

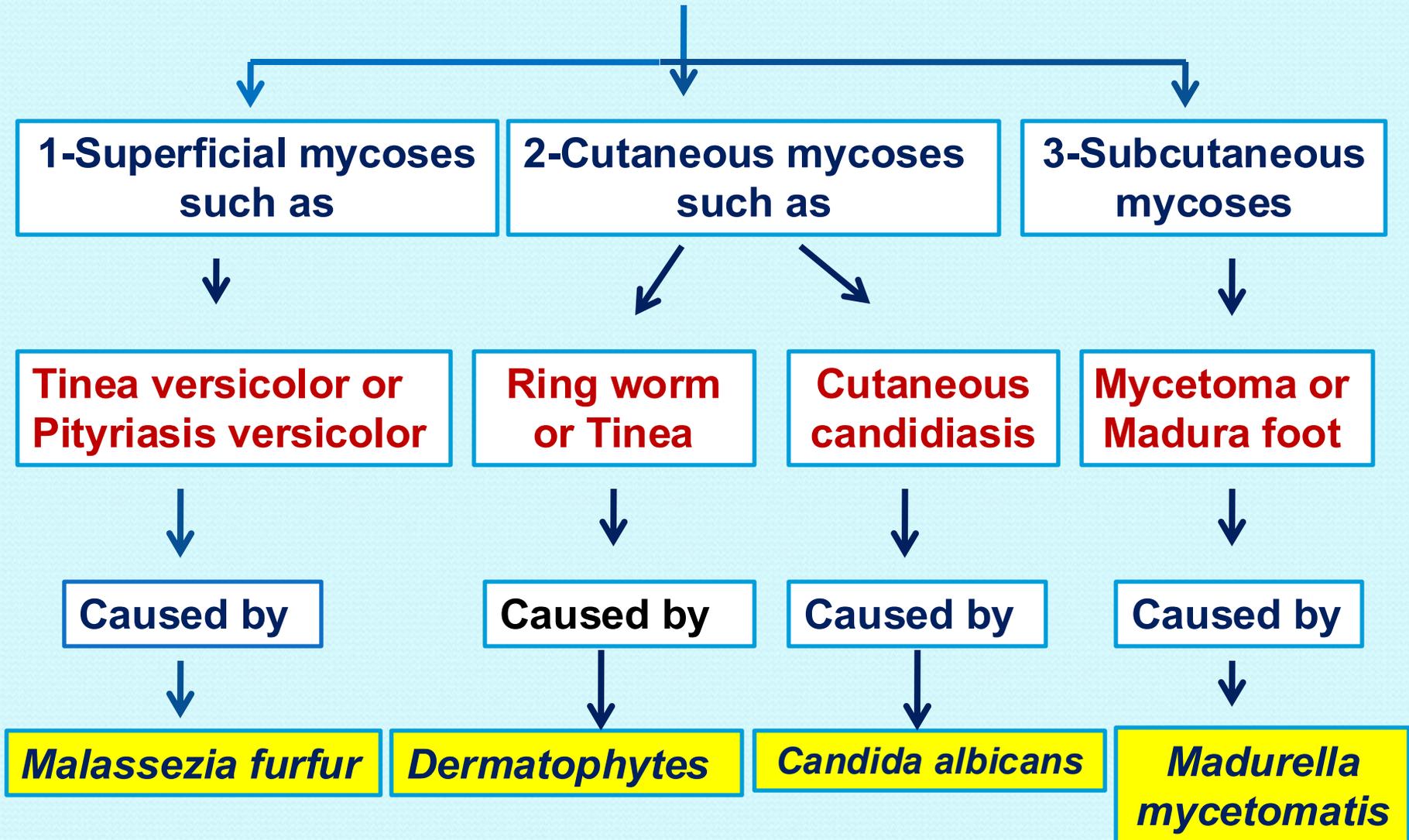
**FUNGAL INFECTION OF  
THE SKIN & SUBCUTANEOUS  
TISSUES**

**BY**

**DR. EMAN ALBATAINEH**

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# Skin & subcutaneous Mycoses

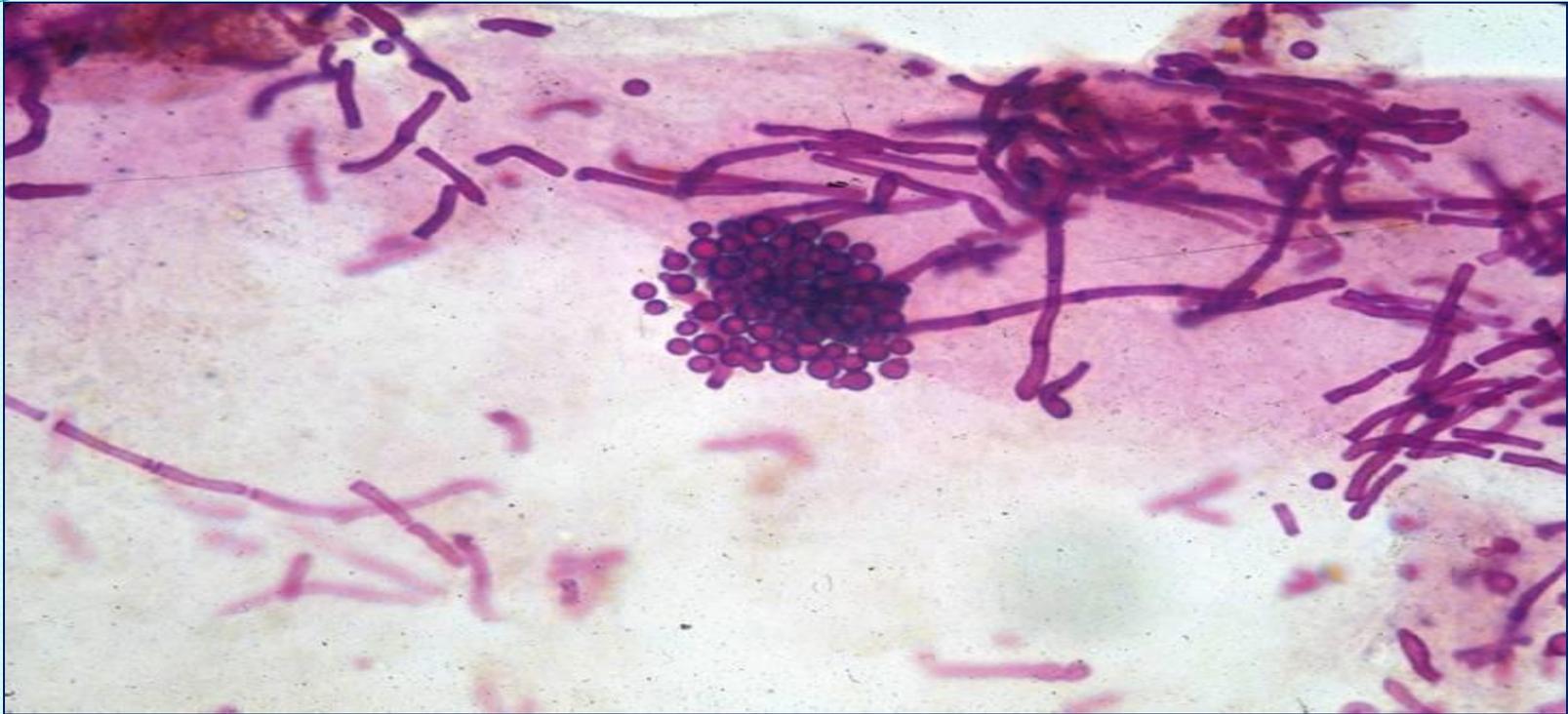


# Superficial Mycoses

## Tinea versicolor (Pityriasis versicolor)

- It is a superficial chronic fungal skin infection of the stratum corneum.
- Caused by *Malassezia furfur*.
- Characterized by superficial brownish scaly areas on light -skinned persons & depigmented areas on dark – skinned persons.
- Its growth depends upon the skin's sebum (oily secretion by the sebaceous glands).
- Asymptomatic & only has a cosmetic importance.





***Malassezia furfur* is a lipophilic 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 permanent cure is **difficult** to achieve.

# Cutaneous Mycoses

## Ring worm or tinea

- Caused by (Tinea) **dermatophytes** (**filamentous fungi**) which include **3 genera**: *Microsporum*, *Trichophyton* & *Epidermophyton*.
- These fungi affect **the keratinized tissues** as skin, hair & nails.
- They spread peripherally from foci to produce ring like lesions.
- Infection not spread to deeper tissues.



## 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 pictures:

- **Body or groin:** Red, itchy scaly rash, ring like with raised border
- **Hair:** loss of hair leaving black dots.
- **Nails:** White and opaque, thickened & broken nails.
- **Interdigital:** Also called toe web infection, this is the most common kind of athlete's foot. It usually occurs between the two smallest toes.



**Ring like lesion  
on the body**

# Clinical forms

**Tinea pedis or Athlete's foot**

**Tinea corporis & cruris**

**Tinea capitis**

**Tinea unguinum**

**Toes web**

**Body & groin area**

**Head**

**Nail**



# 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**).

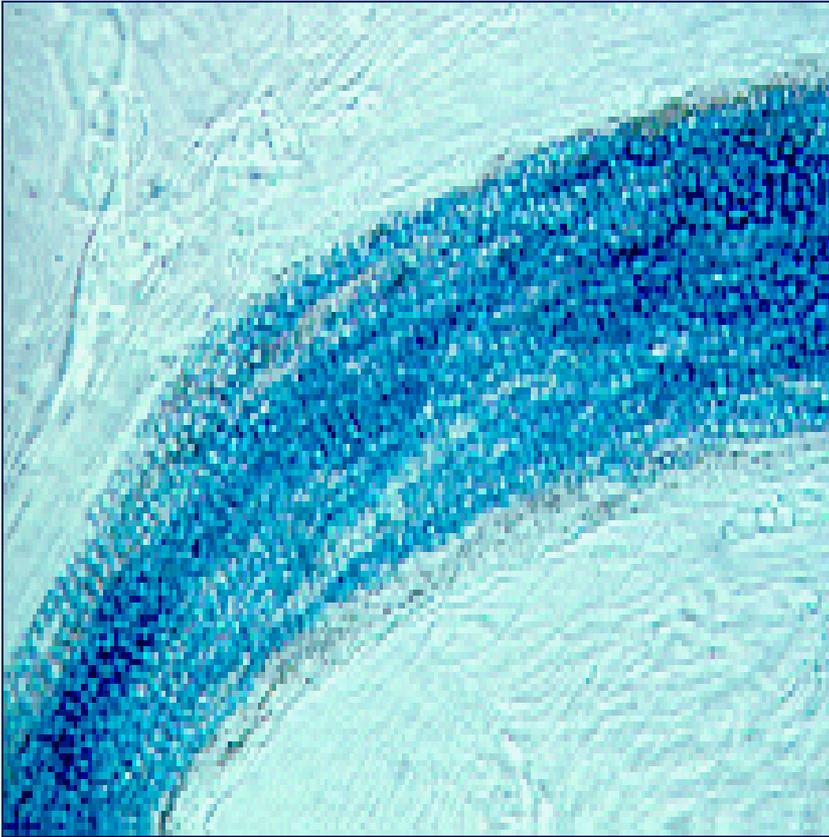
## Culture

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

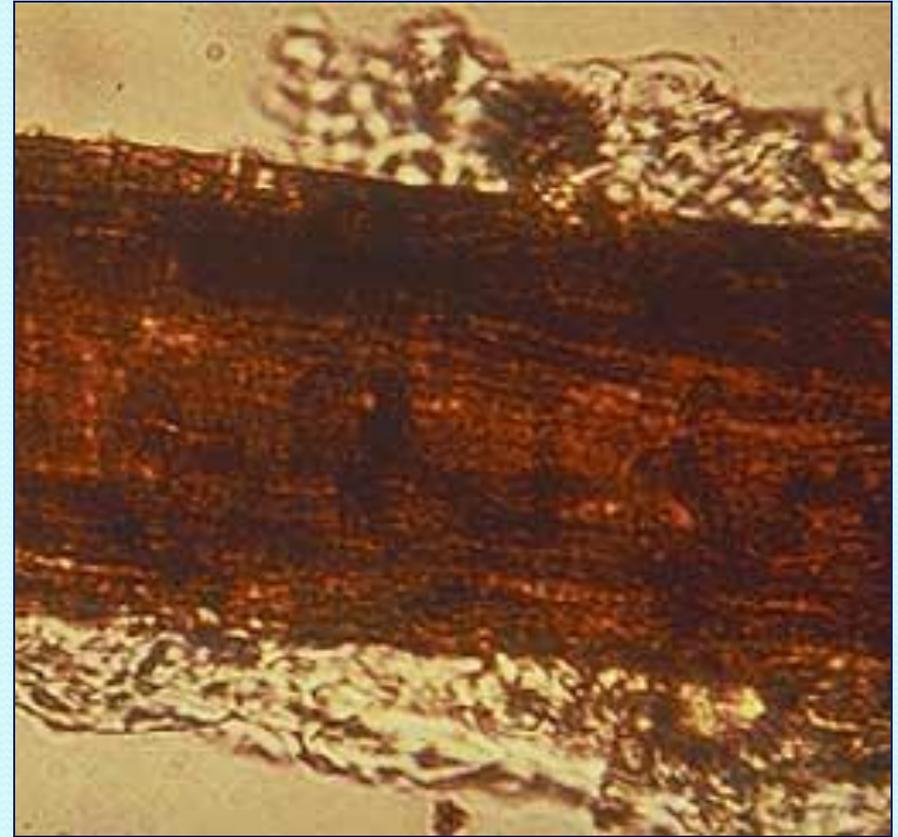
## Treatment

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

## Microscopic examination of infected hair

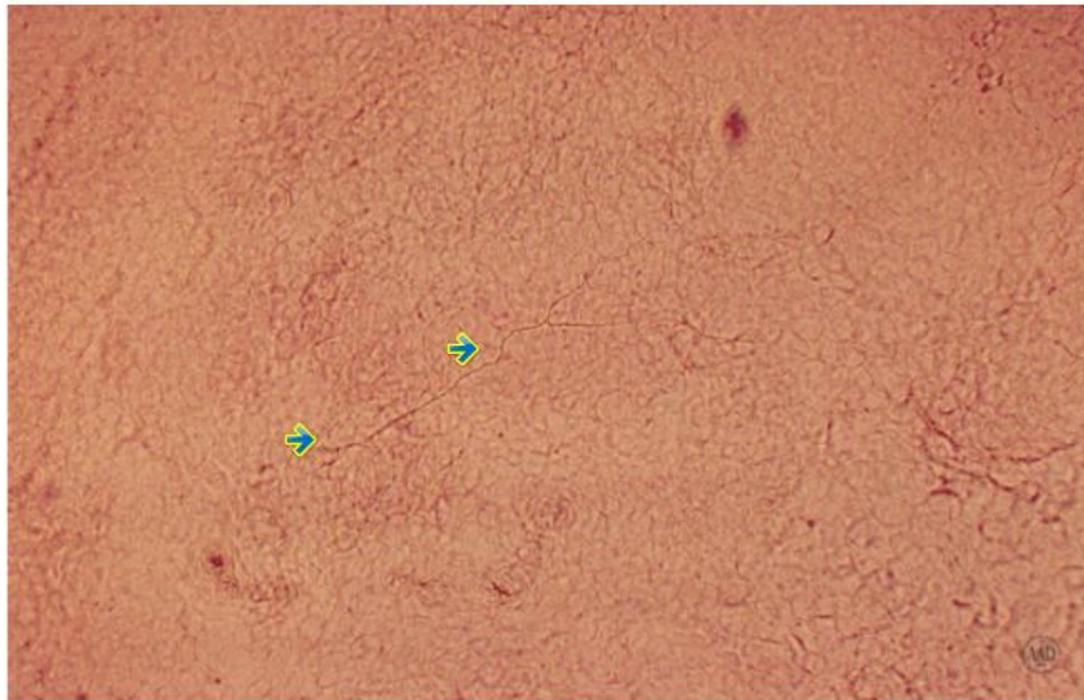


**Endothrix**



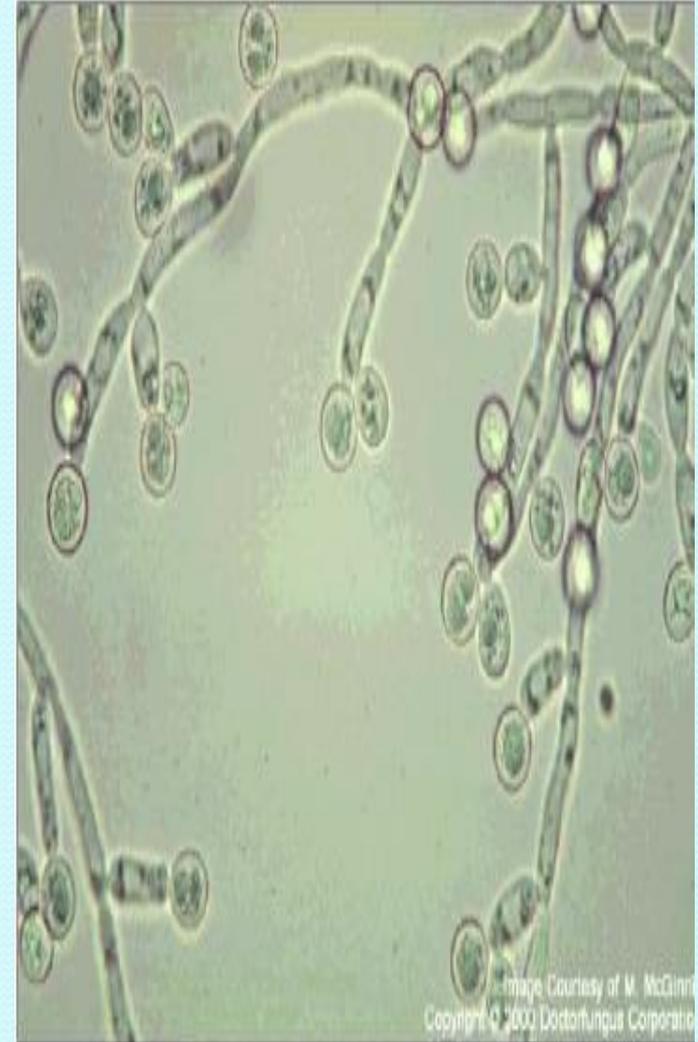
**Ectothrix**

## KOH skin scraping: Fungal filaments



# Candidiasis

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



## PSEUDOHYPHAE

Constricted septa

Origin of branch is constricted and septate

Grows by budding

## TRUE HYPHAE

No constriction

No septum

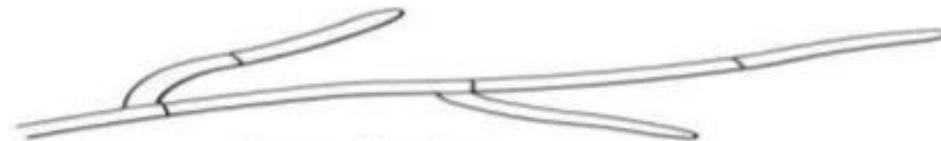
Atypical elongation



Blastospores



Pseudohypha



True Hypha

# **Predisposing factors to *Candida* infections**

- 1- Diseases 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 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:

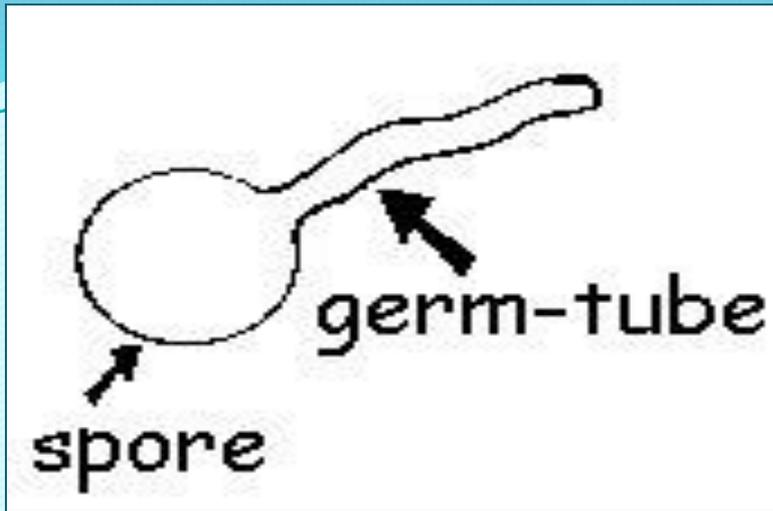
**1- Morphology:** oval budding gram +ve yeast cells.

**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**

**Treatment**

**Oropharyngeal or oesophageal thrush**

**Fluconazole**

**Skin lesions**

**Nystatin ointment**

**Systemic candidiasis**

**Ketoconazole (orally)  
Amphotericin B (IV)**

## Subcutaneous mycoses

### Mycetoma (Madura foot)

- These infection caused by fungi that grow in soil & on decaying vegetations.
- The fungi 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

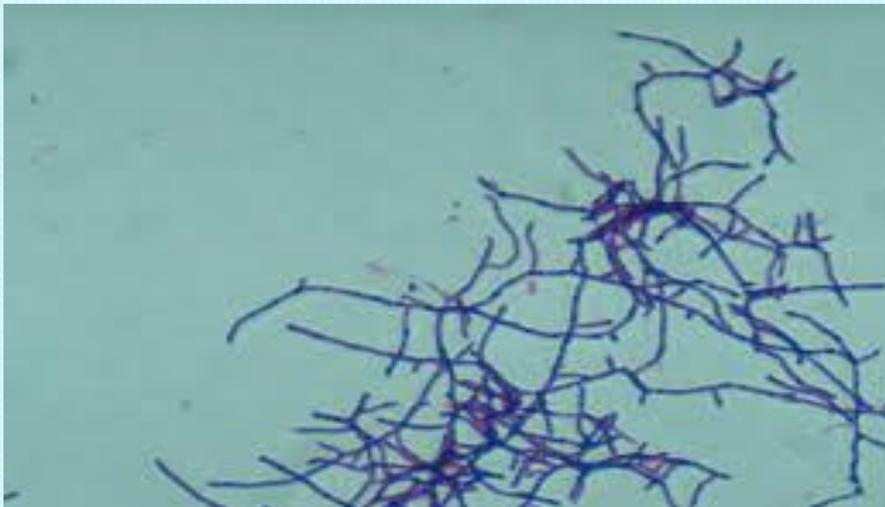
- 1- Eumycetoma: caused by fungi *Madurella mycetomatis* which having true septate hyphae (divided into cells) and spores.
- 2- Actinomycetoma: caused by species of actinomycetes (filamentous aerobic bacteria).

### Clinical pictures

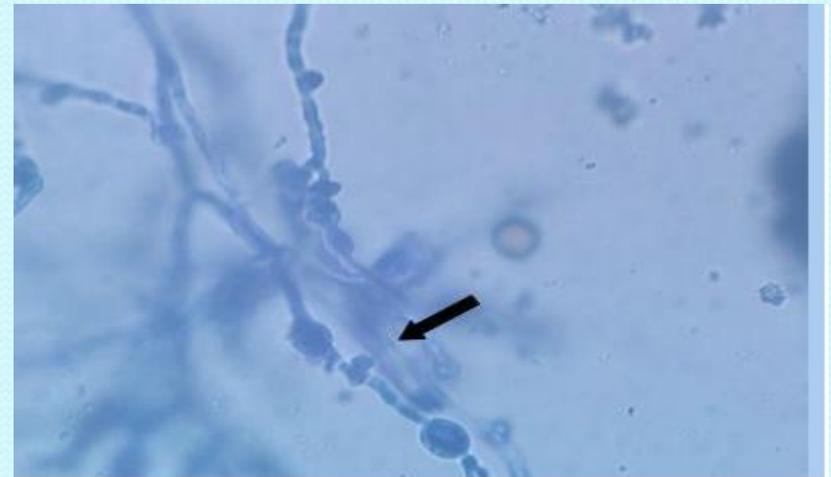
Swelling following trauma, purplish discolouration & multiple sinuses that drain pus containing yellow, white, red or black granules.



**Madura foot**



**Actinomycetes fillaments  
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
- Dapson.

### 2. Surgical.

THANK

YOU

