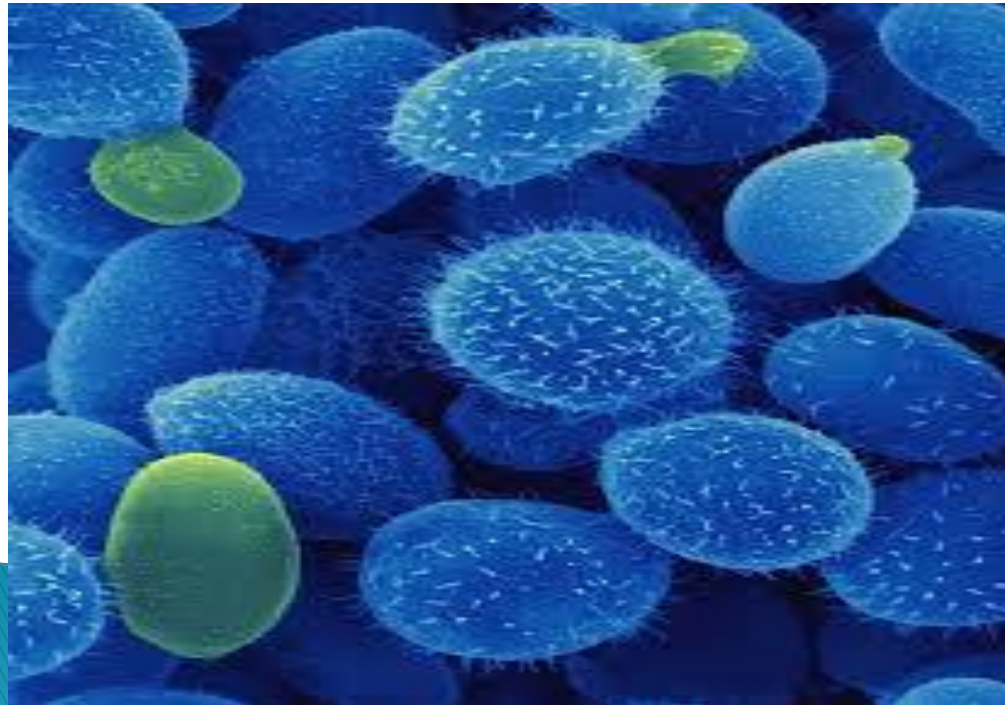


CRYPTOCOCCUS

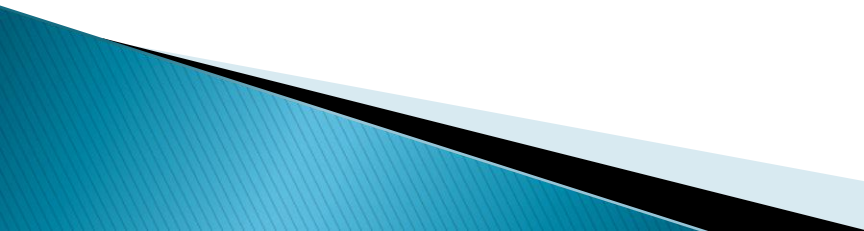


Dr. Poonam Shakya

SYNONYMS

- ▶ Cryptococcosis
- ▶ European Blastomycosis
- ▶ Torulosis

Causal Agent

- ▶ *Cryptococcus neoformans* (encapsulated yeast)
 - ▶ 19 species (only *Cryptococcus neoformans pathogenic*)
 - ▶ Subacute or chronic mycotic infection of man and various species of animals involving the CNS, the respiratory system and eye
- 

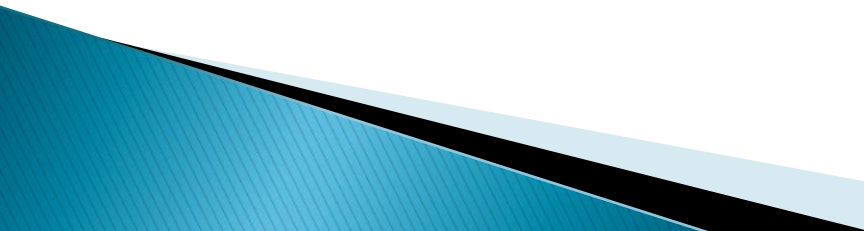
HABITAT

- ▶ Worldwide distribution
- ▶ Present in dust, skin, mucous membrane and intestinal tract of normal animals and birds
- ▶ Reservoir – Bird faeces , particularly pigeons and soil contaminated by avian excreta
- ▶ The organisms are concentrated in pigeon faeces due to their high content of creatinine
- ▶ The creatinine inhibits many other micro organism but can be utilized by *C. neoformans*

Diseases

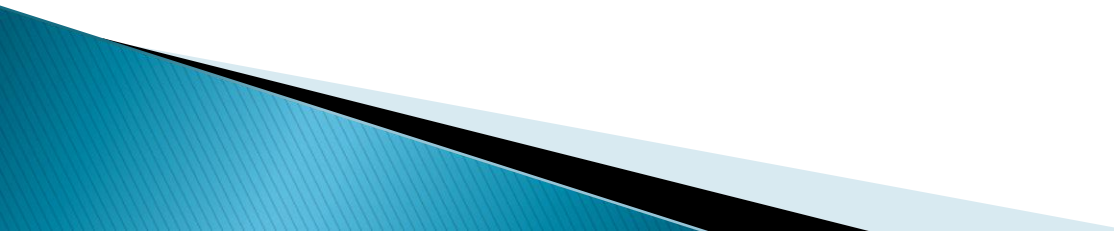
Hosts	Diseases
Dogs & Cats	Nasal granulomas Meningitis Blindness
Horse	Nasal granulomas
Cattle	Cryptococcal mastitis
Human	Cryptococcal meningitis

PATHOGENESIS

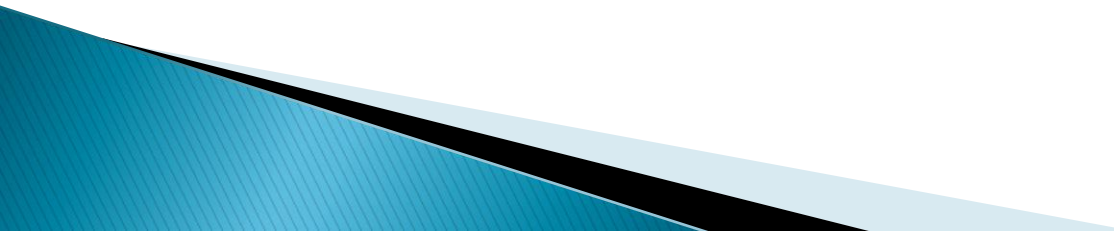
- ▶ Exogenous Infections
 - ▶ Route of infection-Respiratory, acquired by inhalation
 - ▶ Localization in the nasal cavity or paranasal sinuses and later extension to the brain and meninges
 - ▶ Infections extend to the optic nerve resulting in blindness
 - ▶ Virulence factors-
 - A. Antiphagocytic and immunosuppressive capsule
 - B. Enzyme diphenol oxidase
- 

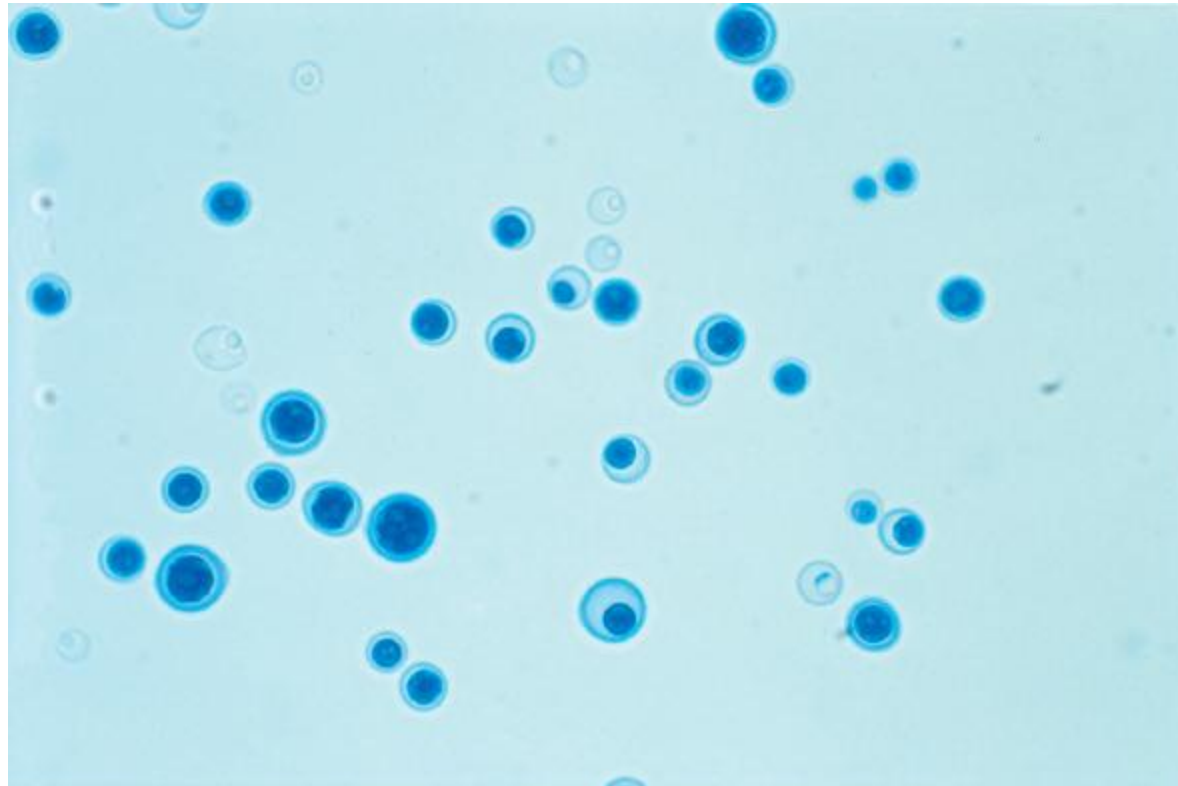
Diagnosis

Specimen

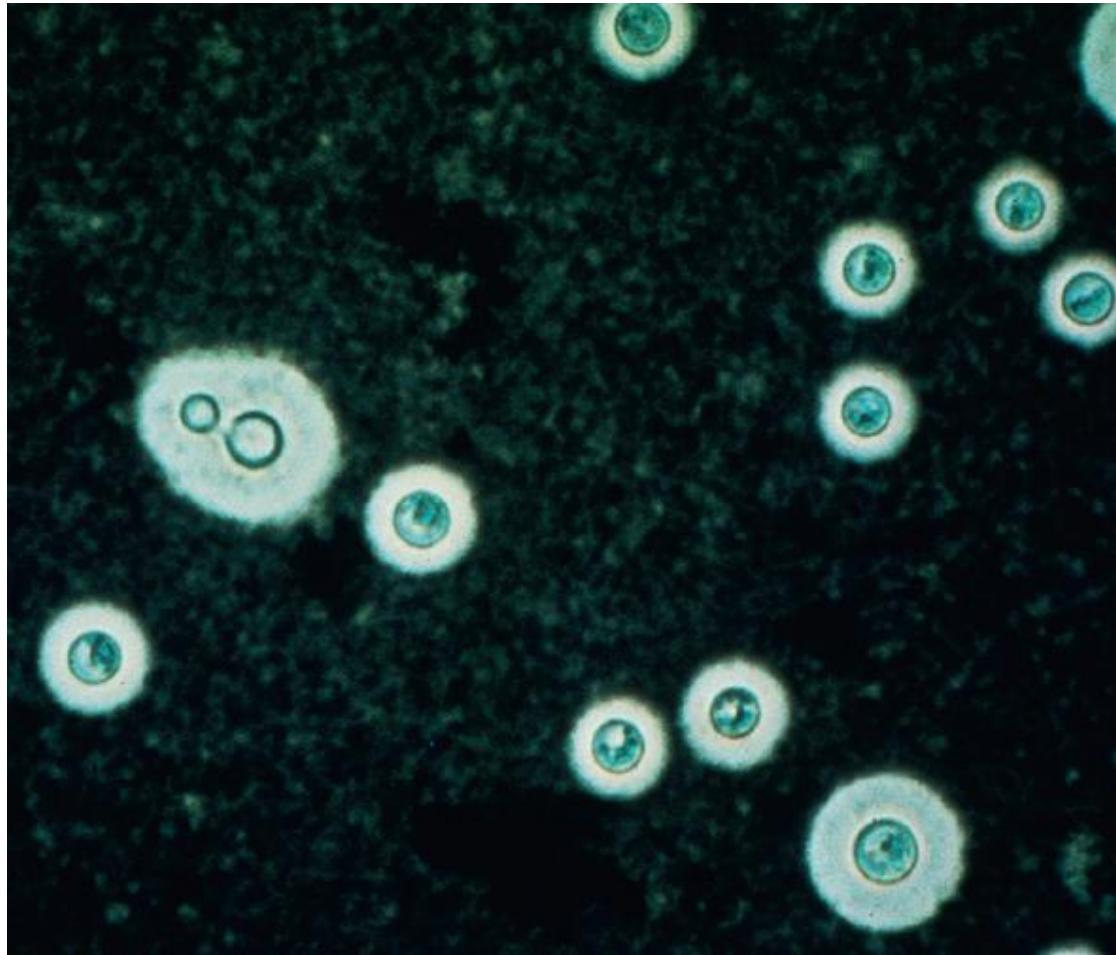
- ▶ Lesions or exudates
 - ▶ CSF
 - ▶ Mastitic milk
 - ▶ Biopsies and tissues
- 

Direct microscopy

- ▶ Demonstration of budding yeast with a large capsule by India ink, Nigrosin and LPCB staining methods
 - ▶ Histological sections -PAS-haemotoxylin stain
- 



Cryptococcus neoformans from a culture (LPCB x1000)



Cryptococcus neoformans in exudate. (Nigrosin stain x 1000)

MORPHOLOGICAL CHARACTERISTICS

- ▶ Two varieties -
 1. *Cryptococcus neoformans var neoformans* (serotypes A & D)
 2. *Cryptococcus neoformans var gattii* (Serotypes B and C)
- ▶ Spherical to oval, thin walled, budding yeast that varies greatly in diameter
- ▶ Cells are surrounded by a mucoid polysaccharide capsule
- ▶ Gram positive
- ▶ Stained by Lactophenol cotton blue or nigrosine stains

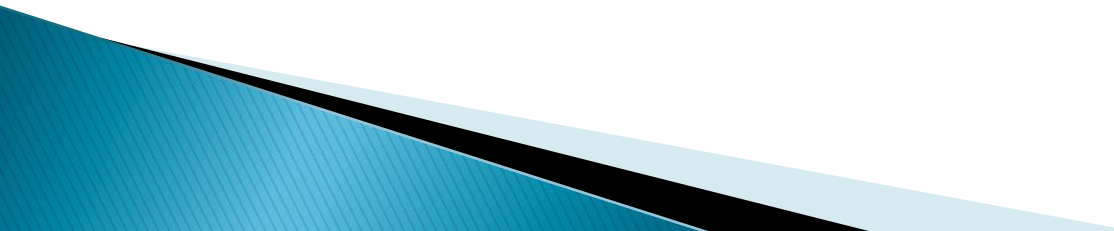
CULTURAL CHARACTERISTICS

- ▶ Media-Blood agar, SDA (without cycloheximide), chocolate agar
- ▶ Aerobic, 37°C
- ▶ Incubated for upto 2 weeks
- ▶ Capsular growth can be enhanced by culture on chocolate agar under 5% Co₂ at 37°C
- ▶ Colonies are smooth, moist, shiny, white and become wrinkled, cream to brownish granular colonies on further incubation. *Cryptococcus species* use creatinine and produce **melanin-pigmented (brown) colonies**.
- ▶ Selective medium -Bird seed agar

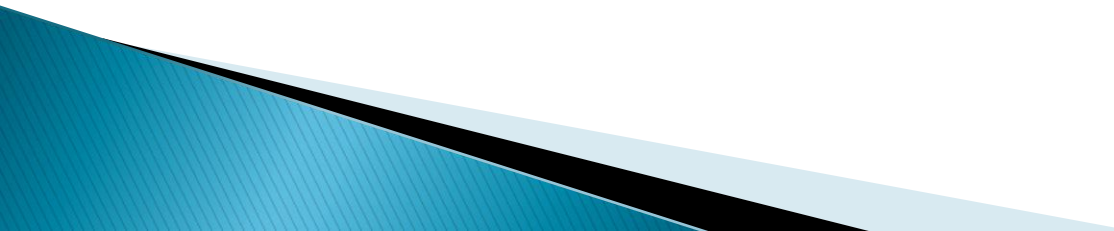
Cryptococcus neoformans on Sabouraud dextrose agar incubated at 25°C (left) and 37°C (right)



BIOCHEMICAL CHARACTERISTICS

- ▶ *C. neoformans* is highly urease positive
 - ▶ It will produce urease on heavily inoculated Christensen's urea agar slope
 - ▶ Melanin production on Niger seed or birdseed agar
- 

Serology

- Slide agglutination
 - Latex agglutination Test(LAT)
 - Tube agglutination
 - CFT
 - ELISA
- 

Animal Inoculation

- Mice
- Intra cerebral or Intra peritoneal inoculation
- Mice dies within 4 days to two weeks
- On PM- gelatinous lesions in the abdominal cavity and lungs

