Taking the Guess Out of Fungus: Dermatophytosis

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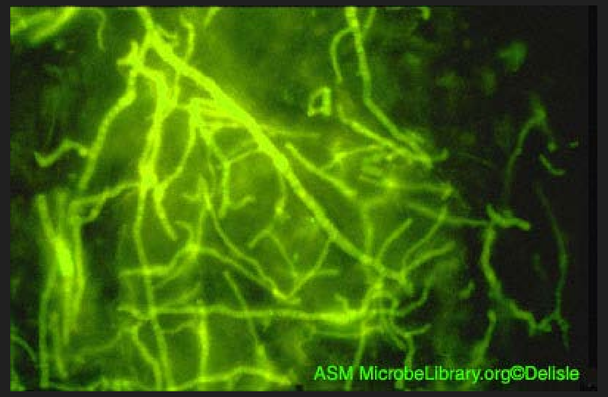
Two Scenarios

What is ringworm?

- Not a worm at all!

- It is an infection caused by a FUNGUS



What is ringworm?

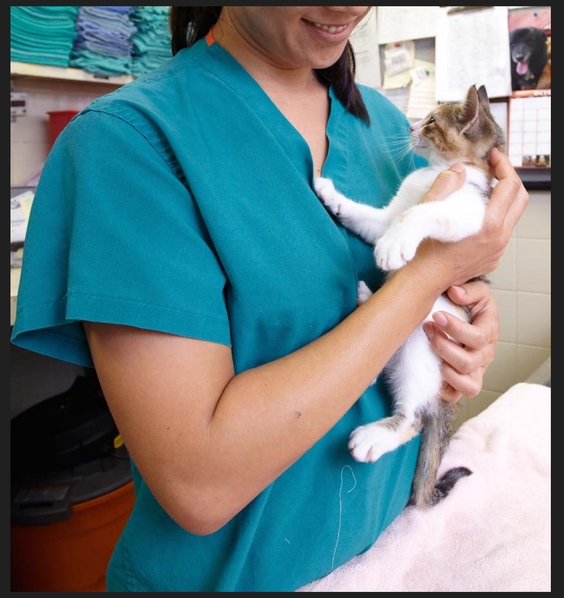
- Infects hair, nails and/or skin

- *Microsporum canis* is the most common by far in shelters

How is ringworm spread?

- Spread via
  - Direct contact
  - Fomites
  - Environmental Contamination

- HAIR and DUST are the most common sources



Who can get ringworm?

- Most animals in shelters that have hair…
- CATS are the species of biggest concern
- Dogs less likely and probably overdiagnosed

Why should we care about ringworm?

- Humans can get it
- Highly contagious- especially for cats

Risk Factors for Infection

- Age
- Breed
- Concurrent Health Status
- Environment
- Stress

Risk Factors - Age

Risk Factors - Breed

- Persian Cats
- Yorkshire Terriers

Risk Factors - Concurrent Health

- Skin conditions
- Felv and FIV
- Pregnant/ Nursing Mothers
- Feline URI

Risk Factors - Stress

- Very important!

- Normal grooming is very important defense mechanism

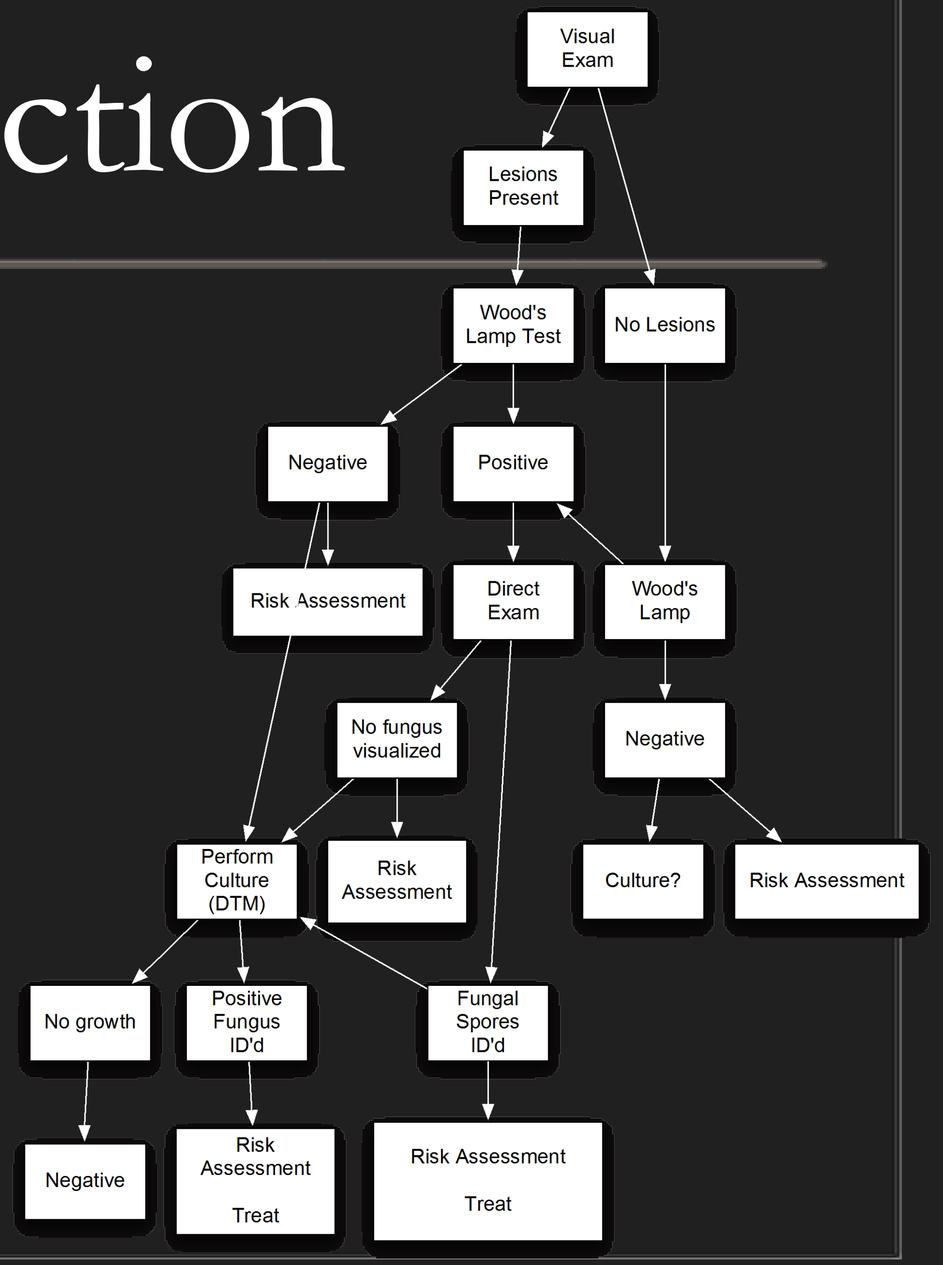
Risk Factors - Environment

- Crowding
- Poor housing
- Not easily cleaned surfaces

Back to the Two Scenarios: Risk Factors?

Recognition of Infection

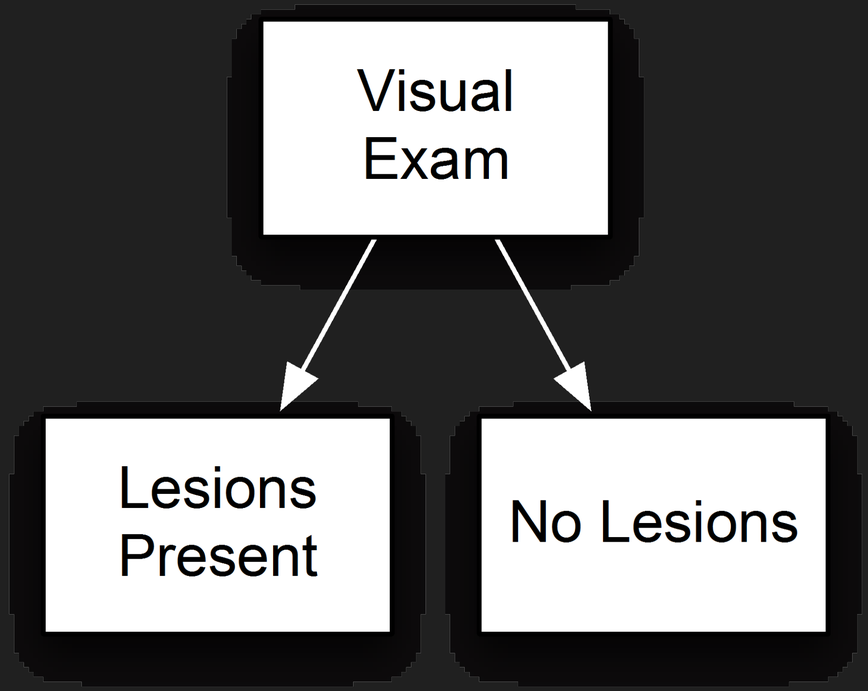
- History
- Visual Exam
- Woods Lamp
- Direct Exam of hairs
- Fungal Culture and Interpretation



Recognition - History

- Highly suspect animals
  - From same household as positive littermates
  - Cagemates with direct contact

Recognition - Visual Exam



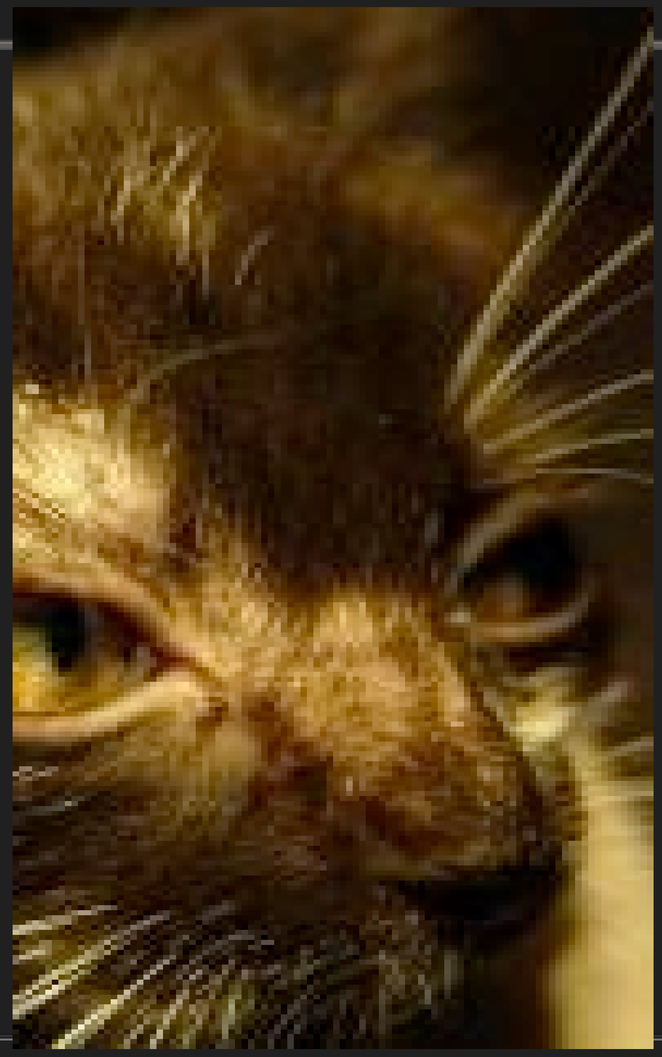
- Intake Exam is important
  - Nose to toes and tail
- *Location, Location, Location*
- Close attention to inside ears, nose, eyes, whiskers, toes and tail

Recognition- Classic Lesions

Circular areas of hair loss with *inflammation*, crusting and scaling

Recognition- Classic Lesions

Recognition- Classic Lesions



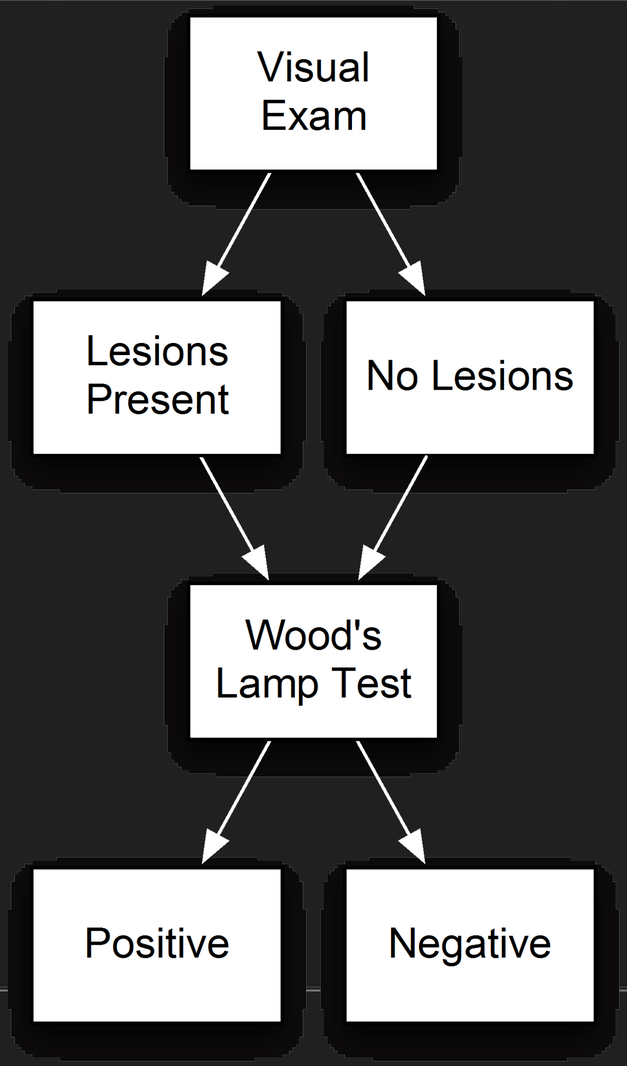
Recognition- Classic Lesions

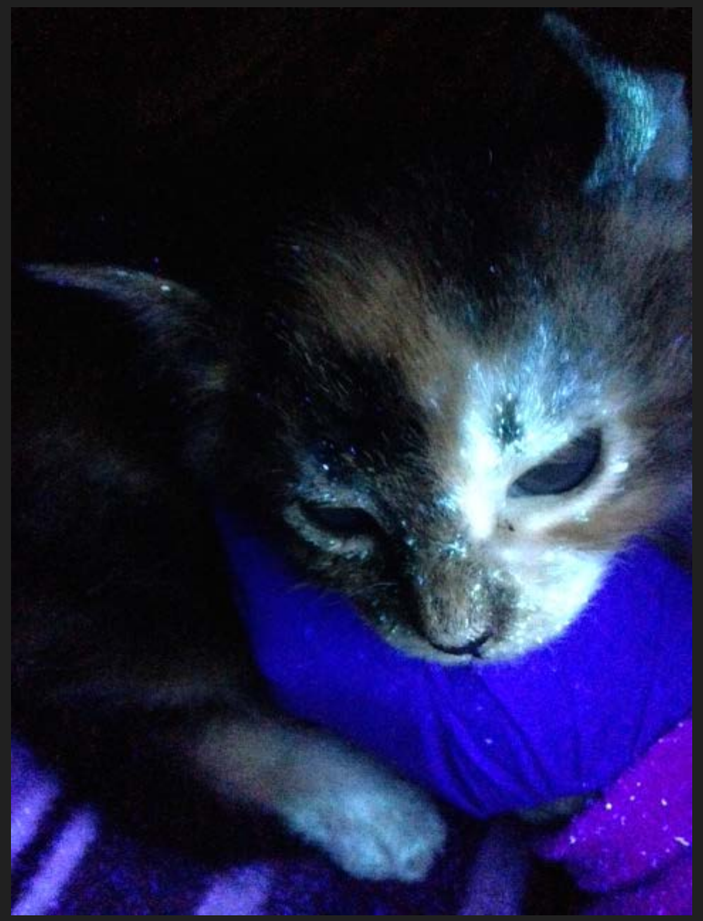
Recognition - Visual Exam

- Not all classic so any cat with skin lesions or suspect animal needs close evaluation

Ringworm can look like anything

Recognition - Woods Lamp





Recognition - Woods Lamp

Model UVL-21

- Invest in a good lamp
- UV lamp that fluoresces at 360 nm
- Use a plug in model

Poor Choice….

Why Do Hairs Fluoresce?

Why Cats Glow

Recognition - Woods Lamp

- Allow lamp to warm up
- Give your eyes time to adjust
- Only *M. canis* glows

Recognition - Woods Lamp

- Look for apple green fluorescence
- Base of hair or whole hair shaft

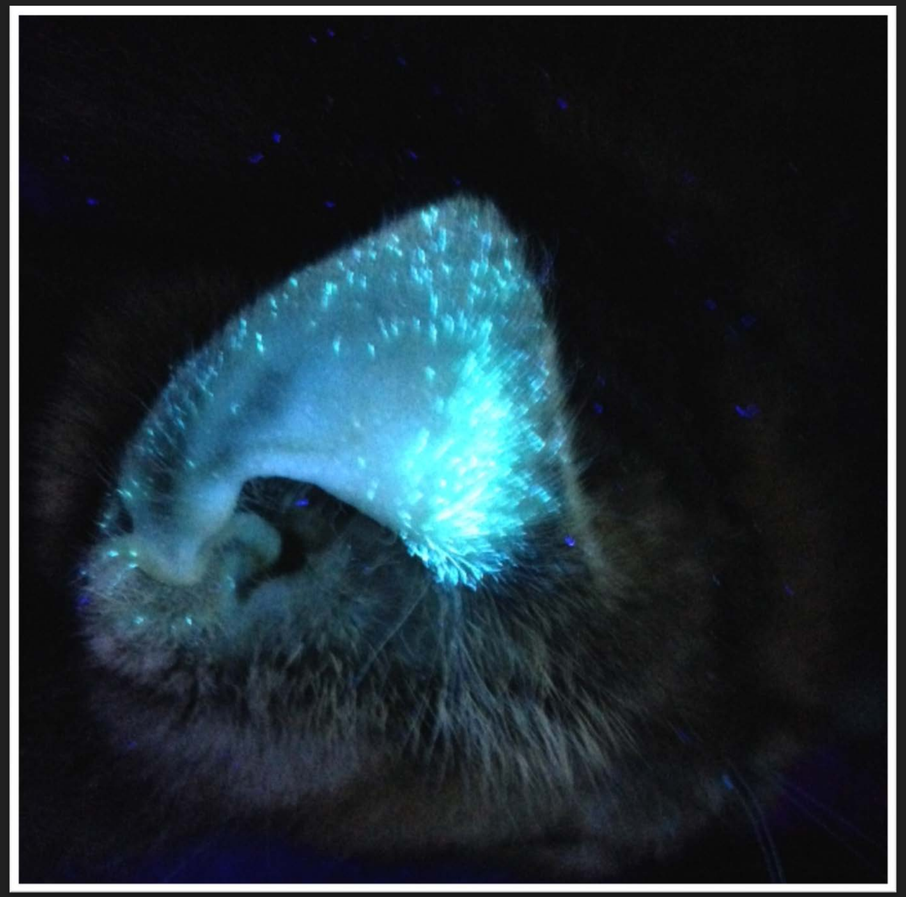
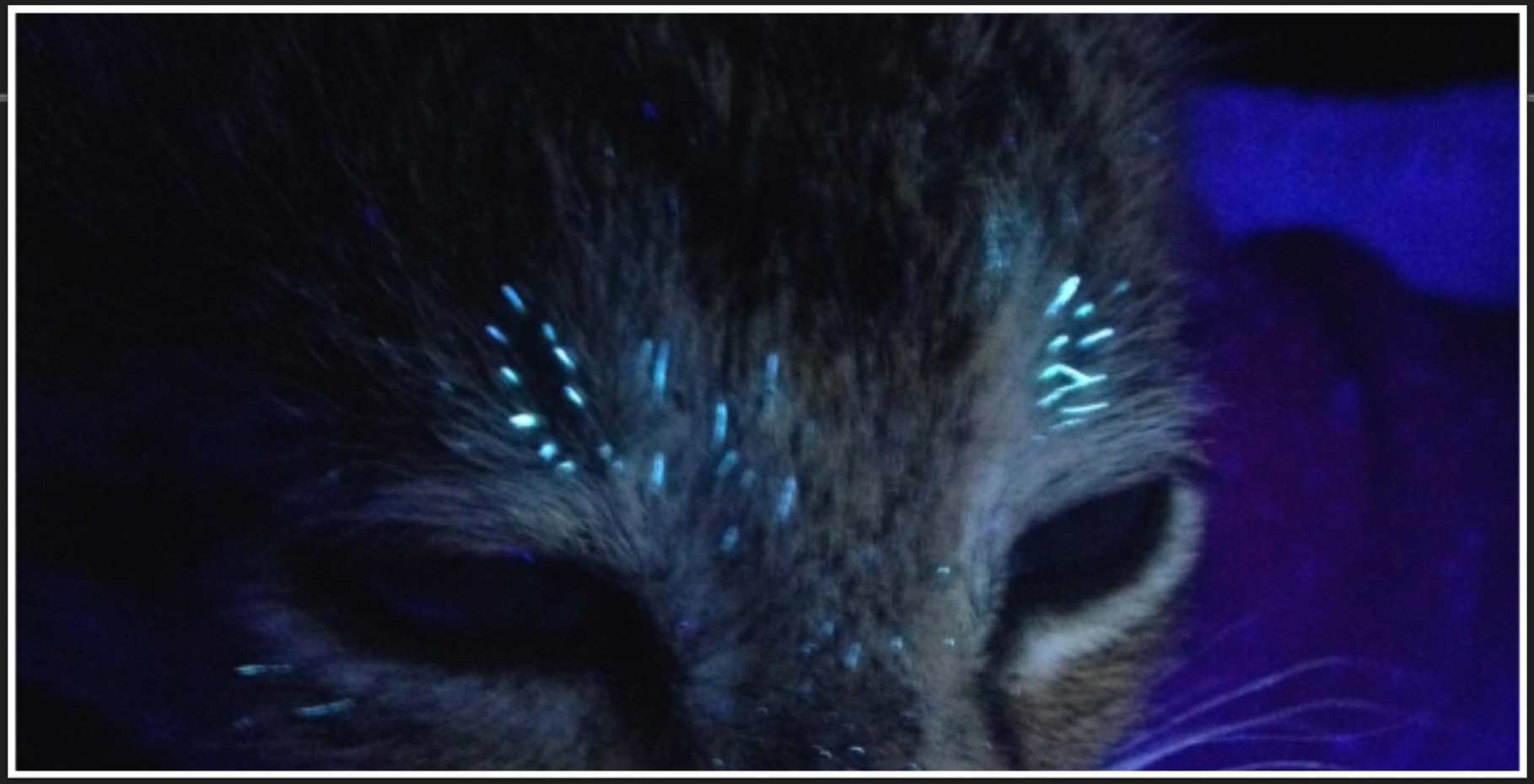
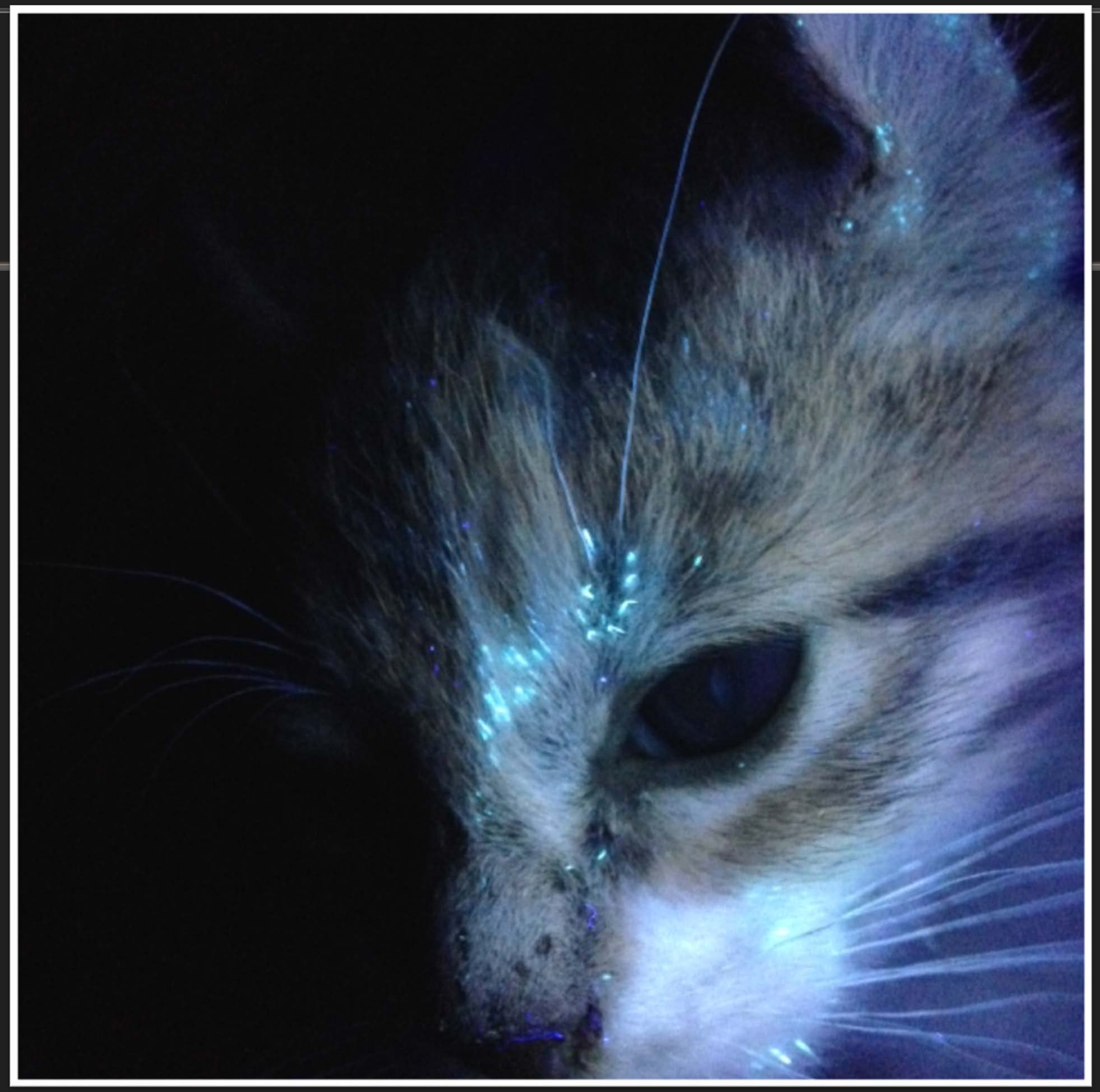


Photo courtesy of Laura Balanoff

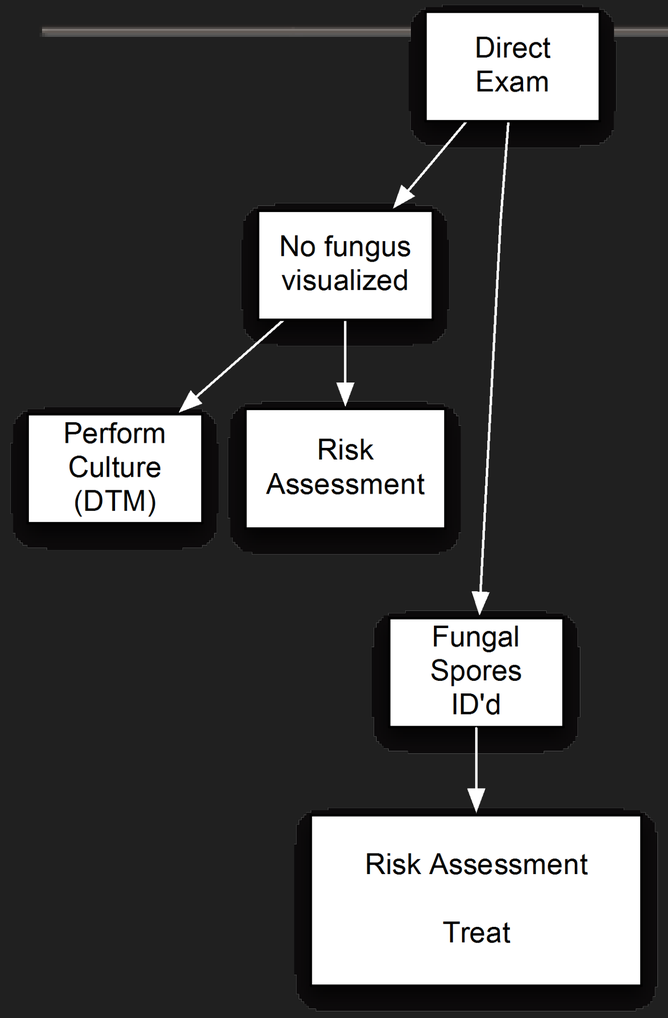




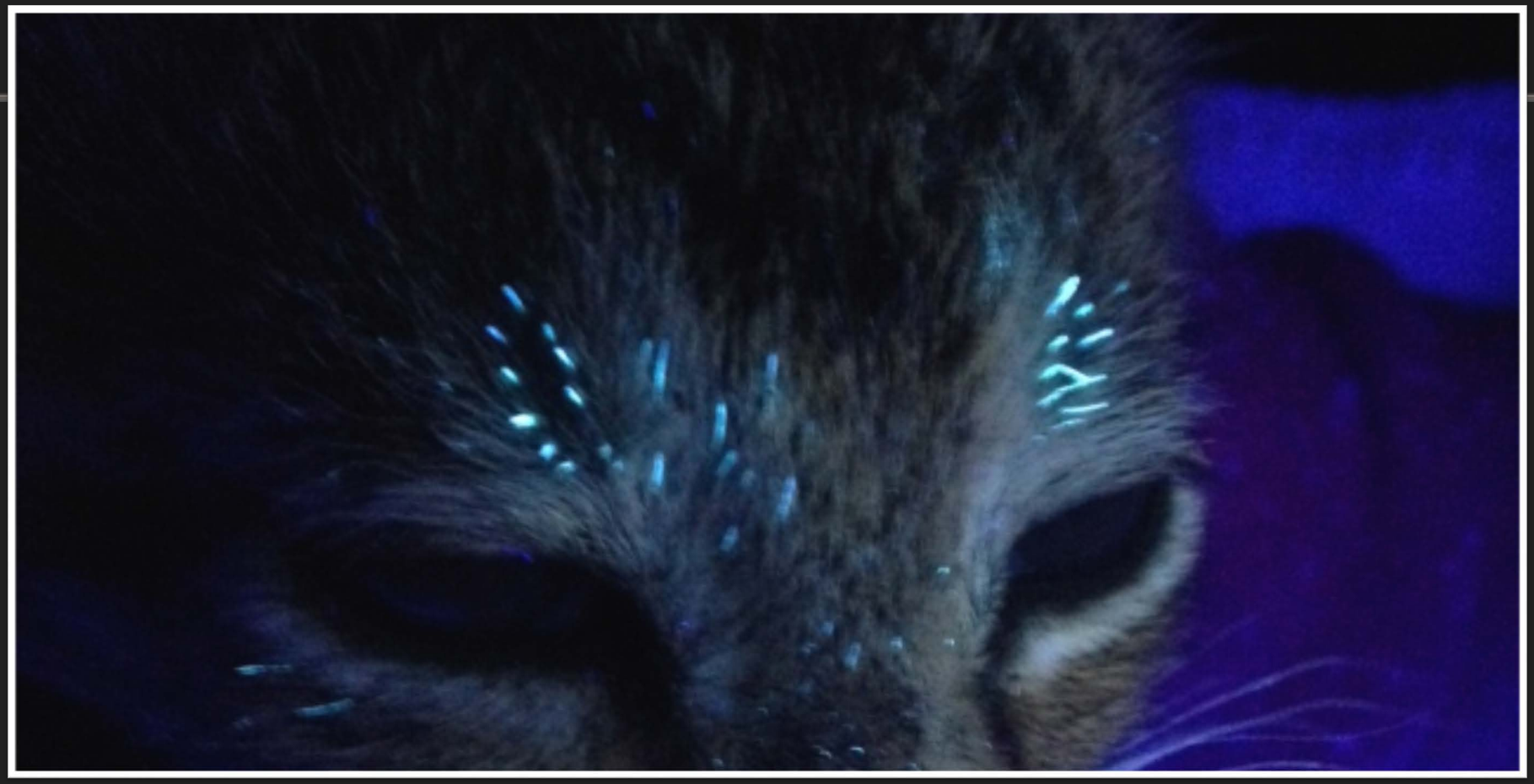
Recognition - Woods Lamp

- False positives
  - Terramycin
  - Doxycycline
  - Dust

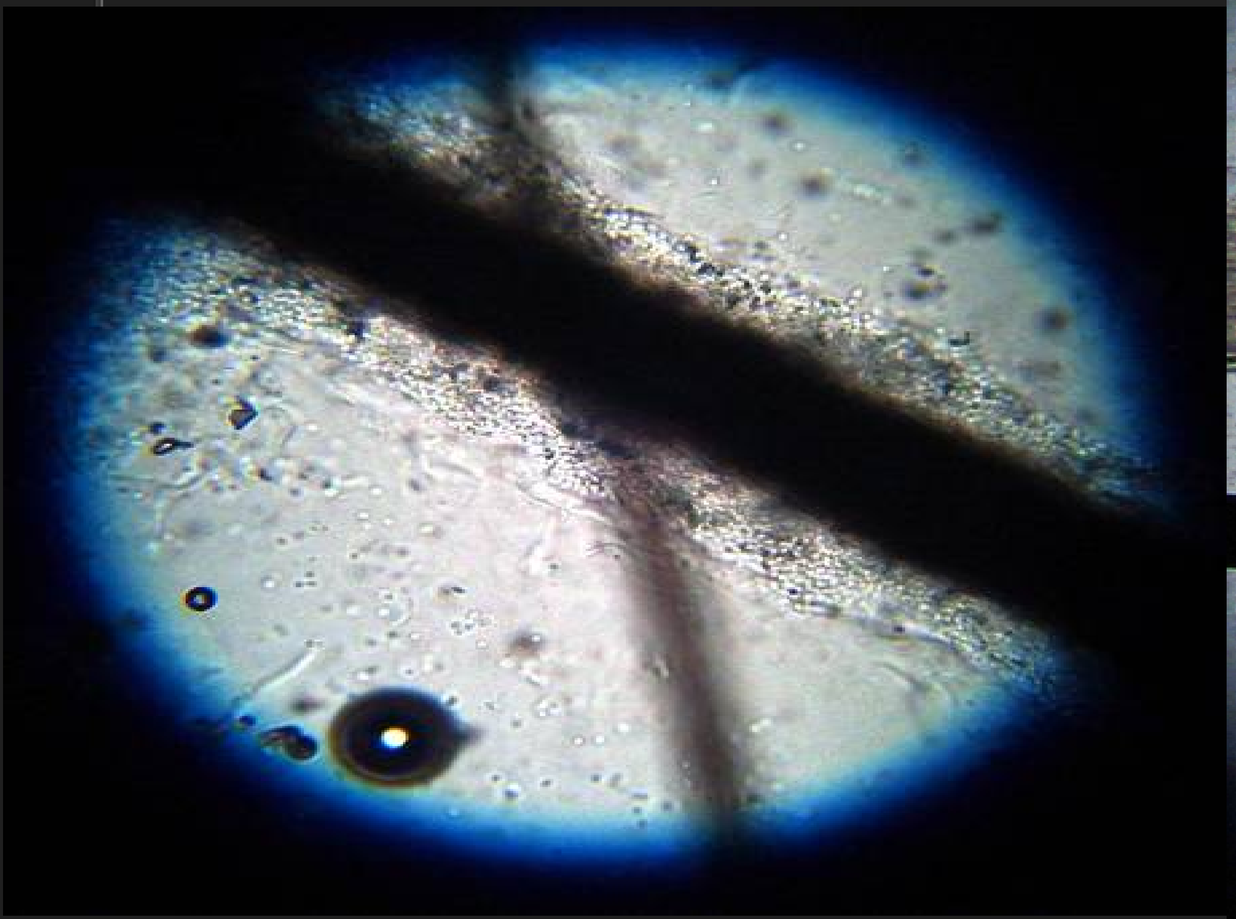
Recognition - Direct Exam

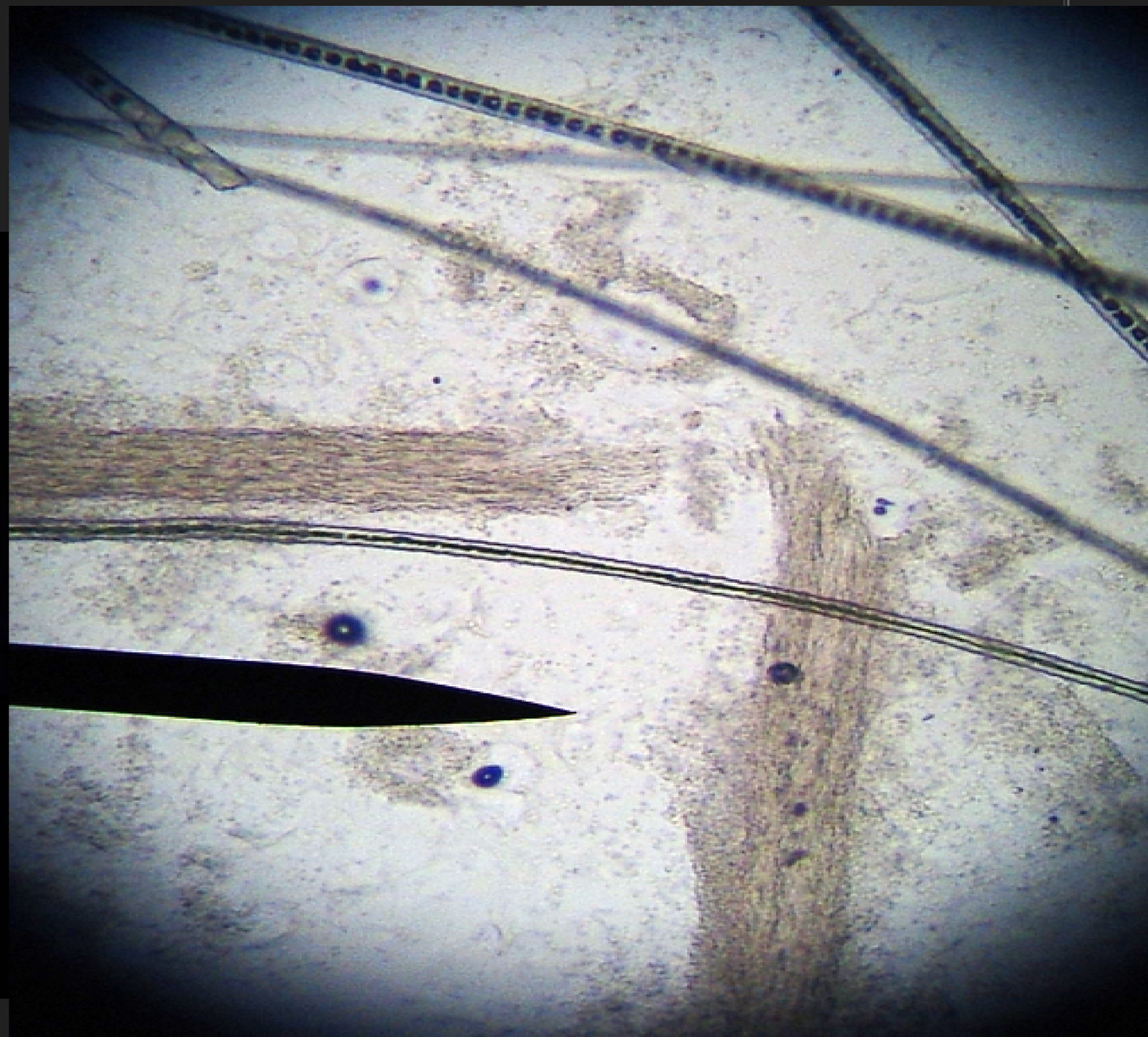


- Super easy and cool - TRY IT!!
- Need a microscope, glass slide, mineral oil

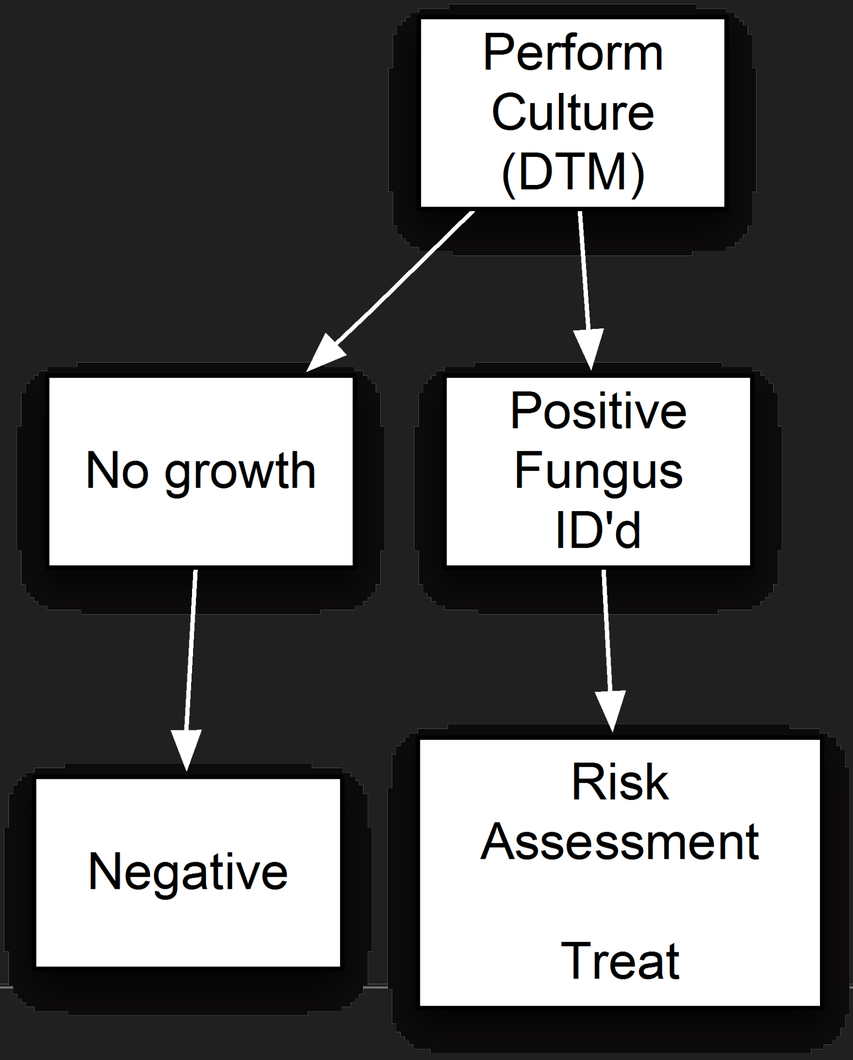


Recognition - Direct Exam





Recognition- Fungal Culture



Recognition- Fungal Culture

- Do them “in-house”
- Use petri-dish style plates- avoid slants
- Incubate at slightly warmer than room temp

Recognition- Fungal Culture

- Toothbrush Test

Recognition- Fungal Culture

- Hold culture plates upside-down
- Gently stab the tips of the toothbrush into the media
- Cover the <u>whole plate</u>

Recognition- Fungal Culture

KEY POINTS

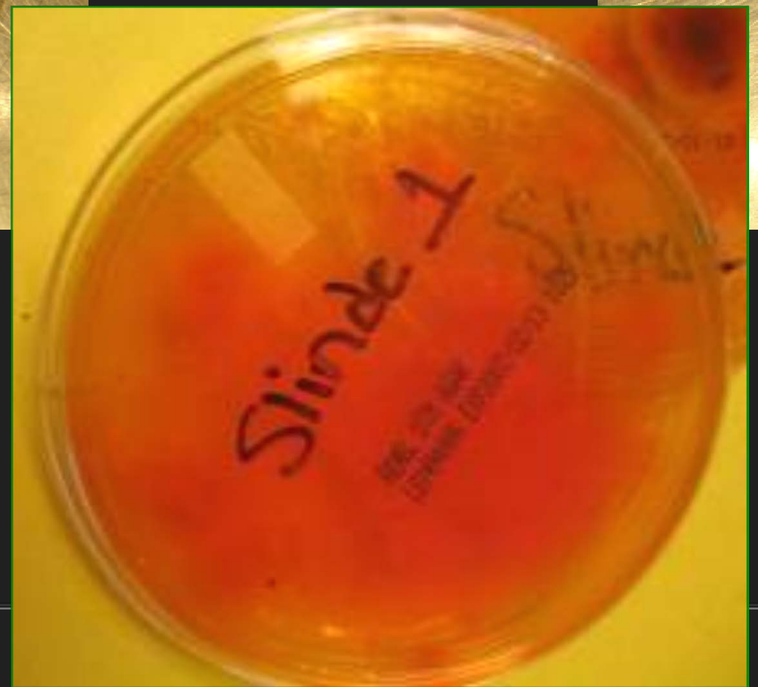
- Most *M. canis* will grow within 10 days if untreated.
- Check cultures DAILY for growth and/or color change or until 21 days
- **RED does NOT mean ringworm!**

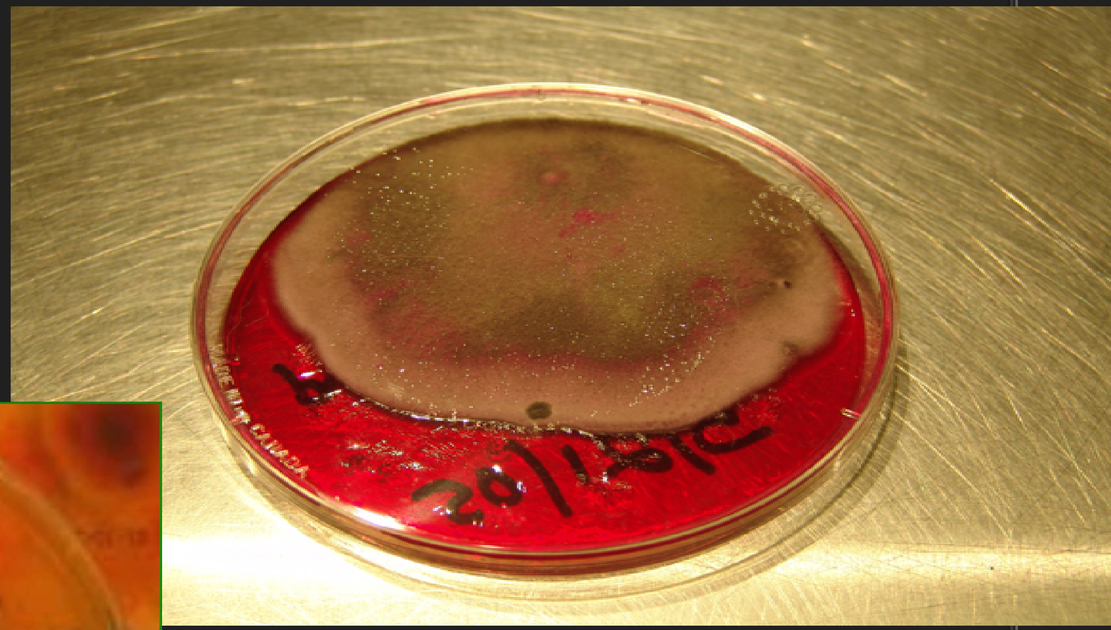
Recognition- Fungal Culture

KEY POINTS

- *M. canis* growth is white and not raised.
- Pigmented growth is non-pathogenic contaminant

Recognition- Fungal Culture





Recognition- Fungal Culture

- Now you need to look under a microscope to confirm who is there…
- It is really easy
- Supplies needed: clear tape, stain, microscope slides and microscope

Recognition - Fungal Culture

M. Canis

M. gypseum

The best test for dermatophytosis = A positive, identifiable fungal culture……in a lesional, glowing cat

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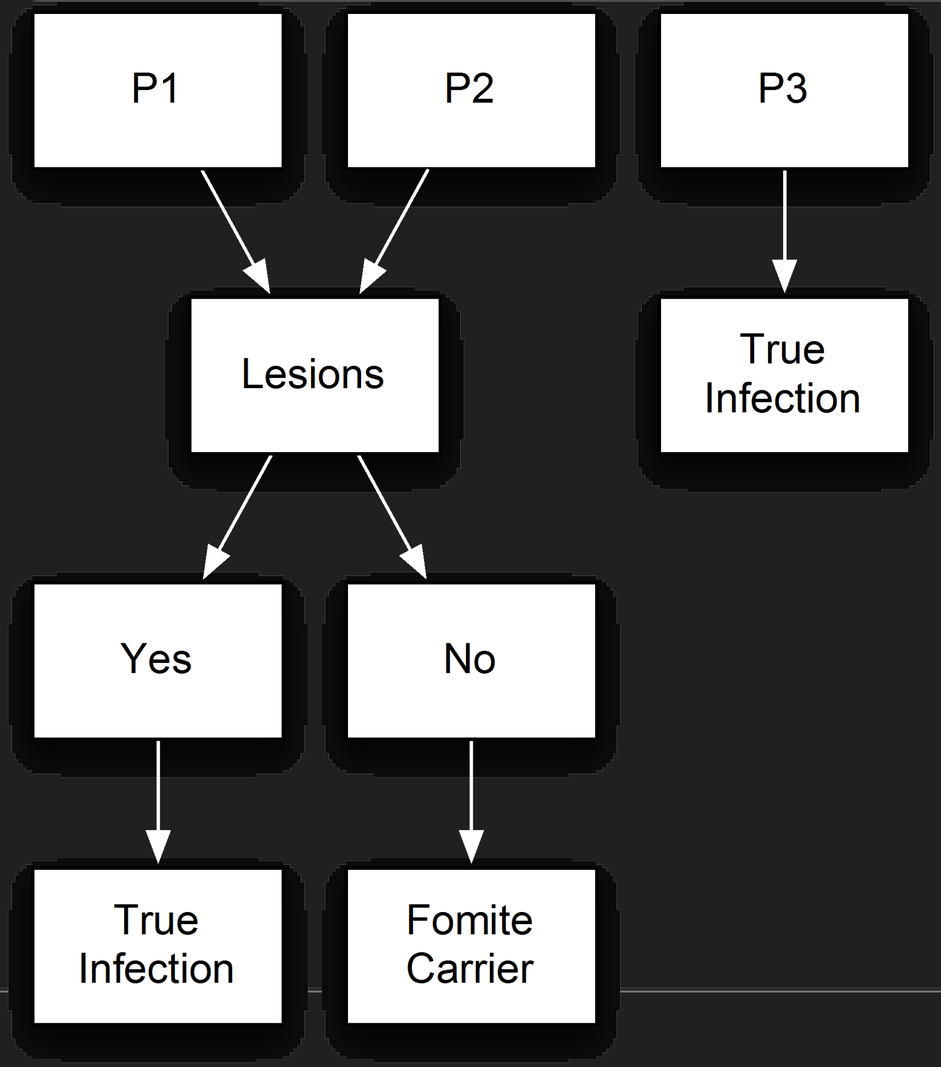
Recognition and Response Pathogen Scoring

- Used to distinguish truly infected cats from “Dust Mops”
- Guides treatment decisions
- Used in conjunction with visual exam for lesions

Recognition and Response Pathogen Scoring



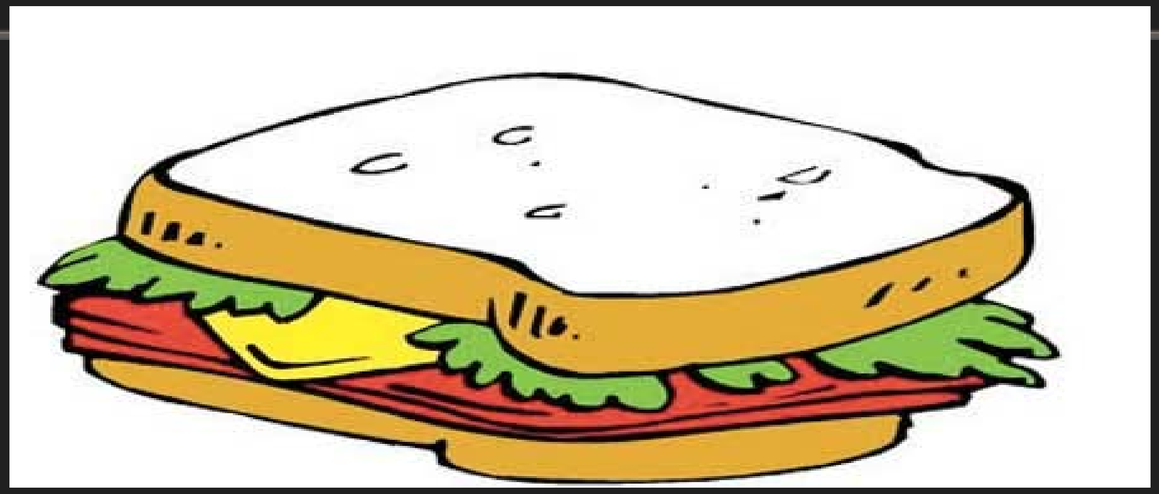
P1 or P2: 1-9 cfu

P3 10 or more cfu

Back To Our Scenarios

- Jyothi Case example here

Response to Infection

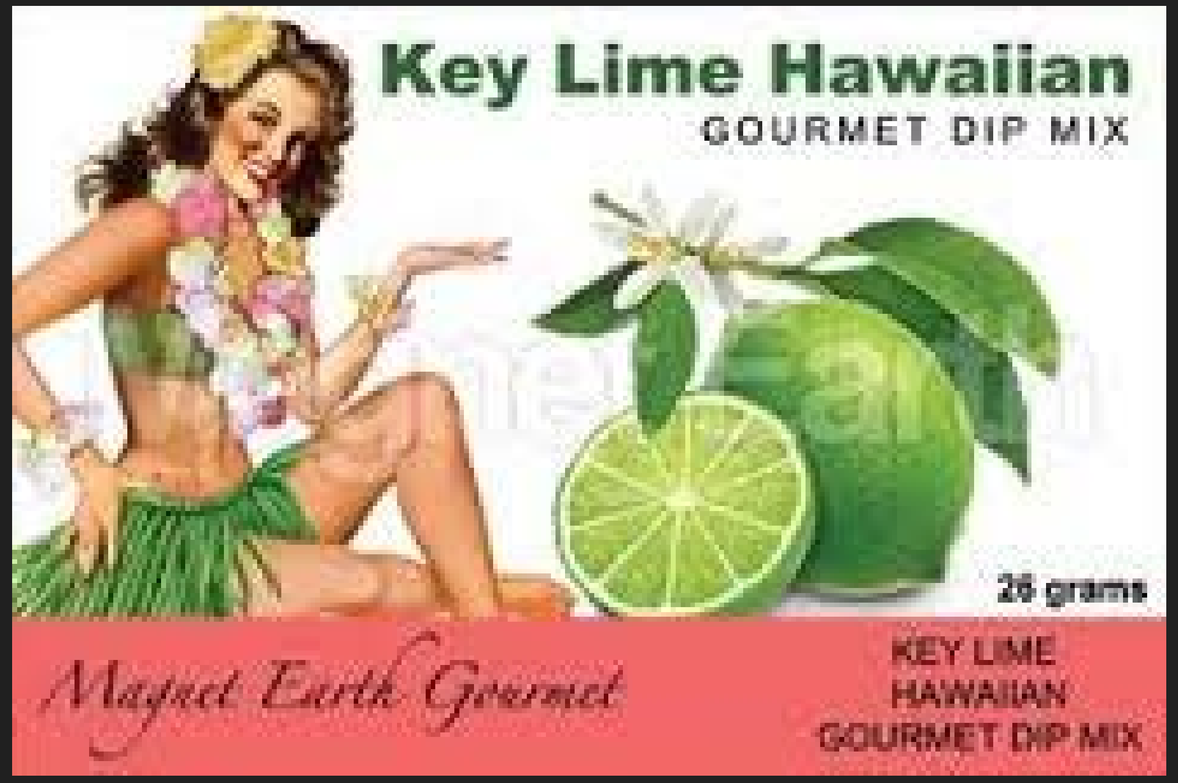


- Generalized topical treatment is the **only** way to kill the spores **ON** the hair-coat and skin

- Systemic treatment only kills spores **IN** the hair follicle

Response- Topical Therapy

- Topical is the most important therapy
- P1 cats topical-only adequate



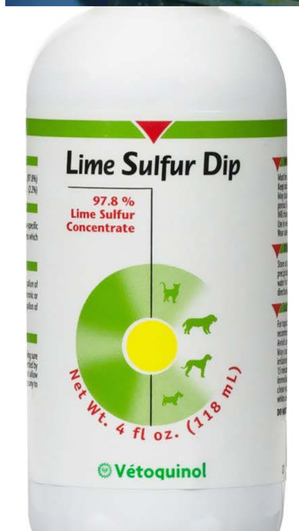
Response - Topical Lime Sulfur

The Good news and the bad…

- Highly Effective
  - No other product shown to be as effective
- Demonstrated rapid times to cure
- Very Safe

Response- Topical Lime Sulfur

- Use 8 oz per gallon
- Add dip then warm water
- Mix fresh each time
- Do not pre-wet
- Garden-type sprayer and then sponge for face



Topical Treatment- Lime Sulfur

Topical Treatment- others

- Chlorhexidine based shampoos (Malaseb)
  - NOT effective
- Focal topical treatment
  - NOT effective
  - Ointments or creams
- Accelerated hydrogen peroxide based shampoos (Accel, Pure Oxygen)
  - Not yet proven or recommended

Treatment - Systemic

- Oral Itraconazole
  - Shown to be highly effective when given for 21 days in conjuction with twice weekly lime sulfur dips
  - Dose: 5-10 mg/kg SID x 21 d

**** Used in conjunction with topical Lime Sulfur Dips****

Treatment - Systemic

- Oral Terbinafine
  - Given SID with food for 21 days
  - 14 day treatment shown not to be effective (Moriello, et al 2013)
  - Dosing: <2.8 kg=62.5 mg, 2.8-5.5 kg= 125 mg, >5.5kg = 250 mg

*** *Used in conjunction with topical Lime Sulfur Dips****

Pathway Planning - Isolation

- Isolation
  - Dedicated ward or room
  - Enrichment- quality of life

Isolation- Treatments and Cleaning

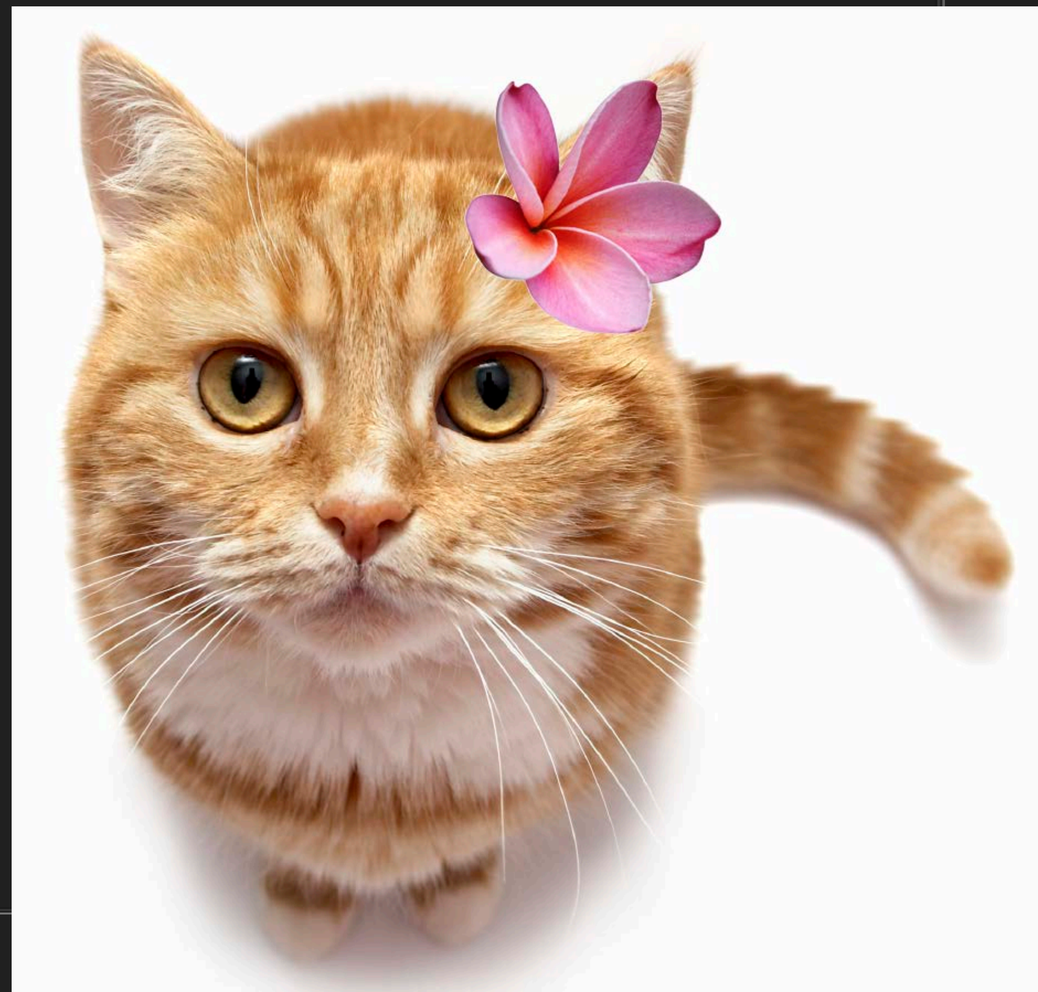
- Treat and clean in order of infectious potential
- Infectious potential may change weekly
- Define clean and dirty zones

Pathway Planning - Foster Care

- Cleanable environment
- Culture environment
- Other pets and children

Determining A Cure

- Cure = Two negative fungal cultures one week apart
- Start culturing one week after starting treatment
- Culture may be negative BEFORE hair grows back with lyme dip protocol



Sanitation and Disinfection

- Physical/ Mechanical Cleaning is ESSENTIAL
  - Remove/ reduce hair and dust.
- Remember that intake areas have most environmental contamination
- Discard items that cannot be readily laundered or disinfected

Sanitation and Disinfection

- Effective Disinfectants
  - Accelerated Hydrogen Peroxide
    - Accel TM
  - Potassium peroxymonosulfate
    - Trifectant TM or Virkon TM
  - Bleach
    - NOT best choice since concentration is harmful to people and animals.

Two Cases

- Wrap up with cases

Acknowledgements

- Special thanks to Dr. Sandra Newbury, Dr. Karen Moriello, and the Dane County Humane Society for many of the photos used in this presentation and the research completed on this topic.