



Superficial and Cutaneous Mycoses

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Superficial Mycoses

- Limited to the outermost layer of the skin
- 4 Infections
 - 1. Pityriasis versicolor
 - 2. Tinea nigra
 - 3. Black piedra
 - 4. White piedra



Superficial

- Do not elicit immune response
- No discomfort
- Cosmetic problems
- Limited to stratum corneum

A decorative graphic on the left side of the slide features three balloons in light green, light blue, and light purple, each with yellow triangular streamers. The balloons are arranged vertically, with the green one at the top, the blue one in the middle, and the purple one at the bottom. The streamers are scattered around the balloons, some pointing upwards and some downwards.

Pityriasis Versicolor

- *Malassezia furfur* (*Pityrosporum orbiculare*)
- Lipophilic yeast like organism
- Rich in sebaceous glands
- Media is supplemented with fatty acids
- Exist in budding yeast, occasionally hyphal

Pityriasis versicolor (An-an)



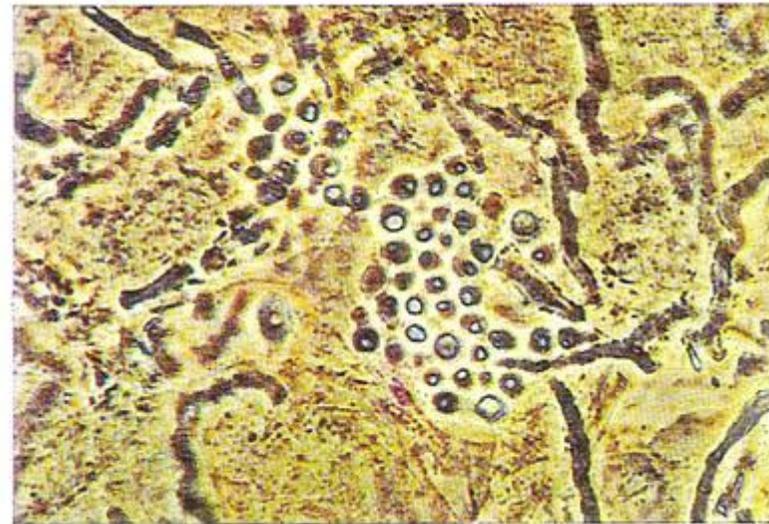


Pityriasis

- Lesions are found in torso, arms and abdomen
- Scale very easily → chalky appearance
- Rarely, papular or grow like folliculitis

Pityriasis

- Clinical Diagnosis:
KOH- Spaghetti and meatballs
- Treatment:
Azoles



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Tinea Nigra

- *Exophiala werneckii*
- Produce melanin → black or brown color
- Grows as yeast → Older hyphae with mycelia and conidia

Tinea nigra

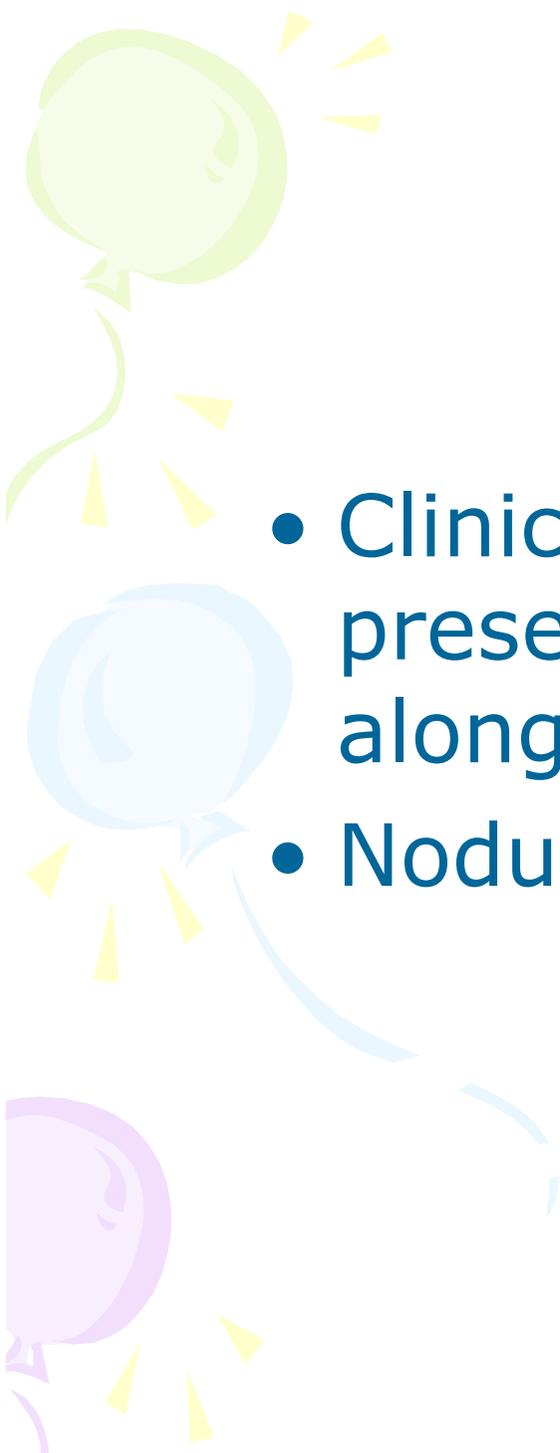
- Lesion-
gray to black
macular
palms
- Diagnosis-
Skin scrapings with alkali stain
- Cultures-
Sabourauds's media pigmented yeast
and hyphae





Black Piedra

- *Piedraia hortae*- exist in teleomorph state
- Cultures – asexual state
 - older cultures → teleomorph (asci ,which contain spindle shaped ascospores)

A decorative graphic on the left side of the slide features three balloons in shades of green, blue, and purple, each with yellow triangular rays emanating from it. The balloons are connected by thin, curved lines.

Black piedra

- Clinical feature:
presence of hard nodules found
along the infected hair shaft
- Nodules contain asci

Three decorative balloons are positioned on the left side of the slide. The top balloon is light green, the middle one is light blue, and the bottom one is light purple. Each balloon has a string and several small yellow triangular shapes radiating from it, resembling a sun or a starburst.

White Piedra

- *Trichosporon beigelii*
- Grows in media without cyclohexamide
- Cultures are pasty and white → developed deep radiating furrows and become yellow and creamy

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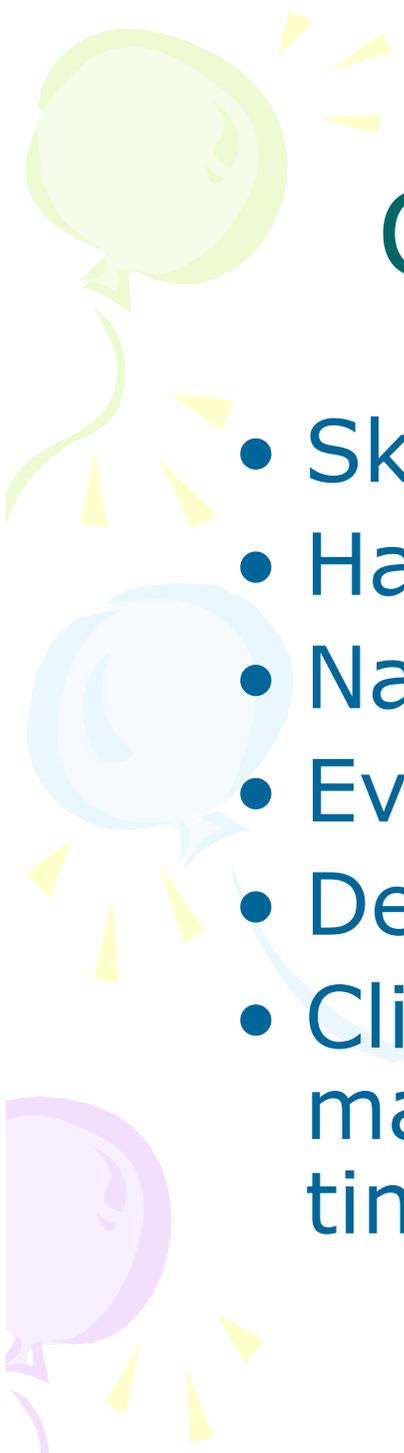
White Piedra

- Microscopic examination septate hyphae that develops into arthroconidia
- Hair- soft ,pasty,cream colored growth



Treatment

- Skin
 - removal of the organism by:
 - 1.Selenium sulfide
 - 2.Thiosulfate
 - 3.Salicylic acid
 - 4.Hyposulfite
 - inhibition of ergosterol by:
 - 1.miconazole



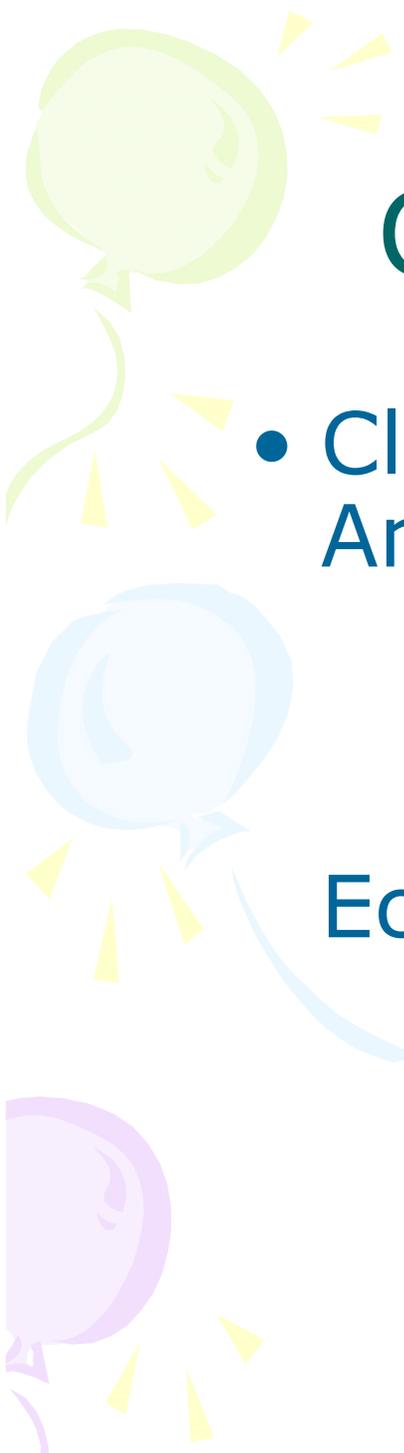
Cutaneous mycoses

- Skin
- Hair
- Nails
- Evoke cellular immune response
- Dermatophytes
- Clinical manifestations → ringworm or tinea



Cutaneous mycoses

- Etiology
 - Microsporum
 - Trichophyton
 - Epidermophyton



Cutaneous mycoses

- Classifications:
Anatomic location

Tinea pedis

Tinea capitis

Tinea corporis

Tinea cruris

Ecologic location

Geophilic

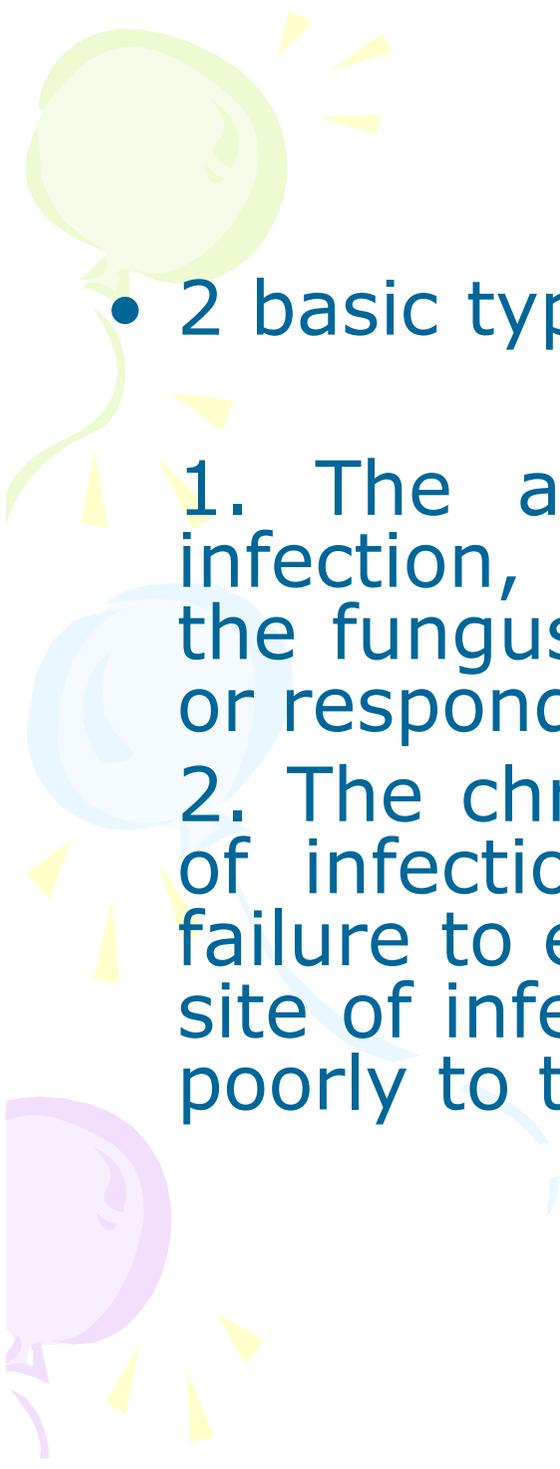
Zoophilic

Anthrophilic

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Cutaneous mycoses

- Keratophilic – use keratin as subject to live (parasites)
- Keratinases- invade only keratinized layers



- 2 basic types of dermatophytic infection:

1. The acute or inflammatory type of infection, which is associated with CMI to the fungus, generally heals spontaneously or responds nicely to treatment.

2. The chronic or non-inflammatory types of infection, which is associated with a failure to express CMI to the fungus at the site of infection, is relapsing and responds poorly to treatment.

Cutaneous mycoses



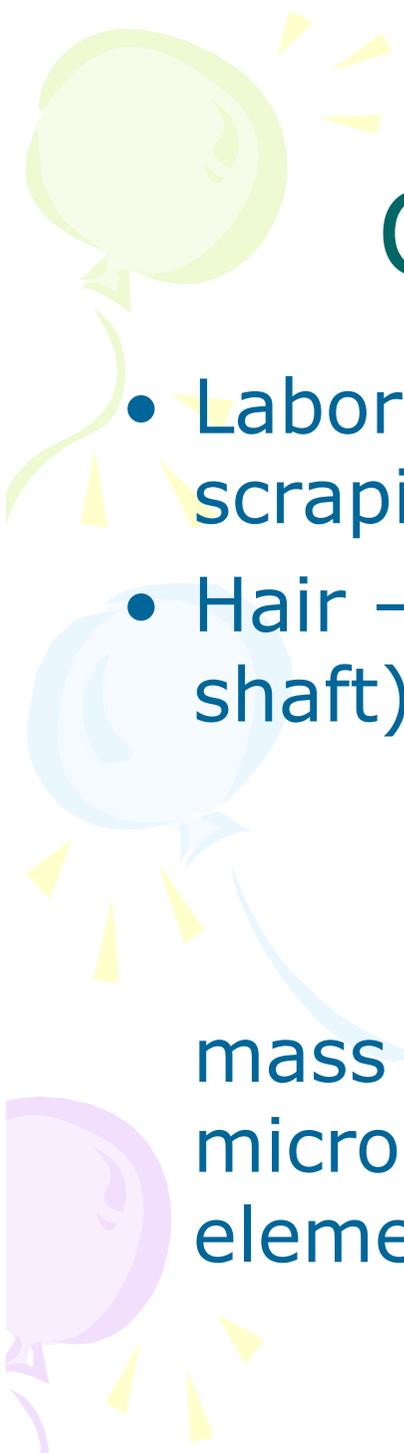
Tinea corporis





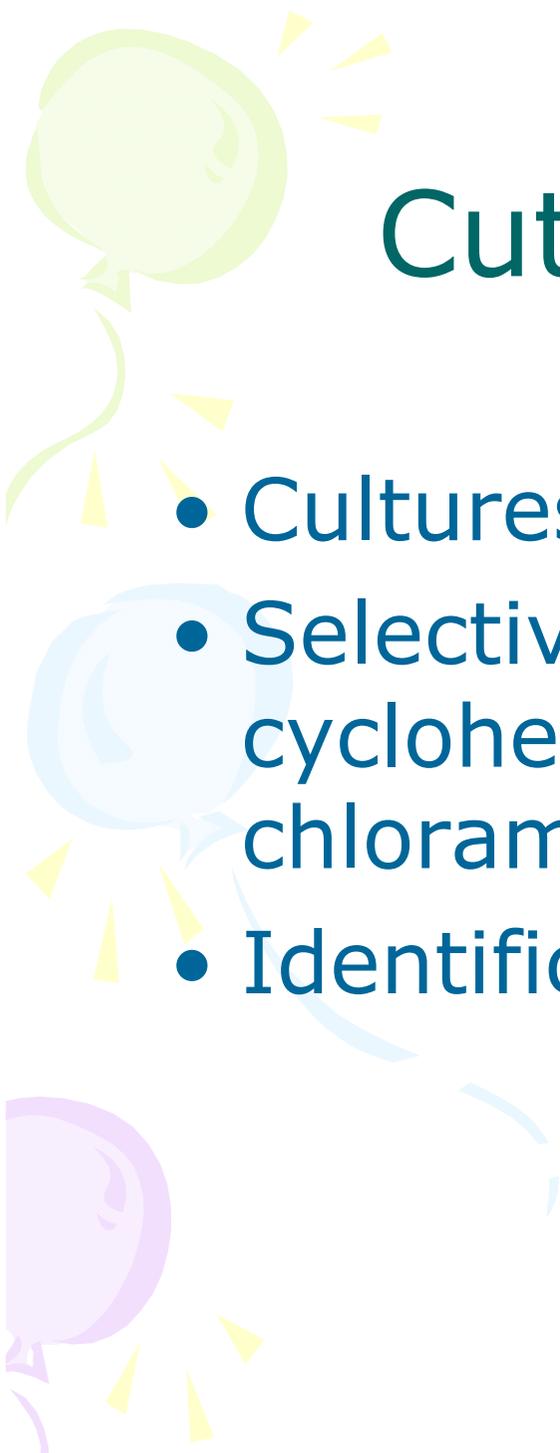
Cutaneous mycoses

- **THE IDENTIFICATION REACTION(ID)**
- Patients infected with a dermatophyte may show a lesion, often on the hands, from which no fungi can be recovered or demonstrated.
- It is believed that these lesions, which often occur on the dominant hand (i.e. right-handed or left-handed), are secondary to immunological sensitization to a primary (and often unnoticed) infection located somewhere else (e.g. feet).
- These secondary lesions will not respond to topical treatment but will resolve if the primary infection is successfully treated.

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Cutaneous mycoses

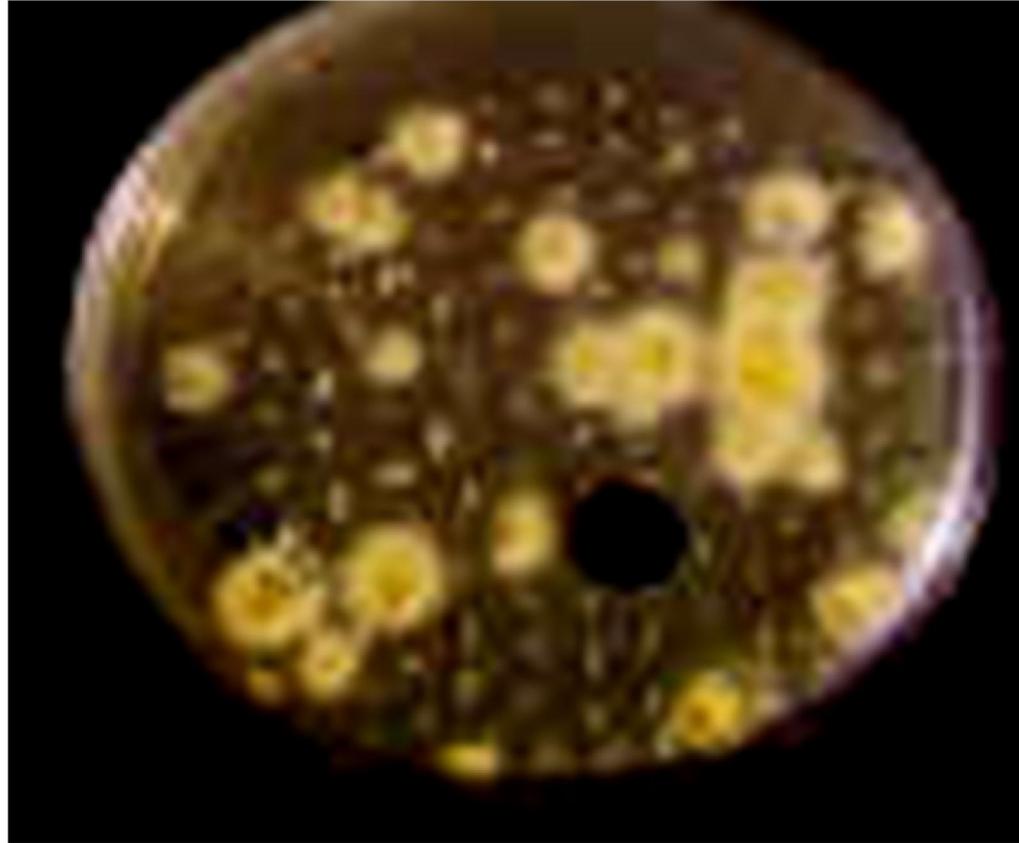
- Laboratory diagnosis:
 - scrapings from clinical specimens
- Hair – endothrix (spores inside the hair shaft)
 - ectothrix
 - exception: *T.schoenleinii*
Disease-favus-waxy
mass of hyphal elements (scutulum)
microscopic –degenerated hyphal
elements

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Cutaneous mycoses

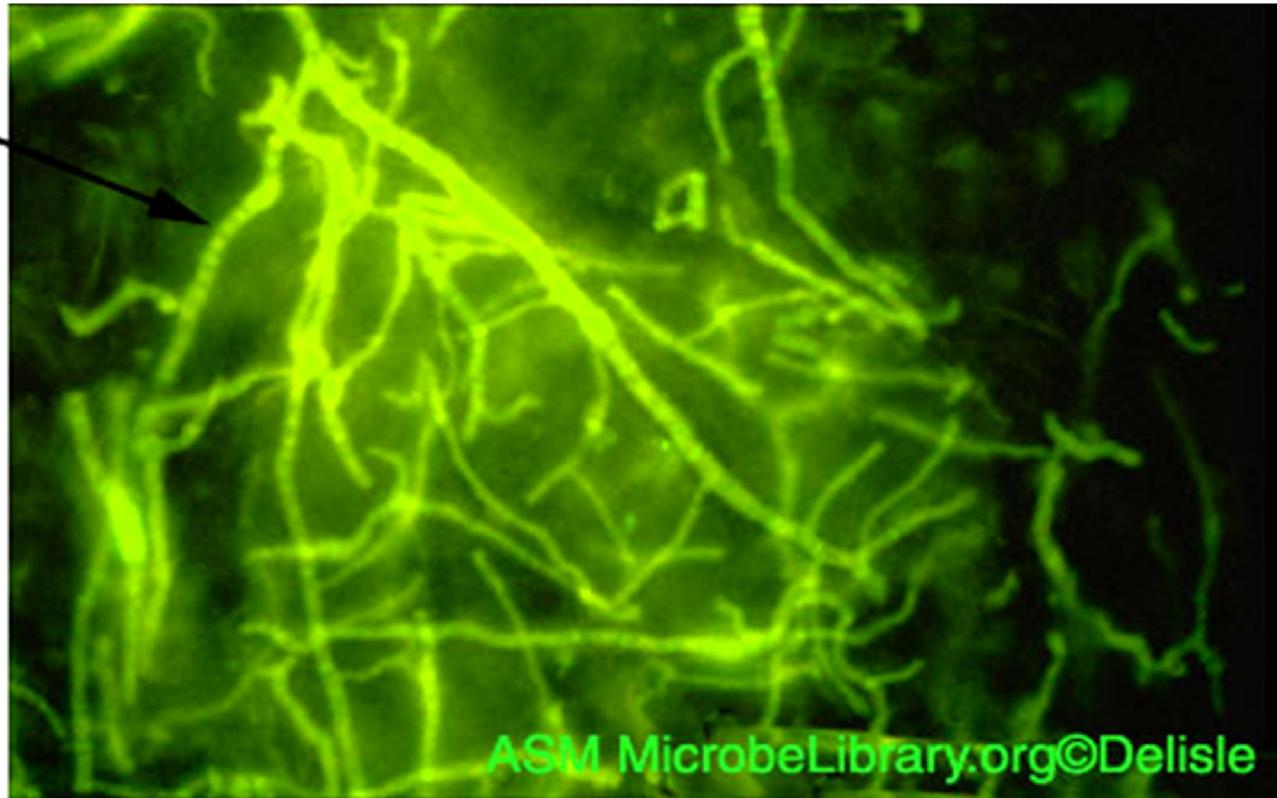
- Cultures
- Selective media – containing cycloheximide and chloramphenicol → incubate at 25 C.
- Identification based on the conidia

Ringworm culture



Microsporium

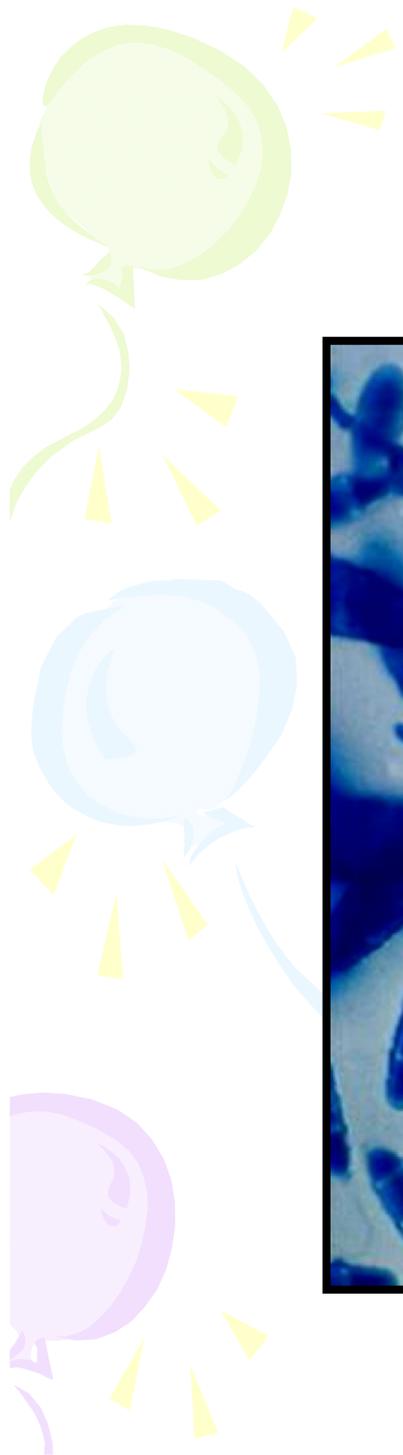
Septate
hyphae



General characteristics of Macroconidia and Microconidia of Dermatophytes

| Genus | Macroconidia | Microconidia |
|----------------|-------------------------------|--------------|
| Microsporum | Numerous, thick walled, rough | Rare |
| Epidermophyton | Numerous, smooth walled | Absent |
| Trichophyton | Rare, thin walled, smooth | Abundant |

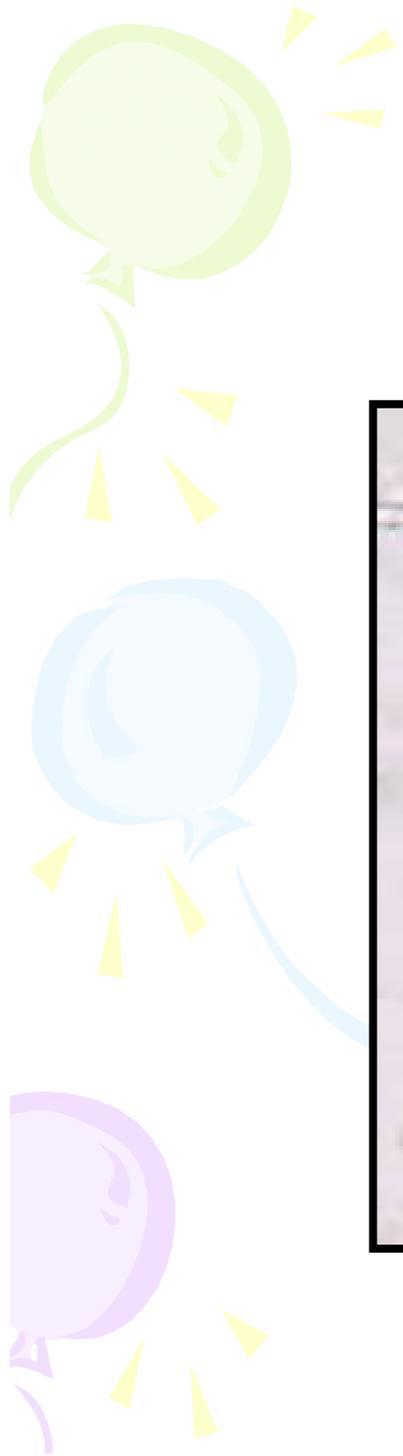
Microsporium



Trichophyton



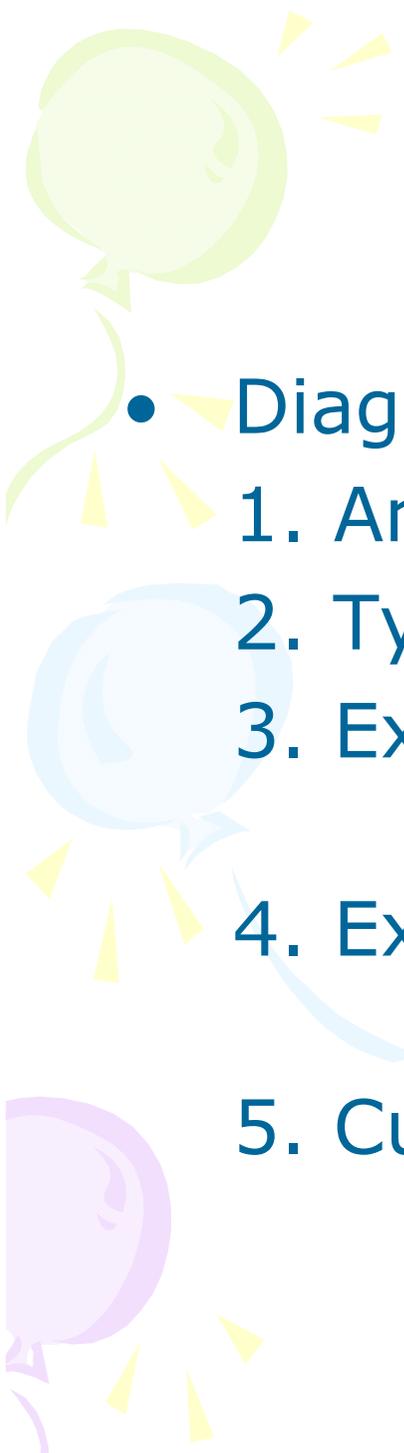
Microsporium



Epidermophyton floccosum







Diagnosis

- Diagnosis is based upon:
 1. Anatomical site infected
 2. Type of lesion
 3. Examination with a Woods lamp (366 A°)
 4. Examination of KOH-treated skin scales from the infected area
 5. Culture of the organism (not too important)



Differential diagnosis

- In a differential diagnosis you must consider:
 1. Leprosy
 2. Secondary syphilis
 3. Pityriasis rosea
 4. Psoriasis
 5. Nummular eczema
 6. Lichen planus
 7. Alopecia areata
 8. Trichotillomania
 9. Dyshidrosis
 10. Contact dermatitis.



Treatment

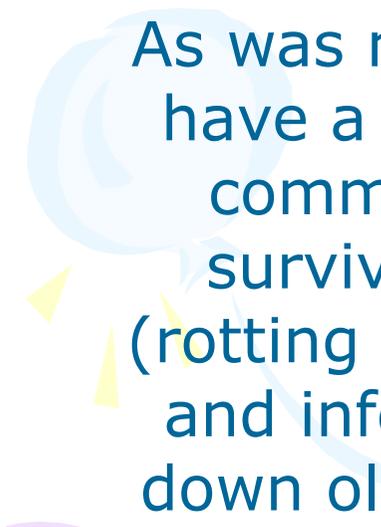
- Skin – azoles, inhibits cytochrome 450 dependent enzyme systems at the demethylation step from lanosterol to ergosterol
- Hair- Griseofulvin, oral , affects microtubular system



DIMORPHIC FUNGI

BLASTOMYCOSIS

(Blastomyces dermatitidis)



As was noted earlier, most of the systemic fungi have a specific niche in nature where they are commonly found. *Blastomyces dermatitidis* survives in soil that contains organic debris (rotting wood, animal droppings, plant material) and infects people collecting firewood, tearing down old buildings or engaged in other outdoor activities which disrupt the soil. In addition to an ecological niche, most fungi that cause systemic infections have a limited geographic distribution where they occur most frequently.

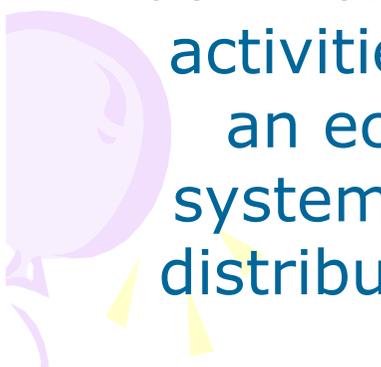




FIGURE 44-7 Schematic illustration of the natural history of the saprobic and parasitic cycle of *Blastomyces dermatitidis*.

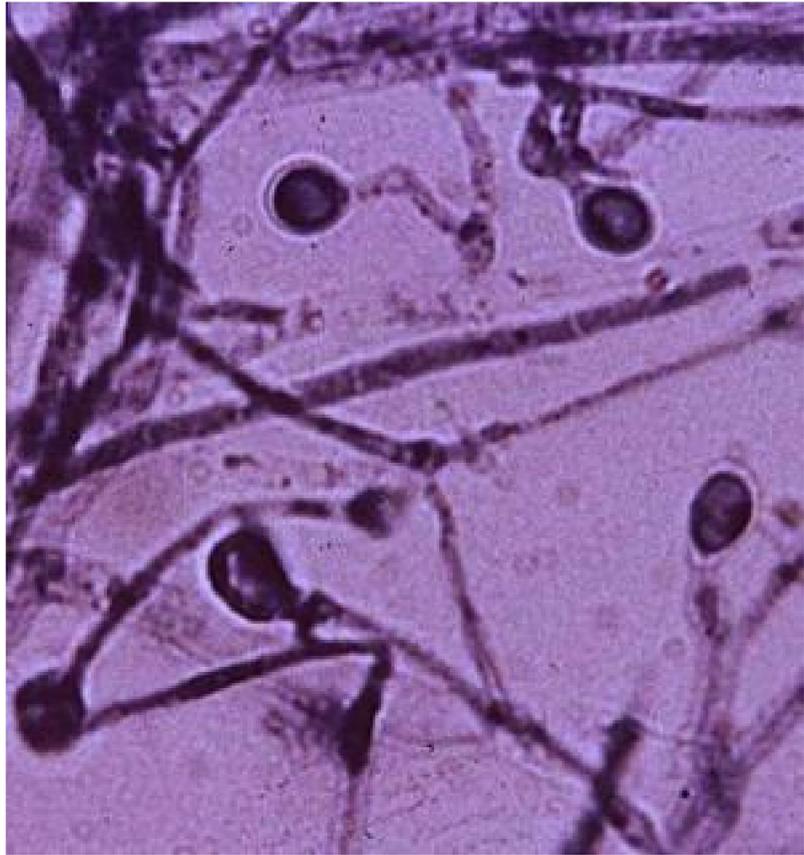
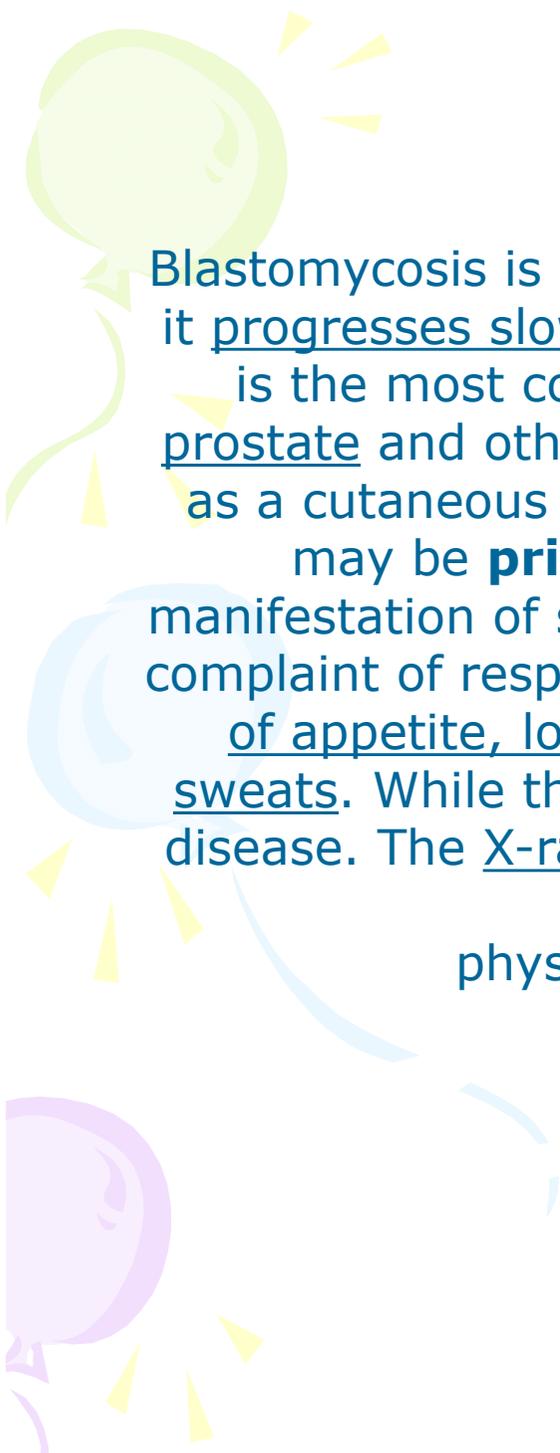
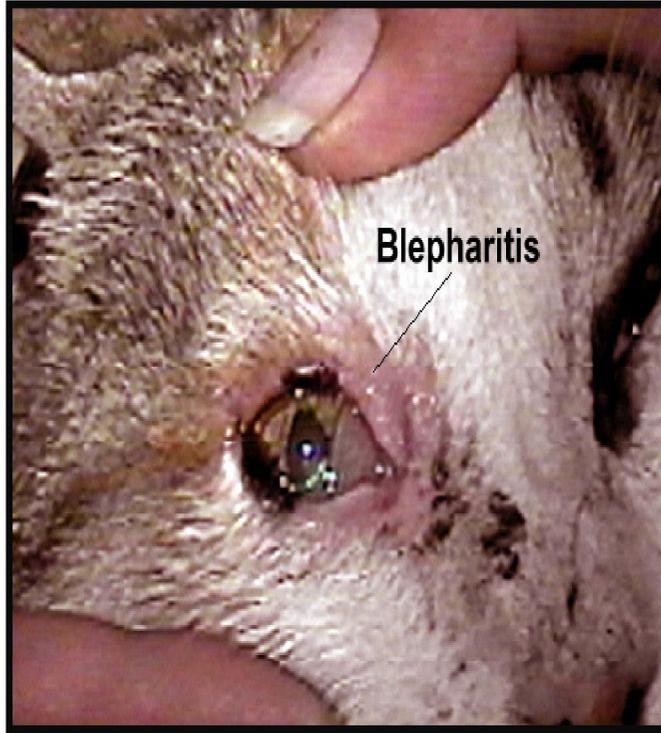


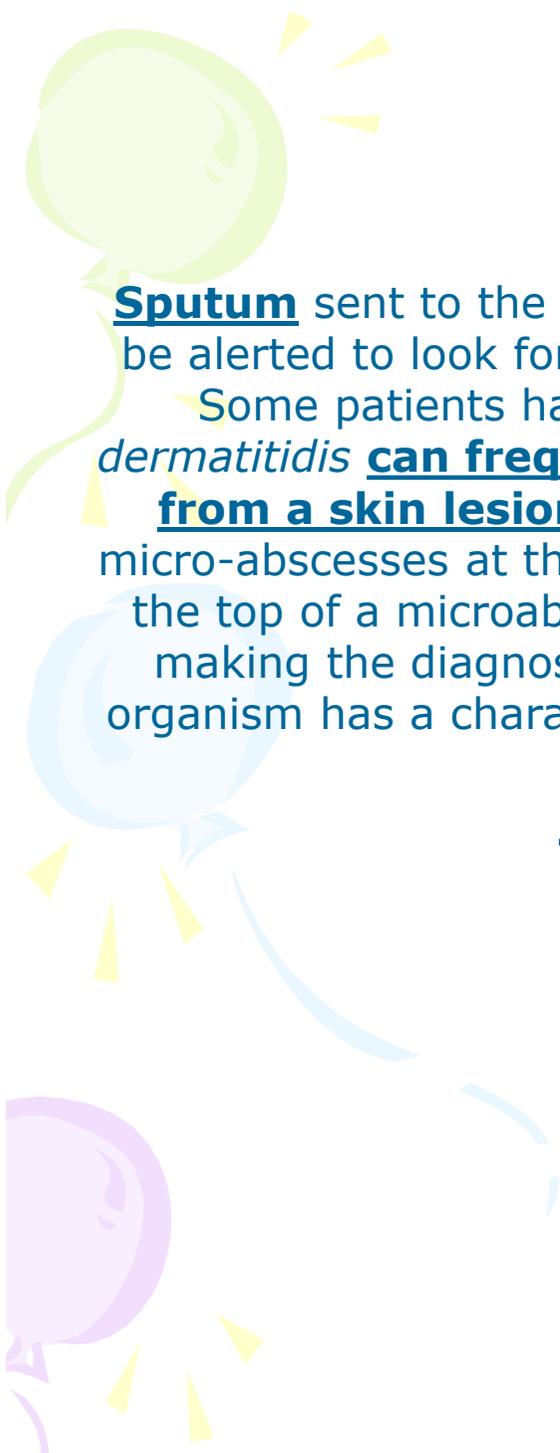


FIGURE 44-8 Broad-based budding yeast cells of *Blastomyces dermatitidis* seen in purulent material expressed from a microabscess.



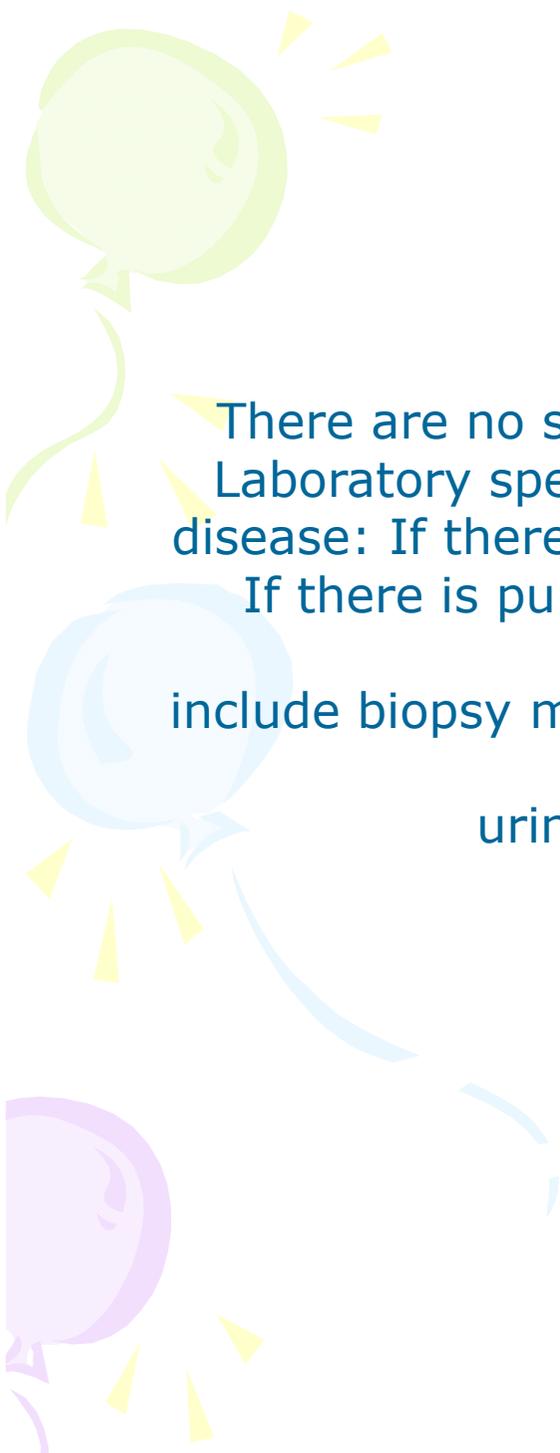
Blastomycosis is a chronic granulomatous disease which means that it progresses slowly. Although the pulmonary and skin involvement is the most common, *B. dermatitidis* frequently affects bone, prostate and other organs. More frequently blastomycosis presents as a cutaneous or a respiratory disease. The **cutaneous lesions** may be **primary** (usually self-limiting) or **secondary** (a manifestation of systemic disease). The patient who presents with a complaint of respiratory symptoms will frequently remark about loss of appetite, loss of weight, fever, productive cough, and night sweats. While these symptoms resemble those of TB, it is not this disease. The X-ray shows obvious pulmonary disease. To make the specific diagnosis, the physician must be aware of blastomycosis.



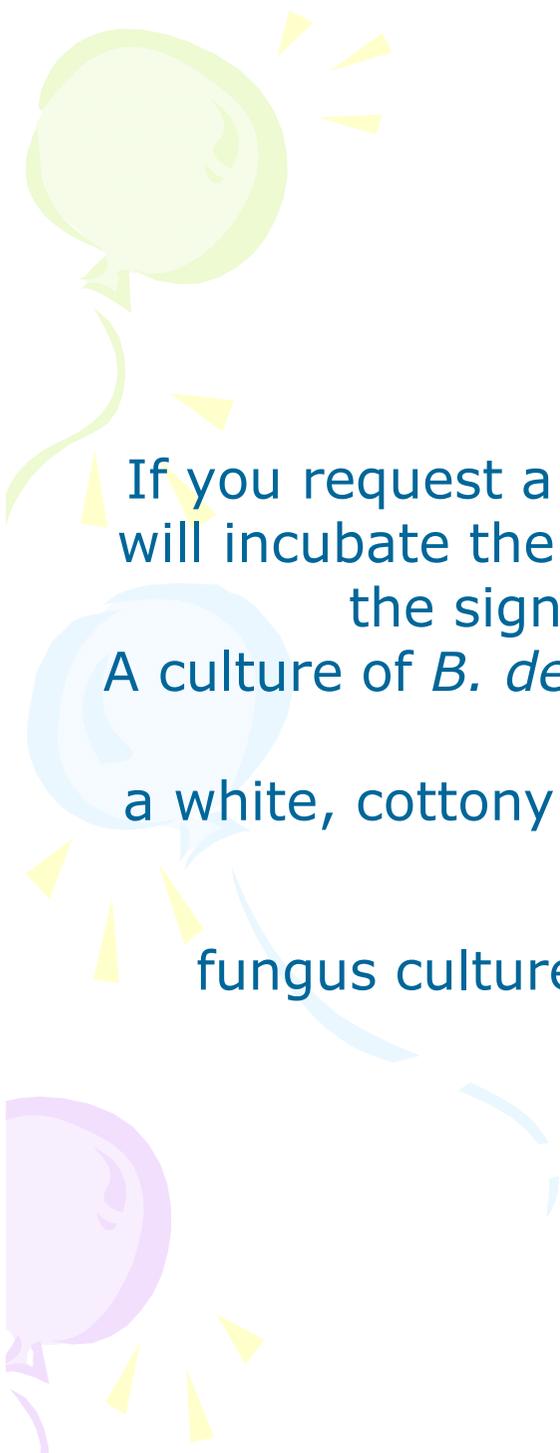


Sputum sent to the lab for "culture" will not grow the organism. The lab must be alerted to look for fungal organisms or to look specifically for blastomyces.

Some patients have a sub-clinical or "flu-like" response to infection. *B. dermatitidis* **can frequently be demonstrated in a KOH preparation of pus from a skin lesion.** A typical cutaneous lesion shows central healing with micro-abscesses at the periphery. A **pus specimen** may be obtained by nicking the top of a microabscess with a scalpel, obtaining the purulent material and making the diagnosis in 5 min. by microscopic examination with KOH. This organism has a characteristic appearance of a **double contoured wall with a single bud on a wide base.**



There are no specific virulence factors for *B. dermatitidis*.
Laboratory specimens depend on the manifestation of the disease: If there are skin lesions, send skin scrapings or pus. If there is pulmonary involvement, send sputum. Other specimens include biopsy material and urine. Occasionally, the organism can be isolated from urine as it often infects the prostate



Mycology

If you request a fungus culture from the microbiology lab, they will incubate the cultures at 37° C and at 25° C because most of the significant pathogenic fungi are dimorphic.

A culture of *B. dermatitidis* takes 2 to 3 weeks to grow at 25 ° C.

It appears as

a white, cottony mold (mycelium) on Sabouraud dextrose agar.

Most specimens for

fungus culture are plated on Sabouraud's dextrose agar.



Microscopically, the mycelia and the fruiting bodies are evident. However, the mold cannot be identified by its fruiting bodies. The fruiting bodies are called **microconidia**, but they are not distinctive. Other fungal saprophytes and pathogens have similar conidia. At 37 °C the yeast form grows in about 7-10 days. It appears as a buttery-like, soft colony with a tan color. Microscopically, we see the typical yeast form of a thick wall and a single bud with a WIDE BASE. This wide base is characteristic of *B. dermatitidis*, and it is important to be able to recognize this. The cells are 12-15 μ in diameter. The yeast will convert to the mycelial form when incubated at 25° C, taking from 3 to 4 days up to a few weeks. Similarly, the mycelial growth can be converted to yeast form when incubated at 37°C. In the past, the only way to identify the dimorphic fungi was to convert from one form to the other, but now it is possible to take the mycelial growth (which is the easiest to grow), and confirm the isolate with a DNA probe in a matter of hours.





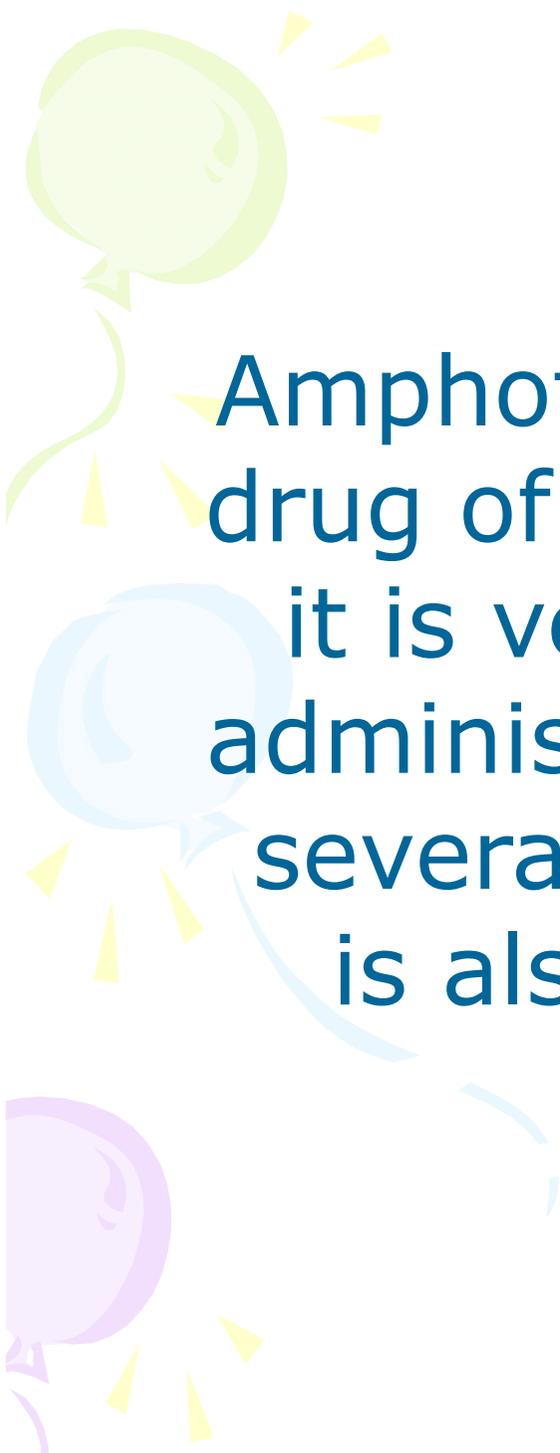
Histopathology

B. dermatitidis produces both a granulomatous and suppurative tissue reaction

Serology

There are 3 serological tests used for blastomycosis:

- **Immunodiffusion test (precipitin)**. This requires 2 to 3 weeks to become positive. This test is positive in about 80% of the patients with blastomycosis. When it is positive, there is close to 100% specificity.
- **Complement fixation (CF) test**. This test requires 2 to 3 months after the onset of disease to develop detectable antibody. Besides the long delay before there is measurable antibody, another disadvantage of the C-F is that it cross reacts with other fungal infections (coccidioidomycosis and histoplasmosis). The advantage is that it is a quantitative test. The physician can follow the patient's response to the disease by monitoring the antibody titer.
- **Enzyme Immunoassay (EIA)**. The latter test has met with mixed acceptance by mycologists. However it is easy to perform and antibody is detected early in the disease process



Amphotericin B remains is the drug of choice (DOC) although it is very toxic and must be administered intravenously for several weeks. Ketoconazole is also being used in mild cases



Thank you very much!!!