

Dermatomycosis (Tinea – ring worm infections)

Microbiology III

Dermatomycoses

- Dermatomycoses or *Ringworm* or *Tinea*.
- Caused by **dermatophytes** a group of filamentous fungi
- Infects only superficial **keratinized** tissues, i.e. **skin, hair** and **nails**.

Classification

Dermatophytes classified into **3 genera**:

- ***Trichophyton***: infects hair, skin and nails
- ***Microsporum***: infects hair and skin
- ***Epidermophyton***: infects skin and nails
- 48 species of dermatophytes are known to cause infections in man.

Habitat: Dermatophytes infect

- **Humans** - anthropophilic
- **Animals** - zoophilic or
- **Soil** - geophilic.

Trichophyton

- This genus produces more microconidia than macroconidia.
- **Macroconidia:** vary in shape - cigar to a cylinder
- Size: 8-50 μm \times 4-8 μm
- Walls are smooth
- spores occur in **chains** and are localised inside the **hair shafts**.
- ***Trichophyton rubrum*** is the most common species that infects man.

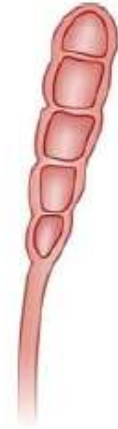
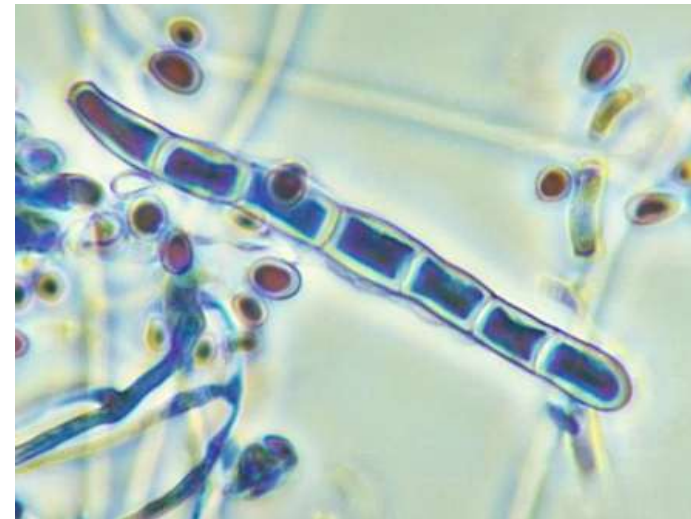


Fig. 76-19. Macroconidia of Trichophyton



Epidermophyton

- It produces smooth, thick walled, large **macroconidia** that are usually composed of 2-4 cells.

Macroconidia :

- abundant
- Size: 20-40 μm \times 6-8 μm .
- occur in clusters of 2-3
- no microconidia

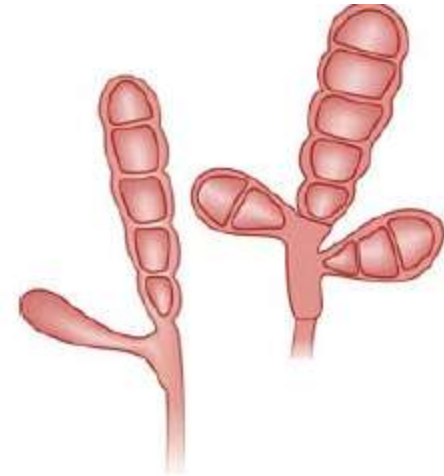
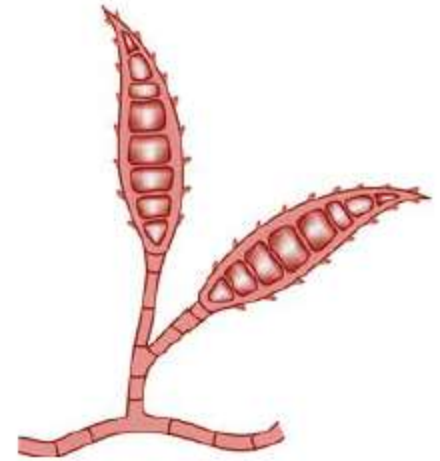


Fig. 76-20. Macroconidia of Epidermophyton

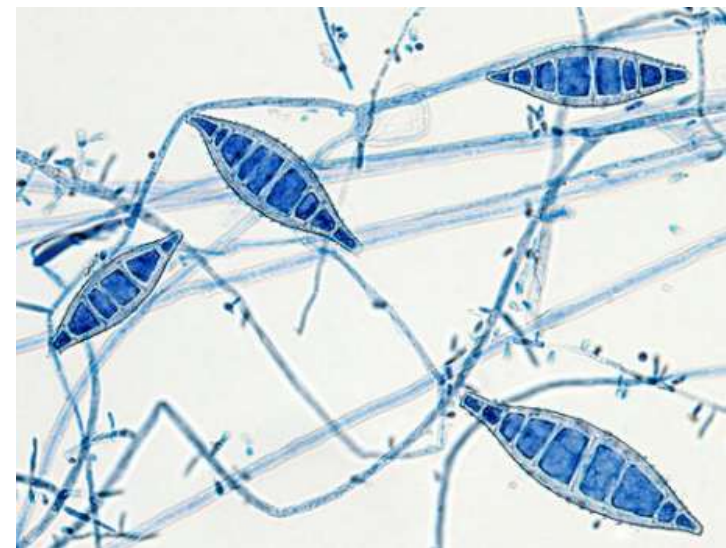


Microsporum

- The no. of macroconidia produced is variable.
- They are **spindle** shaped with **thick roughened** walls.
- Each macroconidium divided into 5-10 cells
- Size: 100 μm long and 6-8 μm wide
- Occurrence of **mycelial** filaments within the hair shaft
 - **endothrix type**
- **Spores** occur on the outside
 - **ectothrix type**



ig. 76-21. Macroconidia of Microsporum



Clinical Features

- The clinical diseases caused by dermatophytes are named after the **portion of the body affected** by the disease.

These are:

- Tinea capitis : scalp
- Tinea corporis : body
- Tinea cruris : groin
- Tinea pedis : foot
- Tinea barbae : beard
- Tinea manum : hand

Transmission

- Human to human transmission
- Direct contact
- Agency of an **infected object** on which **dermatophytes** may survive for **months**
- Development of disease depends upon the **nature** and **size of inoculum** and the **reactivity** of the individual.

Predisposing factors to infection:

- Diabetes
- Peripheral circulatory disorders
- Maceration of creases and folds of skin
- Obesity
- Poor hygiene

Pathogenicity

- Dermatophytes remain in the keratin of the horny layer, nails, scalp and body hair
- Do not cause any allergic or immune reaction

Diagnosis

- **Sample collection:**
- Infected **hair, nails** or **skin** are collected for both **microscopic** as well as **culture** examination.
- Skin scrapings are collected by cleaning the infected area with **ethanol**
- scrapings are kept in sterile petri dish
- Several scrapings are placed in a drop of **10% KOH** and covered with a cover glass.
- Observed under microscope

Direct Microscopic Examination

- The mounted specimen is examined under low and high power of the microscope for septate hyphae and arthrospores

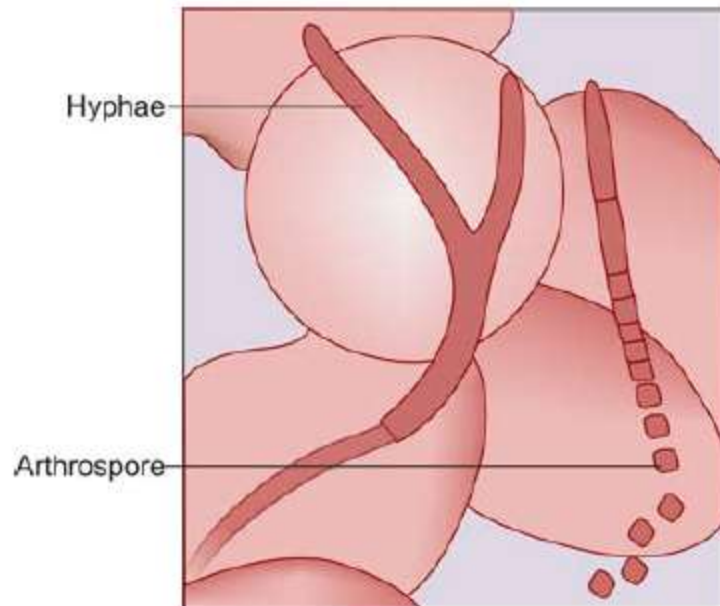


Fig. 76-22. Fungal hyphae in KOH

Culture

- Specimen are placed on Sabourad's medium containing chloramphenicol at pH 6.5.
- The culture is incubated at 27-30°C and examined frequently for colonies.
- Colonies may become visible in 2-3 days but some species may take 2-3 weeks.

Treatment

- Oral griseofulvin is the treatment of choice.
 - Topical ointments and lotions containing clotrimazole and tolnaftate are effective.
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