

MED AID

Fungi

Dermatophytes (cutaneous fungal)

Trichophyton rubrum, Trichophyton tonsurans, Microsporum, Epidermophyton

Branching septate hyphae visible on KOH preparation with blue fungal stain

- Tinea capitis** — Occurs on head, scalp — Associated with lymphadenopathy, alopecia, scaling — Tx: Griseofulvin
- Tinea corporis** — Occurs on body (usually torso) — Characterized by enlarging erythematous, scaly rings (ringworm) with central clearing. Can be acquired from contact with infected pets or warm animals — Tx: Topical: clotrimazole, miconazole; Oral: fluconazole, itraconazole
- Tinea cruris** — Occurs in inguinal area (jock itch) — Often does not show the central clearing seen in tinea corporis — Tx: Topical: clotrimazole, miconazole; Oral: fluconazole, itraconazole
- Tinea pedis** — Three varieties (athlete's foot) — Interdigital (most common), Moccasin distribution, Vesicular type — Tx: Topical: clotrimazole, miconazole, terbinafine; Oral: fluconazole, itraconazole
- Tinea unguium** — Onychomycosis; occurs on nails — Tx: Oral terbinafine

Yeasts

Unicellular, reproduce via budding

Candida (catalase+)

Demorphic, forms pseudohyphae (not a mold, so the structures it forms look like hyphae, but they are not, hence pseudohyphae) and budding yeasts at 20C, germ tubes and spores at 37C

- Systemic or superficial fungal infection
- Diaper rash**
- Infective endocarditis** (people who inject drugs)
- Disseminated candidiasis** (especially in neutropenic patients)
- Chronic mucocutaneous candidiasis** (T-cell dysfunction)
- Vulvovaginitis** (diabetes, use of antibiotics)
- Causes oral or esophageal thrush** in immunocompromised (neonates, steroids, diabetes, AIDS)

Tx: Oral fluconazole/topical azoles for vaginal; Nystatin, azoles, or, rarely, echinocandins for oral; Fluconazole, echinocandins, or amphotericin B for esophageal or systemic disease

Cryptococcus neoformans

Narrow-based budding

- Diagnosis:
 - Latex agglutination test detects polysaccharide capsular antigen and is more sensitive and specific
 - India ink (clear halo)
 - Mucicarmine (red inner capsula)

Tx: Amphotericin B + Flucytosine followed by fluconazole for cryptococcal meningitis

Pneumocystis jirovecii

Oval yeast on silver stain

- Causes bilateral pneumonia (pneumocystis jirovecii pneumonia)
- Diagnosed by bronchoalveolar lavage or lung biopsy, Disc-shaped yeast seen on methenamine silver stain of lung tissue or with fluorescent antibody
- Treatment/prophylaxis: TMP-SMX, pentamidine, dapsone (prophylaxis as single agent, or treatment in combination with TMP)

Malassezia furfur

Tinea (pityriasis) versicolor

- Degradation of lipids produces acids that inhibit tyrosinase (involved in melanin synthesis) then cause hypopigmentation; hyperpigmentation and/or pink patches can also occur due to inflammatory response, less pruritic than dermatophytes
- Tx: Selenium sulfide, topical and/or oral medications

Mold

Multicellular (hyphae), reproduce via spores

Mucor, Absidia, Rhizopus

Non-septate, 90-degree hyphae, mucorales

Order of fungi that are referred to as "bread mold" and are found ubiquitously in the environment

Tx: Surgical debridement, amphotericin B or isavuconazole

Aspergillus

Branched, septate, 45-degree hyphae

Forms 45-degree, branched, septate hyphae

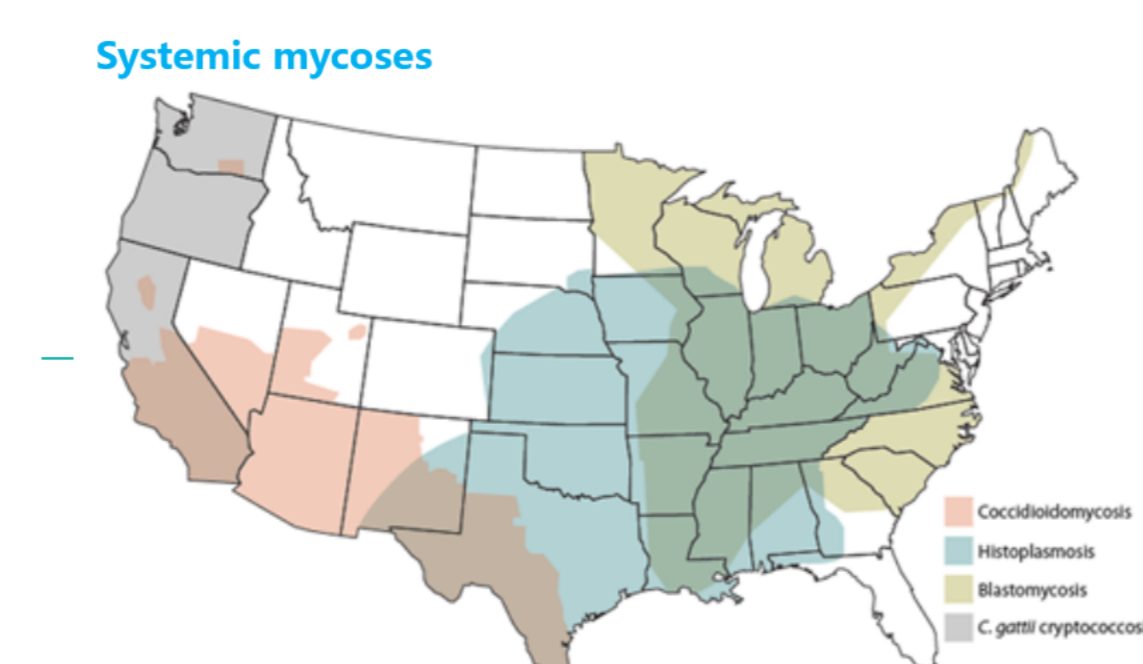
- Causes invasive aspergillosis in immunocompromised patients, especially those with neutrophil dysfunction (chronic granulomatous disease) because Aspergillus is catalase+
- Can cause aspergillomas in pre-existing lung cavities, especially after TB infection
- Some species of Aspergillus produce Aflatoxins (associated with hepatocellular carcinoma)
- ABPA- hypersensitivity response to Aspergillus growing in lung mucus. Associated with asthma and cystic fibrosis; may cause bronchiectasis and eosinophilia

Tx: Voriconazole or echinocandins

Dimorphic

Mold at 25C, Yeast at 37C

Systemic mycoses



Systemic mycoses can form granulomas (like TB); cannot be transmitted person-to-person unlike TB, Tx: fluconazole or itraconazole for local infection; amphotericin B for systemic infection

Histoplasma

Tiny yeast (smaller than RBC)

Associated in particular with caves and bird droppings

Palatal/tongue ulcers, splenomegaly, pancytopenia, erythema nodosum

Blastomycosis

Broad-based budding (same size as RBC)

Associated in particular with decaying wood

Likes to cause skin infections, resulting in ulcerative/necrotic lesions, can sometimes present as pneumonia or osteomyelitis

Coccidioides

Barrel-shaped hyphae, spherules with endospores (not yeast, much larger than RBC)

Associated with dust exposure in endemic areas

Disseminates to bone/skin, erythema nodosum or multiforme, arthralgias, can cause meningitis

Paracoccidioides

Multiple-budding "captains wheel" (much larger than RBC)

Similar to blastomycosis

Sporotrichosis

Sporotrich (causes rosette or daisy-like clusters of conidiophores)

Classically causes a papula at the finger in gardeners following a prick by a rose thorn

That it causes lymphangitis, where it ascends to axilla as either an erythematous streak, or as erythematous ulcerative lesions on the forearm

Tx: Itraconazole or potassium iodine (only for cutaneous/lymphocutaneous)

Opportunistic mycoses