

Mycotic diseases

Superficial mycosis (Dermatomycosis or ring worm)

Superficial mycosis have different reaction pattern because of cutaneous habitat of organism than by its intrinsic properties.

Member of the genera

- 1) Trichophytosis
- 2) Ring worm
- 3) Favus
- 4) Tinea
- 5) Dermatophytosis

Causative agent: Trichophyton
epidermophyton
Microsporum

Susceptibility : All species are suscepable

direct, indirect contact, air born infection more contagious than other Fungi
the organisms grow up on or without hair, St. corneum of the epidermis, in the hair follicles or the nails.

Infection does not extend to deeper st of the body

Pathogenesis: Dermatophytes invade keratinized tissue (st. corneum , hair, shaft, nails) produce proteolytic enzymes (keratinase & Lipase) which help penetrate the surface lipid coat.

The fungal products released from keratinocytes (cytokinase) result in epidermal hyperplasia

Hyperkeratosis
Acanthosis
Parakeratosis

Inflammation with abundant amount of fibrin and leucocytes reinit the area of epidermis when fibrin dry it form dry scales and dry crust, the fungus grow in radiating manner with necrosis in the center and inflammation hyperemic zone in the periphery this cause the lesions to circular hence the name ring worm.

Inflammatory accumulate around destroyed follicles (microabscess). The affected area is devoid of hair (Alopecia), become of folliculitis. Healing begin in the center with development of new area in the vicinity of the healed one.

M.C lymphocytosis associated with congestion and leucocytic infiltration of underlying dermis.

By special stain (PAS, Gridley's Fungus stain and Bayer's stain) we can recognize the Fungus as separate hyphae.

folliculitis with microabscess can be observed.

In many cases, separate hyphae or spores are present in (St. corneum & keratin layer of hair follicles)

The organism can be identified in hair or skin scraping treated Na, K hydroxide and examined under microscope using dark field illumination.

- Clucot Metamm silver stain (specific mycotic)
- Stain fungal hyphae & spores → black color
- Tissue → green

Intermediated mycosis

Sporotrichosis

Granulomatous disease caused by *Sporotrichum schenckii*

Susceptible animal: Horses & mules

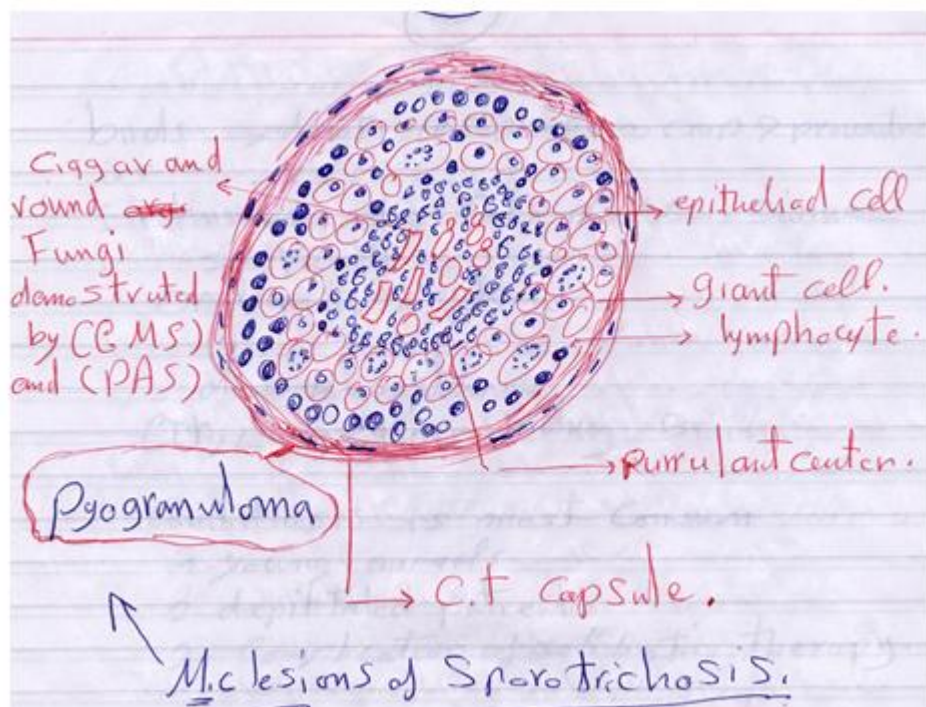
Mode of infection: wound infection (bite wound by rodent) Ingestion and inhalation.

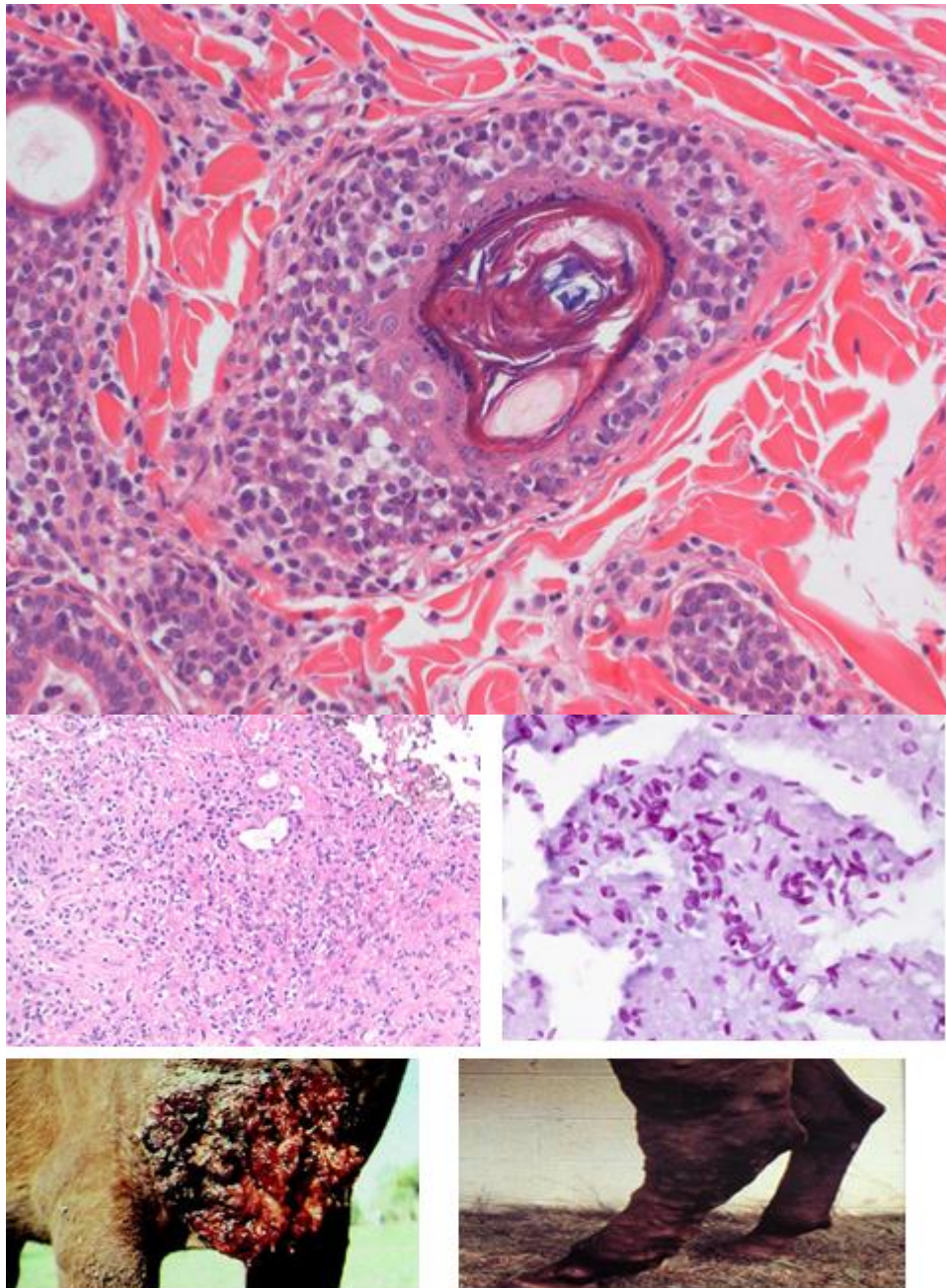
Two form infection limited to S/C and cutaneous lymphatic's over the leg, thorax and abdomen.

Spherical nodules develop a long the course of lymphatic the L.V between nodule are thickened and tortious.

Occasionally nodules: ulcerative (thick creamy pus) heal slowly

Disseminated for lesion extend to other parts of the body, bone, joint, lung, liver, kidney, spleen, internal L.V (more frequently in human, cat and dogs).





Sporotrichosis

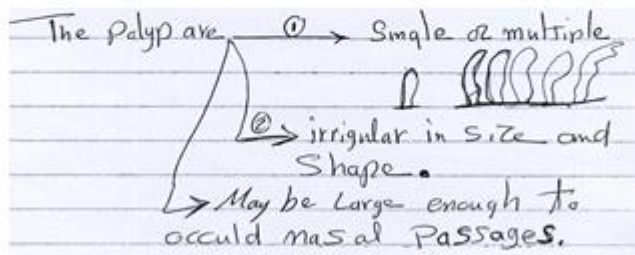
Rhinosporodiosis

Causes: Rhinosporidium seeberi

Characterized by poly granulomatous lesion in the nasal mucosa

Susceptible animal: cattle, horse, mule, dog, cat, goat, duck and geese

The organism invade the sub epithelial stroma less frequently the respiratory trachea or skin. It induce a chronic inflammation leading to polyp formation.

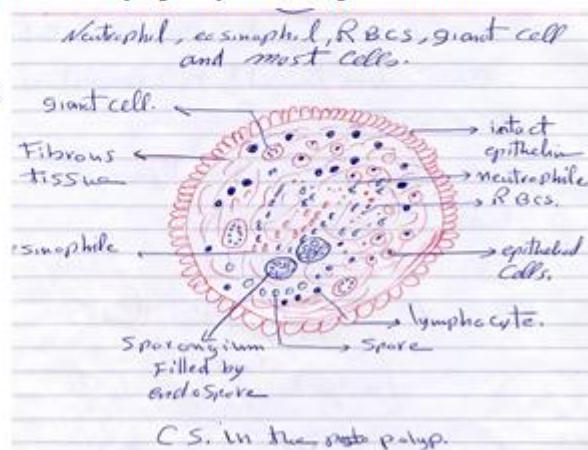


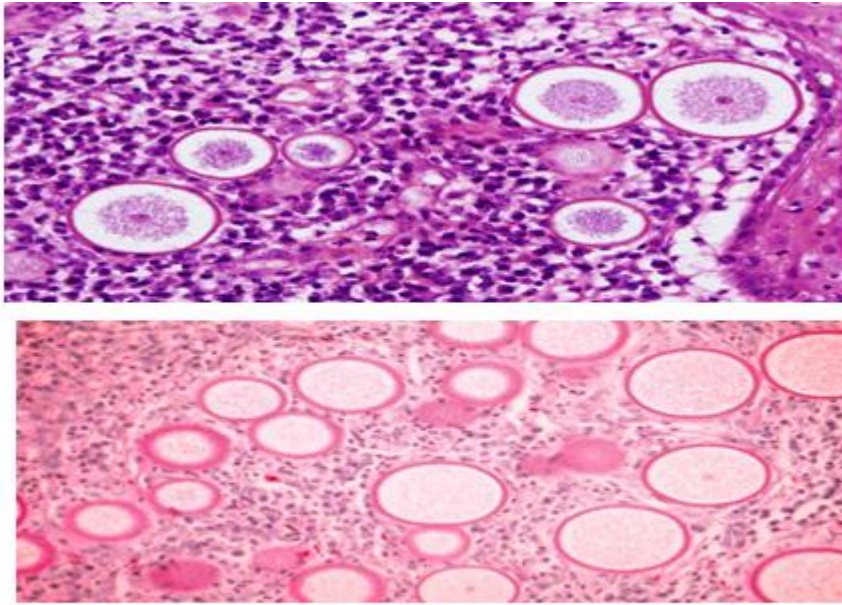
M.C papillomatus epithelium is intact.

The polyp consists of fibrosis or fibromucoid tissue, numerous sporangia or spores are embedded in the stroma.

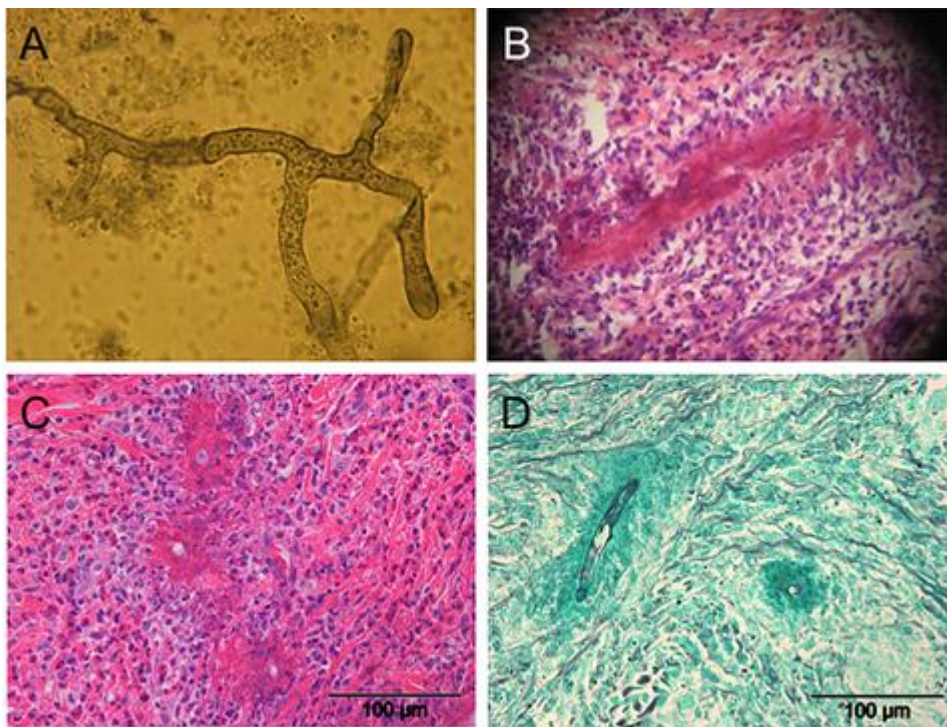
The principal inflammatory cells are lymphocytes and epithelioid cells.

Sporangium evacuation
result in an intense-cellular
reaction.





Rhinosporidiosis



Candidiasis

(Moneliasis, thrush)

Mycotic disease caused by *Candida albicans*

Affecting: digestive system of birds, mm in mammals and cattle.

In cattle abortion & mastitis

In birds mouth, esophagus, crop, pneumonia.

In human, dogs, cat, cattle, swine superficial oral mm & skin

Deep systematic (GIT, lung, liver, kidney, brain)

Candidiasis is most common in

- ☐ Young animals
- ☐ Debilitated patients
- ☐ Complication of antibiotic therapy

Infection fecal contamination of food

Lesions superficial candidiasis, white pseudomembrane overlying skin or mm.

M.C membrane composed of entangled pseudo hyphae, separate hyphae and budding yeast which invade epithelium but not beyond basal cell layer. Leukocytic infiltration (neutrophil, lymphocytes with fibrin) accumulate beneath the epidermis.

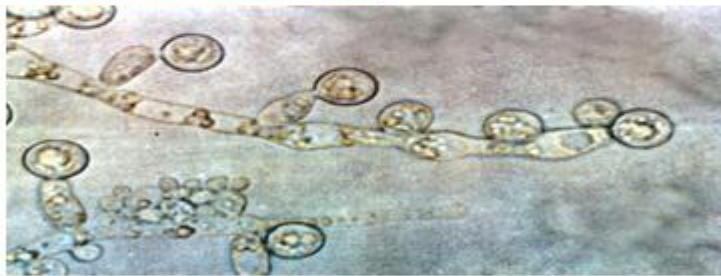
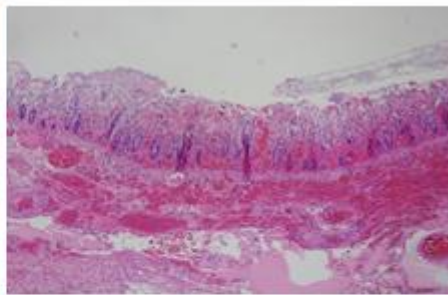
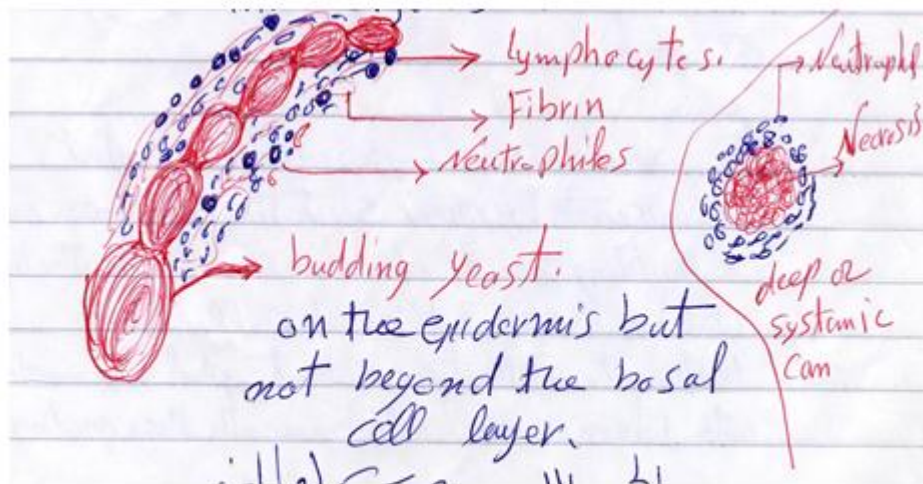
Systemic form

Lesions characterized by necrosis and suppuration, rarely granulomatous.

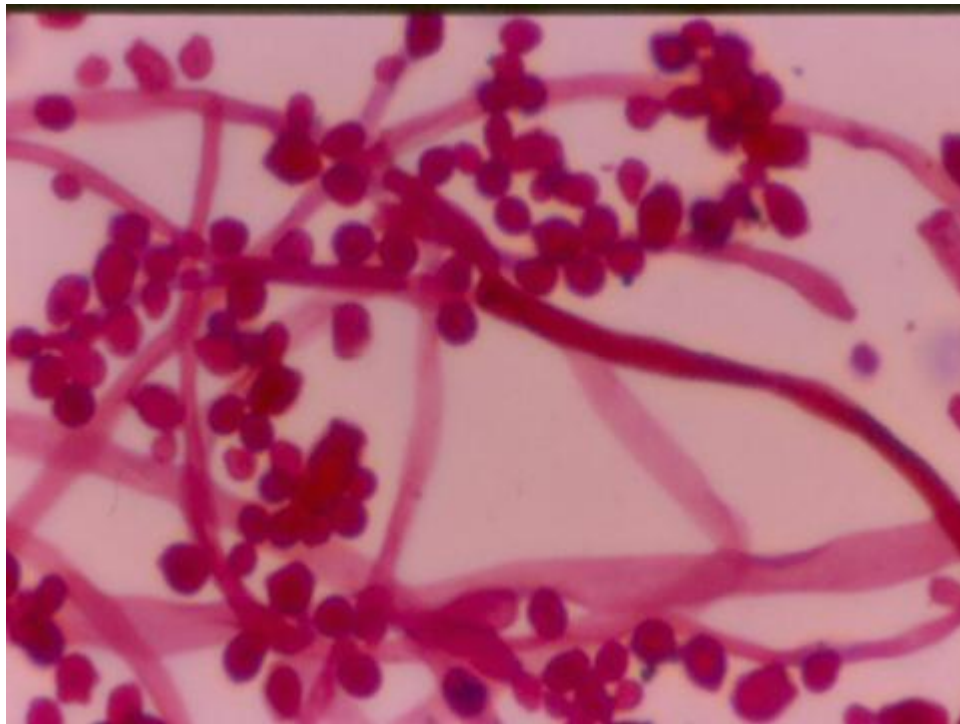
Mastitis patchy or diffuse induration of mammary gland

M.C Necrosis & suppuration, Abortion

Special stain (PAS), Gridley stain. Pseudohyphae or chain of yeast like



Candidiasis



Deep Mycosis

1. Aspergillosis

Disease of respiratory system characterized by granulomatous tissue reaction.

Lesion: in other organs can be also observed

Cause : Aspergillus Fumigatus

Susceptability: most prevalent in avian species, but may occur in mammals (Horses, cat, dog, rabbits, rarely sheep & cattle).

Young chicks- Turkey poult infection from contaminated bedding (broader pn.)

Mode of infection: Through skin, debilitating condition, prolonged antibiotic predispose

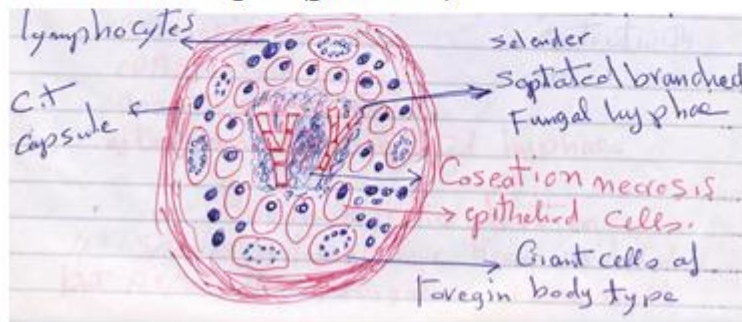
To infection

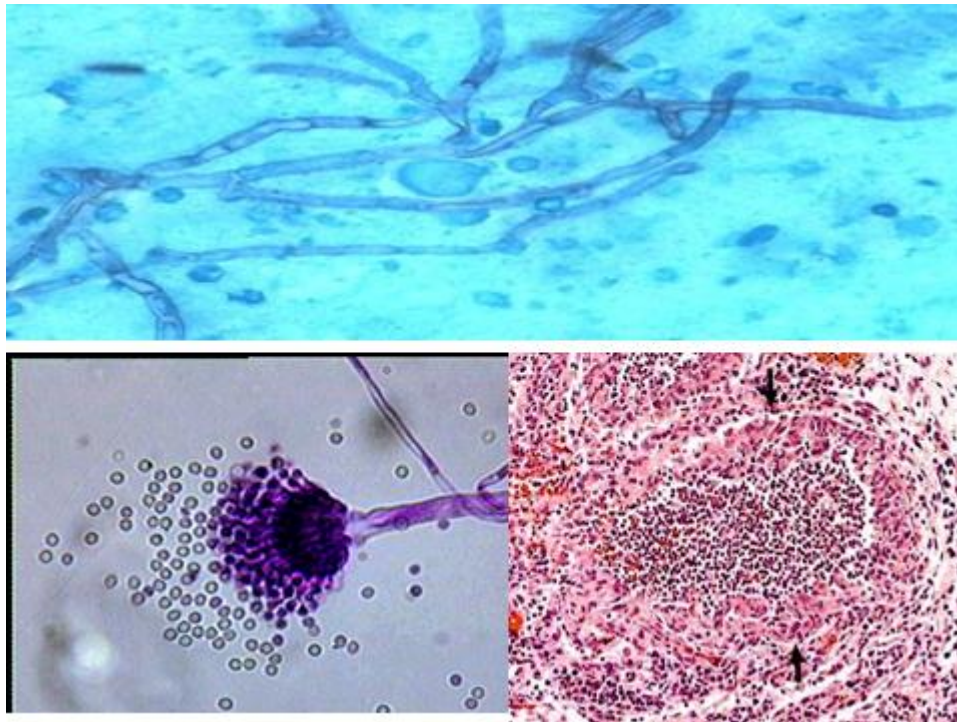
Lesion in birds

1. Diffuse pneumonic form
2. Nodular pulmonary form
3. Diffuse infection of air sacs

In mammals the first two form can occur

Grossly: Diffuse or nodular area of consolidation of the lung
Spherical nodules suggesting tuberculosis occur in the lung, sometimes in other organs (generalized).





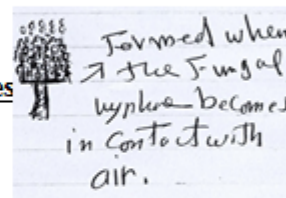
M.C of diffuse pneumonic form bronchi, bronchiole and alveoli are filled with mucous, mycelia, fibrin and leucocytes (epithelial cell and lymphocytes, foreign body giant cells, inflammatory cellular exudate are accumulated in the parenchyma which is penetrated by mycelia of the Fungus.

Chondiophores spores are found in the air passages

☐ Specific stain

☐ Gomori's stain

☐ (PAS) stain are used for identification of the branching septated hyphae.



Bovine mycotic abortion

42 species of Fungi have been isolated but *Aspergillus Fumigatus* is the most frequent pathogen.

Mode of infection via circulation

Not direct through genital tract.

Lesions are observed in placenta of aborted Fetus, enlarged, thickened cotyledon of the maternal placenta which thickened at the margin, necrotic at the center. Intervillous area have a thickened leathery appearance.

M.C

- ☐ Hge, hyperemia, neutrophil and eosinophil cell infiltration.
- ☐ Necrosis tend to separate the maternal and fetal layers of placenta.
- ☐ The Fungus are demonstrated in this zone by (PAS, Gridley's, Bour's) staining techniques.

2. Coccidioidomycosis

Def: Respiratory disease of variety of animals and man. The disease may be in apparent to progressive disseminated and fatal form.

Causes : *Coccidioides immitis*

Route of infection: inhalation of spores from soil.

Susceptability: Cattle, Sheep, Dog, Monkey, Horse and man

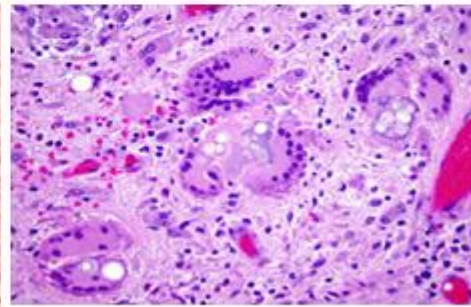
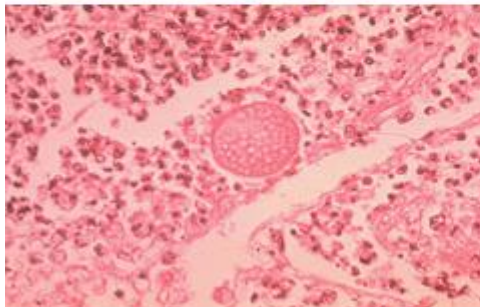
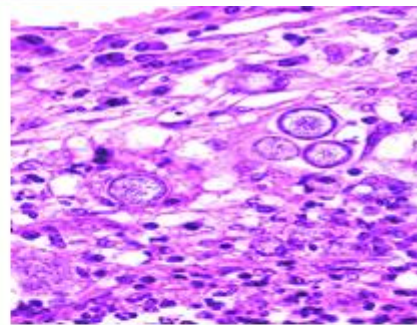
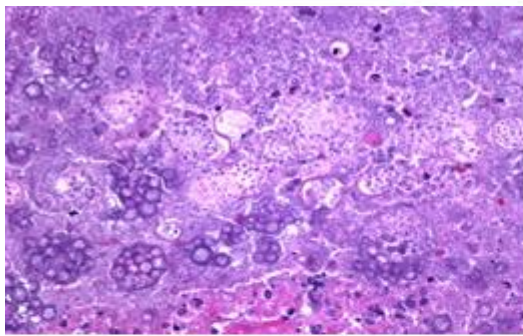
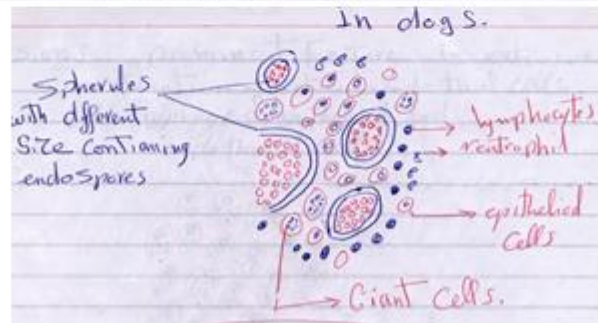
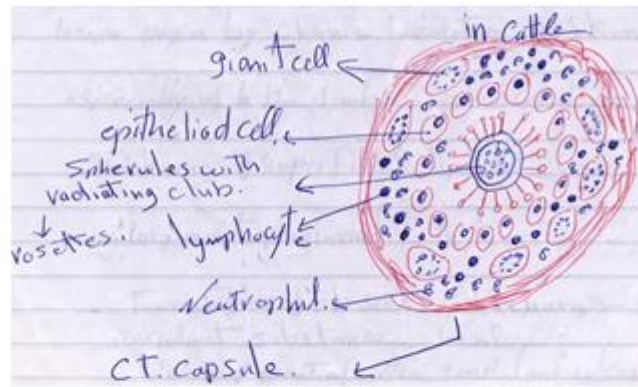
Resemble those of T.B: discrete or confluent granulomas with or without suppuration or calcification.

Nodules are present in lung and bronchial & mediastinal L.N.

Incision of L.N. thick yellow pus.

Disseminated form of the disease are observed in dogs. The nodules are grayish in color and present in different sizes surrounded by C.T capsule.

The organism has tendency to replace normal tissue.



Coccidioidomycosis

3. Histoplasmosis

Pulmonary disease occasionally Fatal disseminated disease in man and animal.

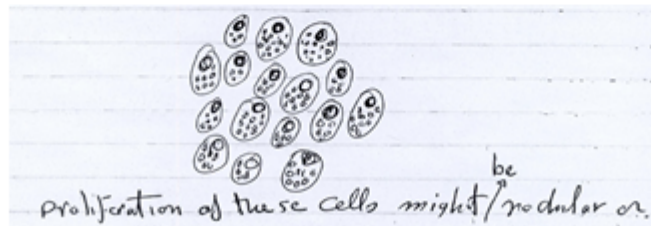
Causes: Histoplasma Capsulatum.

Grow intracellularly as yeast which has affinity for the reticuloendothelial cells

Susceptability: Both mild and disseminated forms occur in variety of animals including (Dogs, Cats, Cattle, Horse and man).

Mode of infection : inhalation spores or mycelial forms.

Lesions: prominent feature is extensive proliferation of reticuloendothelial cells (Macrophages, epithelial and endothelial cells).



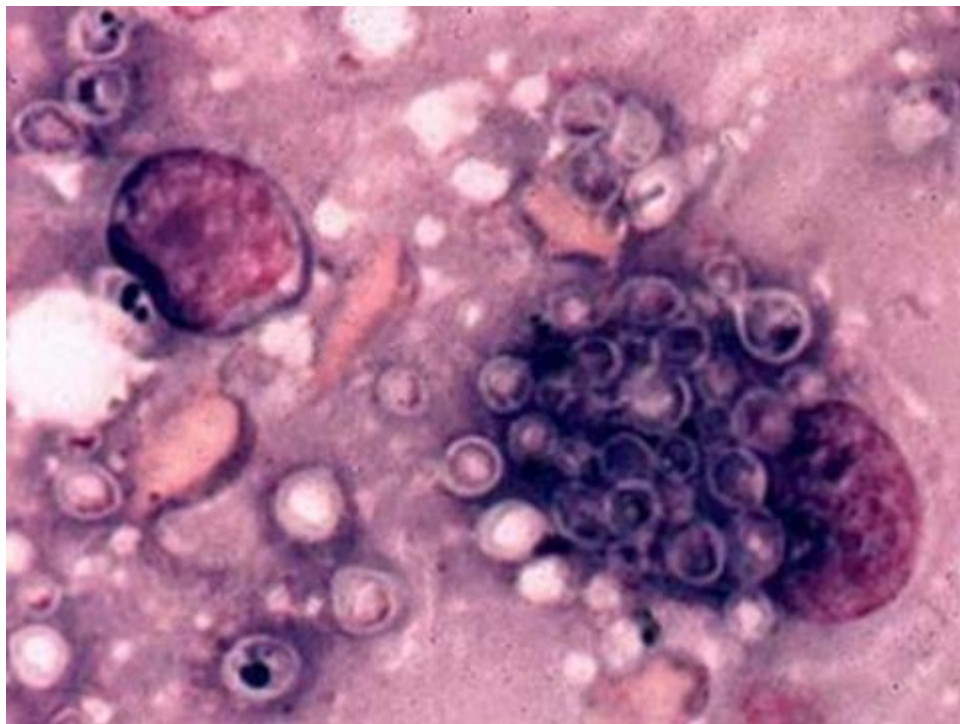
Diffuse the organ to diffusely enlarged light gray in color, proliferation of RBC cause gross enlargement of organ, displacement of normal tissue, interference with tissue function.

The benign form are present in the lung. : capsulated nodules consisted of epithelioid cells and contain the organism , when it become old it changed into fibrocacerus nodule .

In the disseminated form lesions are present in the lung (alveoli & interstitial tissue) may be infiltration with lymphocytes, plasma cells, epithelial (containing the organism. The organism is irregularly egg shaped.

☐ By H&E:

☐ By PAS, Bayer's or Gridley's stain appear as empty red ring.



4. Epizootic lymphangitis (Pseudoglanders)

Disease of skin & superficial lymphatics caused by *Histoplasma Farcinosum*

Fungus dimorphic : Mycelia (room temp.) and Yeast (body temp.)

Through injured skin lesions are in skin, eye and lymph vessels and lymph nodes.

Lesions: begin by chronic induration of skin especially of the limbs

ulceration thickening of superficial lymph VS.

enlargement of regional L.N.

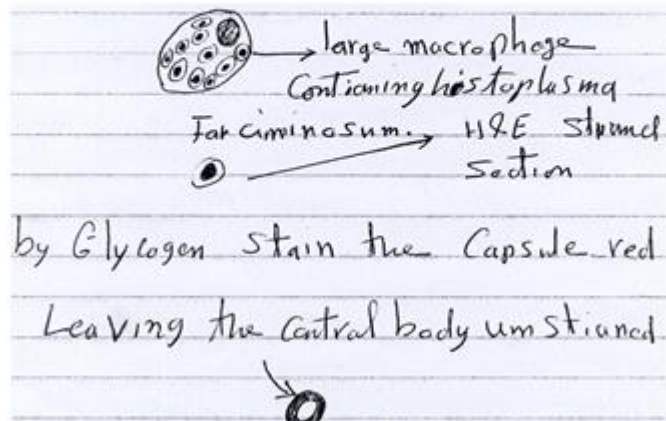
formation of abscess discharge of purulent substance.

Development of new undulant ulcer, the disease rarely become generalized.

M.C

☐ granulomatous tissue reaction

In which macrophages predominate cytoplasm of this large macrophage distended with oval organism which is envelope by thin capsule.



5. Blastomycosis

Granulomatous and suppurative disease of animal and man.

Causes: Dimorphic Fungus

Blastomyces dermatitis

Susceptibility: Man, dog (the most susceptible), Horse and cats.

Mode of infection: inhalation of conidia from colonies of growing mold or sporophytes in the soil or similar substrate.

Spread to other parts of the body from pulmonary focus.

Animal to animal transmission not occur.

Lesions: granulomatous or non granulomatous.

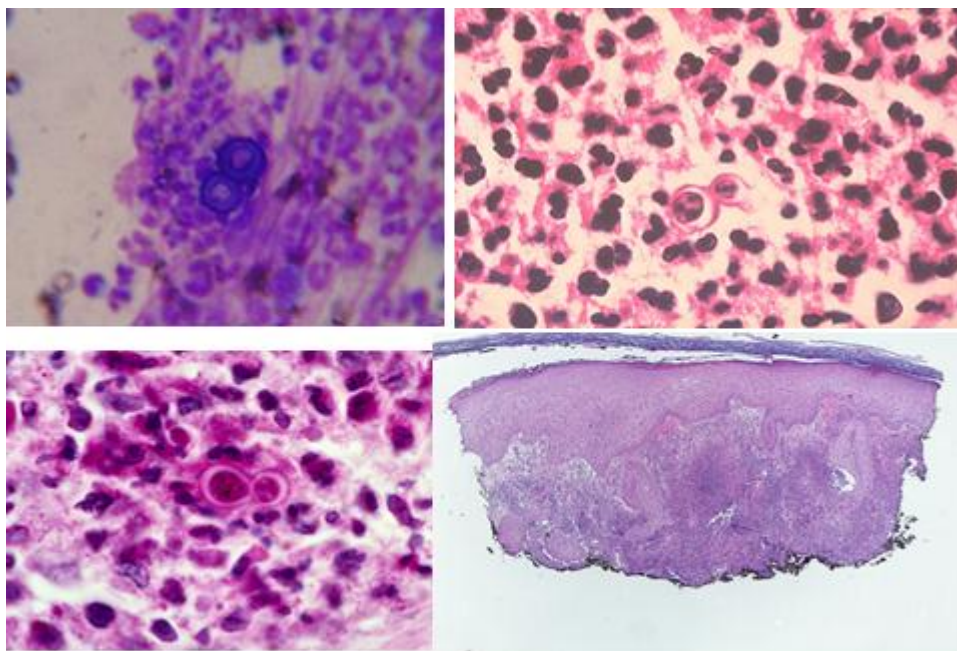
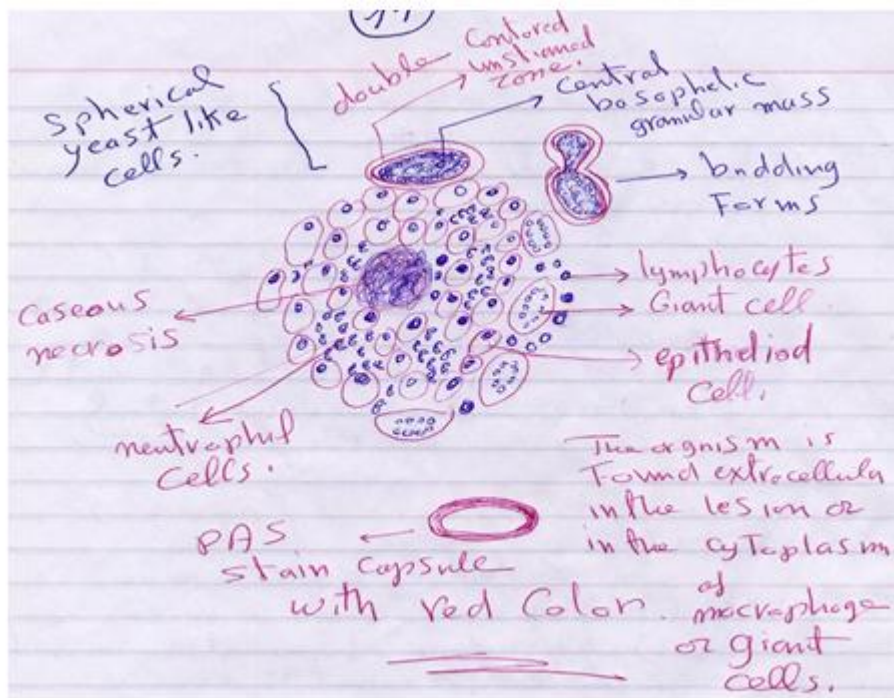
In the skin intraepithelial abscess with epithelial reaction in dermis and subcutis ulceration → slow healing of epidermis pulmonary form

Grossely: multiple grey white nodules of various size. Distributed through the lung or the lesion may appear as diffuse consolidation of one lobe → cut surface teild purulent exudate.

Lesions: are present in the lung but spread to subcutis spleen, kidney L.N, liver, brain, bone, adrenal glands, eye and intestine

The disease must be differentiated

- Histoplasmosis
- Cryptococcosis
- Coccidioidomycosis



Blastomycosis