

Dermatophytes

Dermatophytes:are fungal organisms that are able to exist within the keratinous elements of living skin .

oDermatophytosis - "ringworm"

o disease of the nails, hair, and/or stratum corneum of the skin caused by fungi called dermatophytes.

oDermatomycosis - more general name for any skin disease caused by a fungus.

- Three important anamorphic genera, (i.e., *Microsporum*, *Trichophyton*, and *Epidermophyton*), are involved in ringworm.
- Dermatophytes are keratinophilic - "keratin loving". Keratin is a major protein found in **horns, hooves, nails, hair, and skin**.
- Ringworm - disease called 'herpes' by the Greeks, and by the Romans 'tinea' (which means small insect larvae).

Infections by Dermatophytes

- Severity of ringworm disease depends on (1) strains or species of fungus involved and (2) sensitivity of the host to a particular pathogenic fungus.
- More severe reactions occur when a dermatophyte crosses non-host lines (e.g., from an animal species to man). Among dermatophytes there appears to be an evolutionary transition from a saprophytic to a parasitic lifestyle.
 - Geophilic species - keratin-utilizing soil saprophytes (e.g., *M. gypseum*).
 - Zoophilic species - keratin-utilizing on hosts - living animals (e.g., *M. canis*).
 - Anthropophilic species - keratin-utilizing on hosts - humans (e.g., *M. audouinii*)

Major sources of ringworm infection

- Schools, military camps, prisons.
- Warm damp areas (e.g., tropics, moisture accumulation in clothing and shoes).
- Animals (e.g., dogs, cats, cattle, poultry, etc.).

Collection procedure

- 1-Cleanse the affected area with **70%v/v ethanol**.
- 2-Collect skin scales, crusts, pieces of nail, or hairs on **clean slide** as follows:
 - *Skin scales: Collect by scraping the surface of the margin of the lesion using **sterile scalpel blade**.
 - *Nail pieces: Collect by taking snipping of the infected part of the nail using **sterile scissors**.
 - *Hairs: Collect by removing **dull broken hairs** from the margin of the lesion using sterile tweezers.

Abstract

- Diagnosis of dermatophytes infections using two methods:
- **1-Direct microscopic** examination (KOH method)
- **2-Fungal culture** on sabouraud dextrose agar with antibiotics).

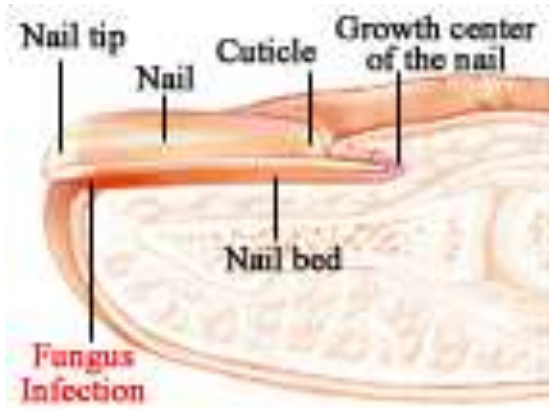
Diagnosis

- Note the symptoms.
- Microscopic examination of slides of skin scrapings, nail scrapings, and hair. Often tissue suspended in 10 % KOH solution to help clear tissue. Slides prepared this way are not permanent. These degrade rapidly due to presence of base.
- Isolation of the fungus from infected tissue.
- Proper treatment is dependent on diagnosis and prognosis.

Tinea Pedis – Athlete's Foot Infection



Tinea Unguium – Nail Infection



Tinea Capitis



Gray Patch

DERMATOPHYTES

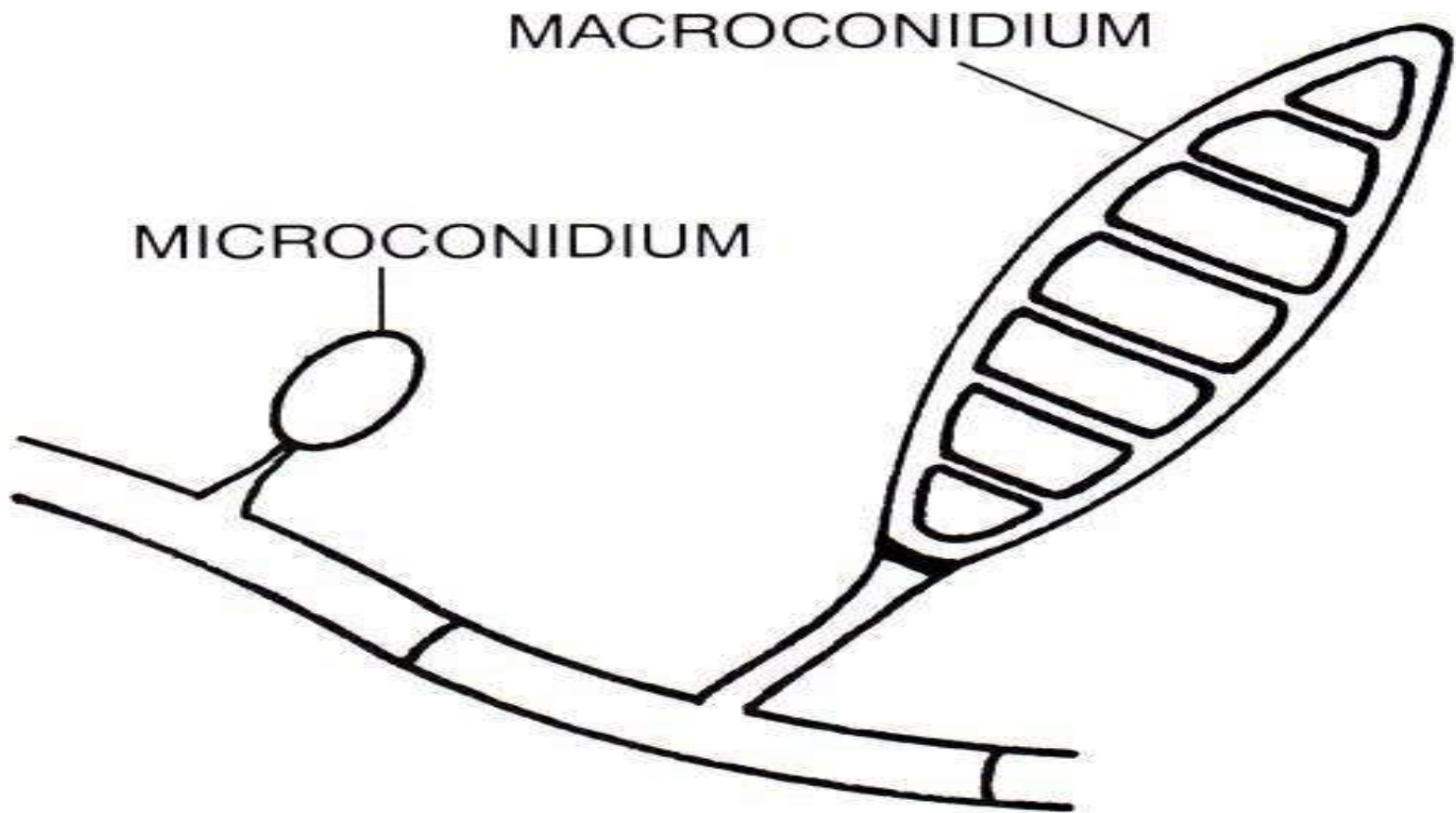
- *Microsporum*.
- Macroconidia are abundant, thick-walled with many septa, up to 15. Macroconidia are often hooked or curved at ends.

Microsporum



http://www.doctorfungus.org/thefungi/microsporum_canis.htm

http://www.mycology.adelaide.edu.au/Fungal_Descriptions/Dermatophytes/Microsporum/Microsporum_canis.html



- *Epidermophyton floccosum*
- Only one pathogenic species in this genus.
- Culture starts out white/turns sulfur color.
- Cultures may be wrinkled to cottony in appearance.
- **No microconidia.**
- Shape of macroconidia is a distinguishing characteristic - clavate macroconidia.

Epidermophyton



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<http://www.doctorfungus.org/thefungi/epidermophyton.htm>

http://www.mycology.adelaide.edu.au/Fungal_Descriptions/Dermatophytes/Epidermophyton/

- *Trichophyton violaceum*
- Attacks hair, scalp, skin and nails.
- Nail infections are persistent.
- Endothrix (black dot infection of scalp).
- Found in humans.
- Disease has been reported in horses, cats, dogs, mice and pigeons.
- Very slow growing in culture with a waxy appearance.
- Colony deep violet in color, purplish pigment diffuses into media.
- Rarely produces microconidia and macroconidia.

Trichophyton

