



*Better health through  
laboratory medicine.*

## PEARLS OF LABORATORY MEDICINE

Diagnosis of Dermatophytes

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# So what is a dermatophyte?

## Pathogen!

- Infect keratinized tissues – hair, skin, nails
- Contagious – direct contact or via fomites
- Risk factors – age, participation in sports, family history, contact with feral animals, etc.

## Fungi!

- Eukaryotic organisms – cell wall, true nucleus
- In three genera: *Epidermophyton*, *Microsporum*, and *Trichophyton*



## When do you suspect a dermatophyte?

- Can be seasonal, and can also depend on geographic location and patient population
- Presents as ring-shaped lesions
  - Look for raising of the skin
  - Skin may be scaly, especially in the center
  - Hair loss may occur
  - Severe itching or pain
- Abnormal nails
  - Yellow or white discoloration
  - Crumbling or thickening
  - Loss of nail



# Common Dermatophyte Infections

Name	Location	Common Organisms
Tinea capitis	Hair (scalp, eyebrows)	<i>M. gypseum</i> , <i>T. mentagrophytes</i>
Tinea corporis	Face, trunk, limbs	<i>E. floccosum</i> , <i>T. rubrum</i>
Tinea barbae	Facial hair	
Tinea pedis	Feet	<i>E. floccosum</i> , <i>T. rubrum</i>
Tinea manuum (manus)	Hands	
Tinea cruris	Groin region	<i>E. floccosum</i>
Tinea unguium (Onychomycosis)	Nails	<i>E. floccosum</i> , <i>T. rubrum</i>



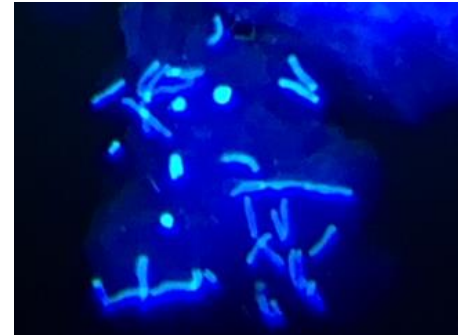
# How do you test for a dermatophyte?

- Determine if an antifungal has been used on the area
- Thoroughly disinfect the area that you would like to sample
  - Hair – hair follicle
  - Skin – leading edge of lesion
  - Nail – near nail bed
- Place in a sterile container and submit to lab



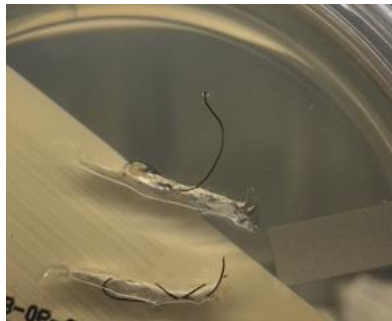
# How does the lab identify a dermatophyte?

- Direct visualization
  - Sample preparation
    - Digest keratin and non-fungal material
    - Add sample to microscope slide
    - Stain fungal elements
  - Scan the slide for hyphae and other fungal elements



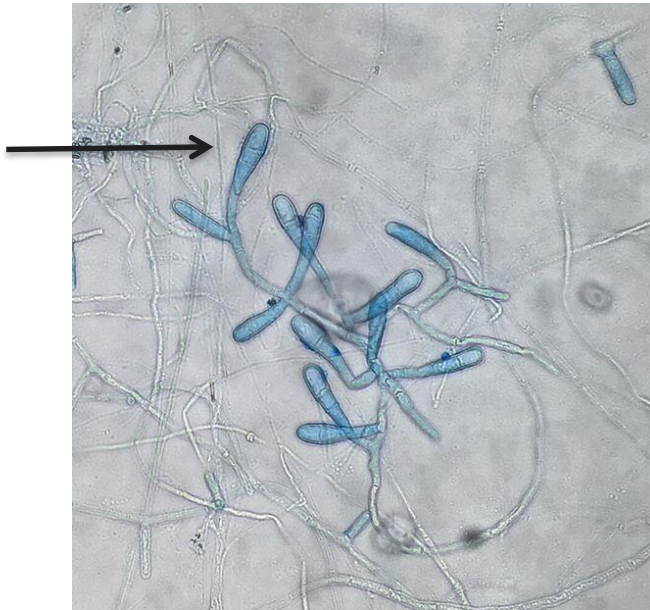
# How does the lab identify a dermatophyte?

- Growth of the microorganism
  - Samples are pushed into agar medium
    - Inhibitory medium – to prevent bacterial growth (ex: Mycosel)
    - Noninhibitory medium (ex. Sabourand Dextrose Agar)
  - Incubate plates at 30°C for 3 weeks



# *Epidermophyton floccosum*

Club-shaped  
Macroconidia



Bright Field Microscopy

Lactophenol Cotton Blue Stain



Phase Contrast Microscopy

Lactophenol Cotton Blue Stain

Photo credit: Eileen Rojas

# Microsporium

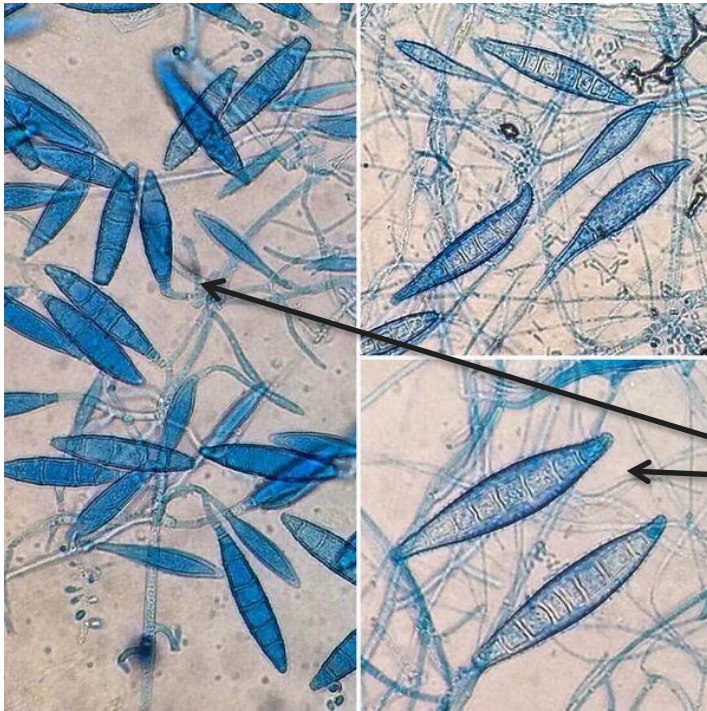
*M. gypseum*



*M. canis*



Ellipsoidal Macroconidia

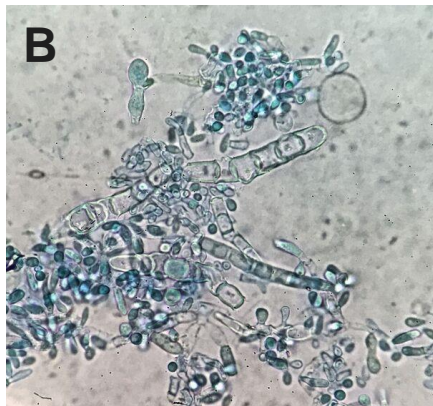
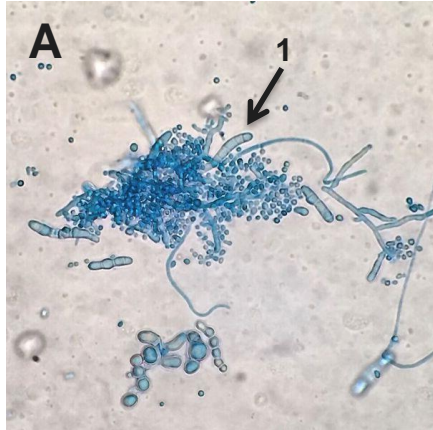


*M. gypseum*

*M. canis*

Photo credit: Eileen Rojas

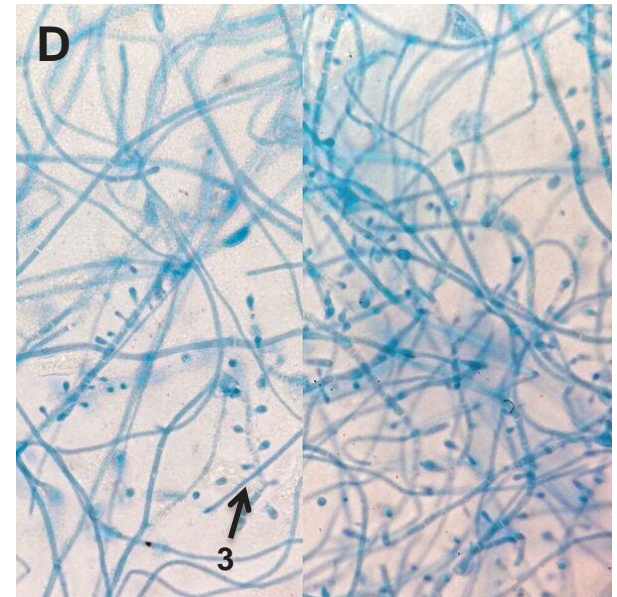
# Trichophyton



*T. mentagrophytes*

- 1. Pencil-shaped macroconidia
- 2. Spiral hyphae
- 3. Alternating conidia

*T. tonsurans*



*T. rubrum*

Photo credit: Eileen Rojas

# Trichophyton



*T. tonsurans*



*T. rubrum*



*T. mentagrophytes*

# Treatment of Dermatophytes

- Most commonly treated with topical agents
- Treatment duration is typically 2 to 6 weeks
- Persistent infections or those involving large portions of the body may require oral therapy
- Combination therapies are recommended to enhance organism coverage and to prevent drug resistance



# References

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# Disclosures/Potential Conflicts of Interest

*Upon Pearl submission, the presenter completed the Clinical Chemistry disclosure form. Disclosures and/or potential conflicts of interest:*

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