DISEASE OF LABORATORY ANIMALS

- Tyzzer’s disease
- Pseudotuberculosis
- Salmonellosis
- Lymphocytic choreomeningitis
- Infantile diarrhoea
- Murine hepatitis virus
- Infectious ectromelia of mice.

PSEUDOTUBERCULOSIS :

CAUSATIVE AGENT : *Yersinia pseudotuberculosis*

- The disease is world wide in distribution .
- Mostly seen in rodents and lagomorphs.

LESIONS :

- Acute to chronic lymphadenitis .
- Nodular swelling of the liver is seen during abdominal palpation **(Wood, 1978).**
- Associated with multifocal necrosis of liver and spleen.
- Necrosis of peyer's patches in small intestine and caecum may be found .
- The disease may also involve other organs such as liver and spleen **(Delong and Manning, 1994)**.

Infected rodents shed large number of organism in faeces.

Pseudotuberculosis:-

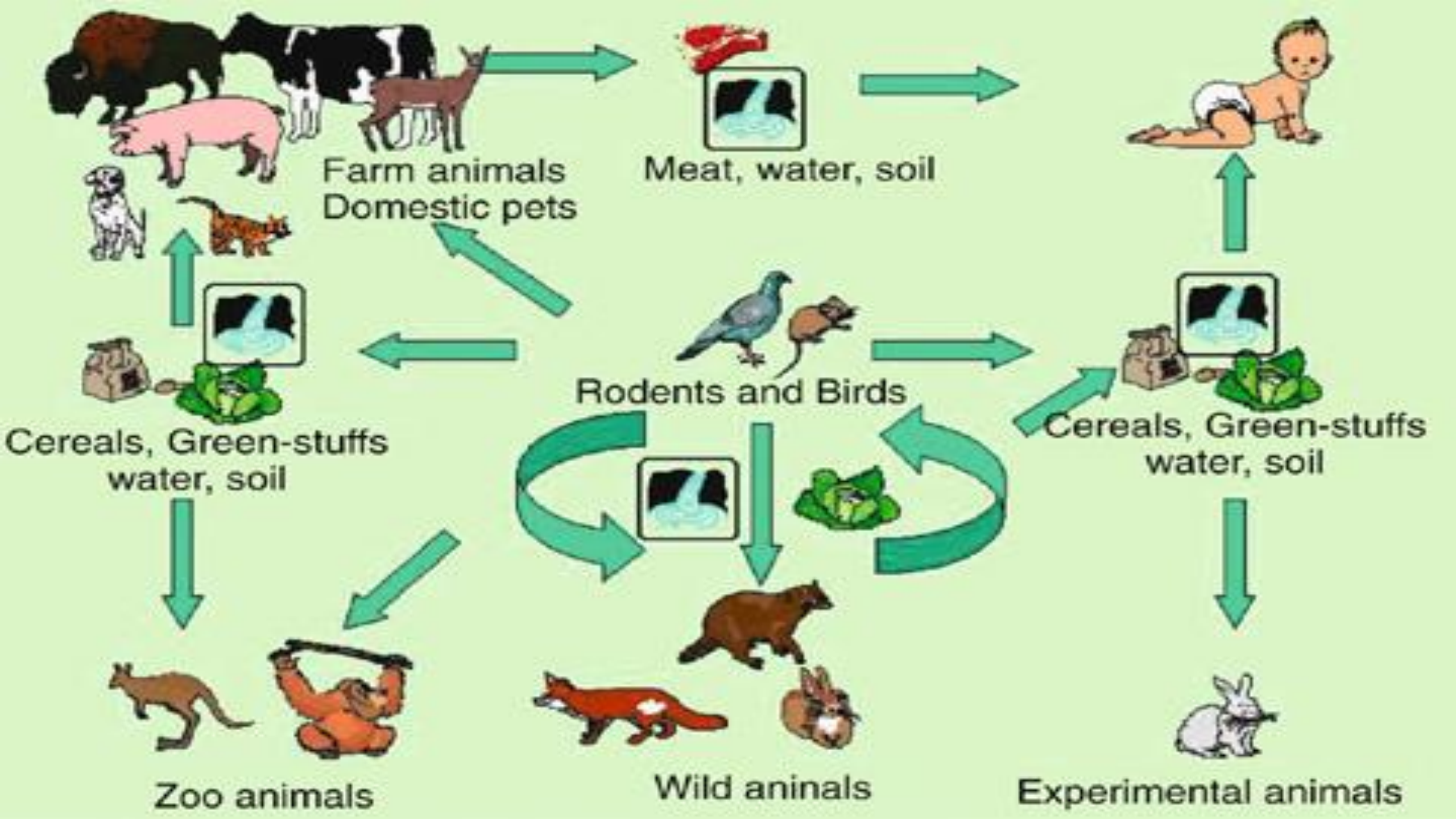
- Etiology:- *Corynebacterium kutscheri* is a gram- positive short rod.
- Incidence:-the incidence of infection is rare.
- Transmission:- by direct contact.
- Clinical sign:- a subclinical infection is the most common form of infection.

Bacteria may be carried in the oral cavity and in cervical lymph nodes without disease in a chronically colonized animal. The rat may exhibit the typical sick rat syndrome: rough hair coat

Hunched posture

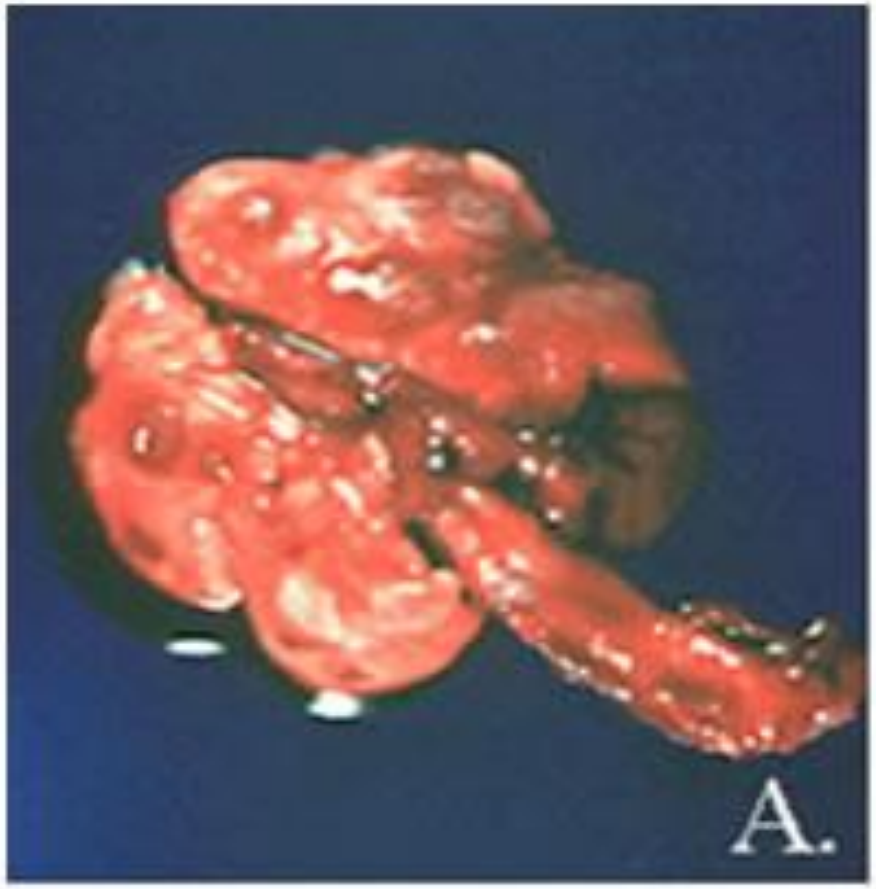
anorexia

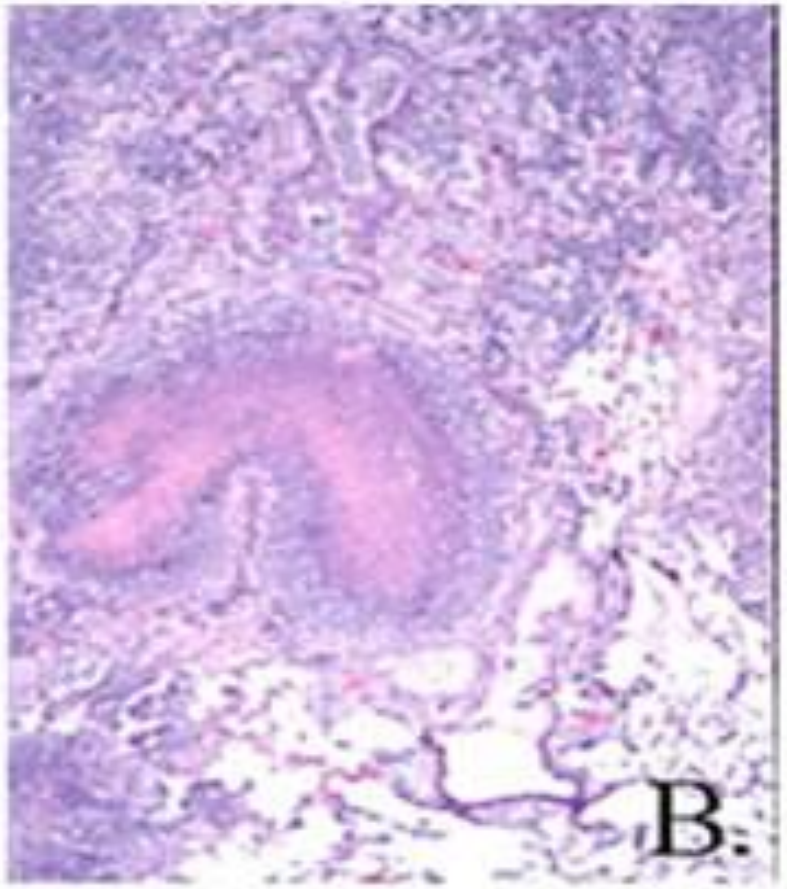
And accompanied by dysponea and occulonasal discharge.

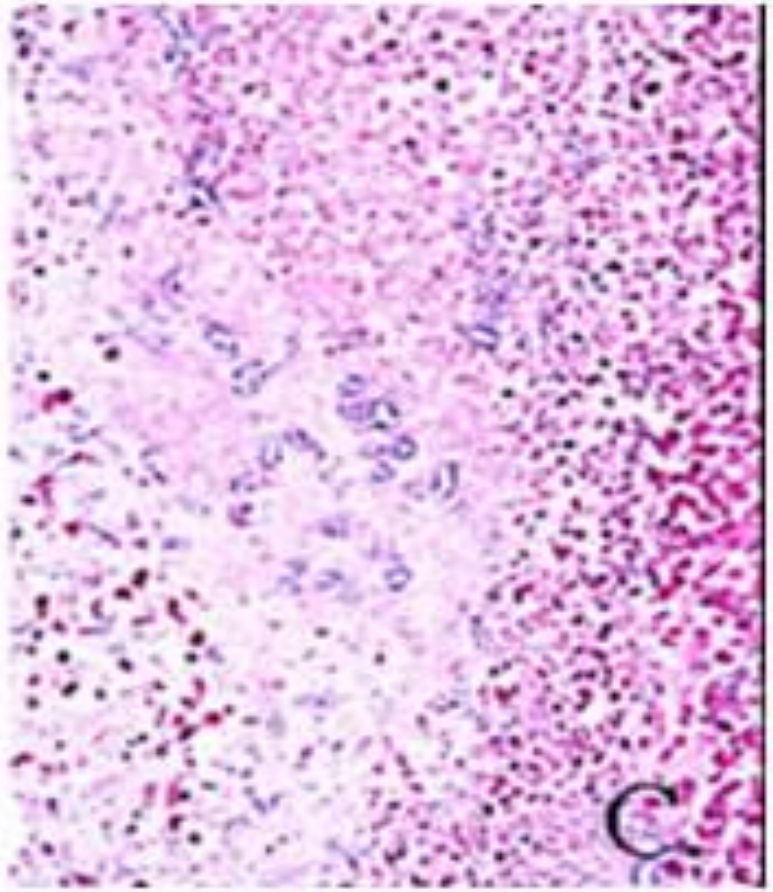

Farm animals
Domestic pets
Meat, water, soil
Cereals, Green-stuffs
water, soil
Rodents and Birds
Cereals, Green-stuffs
water, soil
Zoo animals
Wild aninals
Experimental animals

Pathology:-

- Large white purulent foci in the lungs.
- Purulent foci in the lung parenchyma.
- Gram stained lung sections.







SALMONELLOSIS:

CAUSATIVE AGENT: ***Salmonella limete.***

Sal. Enteritidis

Sal. dublin

It has been reported in rabbits , mice , rat , guinea pig, and hamsters.

Usually enteritis is seen .

Clinical sign:-

- Rough hair coat
- Anorexia
- Emaciation
- Conjuctivitis
- Depression
- Pale and loose faeces
- Splenomegaly
- And death

Necropsy:-

- Changes will be seen mostly in the liver, spleen, and intestinal tract.
- Intestinal tract is often grossly normal, but there may be hyperemia and distension or thickening of the wall accompanied by scant fluid contents rather than normal stool.

Microscopic examination:-

- Multifocal histiocytic granuloma
- Venous thrombosis
- Multifocal necrosis in the liver, spleen, mesenteric lymph nodes, and gut associated lymphatic tissue.
- Gut changes may include edema of lamina propria, leukocytic infiltration, and involvement of the crypt epithelium.

DIAGNOSIS:

- Diagnosis is usually made through direct culture of faeces, intestinal contents, or mesenteric lymph nodes, which may be positive when feces are negative.
- Selenite broth is usually used to detect *Salmonella* .

TYZZER'S DISEASE:

CAUSATIVE AGENT : *Bacillus piliformis.* (pleomorphic sporing organism)

: ***G***ram-negative , obligate intracellular, spore-forming rod.

A contagious disease of laboratory mice characterized by focal necrotic lesions of the liver .

It was first described by Tyzzer (1917).

This has been reported in rabbits , mice , rats , hamsters and guinea pigs.

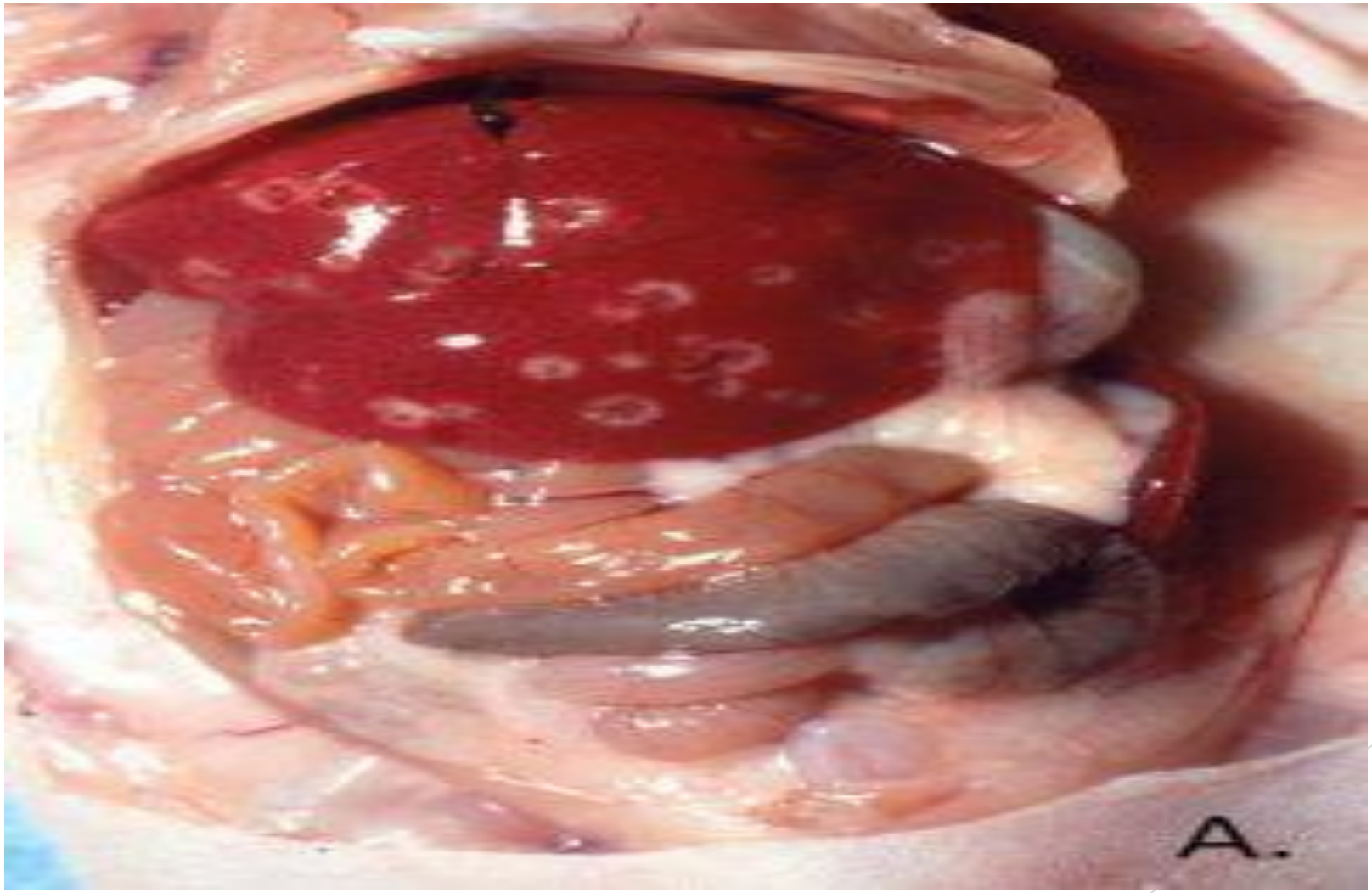
Although many infections are rapidly fatal, subclinical infections are also common.

There is acute enteritis, fluctuations in environment temperatures may predispose this disease.

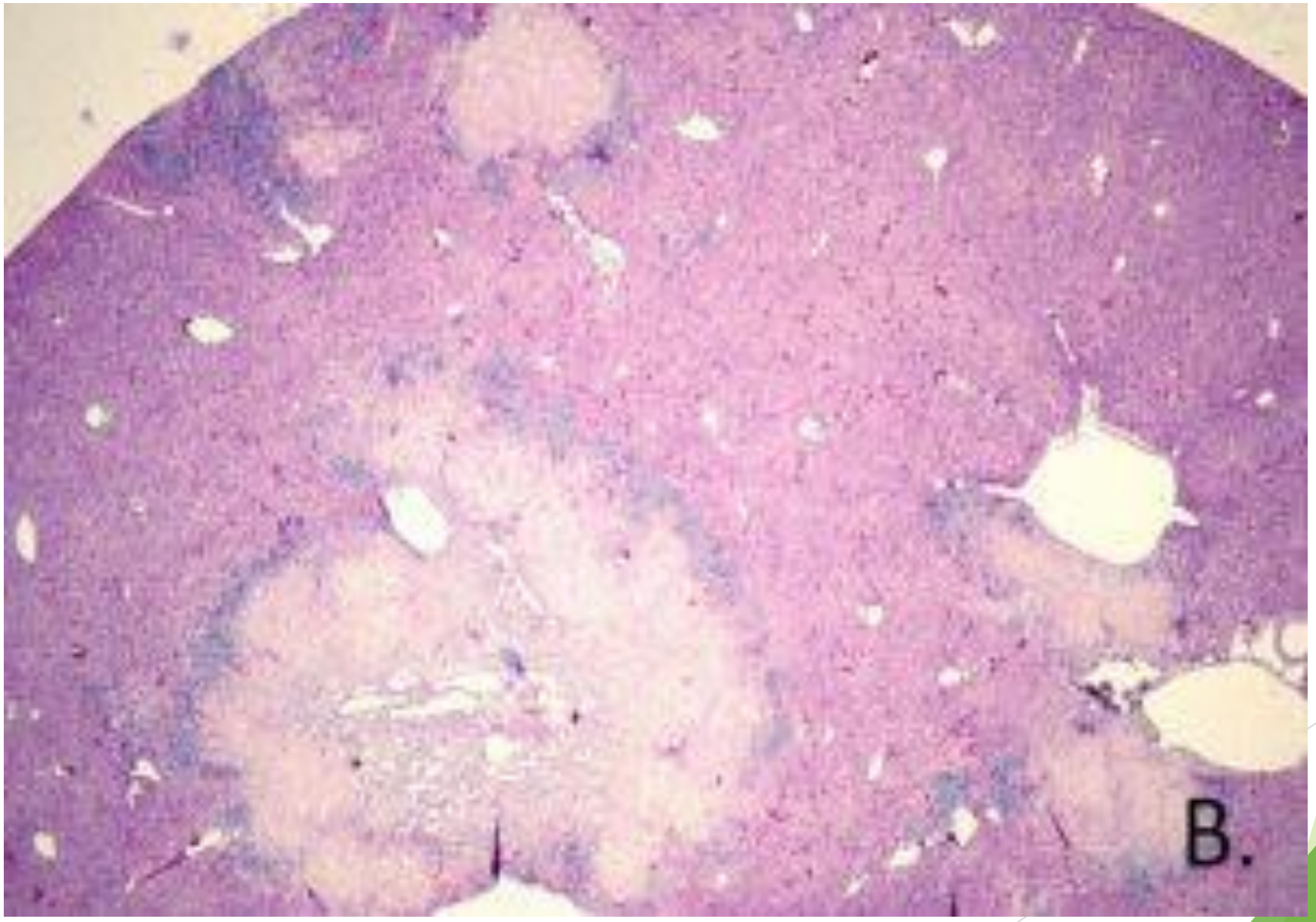
Clinical signs in the disease are listlessness, anorexia, dehydration and death.

Non- descript signs, if any, and a short incubation period make Tyzzer's disease difficult to diagnose and treat before death occurs.

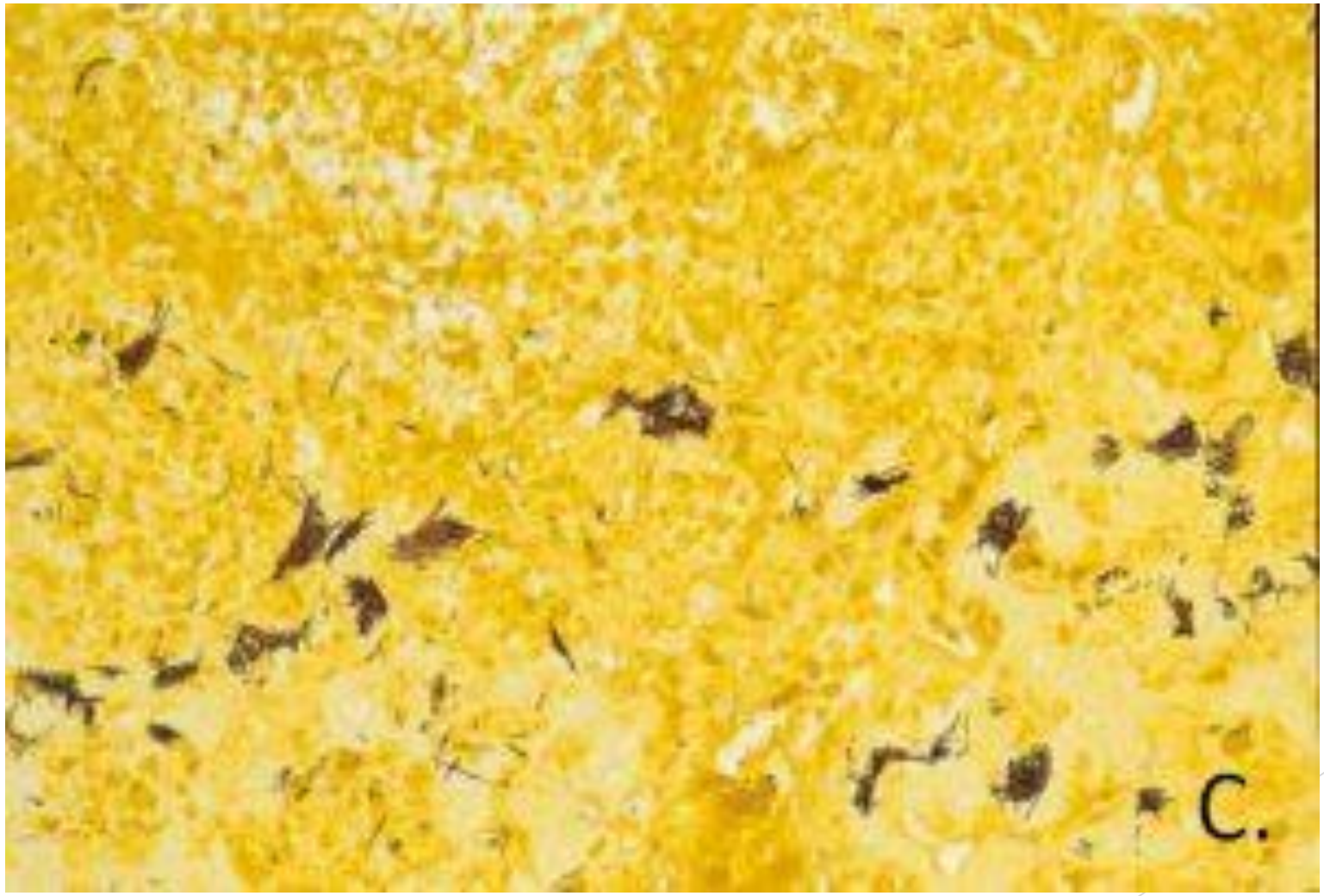
- Clinical sign:- the expression of overt clinical is rare.
- Pathology:- **A.** in weanling or immunodeficient mice, serosal edema and haemorrhage in the ileocecocolic region of the gut and multiple yellowish – white foci of necrosis in the liver are prominent lesions.



- **B.** Coagulative to liquifactive necrosis
- with variable infiltrates of pyogranulomatous inflammatory cells.



- **C.** large clumps of intracellular bacilli in silver staining.
- the bacilli are present within hepatocytes bordering necrotic liver foci and in the cytoplasm of the enterocytes in areas of granulomatous mucosal infiltrates.



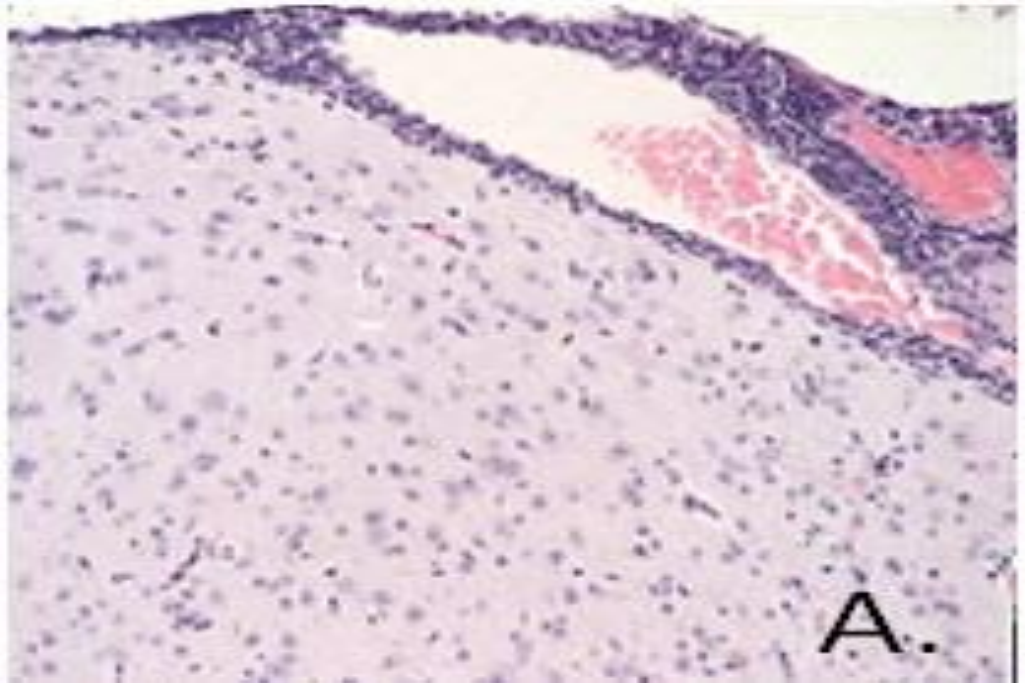
Diagnosis:

- Diagnosis of *C.piliforme* is most commonly made by serology using IFA or MFI.
- PCR of lesions or feces can be used to diagnose infection.
- Silver staining

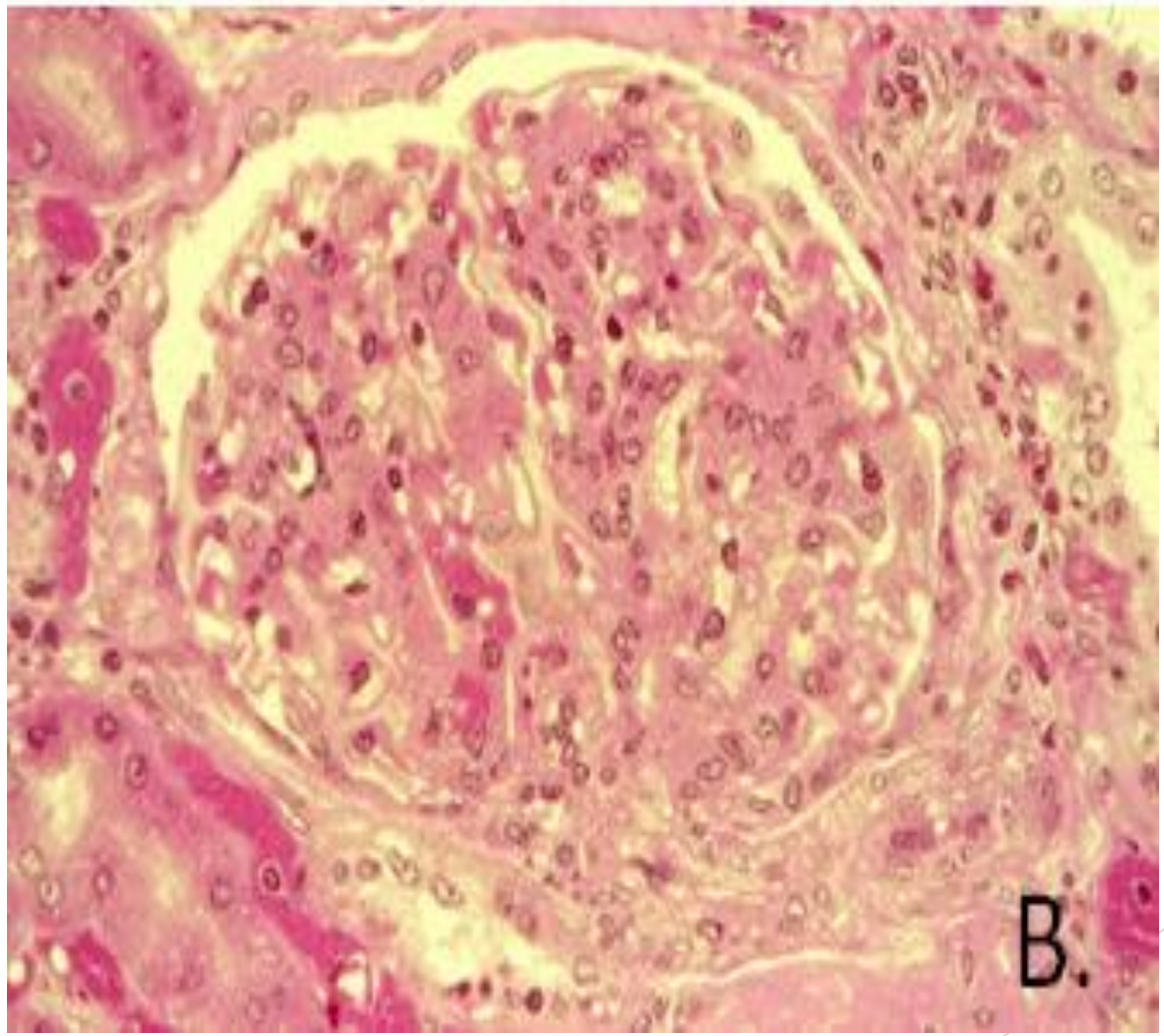
Lymphocytic choriomeningitis : **LCMV is an enveloped RNA virus of the arenavirus group**

- The virus is found naturally in mice, transmitted to logomorphs.
- The virus can cause meningoencephalitis in humans and is transmitted from rodents to logomorphs to human by urine or contaminated food stuffs.
- The disease can easily be diagnosed by twisting the suspected animal by tail, if the animalis LCM positive, a seizure will follow and this is followed by death.
- Inoculation of blood from infected animal into the footpad of healthy mouse will produce a characteristic swelling.
- Control of LCM is based on good hygiene and a control of insect vectors and wild mouse populations.

- Incidence:- Natural reservoir is the wild population.Most reported human cases have been associated with infected pet hamster.
- Transmission occurs via urine and saliva, traumatized skin, conjunctiva, respiratory passages, or congenital contamination.
- Clinical signs are usually not seen. In utero or perinatal infections (within 1 day post- partum) may produce a subclinical persistent infection or a chronic, progressive wasting disease. Signs can include convulsions, decreased growth, and inactivity. Decreased reproduction has been reported in chronically infected females.
- Pathology :- Gross lesions vary. If present, lesions may include splenomegaly, swollen or shrunken, pitted kidneys, lymphadenopathy and hepatomegaly. Microscopic lesions include lymphocytic meningitis
- **A**. chronic glomerulonephropathy



- **B**. widespread vasculitis,
- and marked lymphocytic infiltration of the viscera.



- Diagnosis :-

1. on the basis of histologic observations

2. MFI and IFA tests can be used but are of no any value in endemically infected animals.

3. PCR of hamster tissue or transplantable cells or fluid should be used to diagnose persistent or acute infections.

INFECTIOUS ECTROMELIA OF MICE:

Ectromelia virus (ECTV) is an orthopoxvirus whose natural host is the mouse.

Mouse pox is an acute, systemic, highly lethal disease of remarkable resemblance to small pox,caused by human specific variola virus.

Transmitted by direct contact or by fomites.Although manyroutes of infection are possible experimentally, exposure to the virus via cutaneous trauma is the natural route of infection.

Cage to cage transmission in mousepox infection is primarily through handling of infected mice.

CLINICAL SIGNS AND LESIONS:

The clinical signs and lesions associated with mousepox depend on the strain of mouse infected.

In susceptible strain , there may be 80-90% mortality.This mortality may occur with no other clinical signs, and animal often die before they shed virus.

Susceptible mice exhibit an acute hepatocellular necrosis, as well as necrosis of the spleen, peyer’s patches, thymus, and lymph nodes.

Hepatocellular necrosis may be seen as white spots on the liver.

Intermediate susceptibility strain may show the signs like ruffled fur, hunched posture, facial edema, swelling on the limbs, conjunctivitis,cutaneous pustules, ulceration of the muzzle, limbs, ears, and tail, and the lesions that gives the virus its name, ectromelia, or partial amputation of the limbs and tail.

DIAGNOSIS:

On the basis clinical signs or there is unexplained widespread mortality in susceptible strains.

Serological diagnosis through ELISA or IFA is possible; if animal recover they produce protective antibodies.

Lesions strongly suggestive of mousepox are noted on necropsy, including splenic fibrosis in recovered animals and liver , spleen, and skin lesions in ill animals.

Histologically intracytoplasmic inclusion bodies are seen in skin lesions.

PCR of the skin lesions can be used for confirmation.

PREVENTION AND TREATMENT:

Regular testing of colonies for antibodies should be part of routine health monitoring.

All murine-derived biological products such as tumors, serum, or celllines, should be tested for the presence of viral contaminants before being used in mouse facilities or the laboratory.

Vaccination with attenuated vaccinia virus is possible to preserve valuable strains.

MURINE HEPATITIS VIRUS:

Most Murine hepatitis virus strains , as their name suggests, infect the liver. However , several murine strains are tropic for the central nervous system and cause encephalitis with subsequent CNS demyelination.

ETIOLOGY: Murine corona virus (it is an enveloped, positive sense, single stranded RNA virus).

It enters its host cell by binding to the CEACAM1 receptor.

Strains are Mouse hepatitis virus(MHV),aka murine hepatitis virus

Puffinosis corona virus.

Rat corona virus.

FREQUENCY: common in both wild and laboratory mice.

TRANSMISSION: MHV may be transmitted through aerosols, fomites, and direct contact. The virus is highly contagious, although not persistent in the environment.MHV may also contaminate cell cultures, and transplantable tumors.

CLINICAL SIGN AND LESIONS: in general, MHV infection in immunocompetent mice is asymptomatic. Expression of the disease depends on the age, genotype,sanitary status, and experimental status of the mouse and the tropism and virulence of the infecting strain of the virus.

MHV has two types of tropism in the initial infection- 1. Respiratory- troic strains(uncommon)- the classical lesion in disseminated respiratory MHV is white foci found on the liver.Histopathologic examination reveals the presence of focal necrotizing hepatitis with syncytial cells.these lesions may be found in lymphoid organs as well.

2. Enterotropic strain (most common)- these have a primary tropism for the intestine. Enterotropic strains tend to spresd quickly from mouse to mouse , as the high level excretion in feces will result in significant environmental contamination.

With either viral tropism , disease is more severe in immunodeficient mice.Polytropic strains of MHV cause severe disease in immunodeficient mice , as the ability of the virus to replicate in many tissue leads to necrosis and syncytial cell formation in the liver, spleen, lymph nodes, and bone marrow. If animals are infected as neonates , similar lesions may also be seen in the brain.

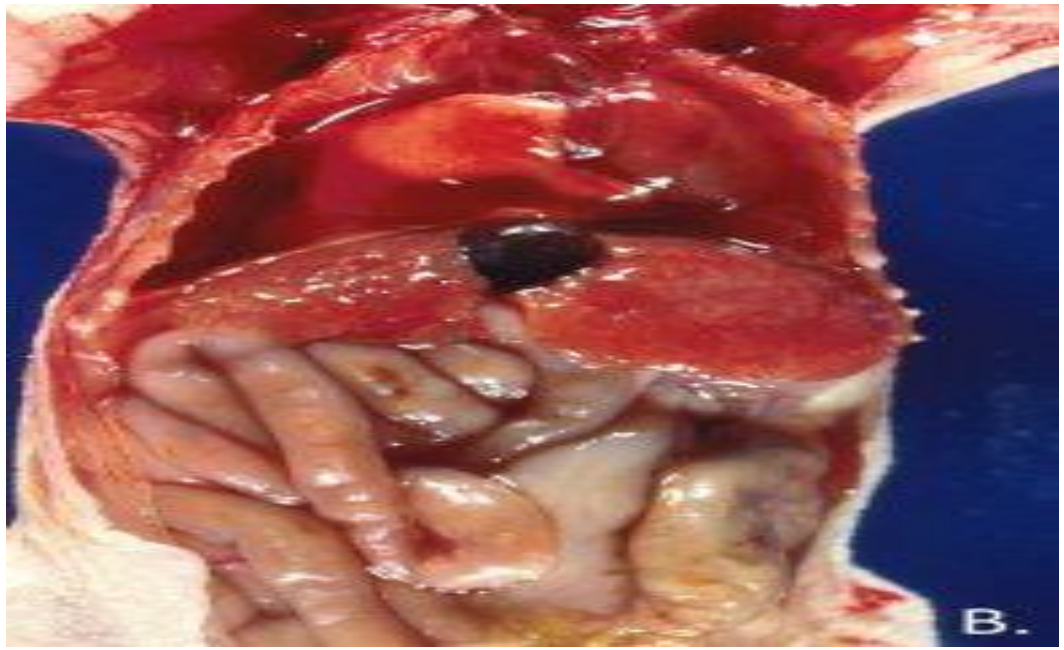
Pathology:-

- Grossly, lesions of MHV infection in immunocompetent mice occur infrequently. Lesions when present, may include

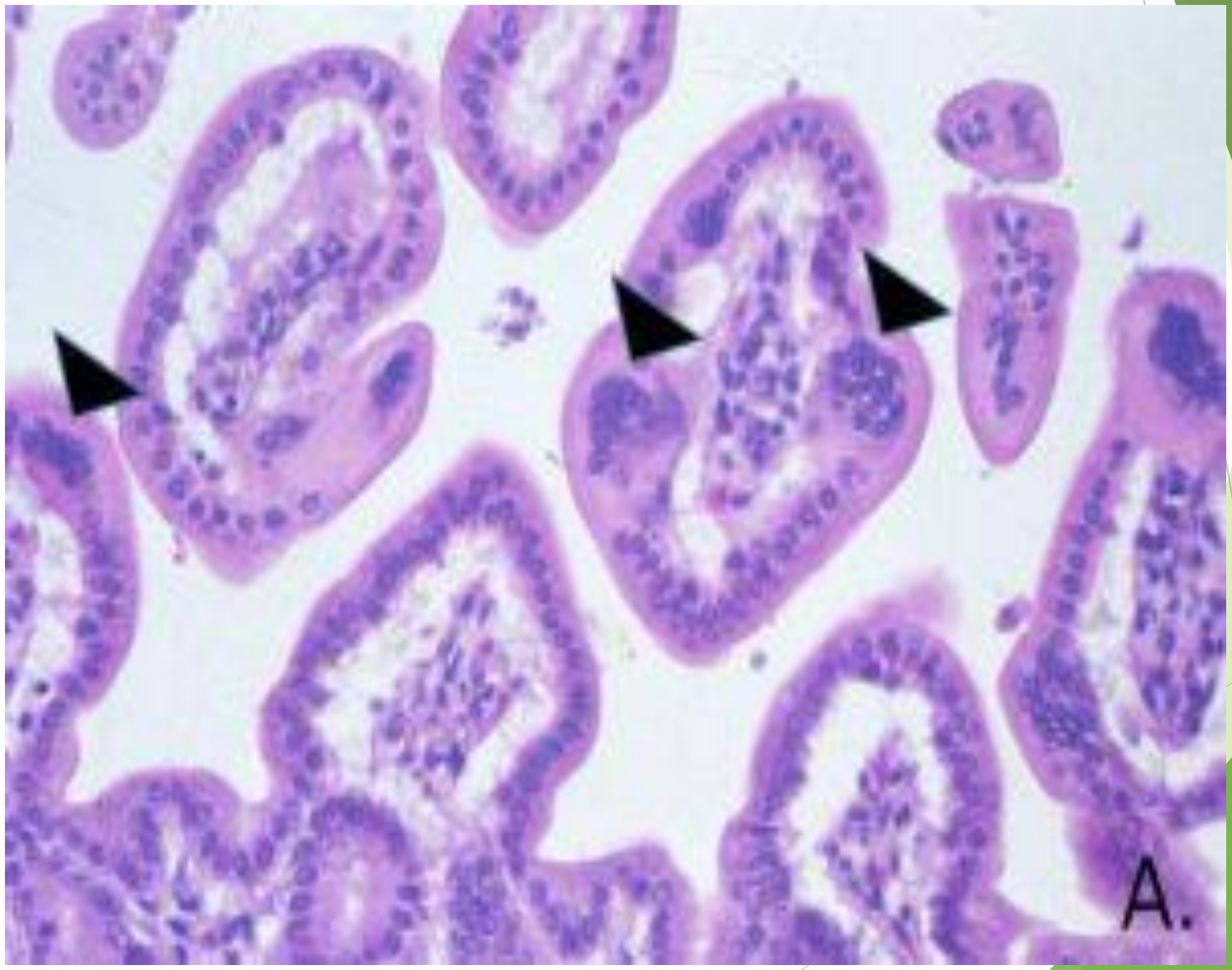
  gaseous distension of the intestinal tract in suckling mice

  multiple white liver foci in older mice

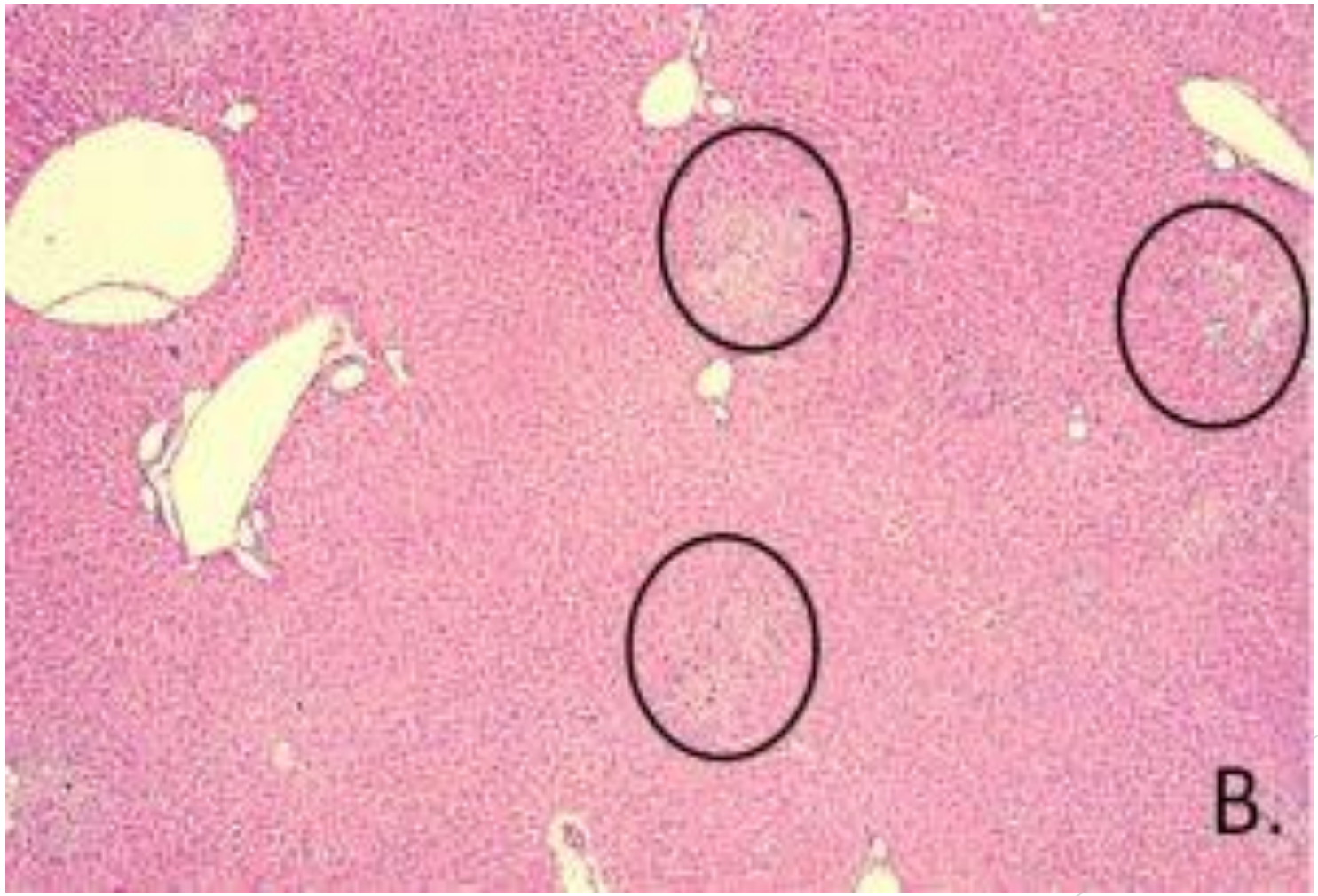
  the liver may have a hobnail, nodular appearance.



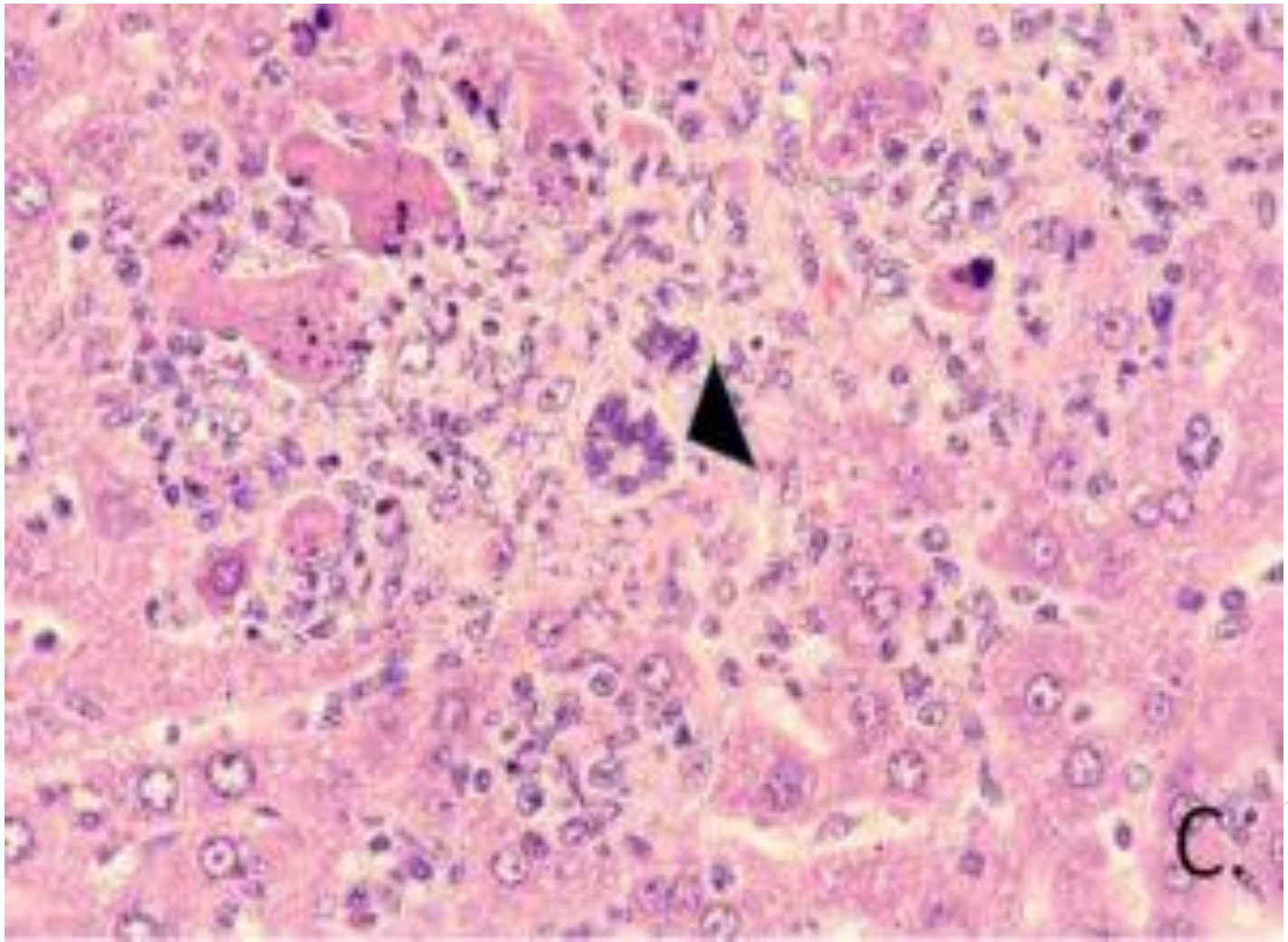
Histopathologic examination of the intestinal tract reveals transient syncytia of the mucosal epithelial cells in mice infected with enterotropic virus strains.



Focal coagulativeliver necrosis can be seen in mice infected with polytropic virus strains.



Hepatocellular syncytia are rarely present around necrotic foci in immunocompetent mice



In immunodeficient mice, intestinal epithelial cells, hepatocytes and vascular endothelial cells undergo syncytial cell formation, necrosis, and replacement with scarring in certain organs,especially liver.

DIAGNOSIS:- Serology of immunocompetent mice is most useful diagnostic test for screening mouse colonies.

PCR can be used ti identify virus in feces.

Histopathologic examination of target tissue may be helpful in identification of infection in immunodeficient mice.

Immunodeficient mice progressively lose weight and die.

Mouse rotavirus(epizootic diarrhea of infant mice or EDIM):-

- Diarrhea in young laboratory mice is often caused by mouse rotavirus, also called epizootic diarrhoea of infant mice(EDIM).
- This virus is highly contagious.
- Transmitted through contaminated bedding, airborne dust, and through contact with infected mice.
- The virus sheds in feces for about 10 days post-infection.
- Animals are most susceptible between 0 to 14 days of age.

Clinical sign:-

- Signs are generally limited to mice under the age of 14 days and that will be-

1. watery, mustard-colored stools
2. animal will be lethargic
3. distended abdomen
4. rectal impaction may occur at 12 to 16 days of age
5. death in these animals is associated with rectal impaction.

Diagnosis :-

- Based on serology, via ELISA or IFA or both.
- By observing typical lesions in clinically ill animals.