Pathogenic Yeasts
Week 13

Pathogenic Yeasts;

- ***Candida albicans***
- ***Cryptococcus neoformans***
- ***Malassezia pachydermatis***
- ***Geotrichium candidum***

Candidiasis

Candidiasis is an infection that usually occurs in the digestive tract and mucous membranes by Candida species, mainly C.albicans, in the vast majority of humans and animals (90%).

C.albicans is commensally located in mouth, esophagus, stomach, intestinal tract, skin-subcutaneous tissues, lung, breast tissue and genital canal. Lesions arising from the agent are encountered.

Most of the infections caused by the agent are of endogenous origin, and predisposing causes such as immunosuppression, long-term antibiotic therapy, and insufficient care-feeding lay the groundwork for the agent to cause infection.

Infection is acute in juvenile animals; It has a chronic course in adult animals.

Clinical Findings

In poultry, clinical signs are almost never observed.

The cases are generally sporadic and rarely endemic. The upper respiratory tract and digestive system are most affected.

In acute cases, loose-structured yellow-white lesions on the mucous membrane of the crop in necropsy; In chronic cases, a thick, terry-like necrotic membrane is observed on the mucous surface.

In ruminants and pigs, mycosis caused by C.albicans are rarely encountered. In cases, abortion, mastitis, mycotic stomatitis, pneumonia and rumenitis are generally observed.

Skin, otitis, intestinal candidiasis, genital candidiasis in dogs and cats

C. albicans'ın hayvan türlerinde neden olduğu hastalıklar

Konakçı Türleri	Hastalıklar
Tavuklar, hindiler, güvercinler ve diğer kanatlılar	Ağız, özefagus ve taşlıkta pamukçuk. Genç kanatlılarda yüksek mortalite ile seyreden gelişme geriliğine neden olur.
Taylar	Midede ülseratif lezyonlardan izole edilmiştir
Kısrak ve aygırlar	Genital infeksiyonlar
Buzağılar	Pnömonik, enterik ve generalize kandidiazis. Hayvanlarda uzun süren antibiyotik tedavilerinin ardından görülür.
Sığırlar	Mastitis: hafif ve kendini sınırlayıcı formu. Bir hafta içerisinde kendiliğinden iyileşir.
Kedi ve köpek yavruları	Mikotik stomatitis
Kedi yavruları	Enteritis
Dişi köpekler	Genital kanal infeksiyonları
Köpekler	Kaslar, kemikler ve deride (nadir) lezyonlarla karakterize generalize infeksiyonlar
Kediler	Piyotoraks
Primatlar ve deniz memelileri	Mukokutanöz kandidiasis
İnsanlar	Yeni doğanlar ve bebeklerde mikotik stomatit, erişkinlerde tırnak infeksiyonları, genital kanal, deri, AC ve diğer organlarda infeksiyonlar

Laboratory Diagnosis

For the diagnosis of the disease, according to the location of the localization, mouth, esophagus, stomach, crop, milk, uterine discharge, skin scraping, etc. materials should be sent to the relevant laboratory under appropriate conditions.

Direct microscopy

Skin and mucous scrapings are treated with 10% KOH and examined under a microscope. Oval-budded yeast-like cells and short mycelial structures are observed.

Examination is performed with Lactophenol Cotton Blue or Gram staining in uterine discharge and smears prepared from milk.

Culture

Planting is done on Sabouraud Dextrose Agar with and without antibiotics from the materials sent to the laboratory. Petri dishes are left to incubate at 25 ° C and 37 ° C for 3-5 days.

Some Candida species can be inhibited by cycloheximide.

Plates are inoculated with a small volume of inoculum as is the case

Identification

Colonial view

Colonies of C. albicans mostly breed in 3-5 days.

They form colonies of white or cream color, bright, highly-convexity, with a fruity sweet scent, 4-5 mm in diameter.

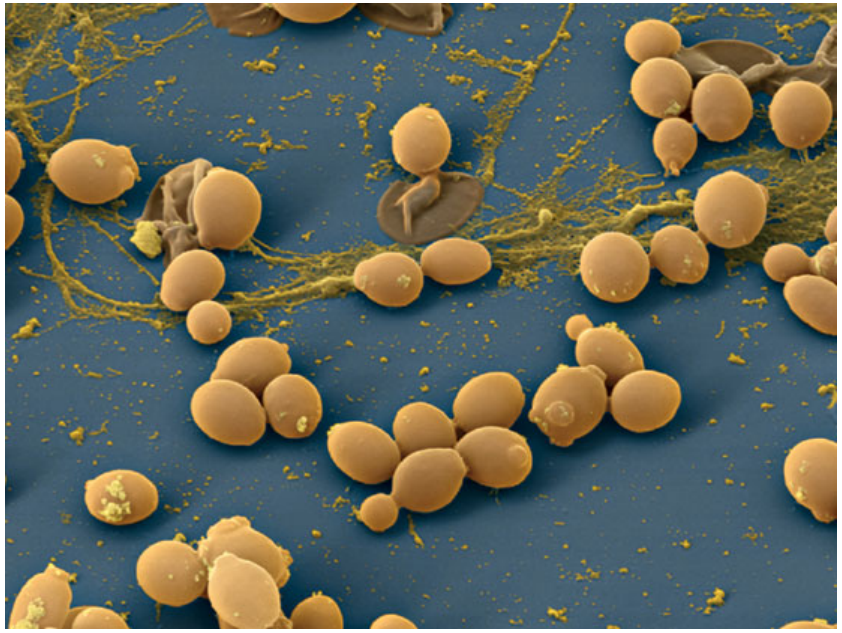
Microscopic views

A small portion of Lactophenol from a single colony can be prepared in Cotton Blue or pre-fixed colonies can be stained with Gram Stain or Methylene Blue.

C. albicans forms thin-walled, budding cells on blood agar and Sabouraud Dextrose Agar.

Demonstration of germ tubes

A small inoculum prepared from breeding colonies is inoculated into 0.5 ml sheep, cattle, rabbit or human serum and incubated at 37 ° C for 2-3 hours.




Dr. Jaime Ruiz

Treatment and Protection

Candidiasis is largely dependent on predisposing factors. Therefore, predisposing factors should be eliminated first.

Copper sulphate can be added to protective drinking water and nystatin can be added to feeds.

Some studies have shown that formic acid application to feeds can be beneficial.

Amphotericin is primarily used in animals to be treated. In addition, topical applications can be applied to lesions.

Cryptococcosis

Cryptococcosis is a subacute and chronic disease caused by Cryptococcus neoformans in humans and animals.

Of the 19 Cryptococcus species, only Cryptococcus neoformans is pathogenic to humans and animals.

It is a thin-walled budding yeast ranging from spherical to ovale, with a diameter ranging from 2.5 to 20 μm.

Its cells are surrounded by a mucoid polysaccharide capsule of varying thickness, and this capsule is larger in animal tissues.

The daughter cells are single and bud from the mother cell with a thin neck.

Cryptococcus neoformans Fungi is a member of the Imperfecti class.

Cryptococcosis (European blastomycosis, torulosis) is a subacute or chronic infection involving the central nervous system, respiratory system, and eye.

Epizootiology

C. neoformans is very common on earth. It has been detected in fruit juices, milk, soil, skin, mucous membranes and intestinal tract of healthy animals.

Due to the high content of creatinine in pigeon droppings, it is found in large amounts in faeces and can survive in pigeon droppings for more than 1 year.

Although creatinine inhibits many other microorganisms, it can be used by C. neoformans.

Pathogenesis

The transmission of the infection is usually by respiration, first localization in the nasal cavity or paranasal sinuses and then the brain and brain membranes.

Infection of the meninges can resemble tubercular meningitis.

Sometimes subcutaneous granulomas occur in the disease, mostly in the cervical or pedal regions.

C. neoformans can affect any mammal, but cryptococcosis is more common in cats, dogs, cattle, horses, and humans.

Antifagocytic and immunosuppressive capsule play a role in the virulence of the causative agent.

Cryptococcal lesions resemble macroscopically myxomatous neoplasms. These include capsular slime, yeast cells, some inflammatory cells, histiocytes, epithelioid and giant cells.

Cryptococcus neoformans'ın hayvan türlerinde neden olduğu hastalıklar

Konakçı türleri	Hastalıklar
Köpek ve kediler	Subkutanöz ve nazal granulomlar, merkezi sinir sistemi lezyonları ve körlük
Atlar	Nazal-pasaj granulomları ve nazal akıntı, Daha az sıklıkta akciğerler ve deride lezyonlar
Sığırlar	Meme bezlerinin şiddetli şişmesi ve sertliğinin görüldüğü mastitisler. Süt verimi düşer ve süt mukoid bir yapıdadır. Çok nadir olarak akciğerlere metastaz görülür.
Diğer hayvanlar	Diğer hayvanlarda çok nadir görülür.
İnsanlar	Cryptococcosis ya immunodepresyon veya fazla miktarda etkene maruz kalma sonucu görülür. İnfeksiyonlar çoğunlukla akciğerler ve merkezi sinir sisteminde (cryptococcal meningitis) görülür.

Laboratory Diagnosis

When working with materials that are thought to contain Cryptococcus neoformans, extreme care should be exercised (ideally in a biosafety cabinet), because the agent can cause serious illness in humans.

Cerebrospinal fluid, lesion or exudates, milk from mastitis animal, biopsy specimens and tissues

Microscopy

The preparation can be prepared from cerebrospinal fluid or clean exudates and examined by India ink or nigrosine staining. With these dyes, the capsule can be shown characteristically.

In tissue biopsies taken from the lesions, histological sections can be stained with PAS-hematoxylin stain. With this staining, the yeast cell will be stained instead of the capsule. The capsule will be observed as a blank around the cell.

The yeast wall and capsule are painted red in Mayer's mucicarmine paint, which is decisive for C. neoformans.

Spherical, capsule-surrounded budding cells are visualized by LPCB or nigrosine staining.

culture

C. neoformans grows very well on blood agar and Sabouraud Dextrose agar which does not contain cycloheximide.

Cultures are incubated aerobically at 37C for up to 2 weeks.

Capsular growth can be increased by 37 ° C incubation in chocolate agar in an environment with 5% CO2.

While saprophytic cryptococcus species cannot grow at 37 ° C, C. neoformans can easily grow at incubation temperatures up to 40 ° C.

Colony growth is not seen until approximately 2 weeks of incubation.

Colonies are S-type, moist, shiny, and tend to mucoidize as they age. It is initially white and later forms a yellowish shade. At 25 ° C and 37 ° C, mucoid yeast colonies are formed and they are differentiated from dimorphic fungi by this way of reproduction.

Biochemical tests

b) Melanin production in Niger or birdseed agar: C. neoformans is one of the few Cryptococcus species that uses creatine in media containing diphenolic and polyphenolic compounds and forms a melanin pigmented (brown) colony. The media are planted intensively and incubated aerobically at 37 ° C for at least 1 week. The dark brown pigment occurs first around the breeding colony and then on the entire medium.

c) Biochemical profile: Biochemical profile of the isolate is determined in API 20C and Uni-Yeast-Tek commercial systems for definitive diagnosis.

Mouse inoculation

Mice are inoculated intraperitoneally. If they do not die spontaneously, they are euthanized after 2 weeks and gelatinous lesions are found in the abdominal cavities and lungs.

C. neoformans is the only Cryptococcus species pathogenic to mice.

Immunological tests

Slide latex agglutination test kits have been developed to determine the antigen in serum and serobrospinal fluid.

Indirect FA tests are used for antibody detection. Since antibodies can be combined with the circulating antigen, they may not always be displayed.