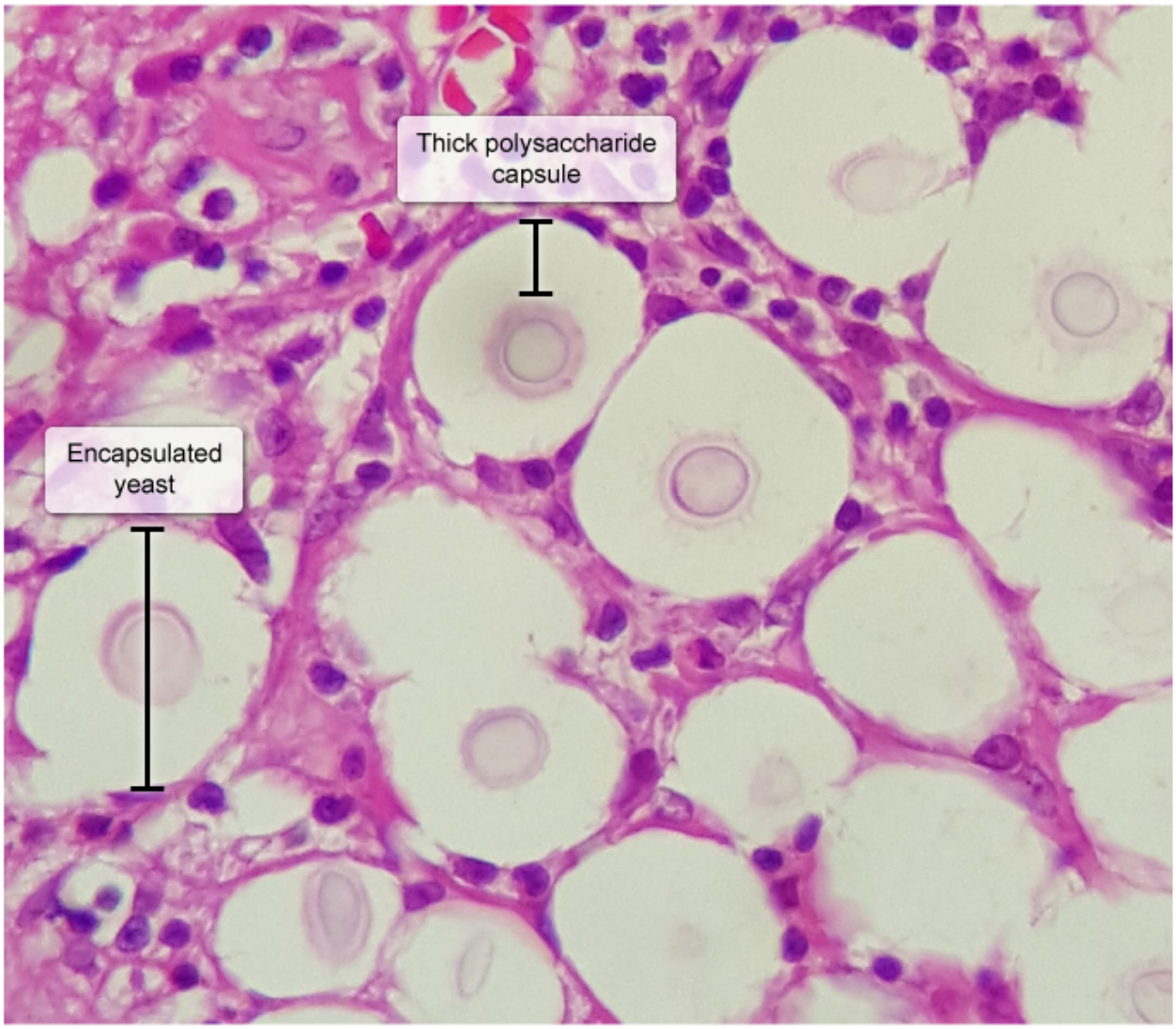
| ***Cryptococcus neoformans*** | |
|---|---|
| **Morphology** | • **Yeast** with a **polysaccharide capsule**<br>• Round/oval cells with narrow-based buds |
| **Epidemiology** | • Soil and pigeon droppings<br>• Respiratory transmission<br>• Opportunistic infection in patients with **AIDS** (CD4 <100/$mm^3$) |
| **Infection** | • **Meningoencephalitis:** Progressive headache, fever, confusion<br>• Possible disseminated disease |

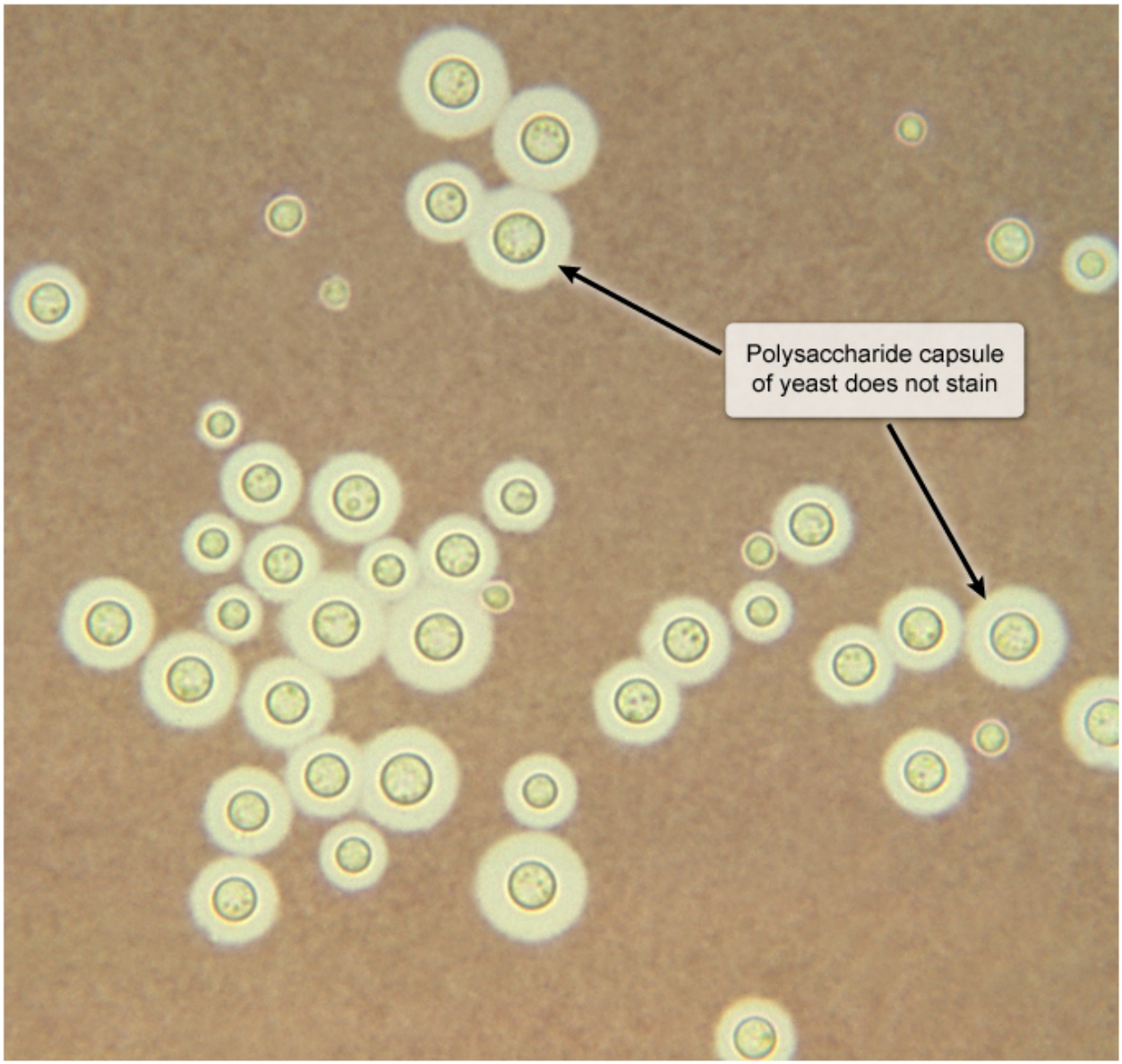
| | |
|---|---|
| **Diagnosis** | • Lumbar puncture: ↓ glucose & ↑ protein & mild pleocytosis with a predominance of lymphocytes<br>• **India ink** stain...> transparent capsule or methenamine silver of cerebrospinal fluid<br>• Latex agglutination of cerebrospinal fluid<br>• Culture using Sabouraud agar |
| **Treatment** | • **Amphotericin B** and flucytosine (induction)<br>• Fluconazole (maintenance) |

Fluconazole drugs inhibit the synthesis of ergosterol ( fungistatic ) , a crucial fungal cell membrane component.

## Cryptococcal encephalitis

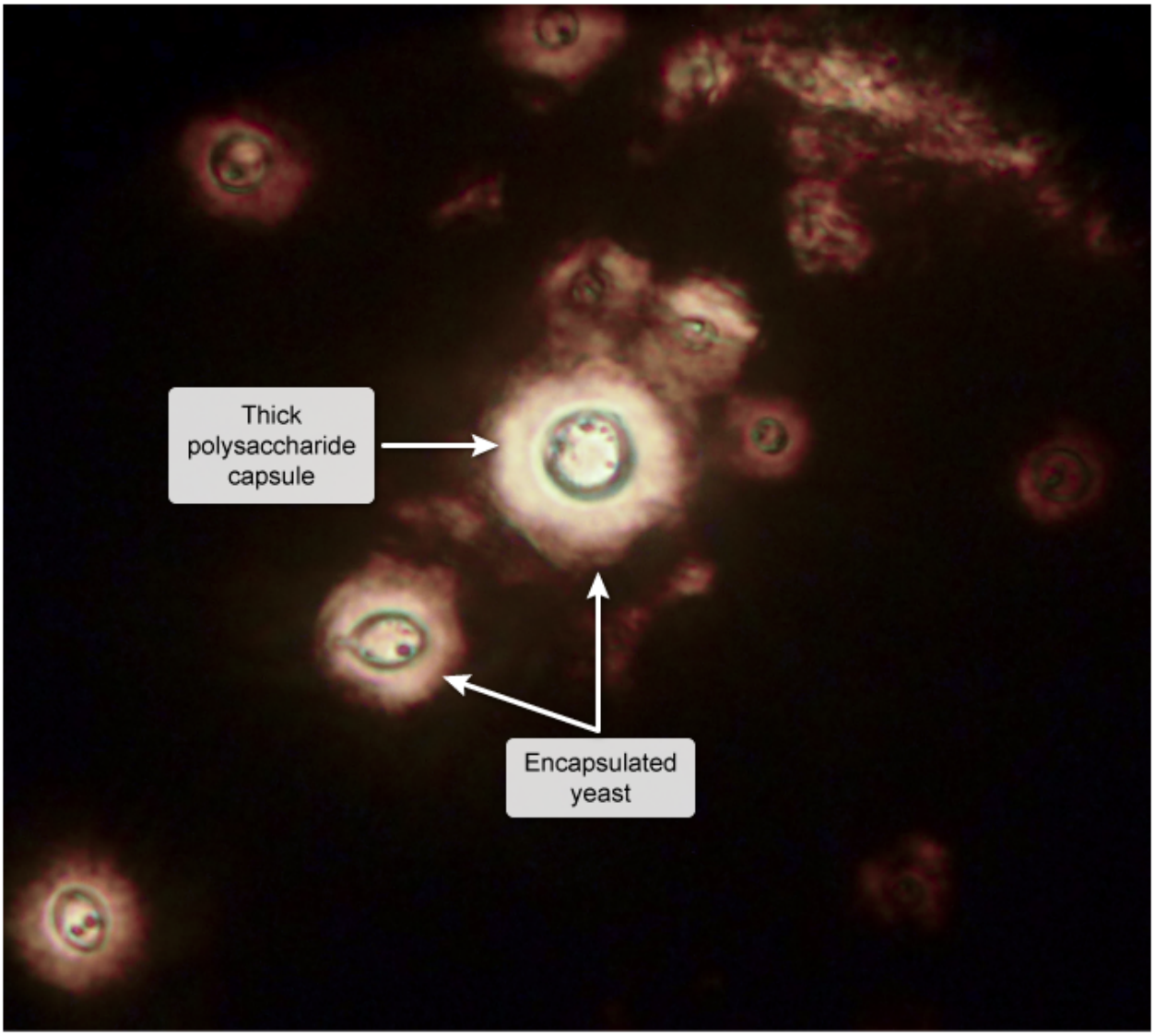


## Cryptococcus neoformans




Cerebrospinal fluid, light India ink stain

***Cryptococcus***

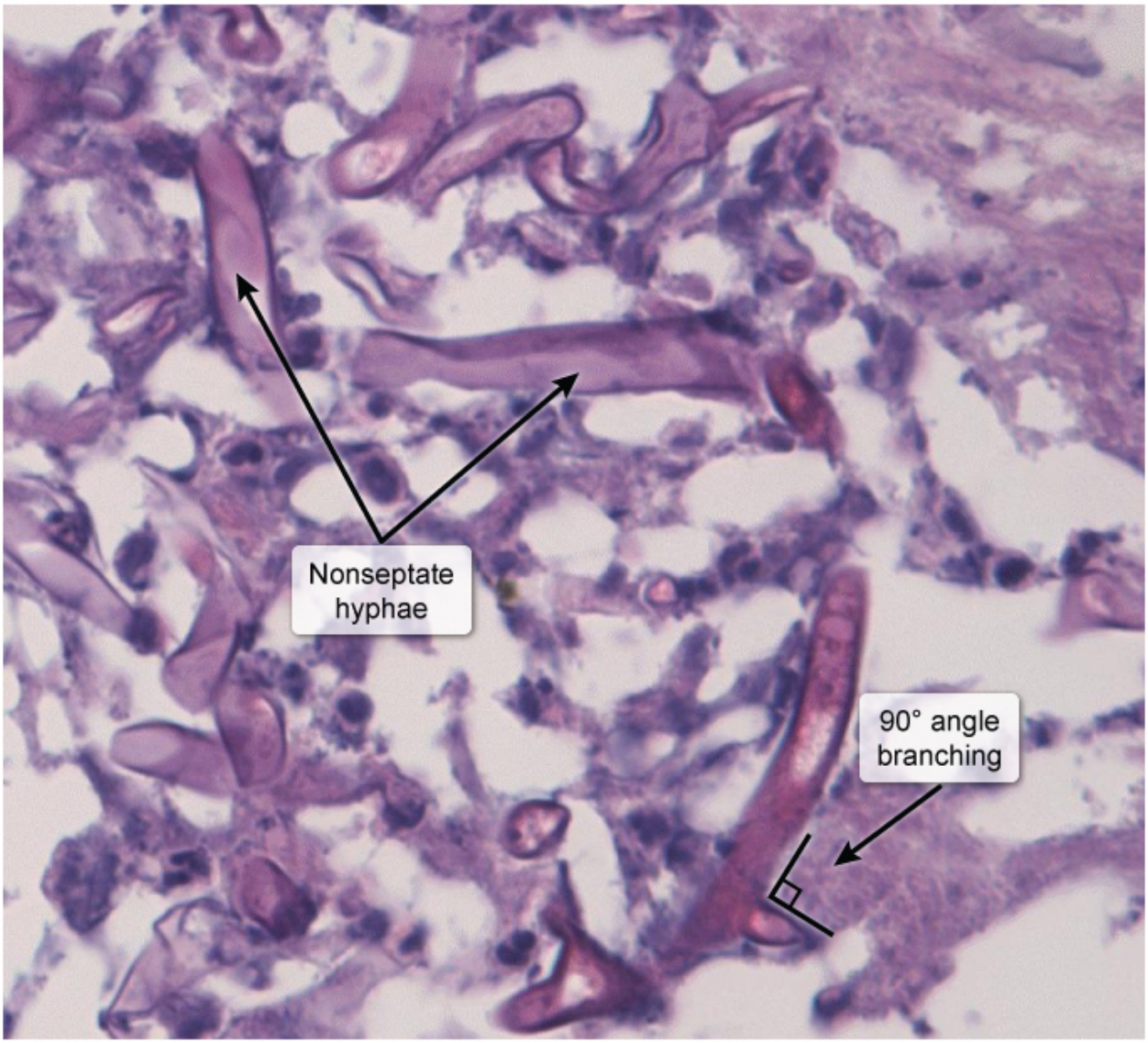



India ink stain



** *Mucor* and *Rhizopus*species are characterized by nonseptate hyphae that branch at wide angles. These fungi cause severe infections of the paranasal sinuses (mucormycosis) in patients who are immunosuppressed (eg, diabetes mellitus).

**Mucormycosis***

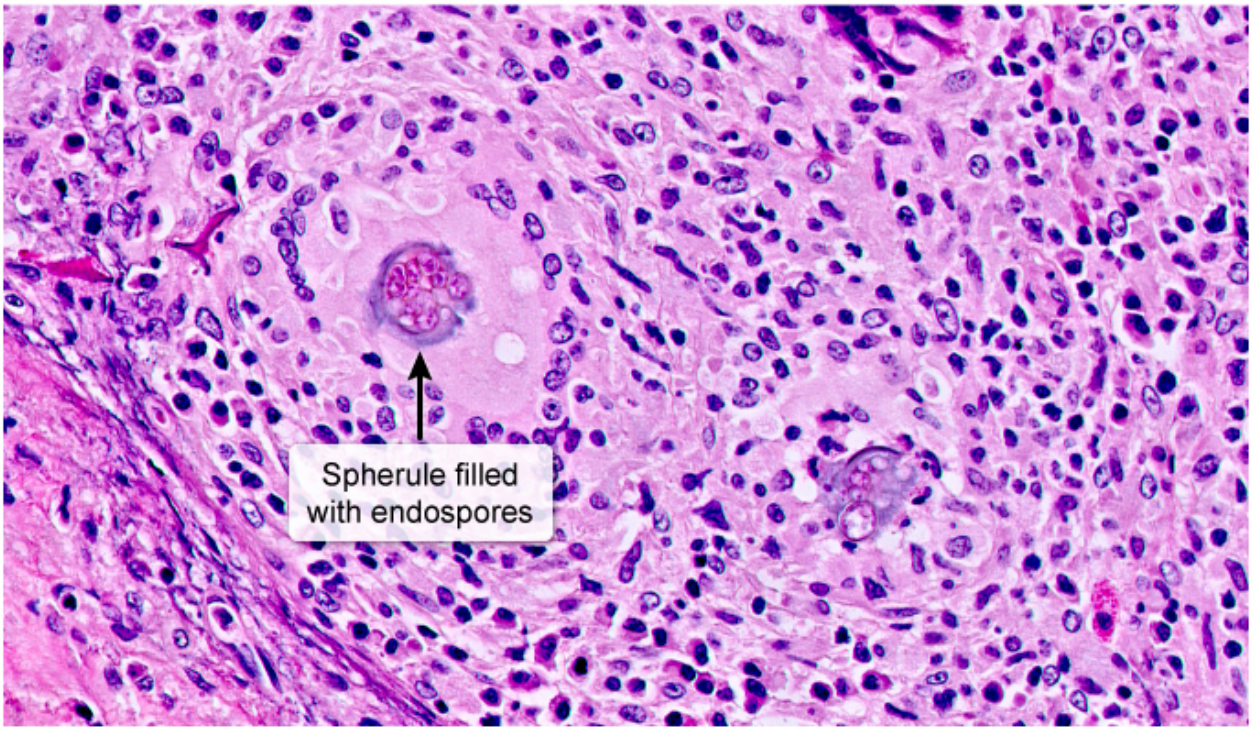



*Frequently due to *Rhizopus* or *Mucor*



** *Coccidioides immitis* is associated with the formation of spherules, which then rupture to release endospores. This fungus primarily causes community-acquired pneumonia in endemic areas (eg, Arizona desert

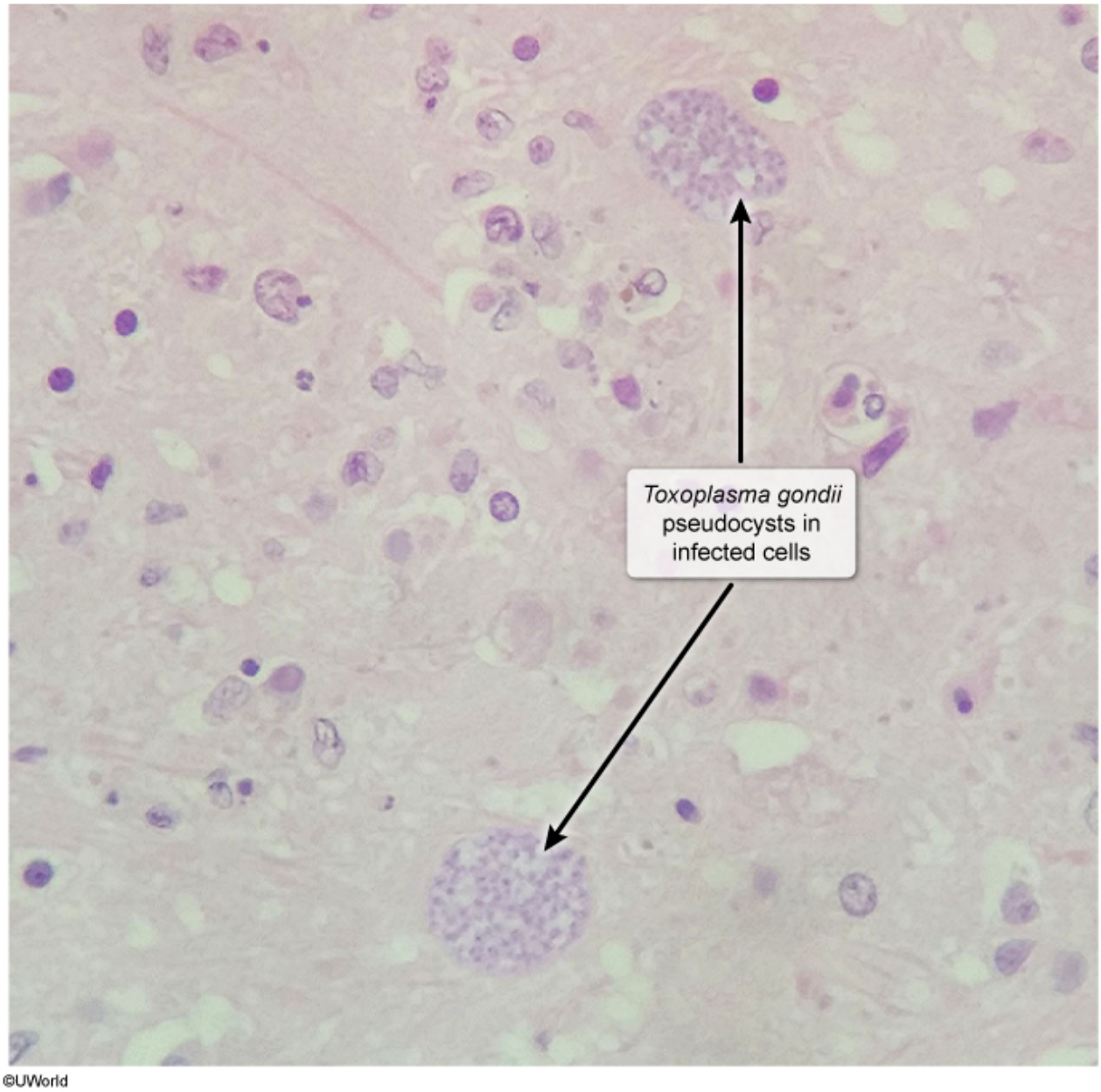
***Coccidioides***





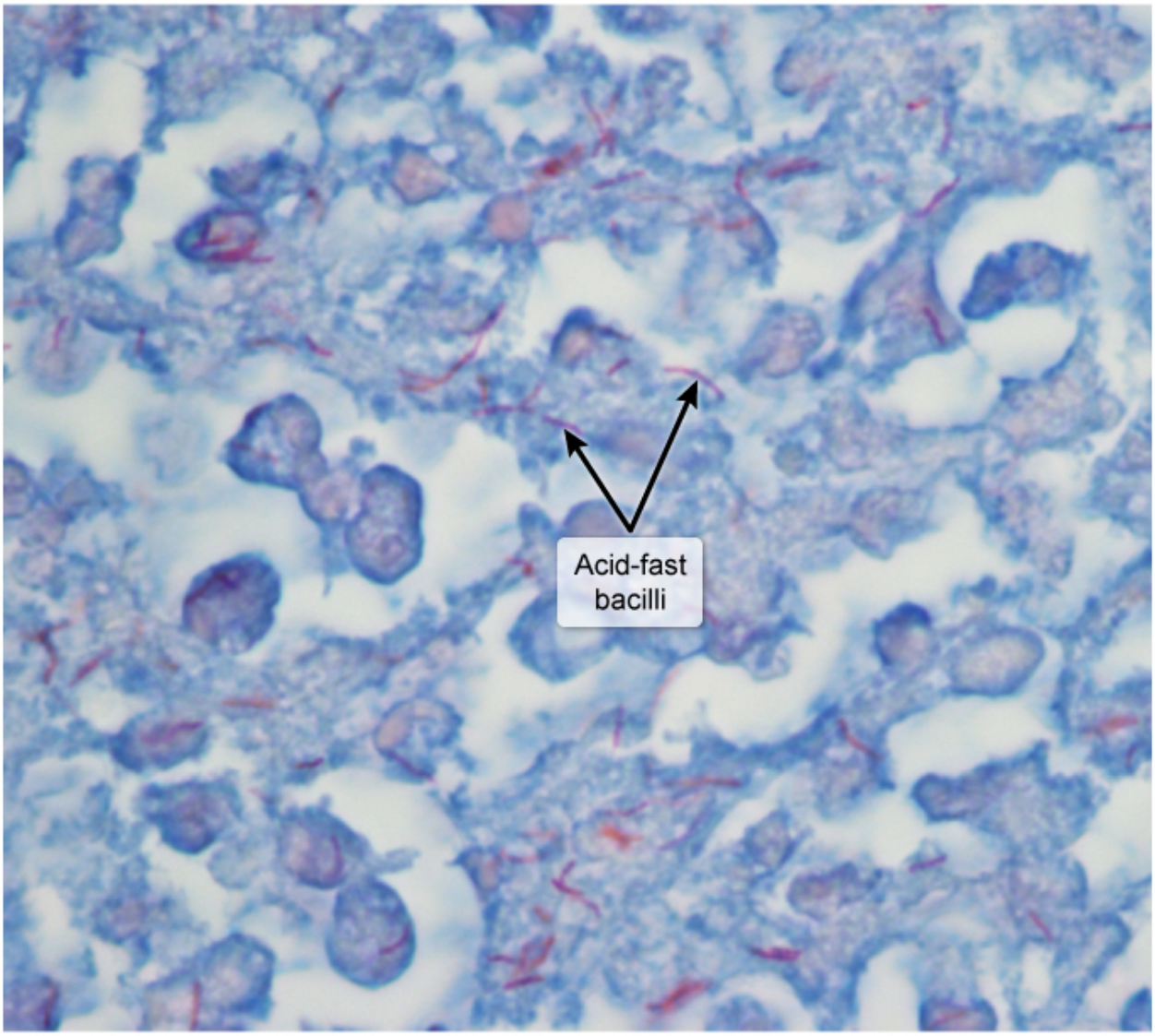

** Tuberculous (TB) meningitis is characterized by formation of a thick, gelatinous exudate in the base of the brain; cerebral vasculitis; and hydrocephalus.  It frequently presents with subacute, slowly progressive nausea, vomiting, fever, cranial nerve deficits, and strokes.

**Cerebral toxoplasmosis**




* ***Toxoplasma gondii*** is a feline parasite ( obligate intracellular ) can cause encephalitis in patients with untreated AIDS.

## Mycobacteria






Acid-fast stain

* Mycolic acid is the primary component of the cell wall of *Mycobacterium tuberculosis*.
*1ry inf. is pulmonary, and may cause CNS tuberculoma.

| **Differences between bacterial & viral meningitis** | |
|---|---|
| **Viral** mostly aspetic meningitis | **Bacterial** |

| | | |
|---|---|---|
| **Common microbes** | • **Enteroviruses** (most common)<br>• Arboviruses<br>• Herpes simplex virus type 2 | • Adults: *Streptococcus pneumoniae* & *Neisseriameningitidis*<br>• Neonates: **Group B *Streptococcus ( S agalactiae )*** & gram-negative bacilli |
| **CSF cell differential** | • WBC count often <500/mm$^3$<br>• Lymphocytic predominance | • WBC count often >1,000/mm$^3$<br>• Neutrophilic predominance |
| **CSF glucose & protein** | • **Glucose** levels are **normal** or slightly reduced<br>• **Protein** generally **<150** mg/dL | • **Glucose** levels **<45** mg/dL<br>• **Protein** is often **>250** mg/dL |
| **CSF Gram stain & culture** | • No organisms identified | • Often positive for a specific organism |
| **CSF** = cerebrospinal fluid; **WBC** = white blood cell. | | |

* focal neurologic signs, seizures, and alterations in mental status should prompt consideration of other diagnosis like bacterial meningitis, encephalitis, and intracranial hemorrhage.