



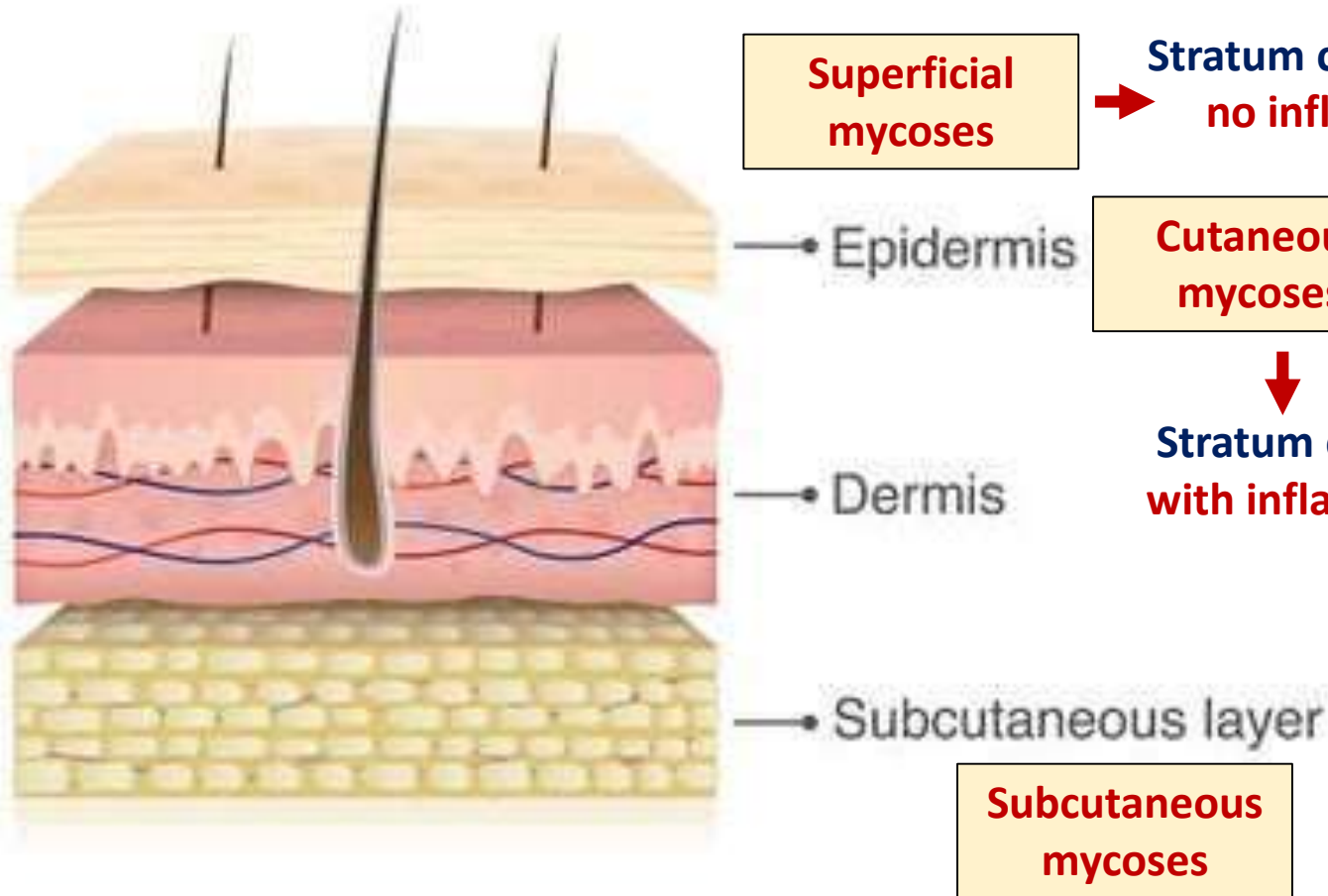
Fungal infection of the skin 2024-2025

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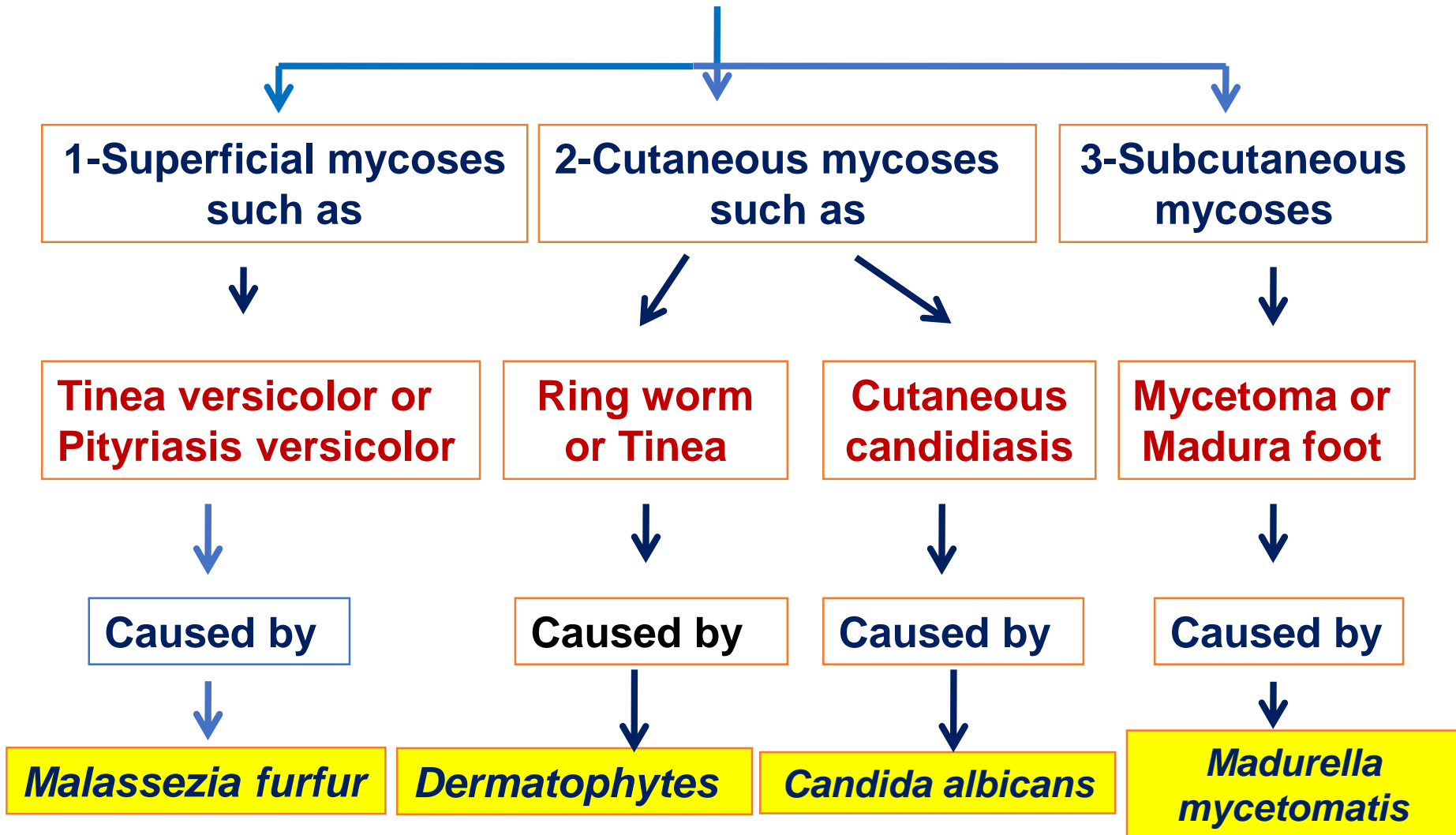
Faculty of Medicine, Mutah University

Three Main Layers of The Skin





Skin & subcutaneous Mycoses



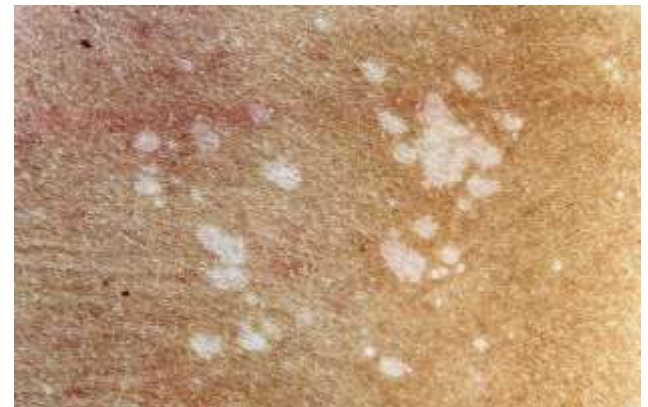
Superficial Mycoses

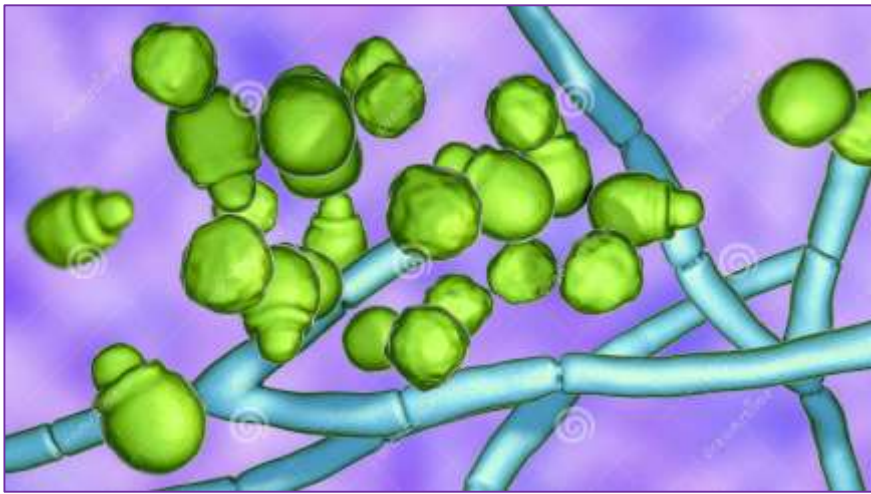
Tinea versicolor (Pityriasis versicolor)



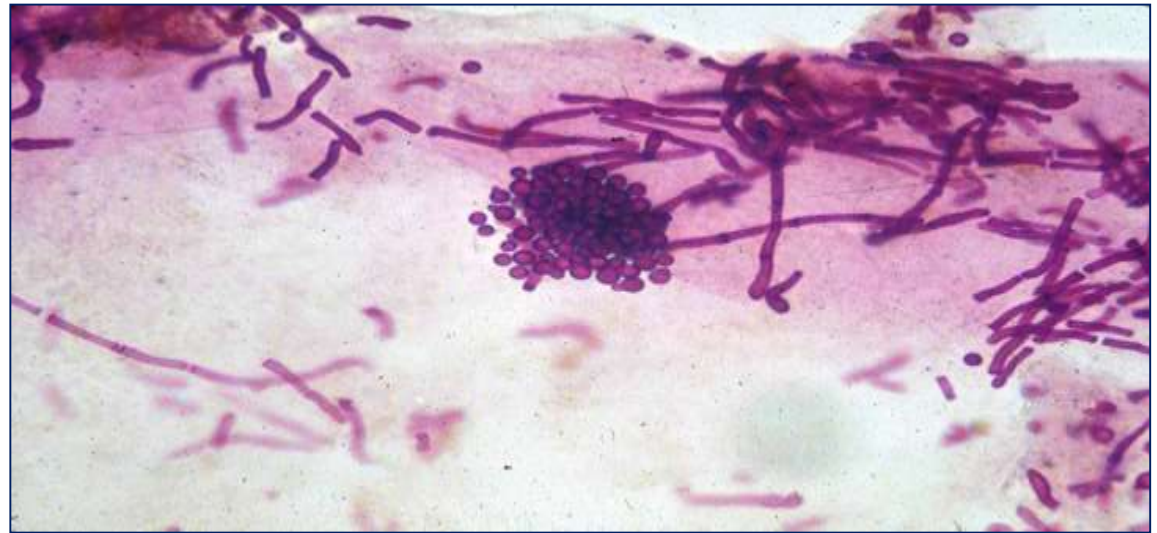
- It is a superficial chronic fungal skin infection of the stratum corneum.
- Caused by *Malassezia furfur* yeast.
- Characterized by superficial brownish scaly areas on light-skinned persons & depigmented areas on dark-skinned persons that affects mainly neck, shoulders, chest and back
- Its growth depends upon the skin's sebum (oily secretion by the sebaceous glands) and increase in hot humid atmosphere
- Asymptomatic & only has cosmetic importance.
- Not contagious

Pityriasis commonly refers to scaling of the skin. The word comes from the Greek 'bran' نخاله





**Bottle like yeast
(spaghetti and meatball
appearance)**



***Malassezia furfur* is a lipophilic gram-positive yeast showing short thick septate hyphae and clusters of budding yeast cells.**



Diagnosis

KOH preparation of skin scales show short thick septate hyphae and clusters of budding yeast cells.

Treatment

- Topical miconazole.
- Lesions **tend to re-occur** and a **permanent cure is difficult to achieve.**

Cutaneous Mycoses

Ring worm or Tinea



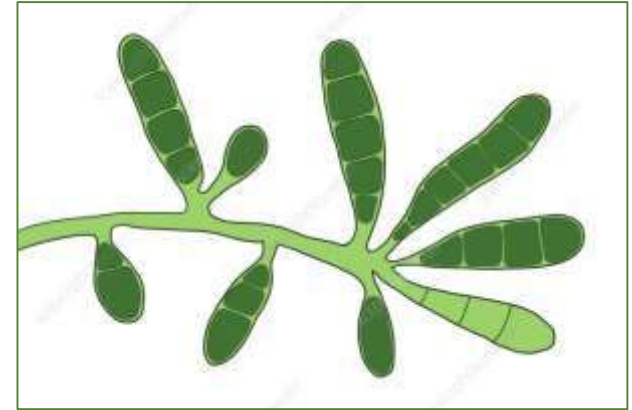
➤ Caused by **dermatophytes** (filamentous fungi) which include 3 genera: *Microsporum*, *Trichophyton* & *Epidermophyton*.

➤ These fungi affect **the keratinized tissues** such as skin, hair & nails.

➤ They spread peripherally from foci to produce ring-like lesions.

➤ Infection does not spread to deeper tissues.

➤ It is **contagious** by contact





Source of infection



1- Man to man by direct contact.

2- From animals e.g., dogs and cats.

3- From the soil.

➤ **The intact skin is an important barrier against infection.**

➤ **Heat and humidity enhance the infection.**



Clinical forms

Tinea pedis or Athlete's foot

Toes web

This is the most common kind of athlete's foot. It usually occurs between the two smallest toes it causes itching, burning and scaling

Tinea corporis & cruris

Body & groin

Red, itchy scaly rash, ring-like with a raised border

Tinea capitis

Head

Loss of hair with different varieties

- Scaly
- Black dot
- Kerion

A kerion is an inflammatory (abscess) that sometimes oozes. Form when your immune system overreacts to the fungal infection ringworm. They most often appear on your scalp, face, neck, shoulders and upper arms.

Tinea unguium

Nail

White and opaque, thickened & broken nails



Tinea pedis



**Demarcated
Circle/Oval**

**Scaling
Patch/Plaque**

**Tinea corporis
& cruris**



Different forms of tinea



Tinea capitis



**Tinea capitis
(Kerion)**



**Tinea Unguium (Nail Fungus)
(Thickened discolored and brittle nails)**

Diagnosis



Microscopic examination

❖ Skin scales, nail & hair are examined microscopically after digestion using 10% KOH.

➤ Branching hyphae are detected among epithelial cells of skin & nails.

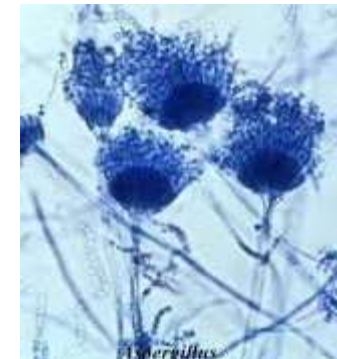
➤ Hyphae or spores are detected in the hair. Spores either detected inside the hair (**endothrix**) or outside the hair (**ectothrix**).

Culture

❖ Culture on **Sabouraud's dextrose agar (SDA)** containing:

❖ The agar is incubated at room temperature for 4 wks.

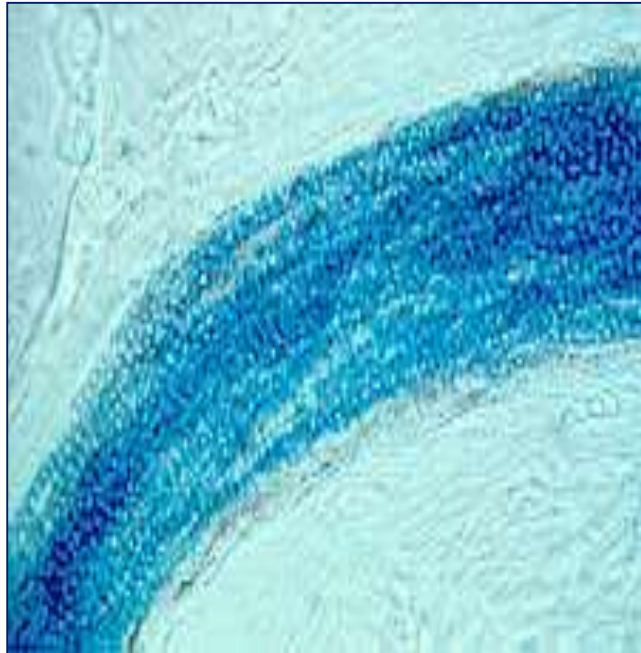
The arising colonies are examined microscopically after staining with **lactophenol cotton blue stain**.



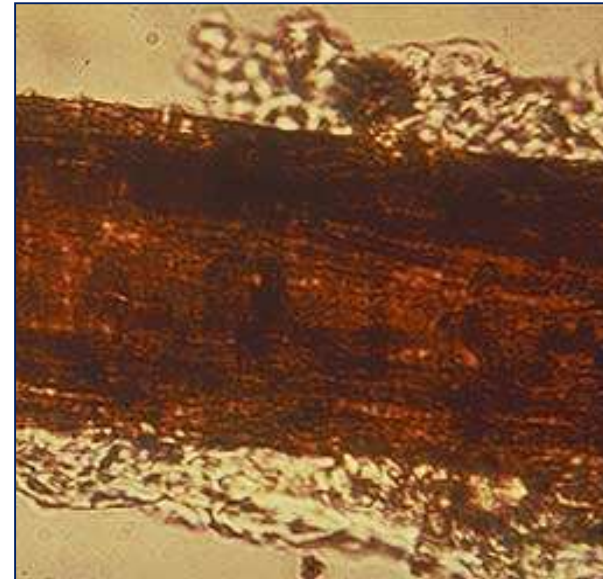
Treatment

Local antifungal cream as miconazole or oral griseofulvin

Microscopic examination of infected hair



Endothrix



Ectothrix

Endothrix refers to dermatophyte infections of the hair that invade the hair shaft and internalize into the hair cell.

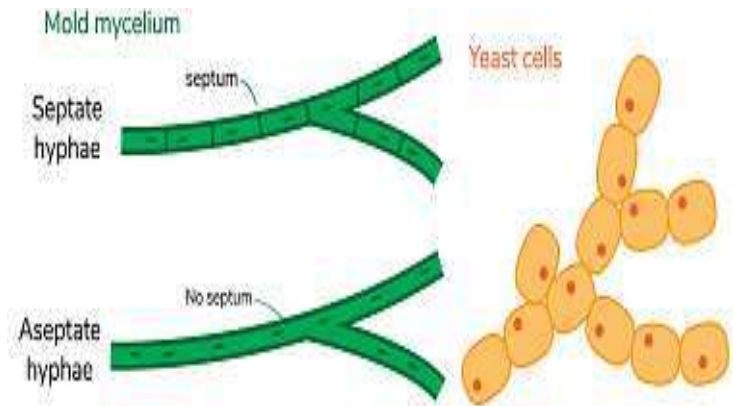
Ectothrix where a dermatophyte infection remains confined to the hair surface.

Cutaneous Mycoses

Candidiasis



- ***Candida albicans*** is the most important species of candida.
- ***Candida albicans*** is an oval gram-positive budding yeast that produces pseudohyphae.
- It is one of the **normal flora** of the mucous membranes of the **upper respiratory, GIT & female genital tracts**.
- It predominates with lowering immunity causing the infection, so it is one of **the opportunistic fungi**.



Pseudohyphae :
are distinguished from true hyphae by their method of growth and lack of cytoplasmic connection between the cells.



Predisposing factors to *Candida* infections

- 1- Diseases such as AIDS & diabetes mellitus.**
- 2- Drugs: prolonged treatment with broad-spectrum antibiotics & corticosteroids.**
- 3- General debility.**
- 4- Indwelling urinary catheters.**



Pathogenesis & Symptomatology

Skin invasion

-They are red lesions (have fluid blisters) - satellite pustules.
-Mainly affect warm moist areas such as the axilla, intergluteal folds, or infra mammary folds.
-Mostly in obese & diabetics.

Mouth infection

C. albicans produces white patches in the mouth (**oral thrush** or **moniliasis**).

Vulvovaginitis

-With itching & vaginal discharge .
-Common with diabetic woman & prolonged use of antibiotics

Nails infection

-Occurs with repeatedly immersing in water (dish washing).
-Painful redness, swelling of nail folds, thickening & loss of nail (**paronychia**).

Systemic candidiasis

Occur in diabetics & Immuno-suppressed persons.

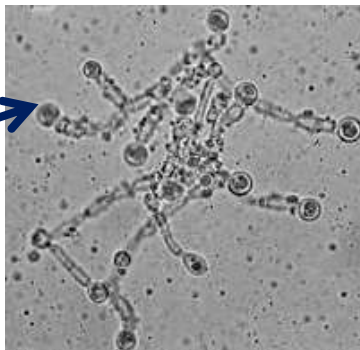


Laboratory diagnosis



Direct microscopic examination

- Specimens from skin, vaginal discharge or exudates from mucous surfaces are examined.
- *C. albicans* is **oval gram-positive budding yeast cell with pseudohyphae.**

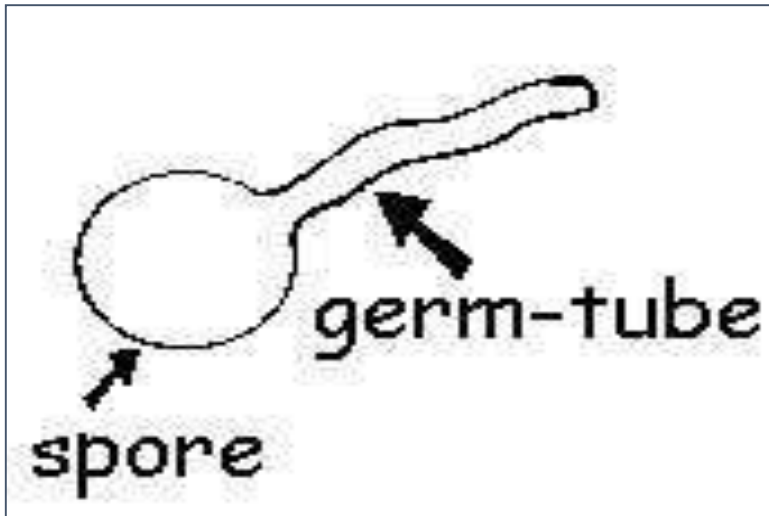


Chlamydo-spore

Culture

On nutrient agar, corn meal agar & SDA. Colonies are creamy in color & identified by:

- 1- **Morphology:** oval budding gram +ve yeast cells.
- 2- **Differentiation tests:**
 - a. **Germ tube test :** germ tube is formed when spores incubated with human serum at 37 C for 30 min.
 - b. **Chlamydo-spore** thick-walled large resting spore formation on corn meal agar.
 - c. **Biochemical reactions:** *C. albicans* ferments glucose & maltose with acid & gas production.



Germ tube



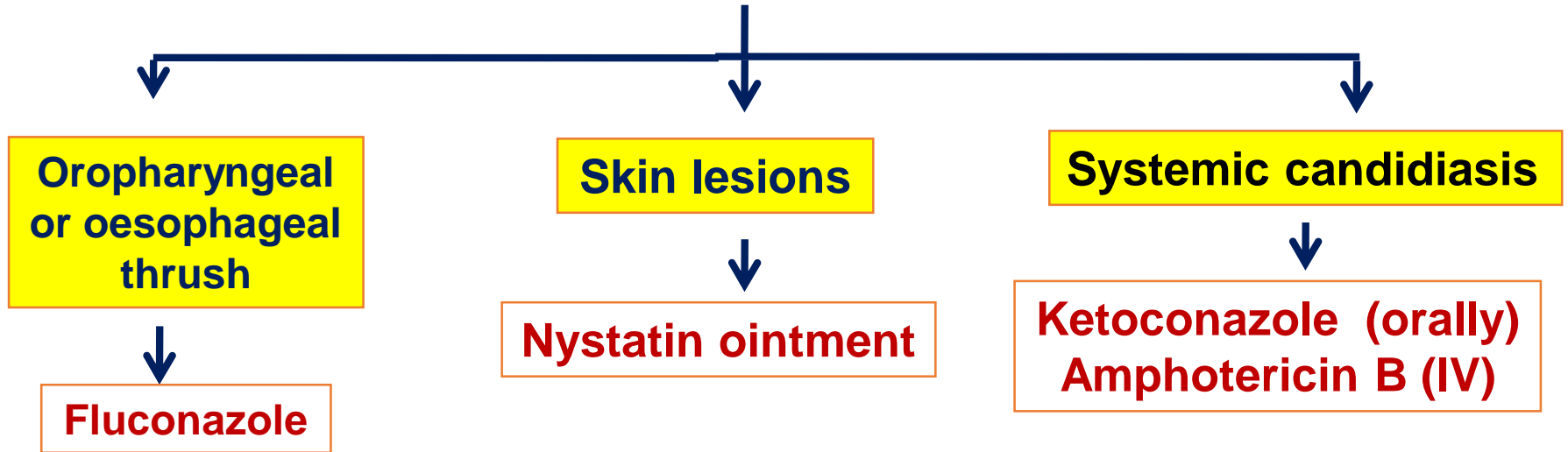
Terminal Chlamydospore & pseudohyphae



Biochemical reaction of *Candida*



Treatment





Subcutaneous mycoses

Mycetoma (Madura foot)

- Mycetoma is a disease caused by certain types of bacteria and fungi found in soil and water.
- was first described by Vandyke Carter in 1860 in Madurai, India
- They are introduced into subcutaneous tissues through trauma.
- Mycetoma is a **chronic granulomatous infection** usually affects the lower limbs.
- The disease usually affects **farmers**.



Causative organism of mycetoma

1- Eumycetoma:

caused by fungi *Madurella mycetomatis* which having true septate hyphae (divided into cells) and spores.

2- **Actinomycetoma:** caused by species of actinomycetes (filamentous aerobic bacteria).

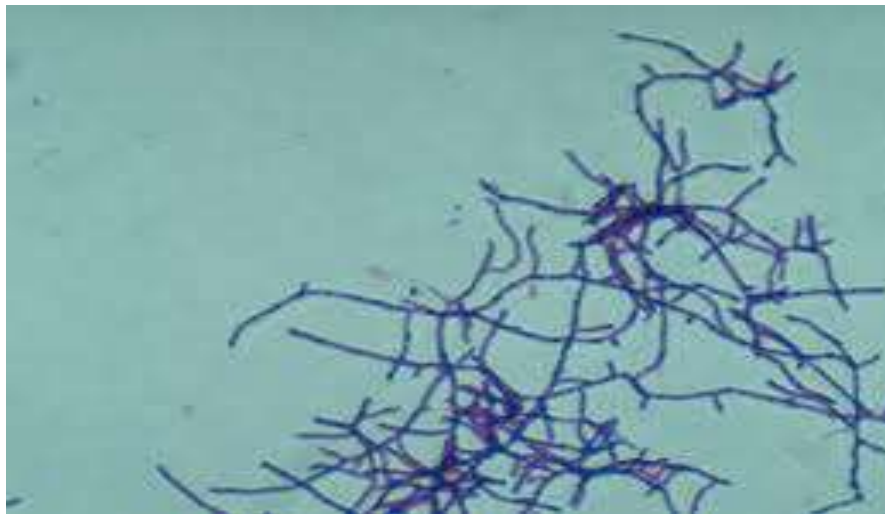
Clinical picture

Swelling following trauma, painless, purplish discoloration & multiple sinuses drain pus containing yellow, white, red, or black granules. Black granules are common with fungi.

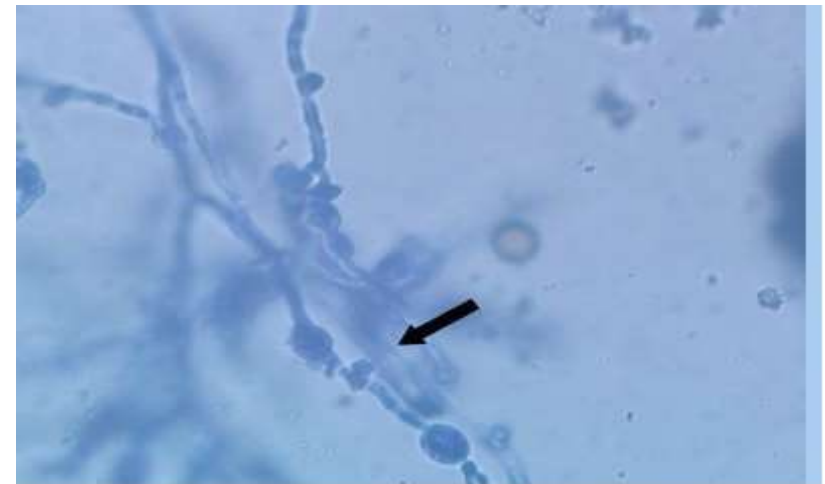


**Differentiation
between
actinomycetes
and *Madurella* is
important ?????**

Madura foot



**Actinomycetes filaments
with no spores**



***Madurella mycetomatis* with
intercalary chlamydospores**



Diagnosis

Macroscopic examination

Microscopic examination

Culture

Depend on the color of the granules

- Black granules are common with fungal infection.
- White, yellow & red granules are common with bacterial infection.

- Septate hyphae with spores in fungal infection.
- Filaments with no spores in bacterial infection.
- (Fungi are Gram -ve while bacteria are Gram +ve).

On SDA



Treatment

Fungal mycetoma

1. Medical:

- ketoconazole
- Itraconazole
- Amphotericin B

2. Surgical.

Actinomycetoma

1. Medical:

- Streptomycin
- Trimethoprim
- Sulphamethoxazole
- Dapsone.

2. Surgical.



Identify ??????

Tinea corporis



**Tinea capitis
(Kerion)**

Tinea versicolor



Tinea cruris



Tinea pedis

