

Blastomycosis

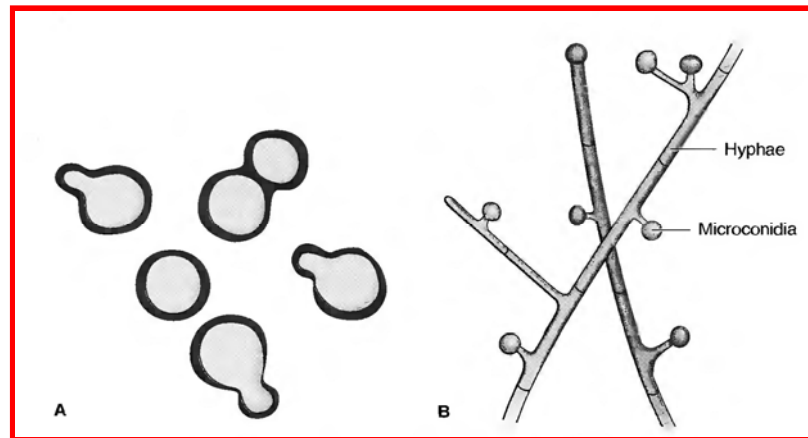
Blastomyces dermatitidis causes
blastomycosis, known as North
American blastomycosis

Dimorphic Fungi

- Histoplasmosis
- Blastomycosis
- Coccidioidomycosis
- Paracoccidioidomycosis
- Sporotrichosis
- Penicilliosis marneffeii

Properties of *Blastomyces*

- *B. dermariridis* is a dimorphic fungus that exists as a mold in soil and as a yeast in tissue.
- The yeast is round with a doubly refractive wall and a single broad-based bud



❖ Note that this organism forms a broad-based bud, whereas *Cryptococcus neoformans* is a yeast that forms a narrow-based bud.

Blastomycosis

- Blastomyces dermatitidis is a dimorphic fungus
→ mycelial form at room temperature
& yeast form at body temperature.
- Etiology of spectrum of diseases that occur either in sporadic or epidemic cases.
- 2 serotypes : A antigen +ve or –ve {mainly in Africa}

Epidemiology

- Estimating incidence has been difficult
 - lack of sensitive & specific diagnostic tests
 - considerable number of cases are subclinical
- Based on clinical reports of cases endemic areas are
 - states bordering **Mississippi & Ohio rivers**
 - Southeastern & South-central
 - & states bordering the **great lakes**
 - Canadian provinces , Midwestern

Epidemiology

- Environment is soil containing decayed vegetations or decomposed woods
- Rain fall or proximity to water source maintaining humidity is a major factor
- Those environmental factors are short lived

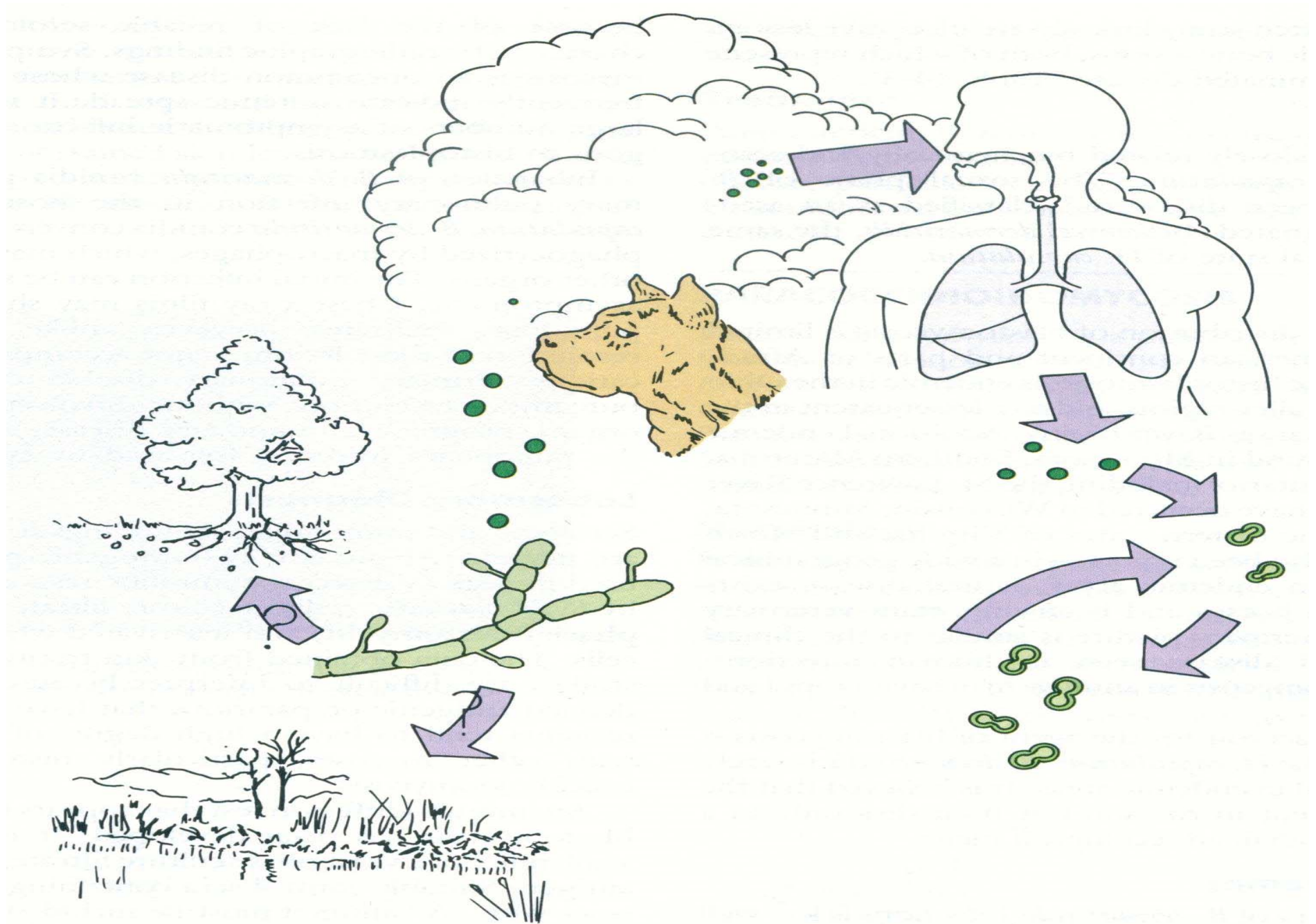
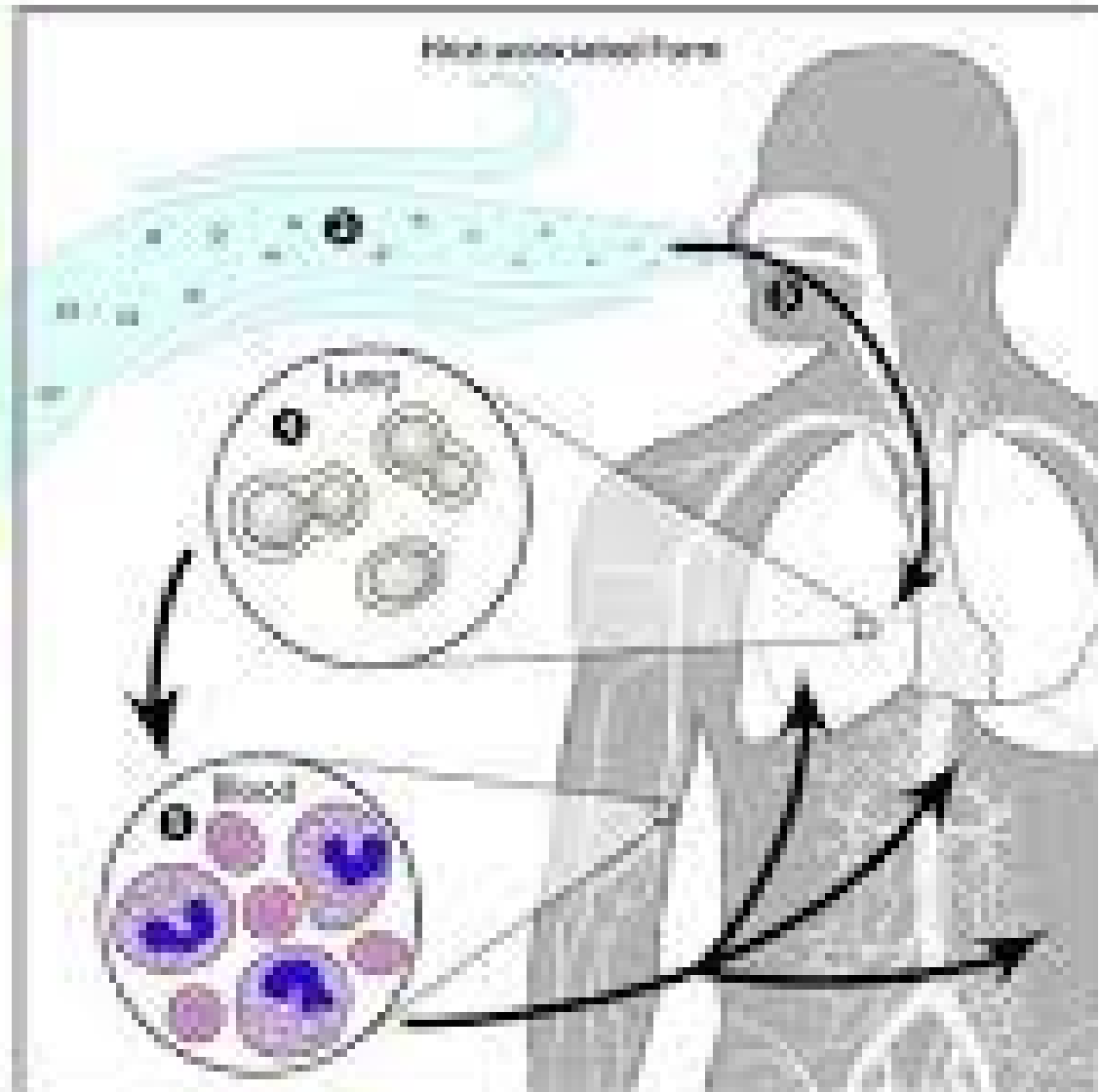


FIGURE 44-7 Schematic illustration of the natural history of the saprobic and parasitic cycle of *Blastomyces dermatitidis*.

Biology of Blastomycosis



Areas Endemic for Blastomycosis



In the environment, *Blastomyces dermatitidis* exists as small, round, yeast-like organisms. The fungus produces another spore (1). These spores are either inhaled or incorporated into the skin of a susceptible host. The warmer temperature inside the host's body is transformational into a larger, more budding yeast. The yeast has a special mechanism to spread the fungi to disseminate to the bloodstream from other parts of the body such as the skin, bones, urinary organs, and central nervous system.



ECOLOGICAL ASSOCIATIONS

PATHOGEN

HUMAN

SOIL

BLASTOMYCES DERMATITIDIS

1898

1964

CRYPTOCOCCUS NEOFORMANS

1894

1951

HISTOPLASMA CAPSULATUM

1934

1949

COCCIDIODES IMMITIS

1900

1932

Transmission & Epidemiology of Blastomyces

- This fungus is endemic primarily in eastern North America, especially in the region bordering the Ohio, Mississippi, and St. Lawrence rivers, and the Great Lakes region.
- Less commonly, blastomycosis has also occurred in Central and South America, Africa, and the Middle East. It grows in moist soil rich in organic material, forming hyphae with small pear-shaped conidia.
- Inhalation of the conidia causes human infection.

Pathogenesis & Clinical Findings of Blastomyces

- Infection occurs mainly via the respiratory tract.
- Asymptomatic or mild cases are rarely recognized.
- Dissemination may result in ulcerated granulomas of skin, bone, or other sites.

Presentations

- *General* : fever , malaise ,fatigue & Wt loss

- *Pulmonary* : Acute resemble CAP

Chronic might be mistaken for malignancy

Reported cases → empyema & ARDS

CXR → alveolar disease

upper lobes predominance

or Mass , miliary reticulonodular pattern

Cavitations & effusions are rare

Presentations

- *Cutaneous*: 2nd most common

Isolated or concomitant with respiratory involvement

Either verrucous or ulcerative lesions

Aspirations or Bx will yield Dx

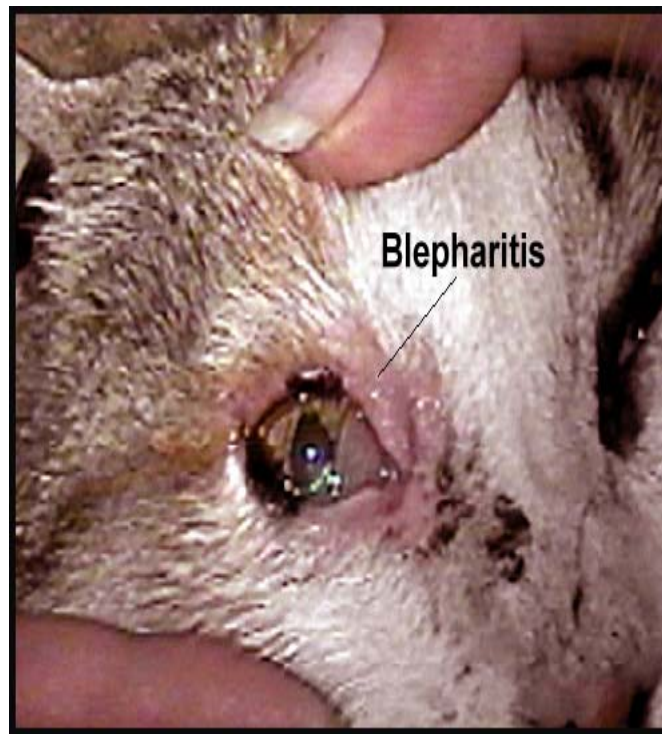
- *Osseous* : both axial & peripheral bones

radiological findings are non specific

Bx → granulomatous inflammation

Presentations

- *CNS* : Meningitis , abscess
Ventricular fluid has a higher yield than LP
- *GU* : Prostatitis & epididymo-orchitis
- *Rare* : LN , Liver & spleen abscess
ocular ,adrenal , breast
Presenting with ITP , Immune hemolysis
Associated with TB , Histo & Coccidio



Blastomycosis

Skin lesions resulting from the dissemination of the fungus from the lungs



Laboratory Diagnosis of *Blastomyces*

- In tissue biopsy specimens, thick-walled yeast cells with single broad-based buds are seen microscopically.
- Hyphae with small pear-shaped conidia are visible on culture.
- The skin test lacks specificity and has little value.
- Serologic tests have little value.

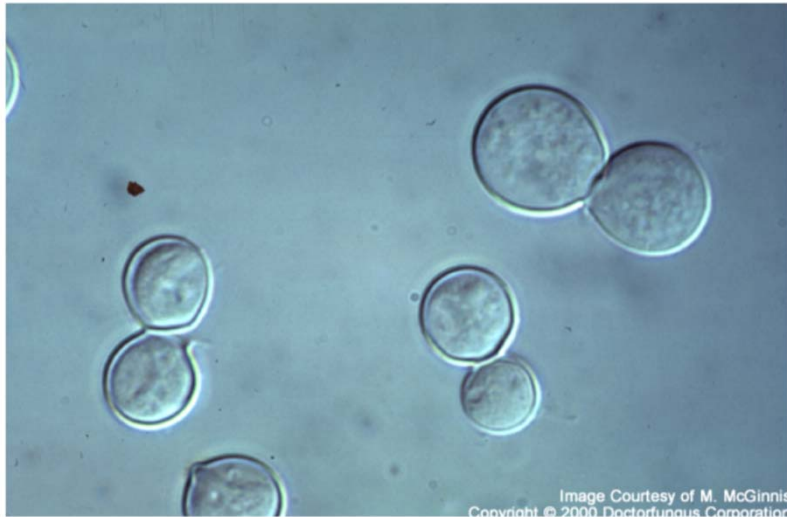
Diagnosis

- High diagnostic yields from culture specimen & culturing different sources will increase yield
- Increase number of specimens increase yield
- Average time to confirm Dx by Culture
→ 5 weeks

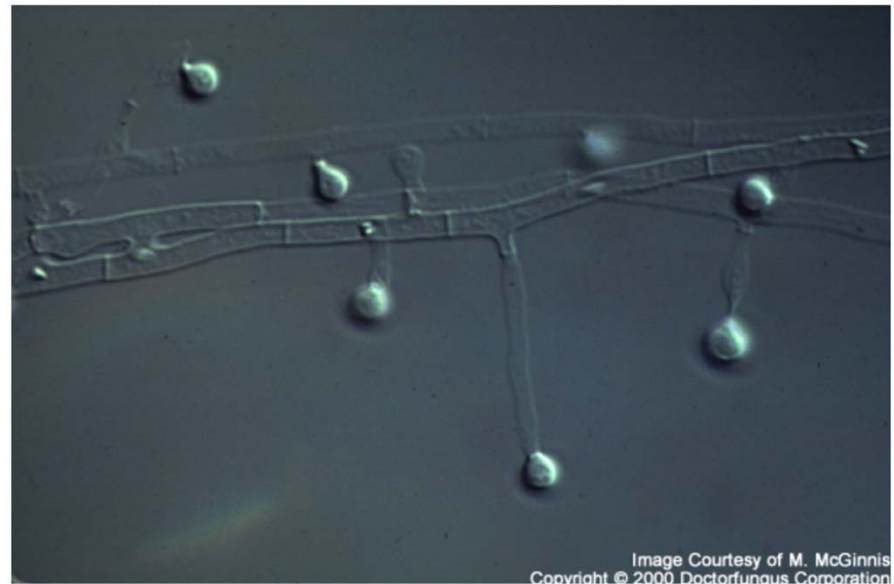
Diagnosis

- KOH may provide faster & comparable yield to cultures
- Serology yield 16-40%
- Wet smear & cytology might be helpful in endemic areas
when starting treatment is urgent
to avoid more invasive investigations

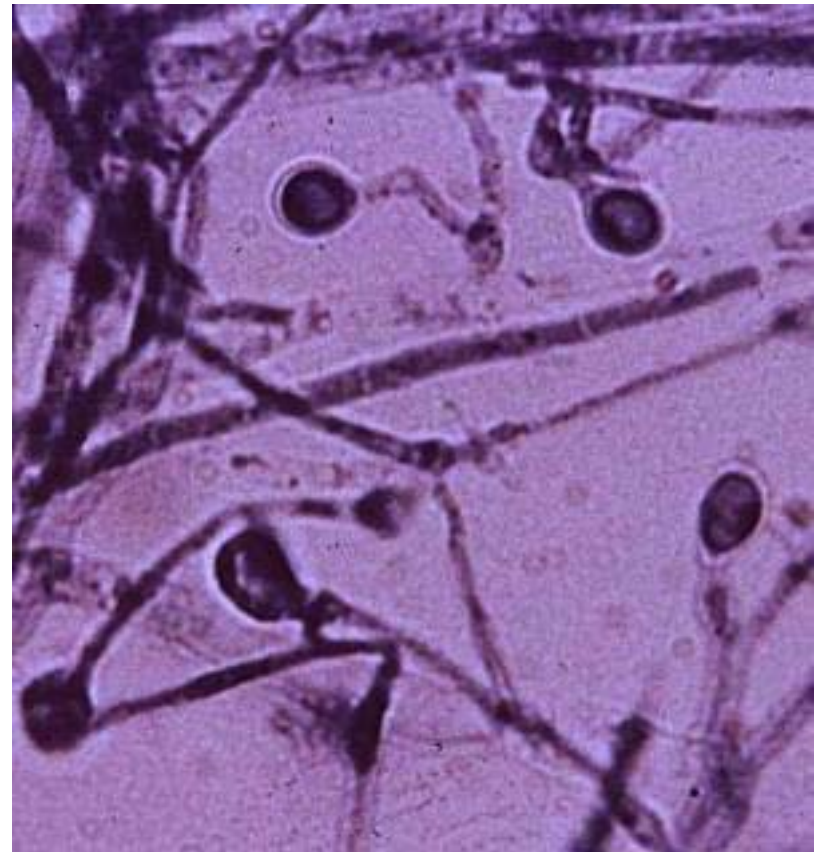
Blastomyces dermatitidis



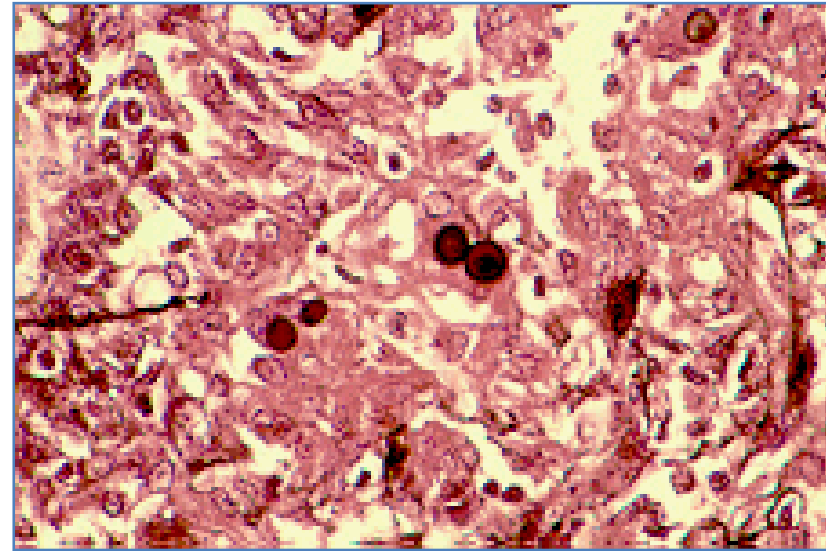
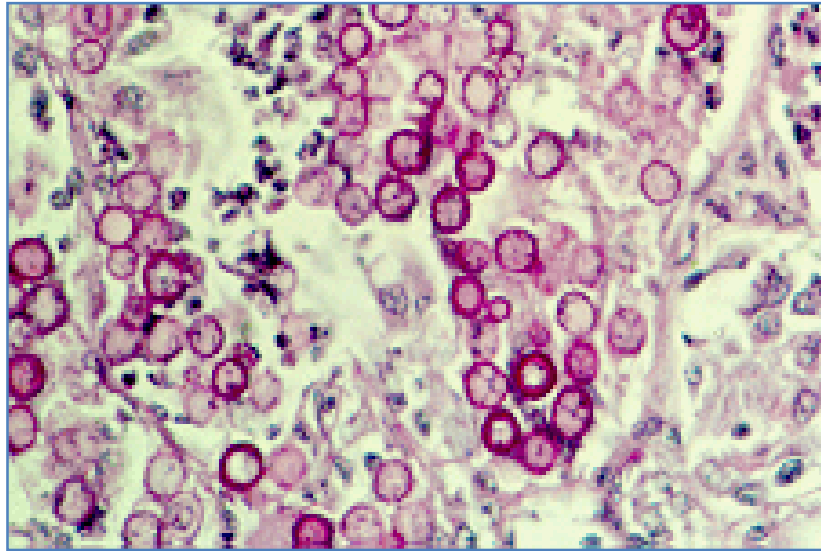
One-celled conidia formed on
short conidiophores.



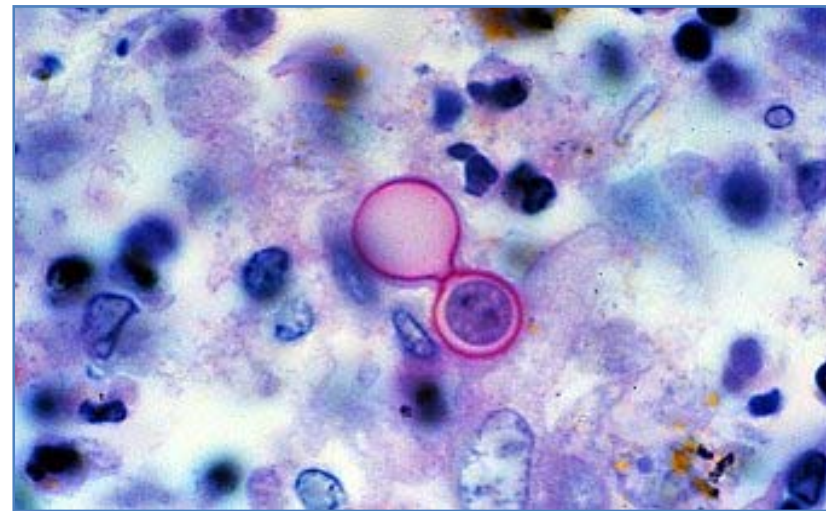
Broad based budding and thickened
cell walls and globose shape are
characteristic of the yeast form of
Blastomyces dermatitidis



Blastomycosis



Tissue sections showing large, broad-
base, unipolar budding yeast-like
cells



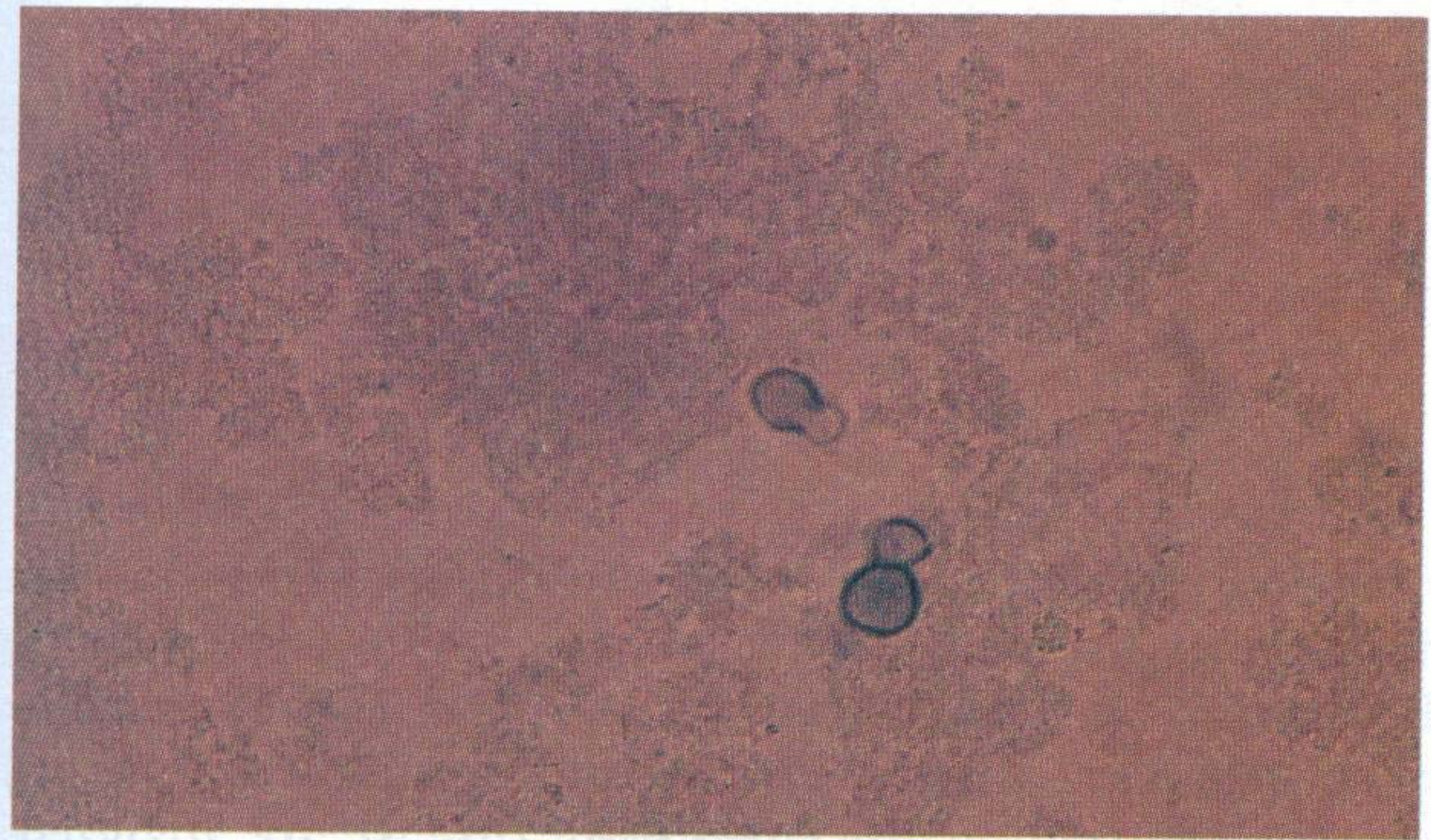
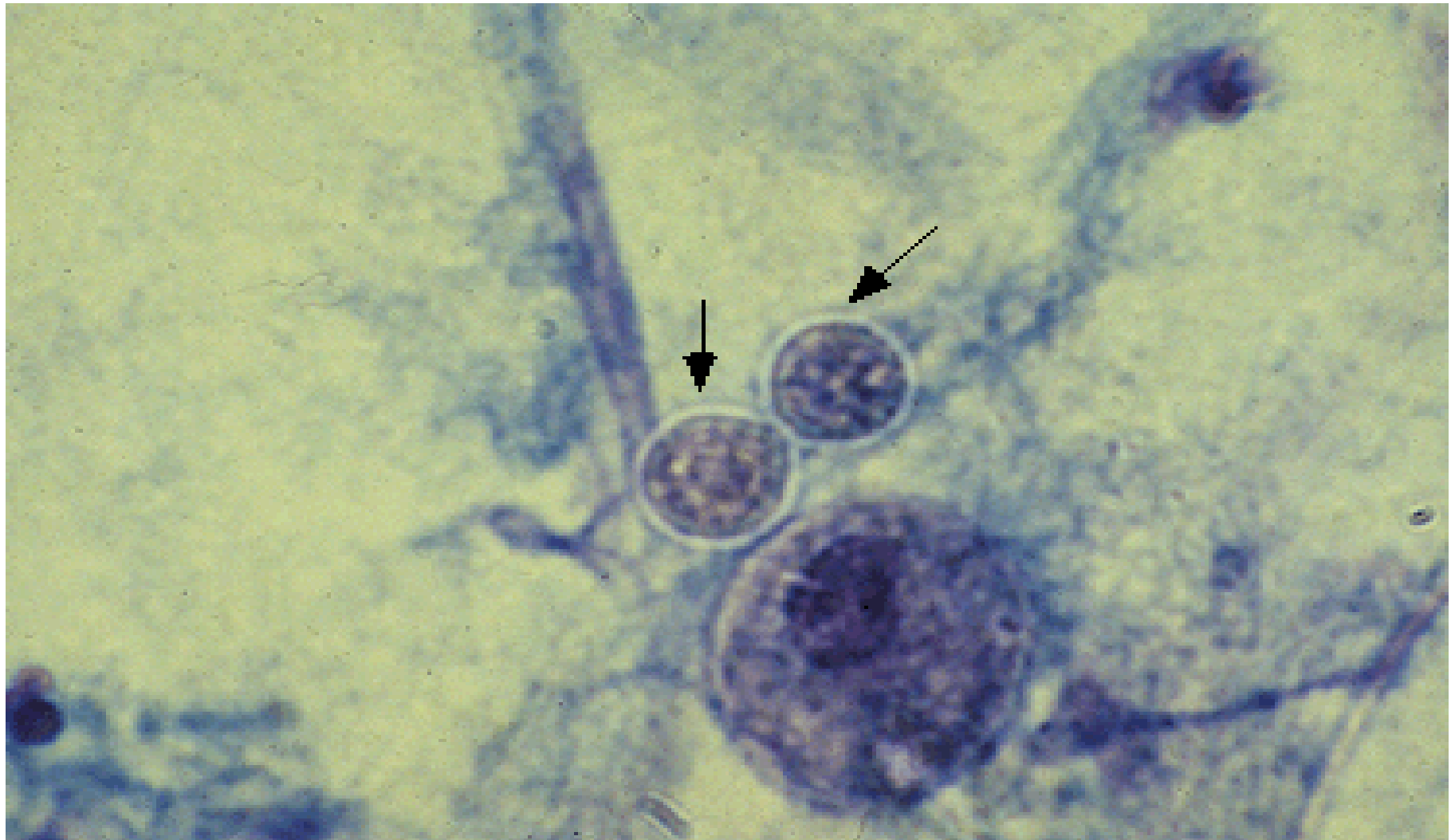


FIGURE 44-8 Broad-based budding yeast cells of *Blastomyces dermatitidis* seen in purulent material expressed from a microabscess.





Blastomyces dermatitidis The yeast phase of *Blastomyces dermatitidis* has a thick refractile cell wall (arrows). Courtesy of Stanley W Chapman, MD.

Treatment

- Spontaneous resolution is very uncommon
- Untreated cases might have mortality 60%
- No randomized trial comparing antifungal Rx
- Rx selection depends on immune status
& severity of infection

Treatment

- Immunocompromized with CNS, Respiratory failure or multioragn failure → Ampho B
- Itraconazole is the drug of choice 200 mg .
6 months cure rate > 90%
- Ketoconazole variable cure rates
with higher CNS relapse

Treatment & Prevention of *Blastomyces*

- Itraconazole is the drug of choice for most patients
- Amphotericin B should be used to treat severe disease.
- Surgical excision may be helpful.
- There are no means of prevention.