

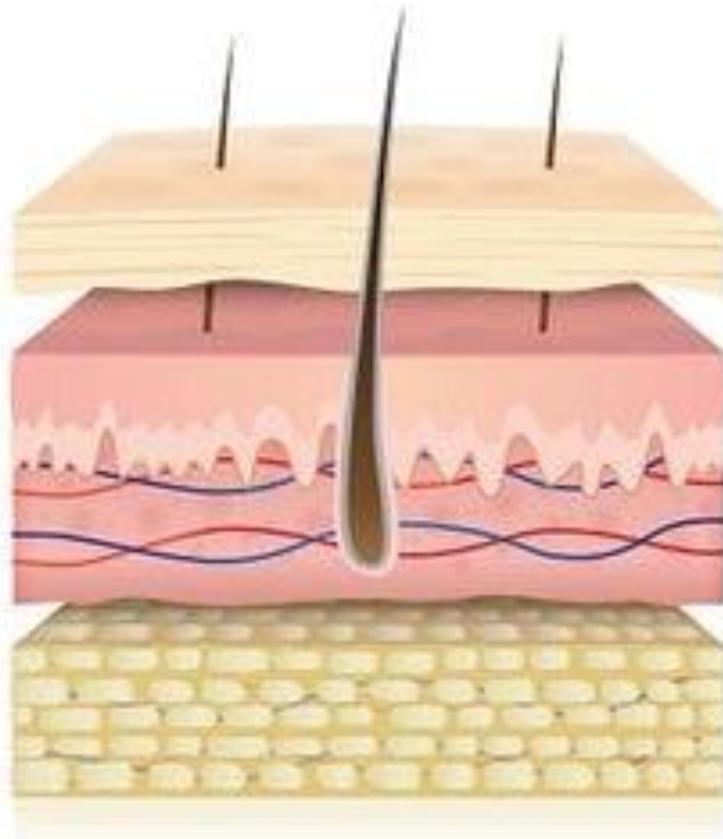


# Fungal infection of the skin

Presented by

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# Three Main Layers of The Skin



**Superficial  
mycoses**

→ **Stratum corneum with  
no inflammation**

→ Epidermis

**Cutaneous  
mycoses**



**Stratum corneum  
with inflammation**

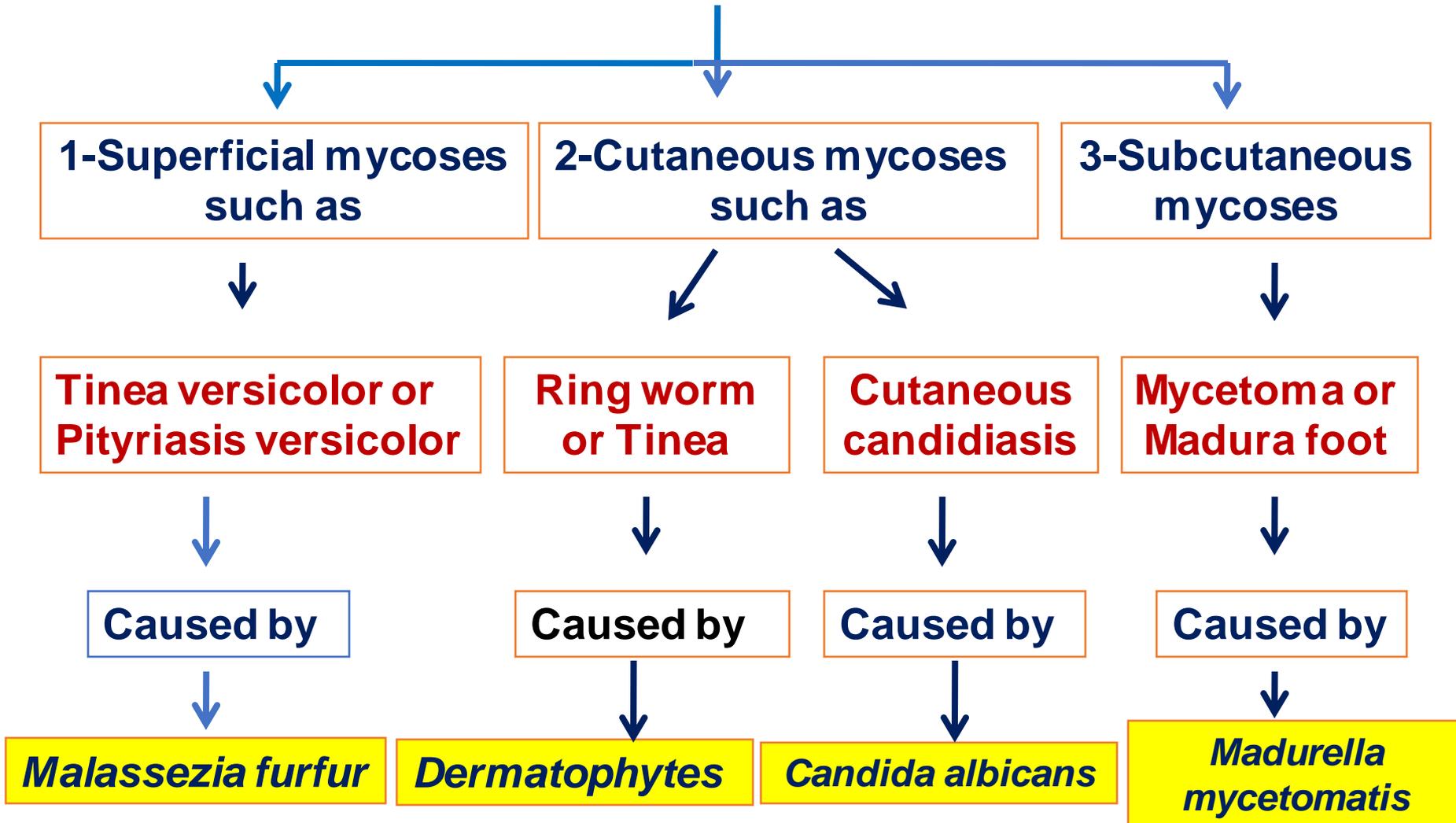
→ Dermis

→ Subcutaneous layer

**Subcutaneous  
mycoses**



# Skin & subcutaneous Mycoses



# Superficial Mycoses

## Tinea versicolor (Pityriasis versicolor)



➤ It is a superficial chronic fungal skin infection of the stratum corneum.

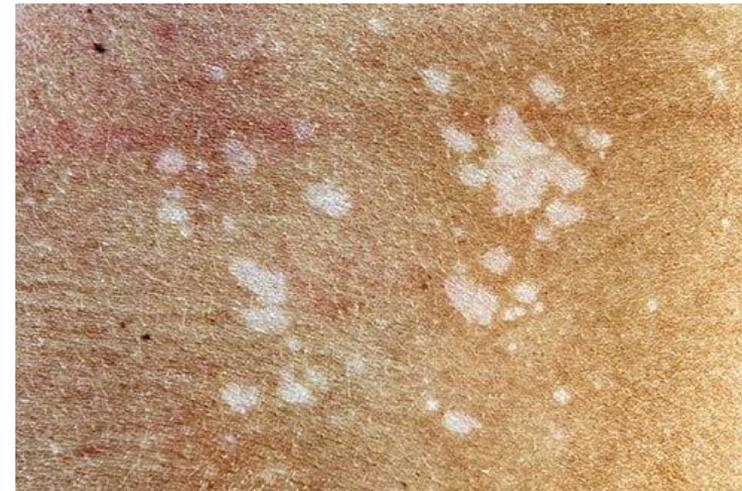
➤ Caused by *Malassezia furfur* yeast.

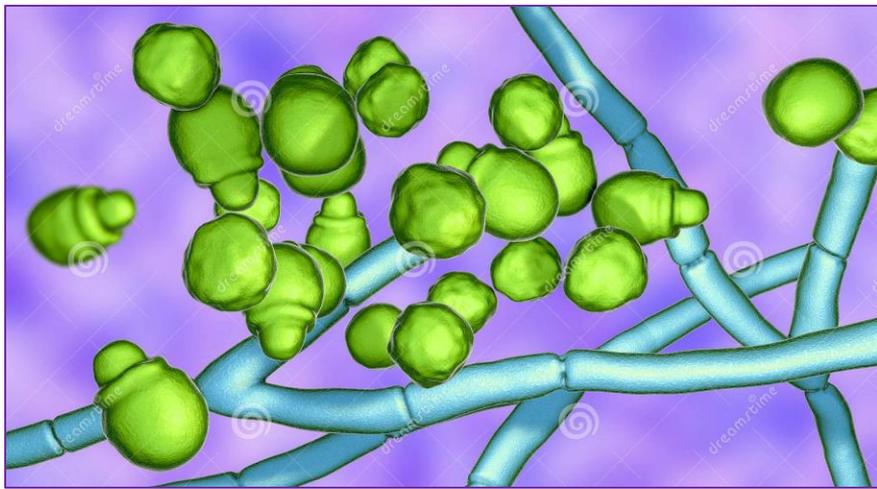
➤ Characterized by superficial brownish scaly areas on light-skinned persons & depigmented areas on dark-skinned persons that affects mainly neck, shoulders, chest and back

➤ Its growth depends upon the skin's sebum (oily secretion by the sebaceous glands) and increase in hot humid atmosphere

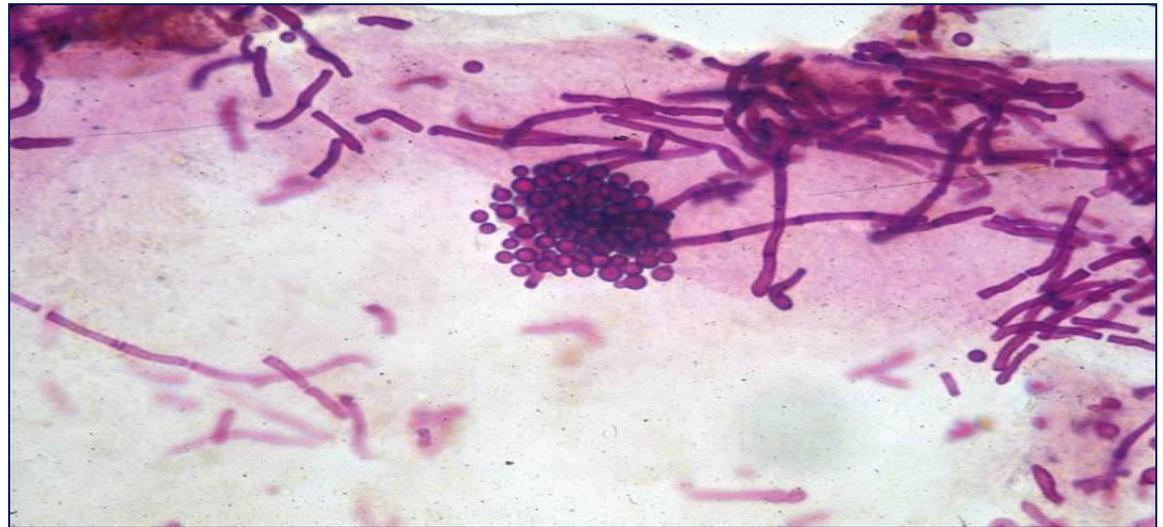
➤ Asymptomatic & only has cosmetic importance.

➤ Not contagious





**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



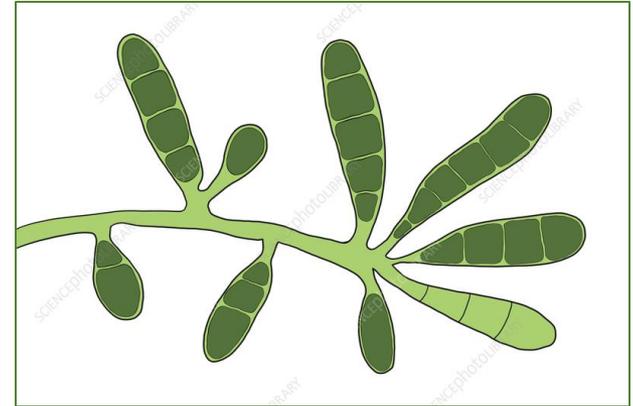
➤ Caused by **dermatophytes** (filamentous fungi) which include 3 genera: *Microsporum*, *Trichophyton* & *Epidermophyton*.

➤ 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.

### N.B.

- 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

**Tinea unguium**



**Nail**

White and opaque, thickened & broken nails



**Different forms of tinea**



# 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**).

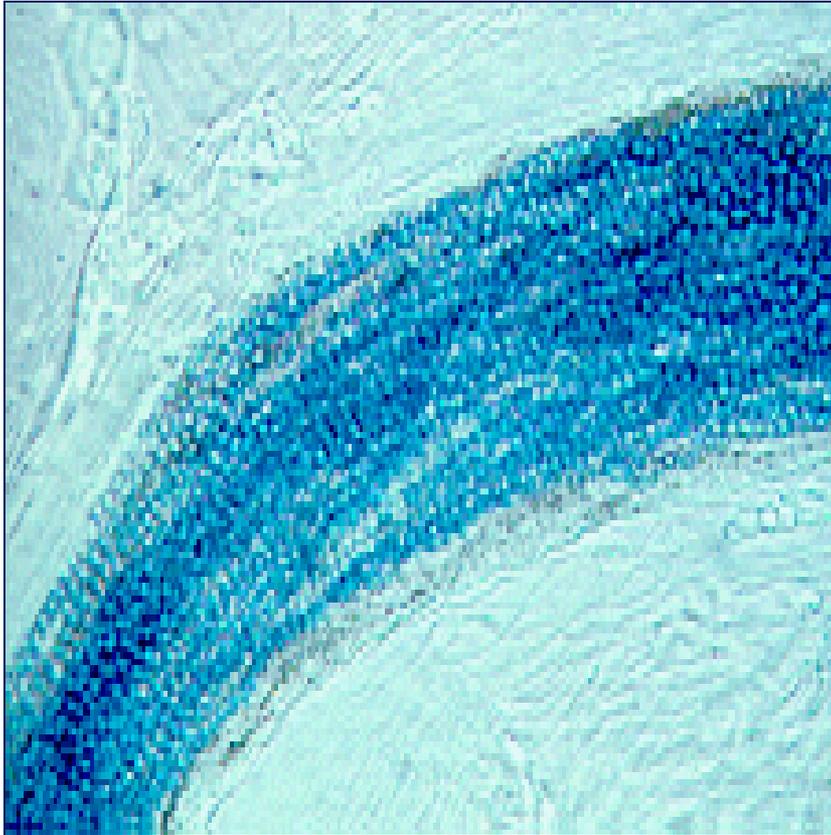
## Culture

- ❖ Culture on **Sabouraud's dextrose agar (SDA)** containing:
  - Actidione to inhibit saprophytes except dermatophytes.
  - Chloramphenicol to inhibit bacteria.
- ❖ The agar is incubated at room temperature for 4 wks. The arising colonies are examined microscopically after staining with **lactophenol cotton blue stain**.

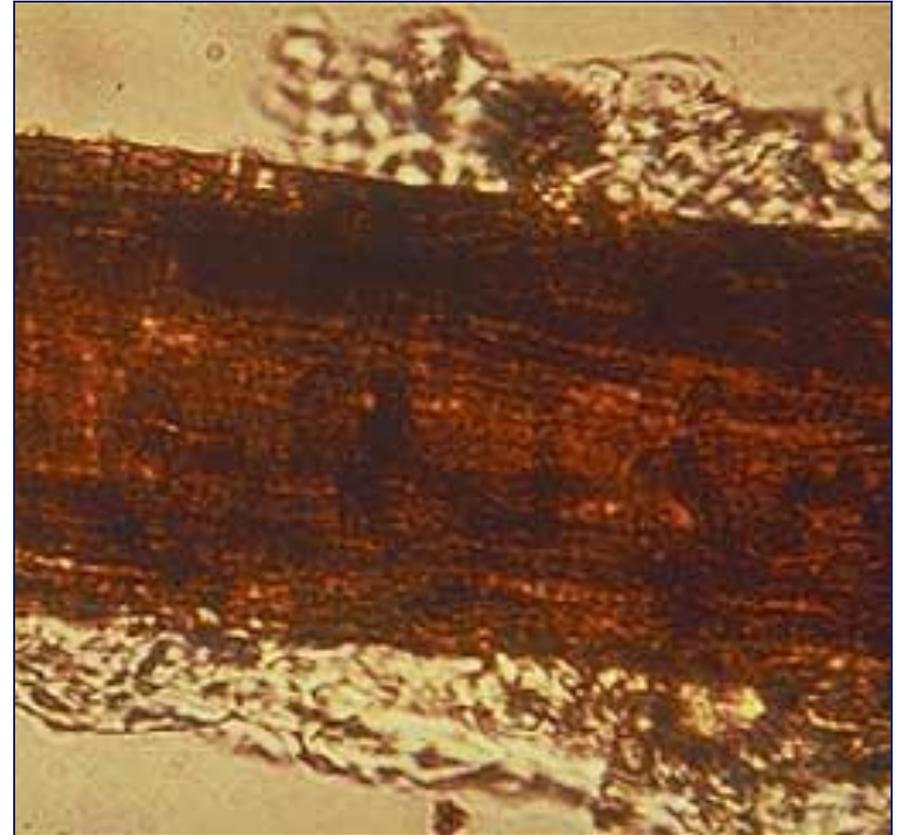
## Treatment

**Local antifungal cream as miconazole or oral griseofulvin**

# Microscopic examination of infected hair



**Endothrix**



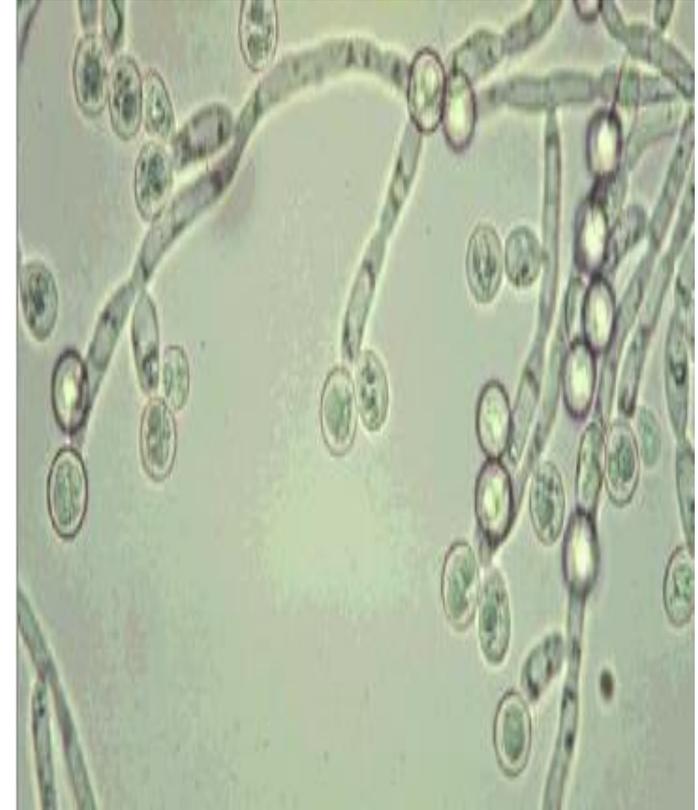
**Ectothrix**

# 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**.





# **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.

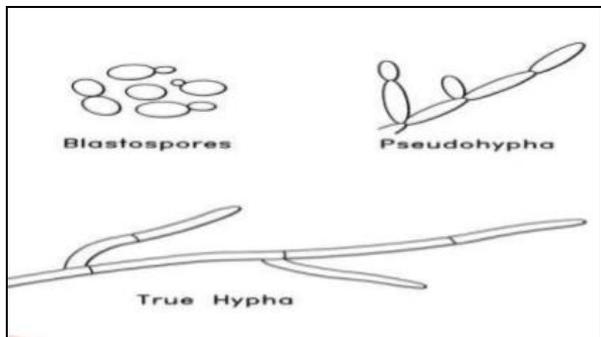


# Laboratory diagnosis



## Direct microscopic examination

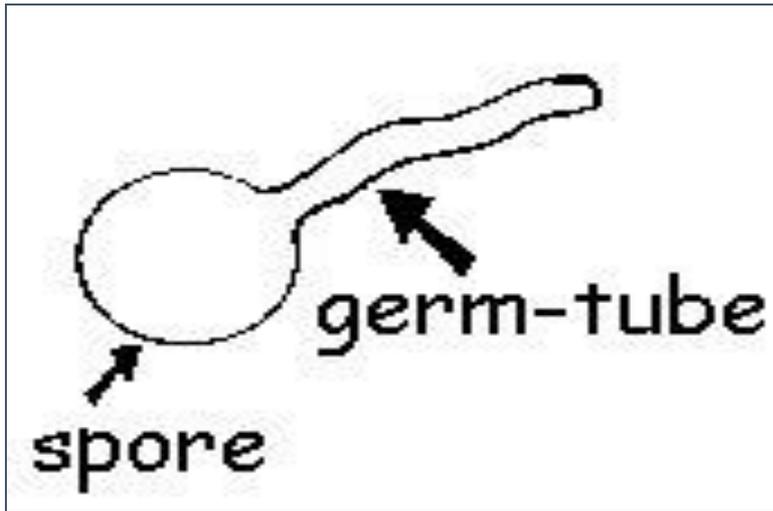
- Specimens from skin, vaginal discharge or exudates from mucous surfaces are examined.
- *C. albicans* is **oval gram-positive budding yeast cell with pseudohyphae.**



## 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. **Chlamyospore** thick-walled large resting spore formation on corn meal agar.
  - c. **Biochemical reactions:** *C.albicans* ferments glucose & maltose with acid & gas production.



**Germ tube**



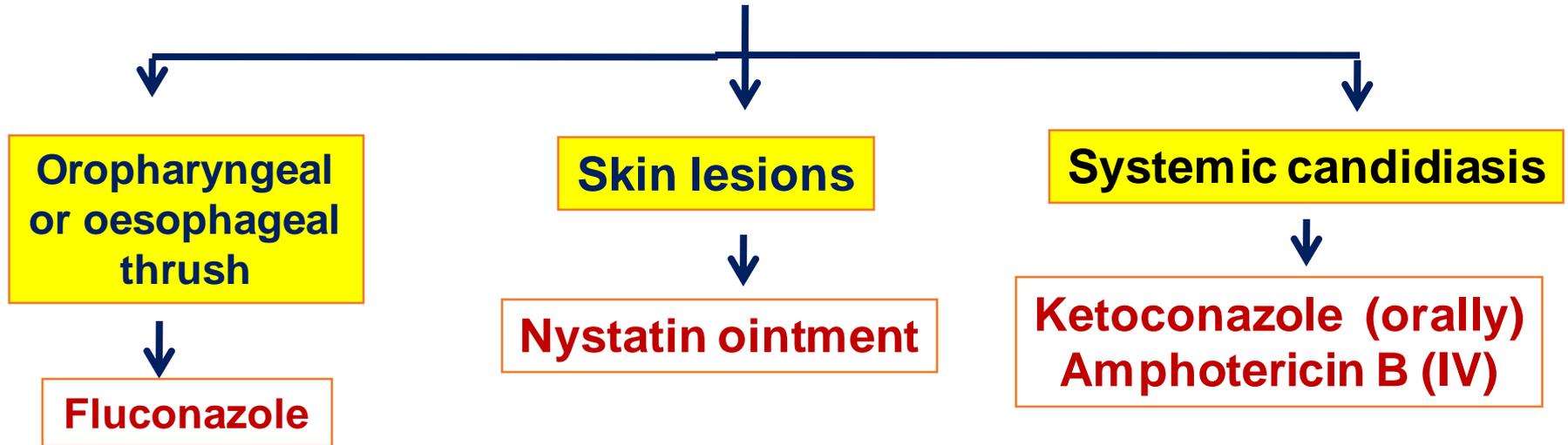
**Terminal Chlamydospore & pseudohyphae**



**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.
- 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).

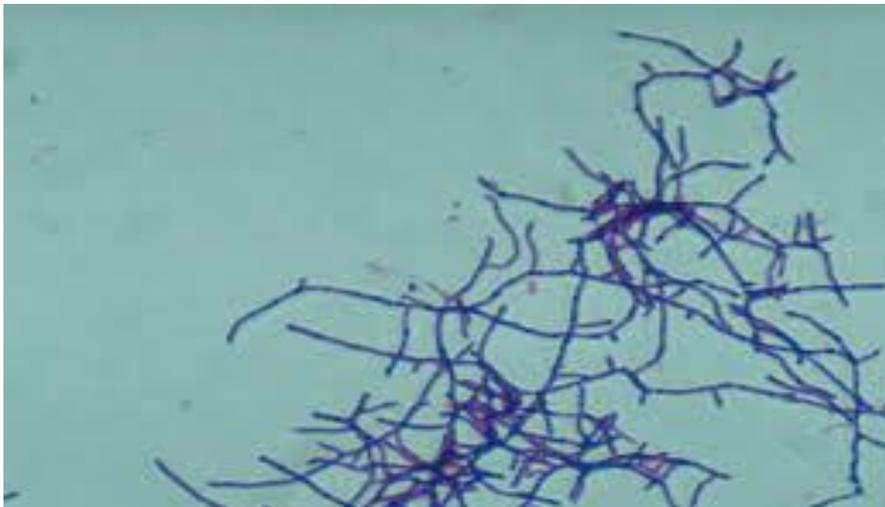
## Clinical picture

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

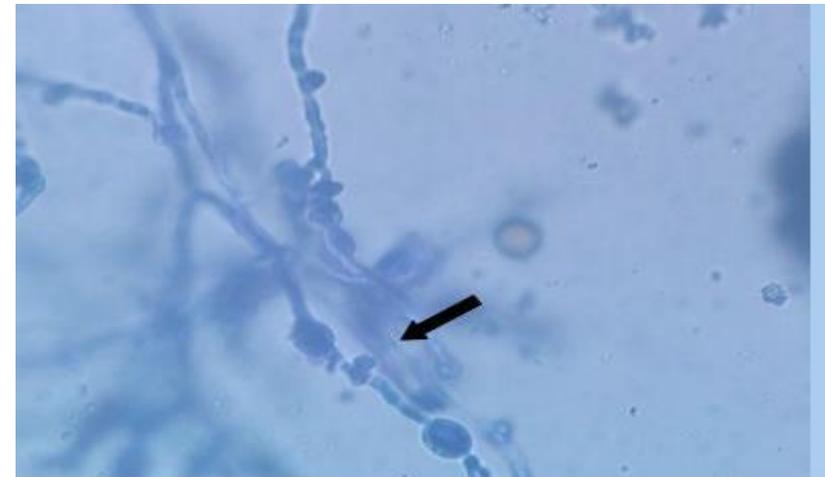


Differentiation  
between  
actinomycetes  
and *Madurella* is  
important ?????

**Madura foot**



**Actinomycetes filaments  
with no spores**



***Madurella mycetomatis* with  
intercalary chlamydospores**



# Diagnosis

Macroscopic examination

Depend on the color of the granules

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

Microscopic examination

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

Culture

On SDA



# Treatment

## Fungal mycetoma

### 1. Medical:

- ketoconazole
- Itraconazole
- Amphotericin B

### 2. Surgical.

## Actinomycetoma

### 1. Medical:

- Streptomycin
- Trimethoprim
- Sulphamethoxazole
- Dapson.

### 2. Surgical.



**Identify ??????**





**Identify ??????**



