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

<table>
<thead>
<tr>
<th>Name</th>
<th>Location</th>
<th>Common Organisms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tinea capitis</td>
<td>Hair (scalp, eyebrows)</td>
<td><em>M. gypseum</em>, <em>T. mentagrophytes</em></td>
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<tr>
<td>Tinea corporis</td>
<td>Face, trunk, limbs</td>
<td><em>E. Floccosum</em>, <em>T. rubrum</em></td>
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<tr>
<td>Tinea barbae</td>
<td>Facial hair</td>
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<tr>
<td>Tinea pedis</td>
<td>Feet</td>
<td><em>E. floccosum</em>, <em>T. rubrum</em></td>
</tr>
<tr>
<td>Tinea manuum (manus)</td>
<td>Hands</td>
<td></td>
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<tr>
<td>Tinea cruris</td>
<td>Groin region</td>
<td><em>E. floccosum</em></td>
</tr>
<tr>
<td>Tinea unguium (Onychomycosis)</td>
<td>Nails</td>
<td><em>E. floccosum</em>, <em>T. rubrum</em></td>
</tr>
</tbody>
</table>
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
    o Digest keratin and non-fungal material
    o Add sample to microscope slide
    o 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
Microsporum

M. gypseum

M. canis

Ellipsoidal Macroconidia

Photo credit: Eileen Rojas
Trichophyton

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

T. rubrum

T. tonsurans

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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