I started the Dane County Humane Society Dermatophyte Treatment Project in 2003.

- Her ongoing leadership and mentoring for new volunteers played an immeasurably important role in keeping that program alive.

- Animals everywhere can hope many others will follow her incredible example.

Fungus is a lot like us.

The similarities between mammalian cells and fungal cells make it difficult to design drugs that will kill the fungus without killing us.
Potential for human infection: Zoonosis

Mechanical Carriers vs. True Infection

- True infection happens when micro-trauma allows fungal spores to invade the skin and hair to establish growth.

- Mechanical carriers are animals who have spores, like dust, on their hair coat from the environment.

- No true carrier state
Know your Dust Mop

Screening Animals for Ringworm: Recognition and Diagnostics

Screening exams, Wood’s lamp exams, direct exams of hair and cultures define cases, direct animal movement and guide treatment protocols.
Screening Protocol

Screening exam at admission includes a Wood’s Lamp exam

GO HOME!

Direct exam

No lesions?

Fluorescing Lesions?

Non-Fluorescing Lesions?

Pos.

Wait for culture results

Neg.

Treat as true infection

Culture

Choose the Right Location

- Non-Lesional first, please.
- Clean up after yourself.
- Admitting areas consistently have the highest levels of environmental contamination.
Screening Exam

- Get into the habit of doing an exam the same way every time
- Document lesions
- Use a physical exam form
- A careful physical at intake also helps identify other problems.

Check for Lesions

Look for *inflammatory* abnormalities of the skin.
Classic Lesions

Sites Not to Be Missed

- Inside the ears
- Nose, eyes and whiskers
- Tips of toes and bottoms of the feet
Ringworm Lesions?

Systematic Wood’s Lamp Screening
Wood’s Lamp 101

- Invest in a good lamp.
- Wood’s lamps have UV wavelength that will cause the most effective fluorescence.
- Consider a magnifying glass.

http://www.minresco.com/uvlamps/fraud.htm
(see UVL-21 compact lamp at bottom of page)
Turn out the lights, warm up the lamp, invite company

- Give your eyes time to adjust to the dark.
- Give the lamp time to warm up.
- You will need at least three hands.

Ringworm Glow: Basics

- Apple-green
- Occasionally blue-white
- The whole hair shaft should glow
- Especially the base
- Fungal growth does not make the hairs stick together.
Why Cats Glow

Fluorescence is a metabolite of the fungus that coats the hair as it is produced. The fungus grows in the hair follicle and along the base of the hair. So, fluorescence will be seen most commonly close to the skin. Often the entire shaft of the hair will glow.

What will glow?

• M. canis is the only pathogen of veterinary importance that fluoresces

• Previously estimated that only 50% of M. canis strains glow

• The truth is we don’t know how many strains glow and what factors influence fluorescence.

• In our experience, most infected cats do have fluorescing hairs.
Tricky Things that also Glow

- Doxycycline
- Terramycin
- Carpet fibers
- Dust

Direct Examinations of Fluorescing Hair
Direct exam of Wood’s positive hair

Supplies:
Wood’s lamp
Mineral oil
(Chlorphenolac or KOH with caution)
Microscope
Microscope slide
One cat or one dog
At least FOUR hands
Patience, practice and testing

Plucking hairs

Wood’s Lamp
Third Hand
Glowing hair

Fourth Hand
Drop of mineral oil or chlorphenolac
Setting up the microscope

• With the room lights low and the microscope OFF
• Look through the eyepiece
• Find the glowing hair using woods lamp next to the stage
• NEXT
• Turn on the microscope light to examine the hair

Direct Exam
Always back up your results with a culture.

As close as we get to a SNAP test for ringworm

Using and Understanding Fungal Cultures
How to Culture

• A toothbrush is an ideal means of collecting spores from the hair coat.
• Brush the whole cat vigorously from nose to toes.
• Remember to brush common areas of infection such as the face, inside the bell of the ears and tips of toes.
• For lesional cats, brush the whole cat first, then the lesion.
• Most cats love this!

<table>
<thead>
<tr>
<th></th>
<th>TB30</th>
<th>50 tuft polypropylene bristle Tooth brush</th>
<th>$88.40</th>
<th>1,440</th>
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http://www.hotelsupplies-online.com/fs_toothpaste.htm

Dermatophyte Test Media

• Fungal culture media.
• Contains an indicator that turns the media gel from orange to red as the pH of the media changes.
• Incubate at slightly warmer than room temperature. (78-80 F)

www.remel.com and search under Catalog for DTM
Inoculating Culture Media

- Always set up cultures in a clean area.
- Hold culture plates upside-down.
- Gently stab the tips of the toothbrush into the media.
- Cover the whole plate in a consistent pattern.

DTM

- Avoid using slants, if possible.
- Purchased petri dish style plates are currently the best alternative to making your own plates.
- Derm Duets from Bacti Labs as a substitute
- Treat fungal cultures as a biohazard for disposal.
Culture Interpretation

- Red only means “Look at me!”
- All pathogens turn DTM red.
- Not every organism that turns the media red is a pathogen.

Contaminant Growth

- Pigmented colonies are non-pathogenic contaminants.
- Contaminants are often common environmental organisms.
- Ringworm is never normal flora.
Early Growth

Culture Interpretation

- All suspect fungal colonies should be examined microscopically to identify the organism.
- Microsporum species are most common
  - M. canis ***
  - M. gypseum
- Trichophyton species may be pathogenic but are less common.
Tape Preps

- **Supplies**
- Clear tape works best
- **Stains**
  - Lactophenol cotton blue
  - or
  - New Methylene blue
- **Microscope**
- **Microscope slides**

1. Drop of stain on microscope slide
2. Gently touch tape to colony (sticky side down)
3. Place tape sticky side down over stain
4. Drop of stain on top
5. Cover-slip
Microscopic Identification

- M. canis
- M. gypseum

The P Scoring System

- Pathogen Score strongly influences treatment decisions
- Helps define cases
- Benefits from complete and consistent sampling method
- Must be used in conjunction with a thorough check for lesions
Assessment Based on Pathogen Score Results

Lesions?

NO

fomite carriers

YES

true infection

P1 or P2
1 - 9 cfu

P3
10 or more cfu

All P3 cats

true infection

Screening the Environment

- Use all the same tools
- Substitute a Swiffer for the toothbrush
- Look for where hair and dust would collect
Create an Isolation Facility

Mandatory Dress Code

• Prevention of zoonotic infection should be the top priority.
Treatments and Cleaning

- Treat and clean in order of infectious potential
- Infectious potential may change weekly
- Define clean and dirty zones

Treatment Basics

- Topical treatment
- Oral / systemic treatment
Topical Anti-fungal Treatment

Lime Sulfur

Published clinical research with shelter animals (in conjunction with oral itraconazole) has:

- Demonstrated rapid times to cure (+/-14 days) for true infections (P3)
- Demonstrated excellent control of environmental contamination even after the first treatment
- Demonstrated that adverse reactions are very rare (did not occur).
- No other product has yet been shown to have equivalent efficacy.
Other Promising Topicals?

- Accelerated Hydrogen Peroxide
- BUT...

How to Make a Dip Sink

- Cheap
- Portable
- No need to call a plumber.
Garden Sprayers

- Half gallon sprayer is preferred.
- Easily lifted when full.
- Solution stays warm.
- Short stubby spray nozzle helps with control.
- Clean thoroughly after each use.
- Fill with hot water and allow to discharge completely to prevent clogging of nozzle and valve.

Dilution and Mixing

- **8 oz** LymeDyp in 1 gallon water
- Higher concentration dilution on label
- Mix by putting 8 oz. LymeDyp in the sprayer then fill to 1 gallon
- Mix fresh solution each time, discard excess
The Dyp Show

• Use gentle but firm handling.
• Keep the spray close to the skin.
• Allow most cats to find a secure place to hold on.

The Dyp Show

• Soak the entire cat to the skin.
• Treatment must reach the base of the hairs to be effective.
• Pre-wetting is unnecessary and causes dilution.
The Dyp Show

- A small sponge or raglet may be used for the face and ears.
- The face and ears are the most difficult places to clear of infection.

The Dyp Show

- No need for party hats
- Minimal side effects
- No significant adverse reactions
Systemic (oral) Anti-fungals

Remember this?

Published clinical research with shelter animals oral itraconazole in conjunction with lime sulfur has:

- Demonstrated rapid times to cure (+/-14 days) for true infections (P3)
- Demonstrated excellent control of environmental contamination even after the first treatment
- Demonstrated that adverse reactions are very rare (did not occur).
- No other product has yet been shown to have equivalent efficacy.
Itraconazole 101

- 100 mg caps designed for humans can be split into doses for cats with a steady hand and some gel caps
- Liquid is available for dosing kittens but more costly

Published Protocol

- LS (8 oz. / gallon) twice weekly until cure is confirmed
- Oral itraconazole daily for 21 days

WITH THIS PROTOCOL:
- Cure is defined as two consecutive negative cultures taken at one week intervals
Other Hopefuls

- Fluconazole
- Terbinafine
- BUT....

Thanks to you for your caring...

...and to the ASPCA for making my position possible
• Does Spay/Neuter Have a “People Problem”?  (9/26)
• Ringworm Outbreak Management  (10/02)
• Starting a TNR Program in Your Community  (10/17)
• Beating Ringworm: Yes, You Can!  (10/23)

www.aspcapro.org/webinars