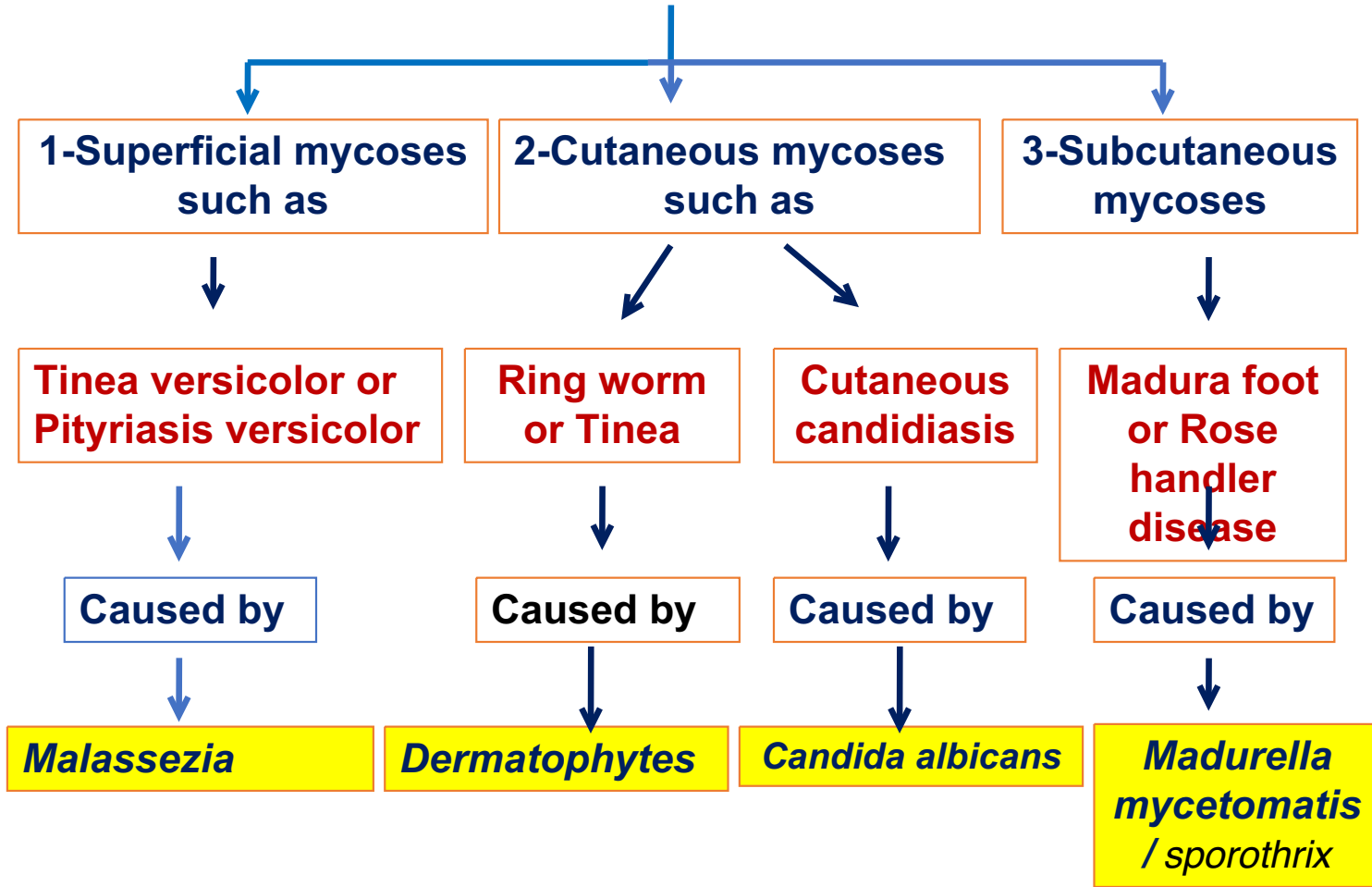


# Fungal infections of the skin

By : Nader Alaridah MD,PhD

# Skin & subcutaneous Mycoses



# Superficial Malassezia infections:

- Lipophilic yeast round in shape
- Normal commensals of skin
- Can cause skin infections and catheter associated infections

# Superficial Malessezia infections

## **Pityriasis versicolor:**

:

- Skin (stratum corneum) infection
- Trunk and proximal limbs
  
- M. furfur and M. globosa
- Common in tropics and precipitated by sun exposure
  
- Carboxylic acid produced by the yeast causes the depigmentation

# Superficial Malessezia infections

## **Pityriasis versicolor:**

:

### **Clinically:**

- Asymptomatic Non itchy macules hypo or hyper pigmented
- Can coalesce to form scaly plaques







# Superficial Malassezia infections

## **Pityriasis versicolor:**

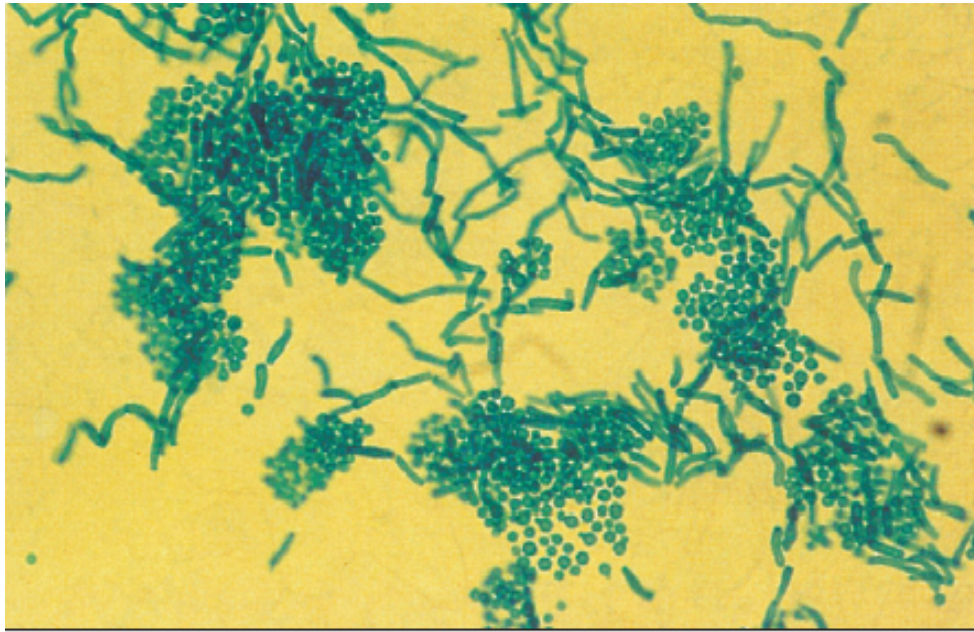
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### **Diagnosis:**

- UV light: pale greenish colour under **Wood's ultra-violet light**
- Skin scraping then Ink and KOH staining
- ☐ thick septate hyphae and clusters of budding yeast cells (Spaghetti and meatballs)



# Malassezia furfur



# Superficial Malassezia Infections

**Treatment if needed is for cosmetic reasons:**

- Some resolve spontaneously
- Topical azoles cream/ shampoo for 2 weeks or in severe cases use oral azoles
- Recurrence is common

**(Seborrheic dermatitis):**

Skin hyperproliferation with dandruff being the mildest manifestation.

**Lesions** are red and covered with greasy scales and itching is common in the scalp.

M. furfur

Azoles

# Cutaneous Mycoses

## Ring worm or tinea

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

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

? Infection not spread to deeper tissues.



## **Source of infection**

- 1- Man to man by direct contact ( Anthrophilic)**
- 2- From animals e.g. dogs and cats (Zoophilic )**
- 3- From the soil (Geophilic).**

### **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

Tinea corporis  
& cruris

Tinea capitis

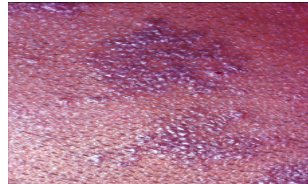
Tinea unguinum

Toes web

Body & groin  
area

Head

Nail



**? Clinical pictures:**

**? Red, itchy scaly rash, ring like with raised more inflamed border on the body or groin.**

**? Scaling and hair loss leaving black dots.**

**? White and opaque / yellow , thickened & broken nails.**

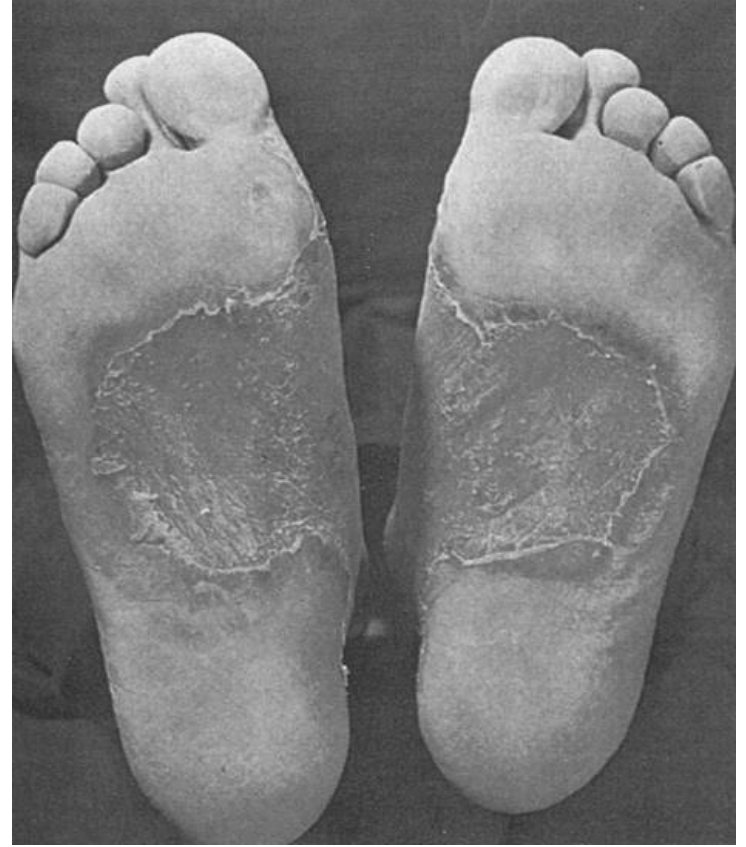
**? DDX: Eczema, psoriasis, impetigo, alopecia, drug reactions.**



**Ring like lesion**



- Tinea pedis showing interdigital scalping
- *T. mentagrophytes*



Dermatophytosis of the soles

# 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)**:

? 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 terbinafine weeks to months**

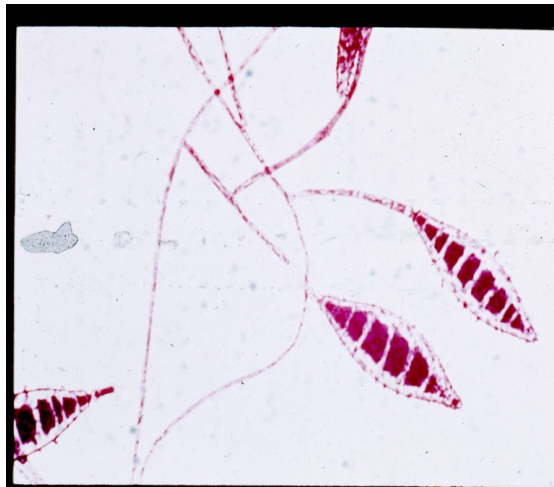


# Common Dermatophytes



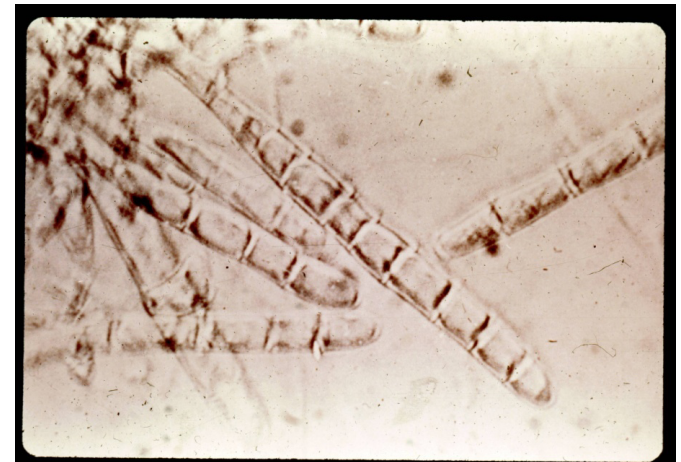
*Epidermophyton floccosum:*

Bifurcated hyphae with multiple, smooth, club shaped macroconidia (2-4 cells)



*Microsporum:*

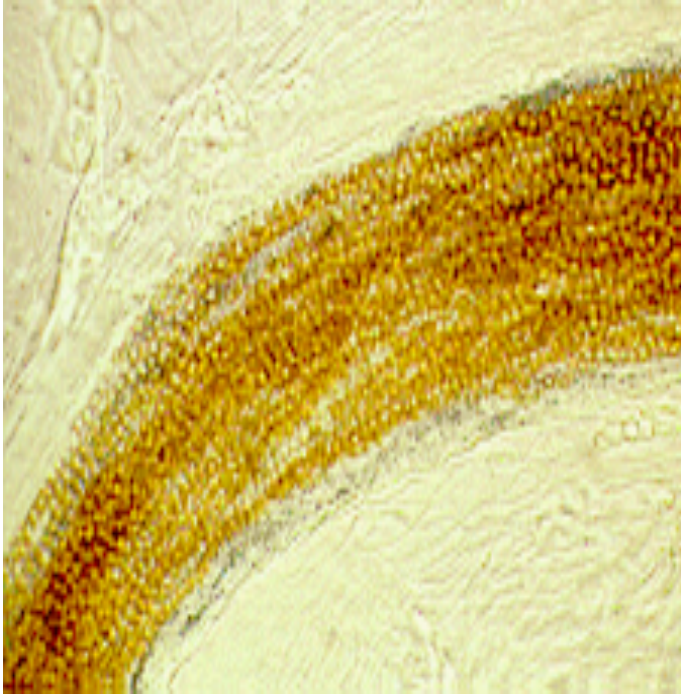
Thick wall spindle shape multicellular



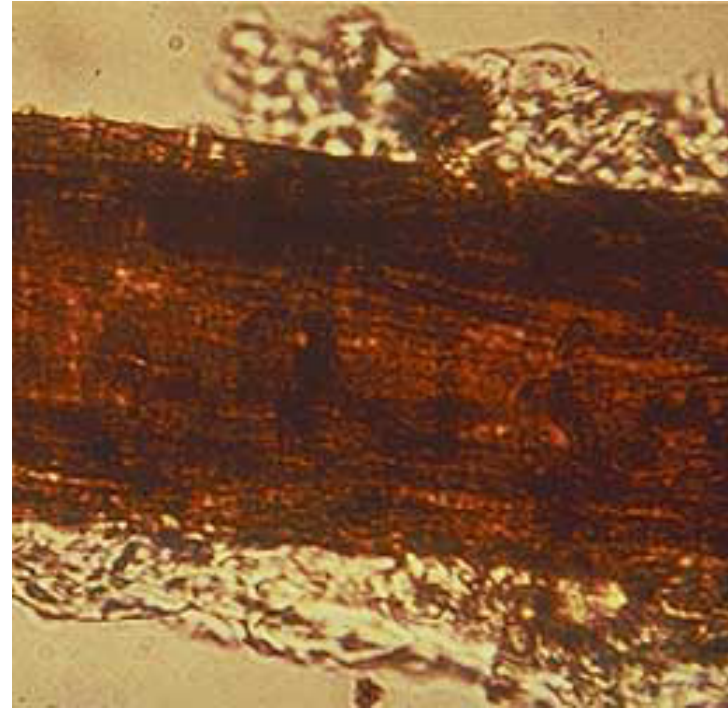
*Trichophyton:*

Large, smooth, thin wall, septate, pencil-shaped

## Hair examination



**Endothrix**



**Ectothrix**

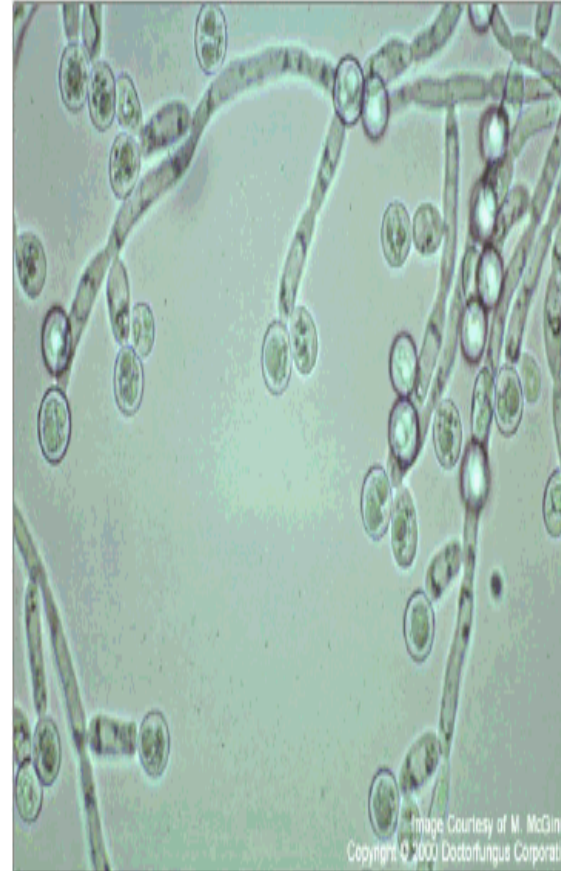
# Candidiasis

? ***Candida albicans*** is the most important species of candida (other species...).

? ***Candida albicans*** is oval gram positive budding yeast which produce pseudohyphae.

? It colonises the mucous membranes of the **upper respiratory, GIT & female genital tracts.**

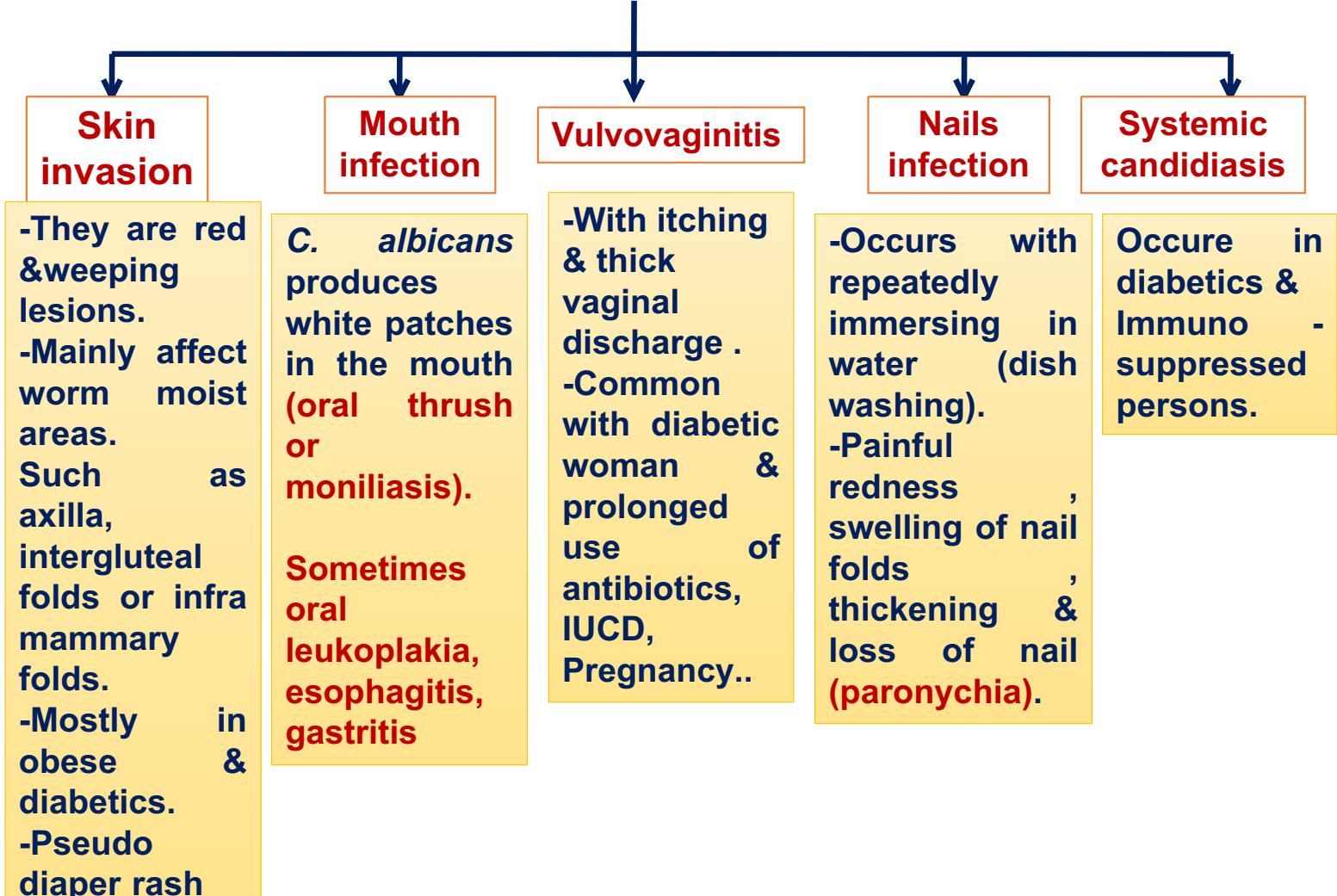
? It causes superficial infections but can predominate with lowering in immunity causing infection so it is one of **the opportunistic fungi.**



## **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





**Candida fingerweb erosion :related to fatness , occupation etc.**



# 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:

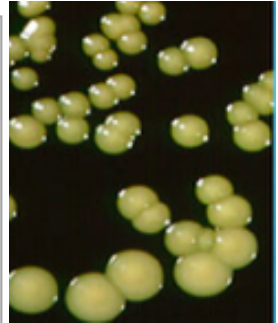
1- **Morphology:** oval budding gram +ve yeast cells.

2- **Differentiation tests:**

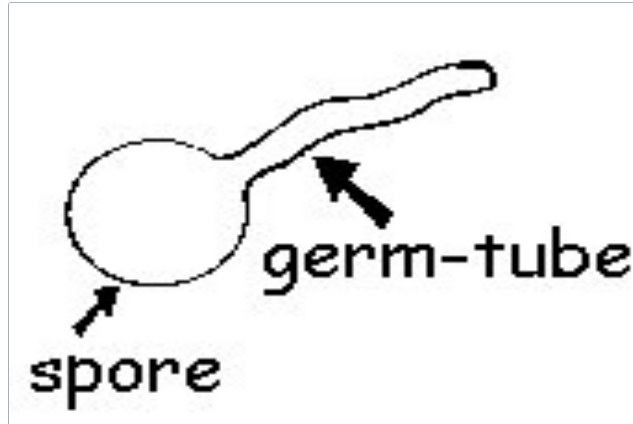
a. **Germ tube test :** germ tube is formed when colonies incubated with human serum at 37 C for 30 min.

b. **Chlamydospore** formation on corn meal agar.

c. **Biochemical reactions:** *C.albicans* ferments glucose & maltose with acid & gas production.





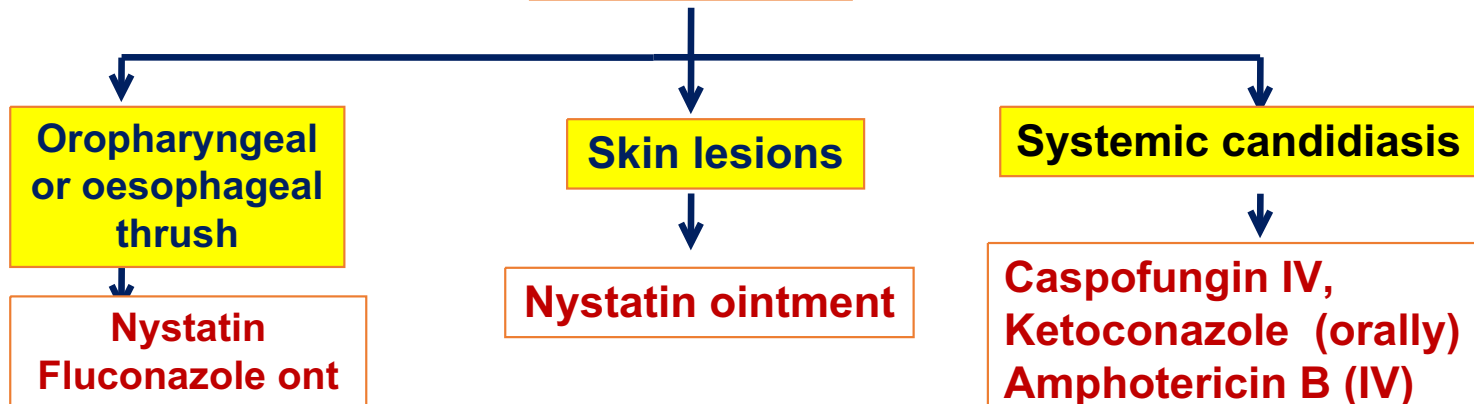


Germ tube



Terminal Chlamydospore & pseudohyphae

## Treatment



## Subcutaneous mycoses

### Sporotrichosis

- ? Nodular condition caused by *Sporothrix schenckii*
- ? The fungi introduced into subcutaneous tissues through trauma.
- ? A small papule or subcutaneous nodule develops at the site of trauma 1 week to 6 months after inoculation, and infection spreads, producing a series of secondary nodules along the lymphatics that drain the site



# Endemic mycosis

- Endemic mycosis is caused by a thermally dimorphic fungus, and the infections are initiated in the lungs following inhalation of the respective conidia.
- Each of the four primary systemic mycoses—coccidioidomycosis, histoplasmosis, blastomycosis, and paracoccidioidomycosis—is geographically restricted to specific areas of endemicity.
- Most infections are asymptomatic or mild and resolve without treatment. However, a small but significant number of patients develop pulmonary disease.

# Coccidioidomycosis & Blastomycosis

- ***Coccidioides immitis* & *Blastomyces dermatitidis***.. soil inhabiting **Dimorphic Fungus**.. Endemic in south-western U.S.A., northern Mexico and various parts South America.
- Respiratory infection, resulting from the inhalation of microconidia, often resolves rapidly leaving the patient with a strong specific immunity to re-infection.
- Some individuals the disease may progress to a chronic **pulmonary** condition or a **systemic disease** involving the meninges, bones, joints, subcutaneous, cutaneous tissues.. Antigen Skin test positive.. Not significant in diagnosis.



# Laboratory Diagnosis

- **Direct microscopy and culture** should be performed on all specimens (sputum, bronchial washings, CSF, pleural fluid tissue biopsies from various visceral organs ).
- wet mounts in 10% KOH with india ink.. Ovoid-budding yeast cells (b) Gram-stain smear..
- Cultures on **Sabouraud dextrose agar** should be maintained for one month at 25C.... fungal growths & Wet Mount.. Identification ..produces hyphae-like conidio-phores & Spores.. Color of fungal growth
- **Serological tests are of limited value..** not significant
- Detection of Histoplasm antigen in blood & urine is significant

Thank you