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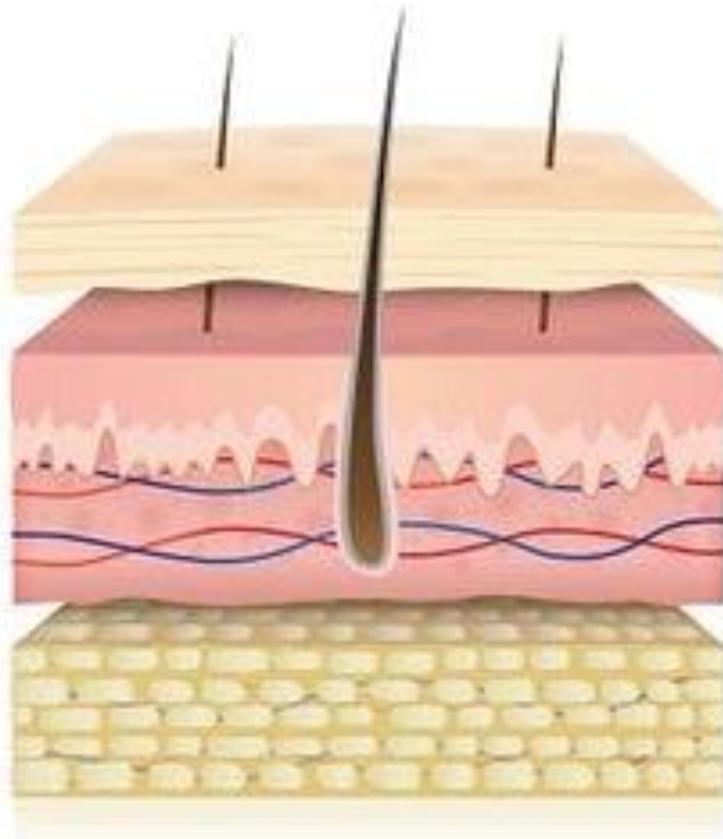
Fungal infection of the skin

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Three Main Layers of The Skin



Superficial
mycoses

↓ only
Stratum corneum with
no inflammation

Epidermis

Cutaneous
mycoses

↓ stratum
(corneum)
Skin, hair, nail and
mostly with
inflammation

Dermis

(hypodermis)

Subcutaneous layer

Subcutaneous
mycoses



= Fungal infection

Skin & subcutaneous Mycoses

1-Superficial mycoses
such as

2-Cutaneous mycoses
such as

3-Subcutaneous
mycoses

called:

**Tinea versicolor or
Pityriasis versicolor**

**Ring worm
or Tinea**

**Cutaneous
candidiasis**

**Mycetoma or
Madura foot**

Caused by

Malassezia furfur

Caused by

Dermatophytes

Caused by

Candida albicans

Caused by

***Madurella
mycetomatis***

Superficial Mycoses

Tinea versicolor (Pityriasis versicolor)



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

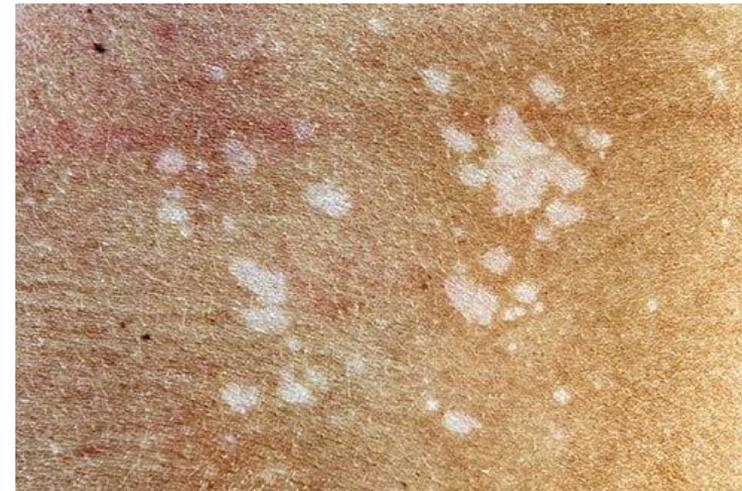
➤ Caused by *Malassezia furfur* yeast. → oval shape.

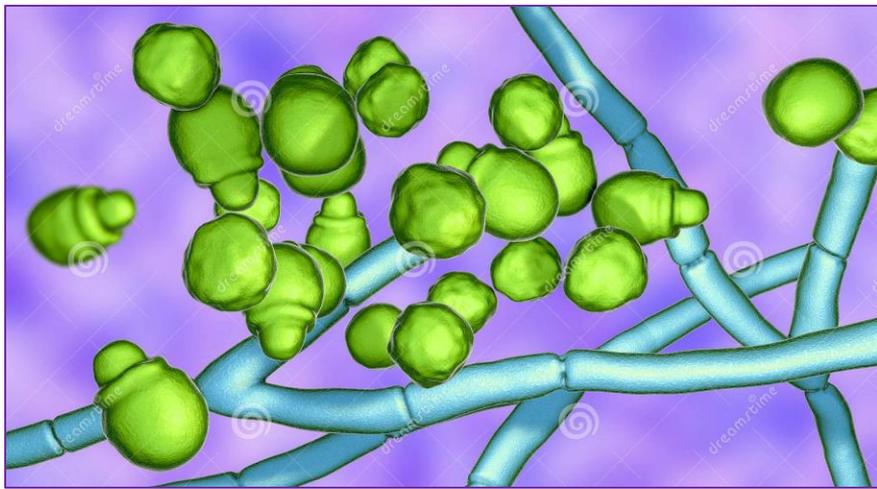
➤ Characterized by superficial brownish scaly areas on light-skinned persons & depigmented areas on dark-skinned persons that affects mainly neck, shoulders, chest and back

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

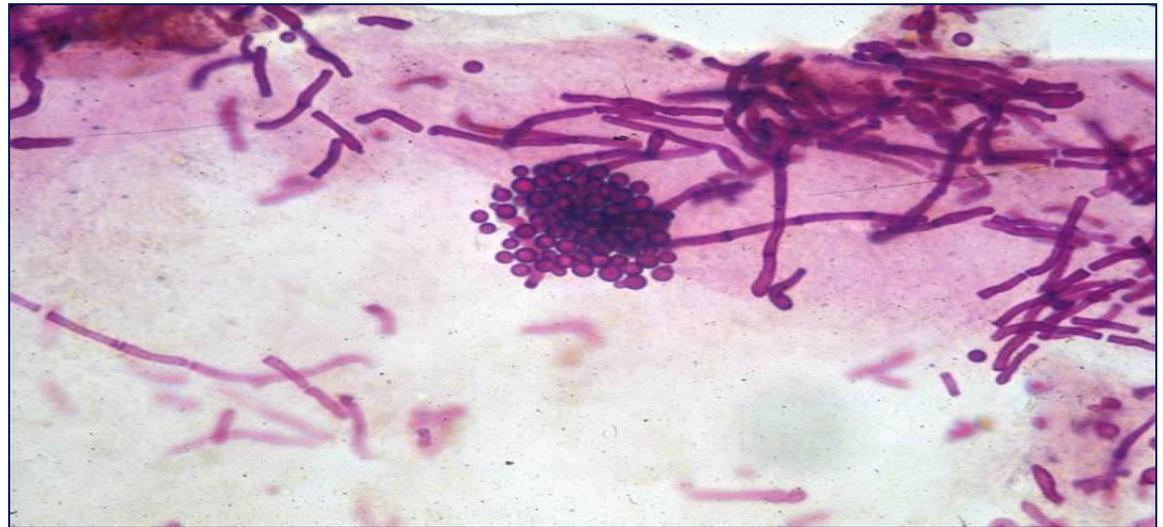
➤ Asymptomatic & only has cosmetic importance.

➤ Not contagious → it normal skin flora convert pathogenesis under some cases.





**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



10% → to dissolve layer + Keratin.

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

- Yellowish fluorescence under Wood's light. = (UV)

Treatment

➤ Topical miconazole.

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

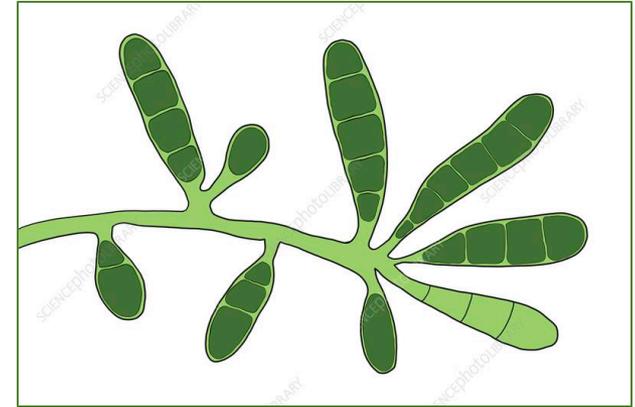
Cutaneous Mycoses

Ring worm or Tinea



Start central then spread peripherally.

- 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



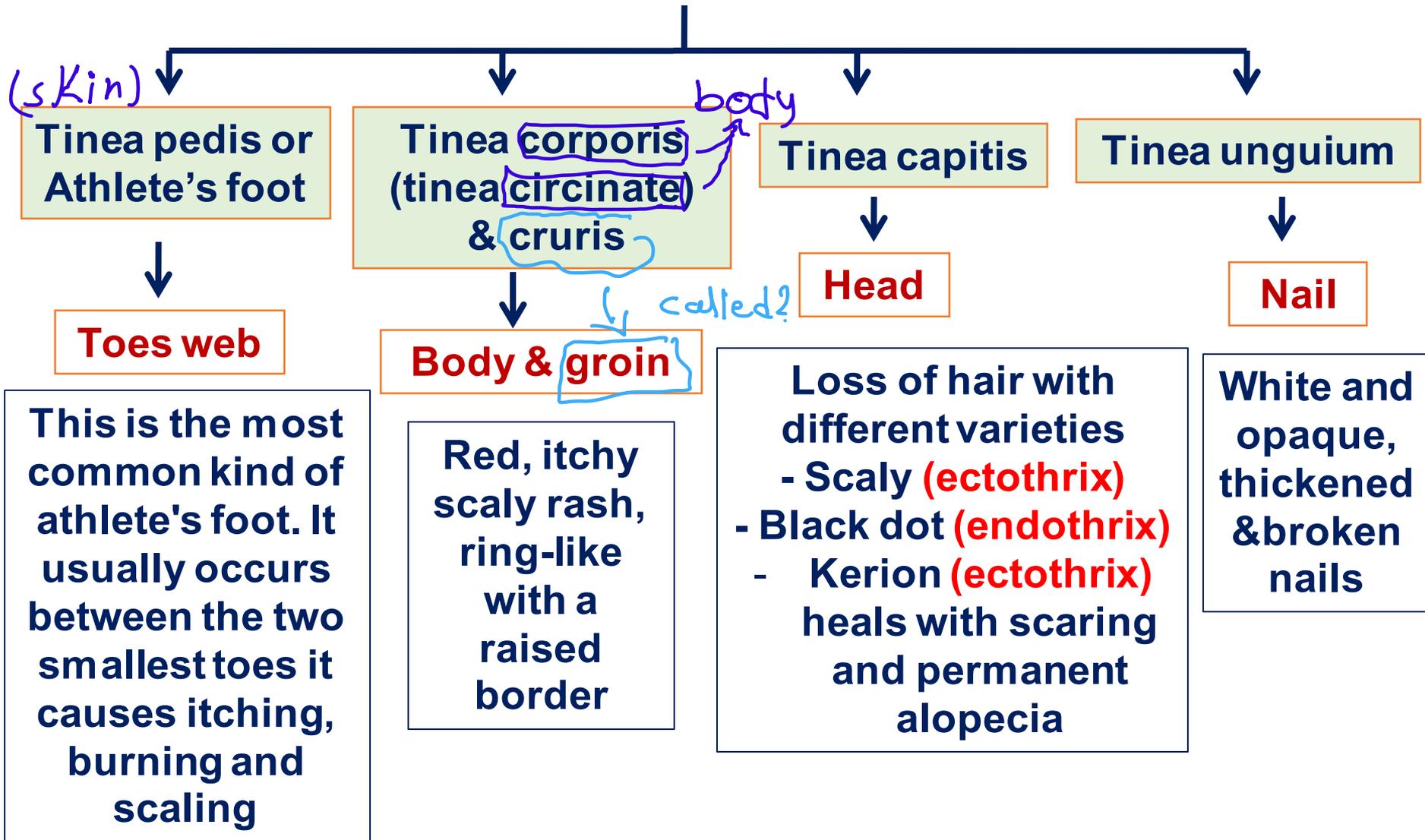
- 1- Man to man by direct contact.
- 2- From animals e.g., dogs and cats.
- 3- From the soil.

N.B.

- The intact skin is an important barrier against infection.
- Heat and humidity enhance the infection.



Clinical forms



Pedis



corporeis



corporeis



cruris



Different forms of tinea

Scaly



black dot



Kerion



Wing like um -





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: *add (AB)*
- 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

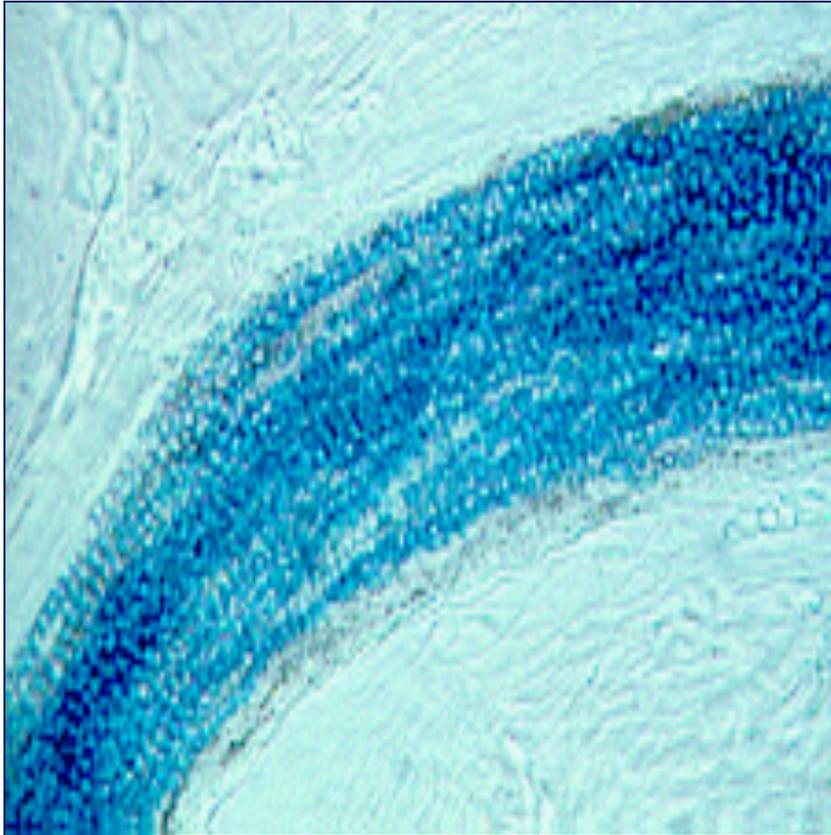
Local antifungal cream as miconazole or oral griseofulvin

(topical systemic) anti fungal

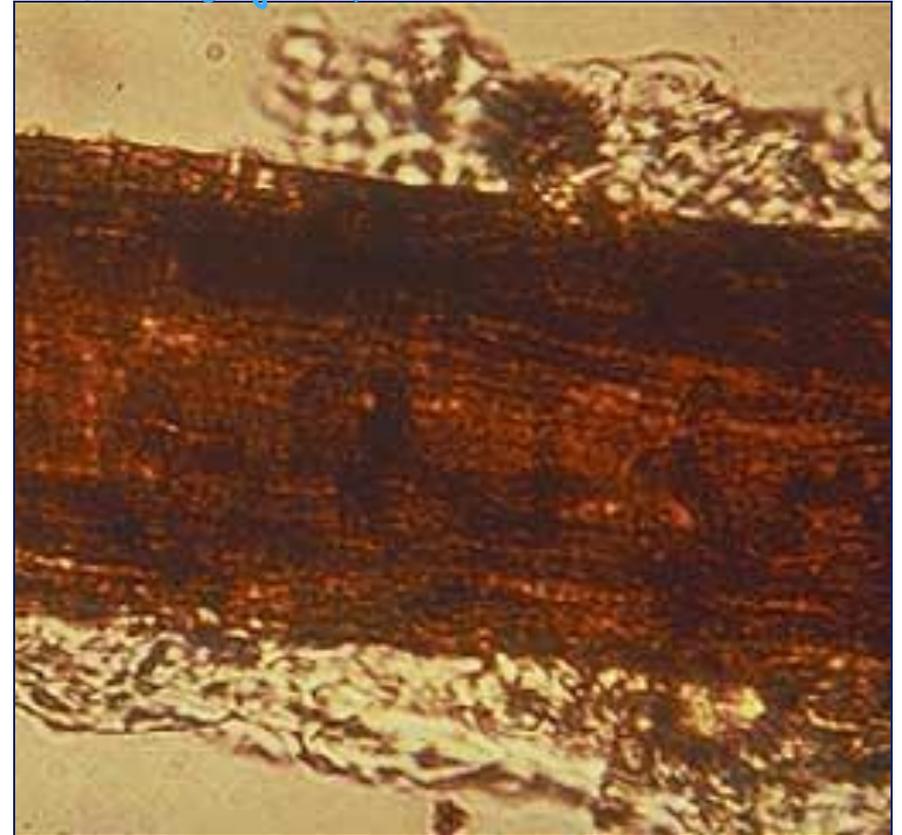
Microscopic examination of infected hair



inside hair



outside hair



Endothrix

seen
in
black
dot type.

Ectothrix

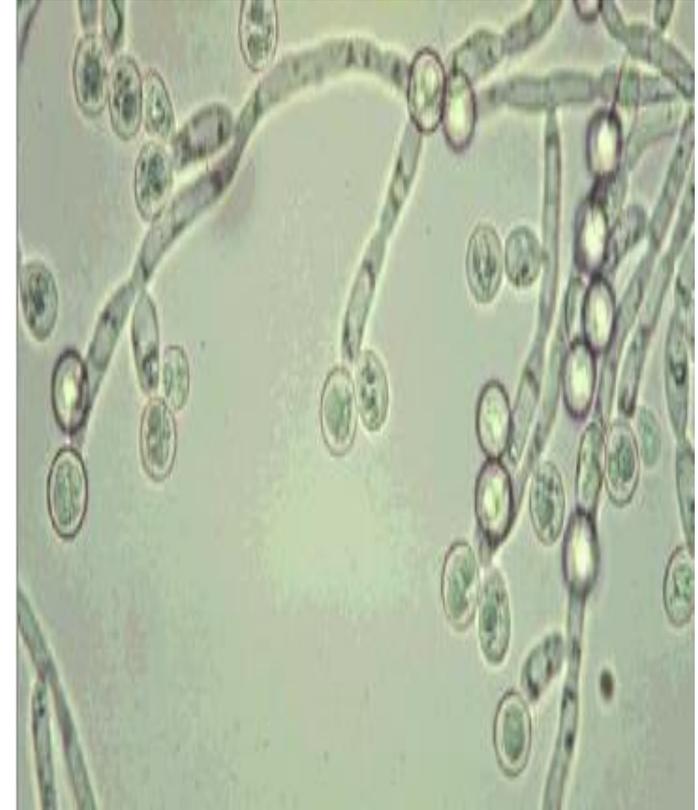
in
scaly
+
Kerion¹³

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**).

(stressful)

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.

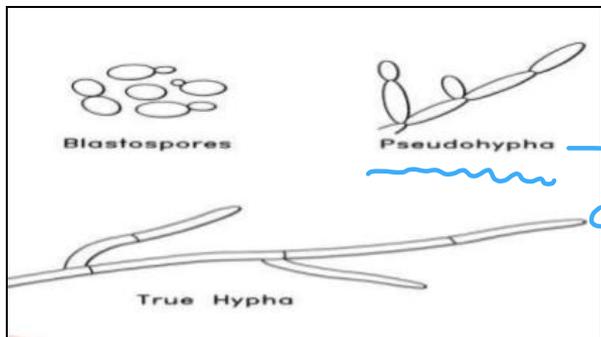


Laboratory diagnosis



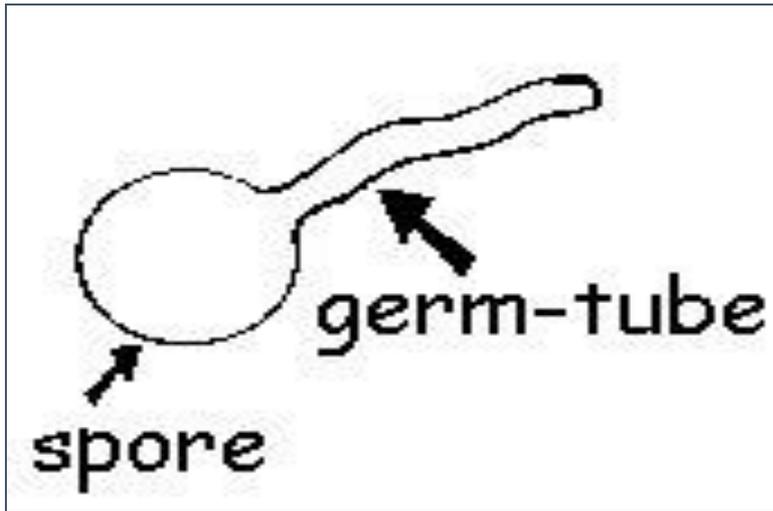
Direct microscopic examination

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



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

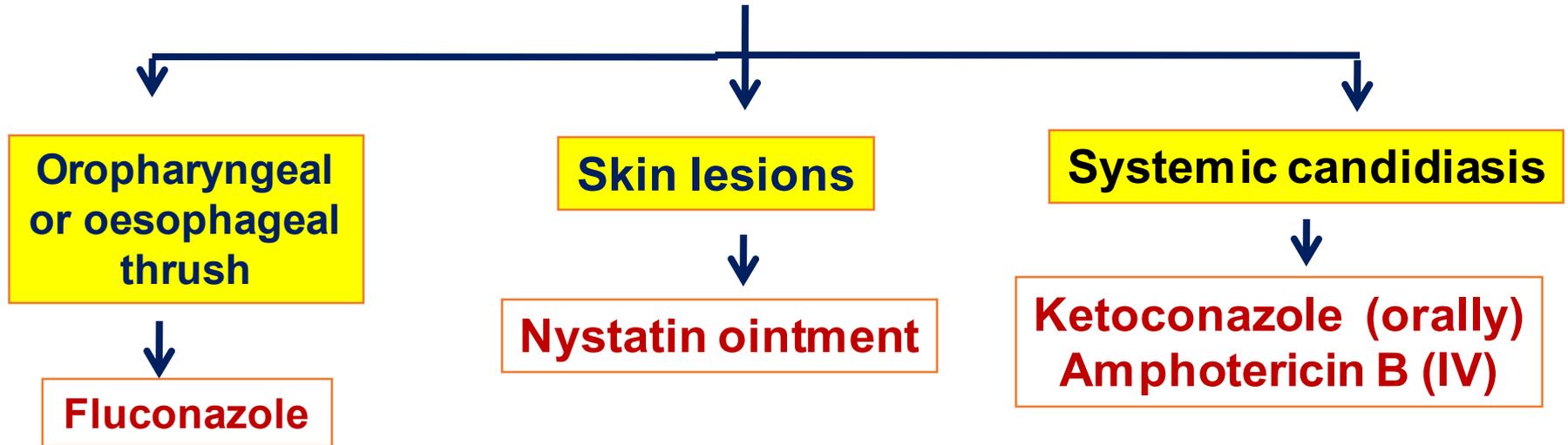


Biochemical reaction of *Candida*

* ferment + gas production



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).

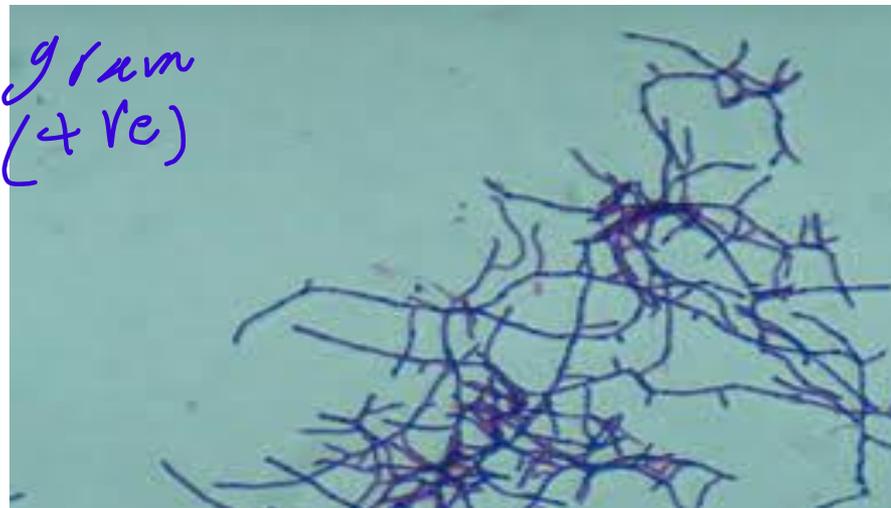
Clinical picture

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 / no septum**



***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

by gram stain

- 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

Actinomycetoma

1. Medical:

- ketoconazole
- Itraconazole
- Amphotericin B

2. Surgical.

1. Medical:

- Streptomycin
- Trimethoprim
- Sulphamethoxazole
- Dapson.

2. Surgical.



Identify ??????



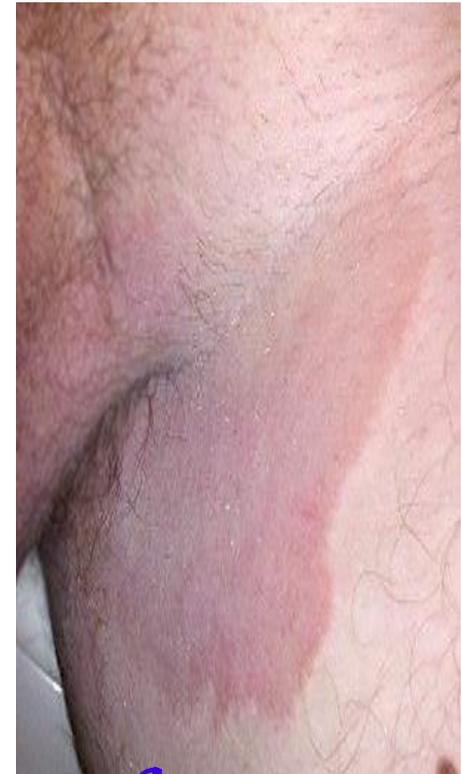
kerion



Tinea corporis



versicolor



Irion²⁷



Identify ??????



