



Infectious Diseases of the Reproductive Tract





Brucellosis

- **Etiology**

- *Brucella abortus* (cattle, sheep, and goats), *Brucella melitensis* (sheep and goats), *Brucella ovis* (sheep)
- Brucellosis is characterized by bacteremia

- **Clinical signs**

- Abortion is the primary complaint and usually takes place in the second half of pregnancy
 - After the 5th
- Retained placentas and mastitis are other clinical signs of brucellosis
- Infection of testes and accessory sex glands can be seen in males
 - Orchitis and epididymitis

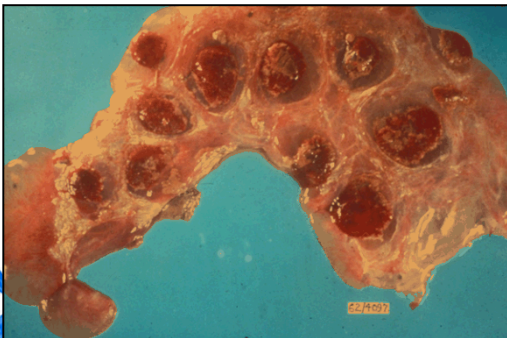




Brucellosis

- **Diagnosis**

- Gross pathological diagnosis is difficult because the fetus is typically autolyzed
 - **Primary features of brucellosis abortion are placentitis**
 - **Cotyledons are necrotic and intercotyledonary placenta is thick and opaque with yellow exudate**
- Confirmatory diagnosis requires isolation of the organism from the fetus, placenta, or maternal uterine or mammary secretions using culture or PCR
- Milk, uterine fluid, and fetal tissue should be submitted for testing
 - **The milk and uterine fluid can be collected in a clean tube or syringe**
 - **Sections of fetal lung or placenta should be collected and kept cool during transit**





Brucellosis

- **Diagnosis – serology**
 - Serological diagnosis is not used for international trade purposes
 - Use serology only for national and local epidemiology and control studies
 - Serology produces false positives when an animal has been vaccinated and false-negatives are seen just after parturition or in pregnant cattle
- **Pathophysiology**
 - Brucella causes a bacteremia that leads to the spread of the organism to lymph nodes, mammary gland, and the uterus
 - Infection is long-term because it is an intracellular pathogen
- **Epidemiology**
 - Infection occurs by ingestion and is not easily transmitted between animals
 - Care should be taken when handling infected materials as brucellosis is a zoonotic disease



Brucellosis

- **Treatment**

- Antibiotic treatment can reduce shedding but is usually ineffective
 - **Oxytetracycline and streptomycin**
- Culling and vaccination are the most effective means of eradication

- **Prevention**

- Vaccination
 - **RB51 or Strain 19 in cattle or Rev 1 strain for sheep and goats**
 - RB51 and Rev1 are attenuated strains and less likely to cause disease in humans and animals
 - Strain 19 is attenuated but still resulted in animal and human infections
 - ***If vaccination is employed, an animal marking system should be initiated – very important of vaccinated animals could test positive if serology is used***
- Removal of all animals suspected of infection





Brucellosis

- **Public health**

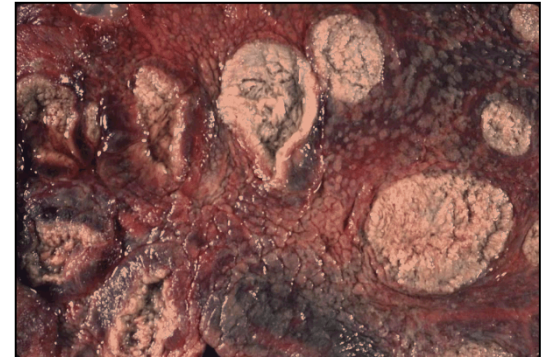
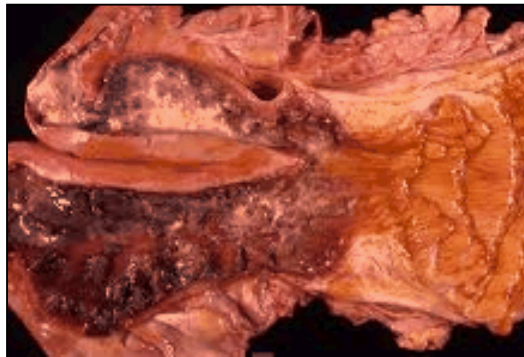
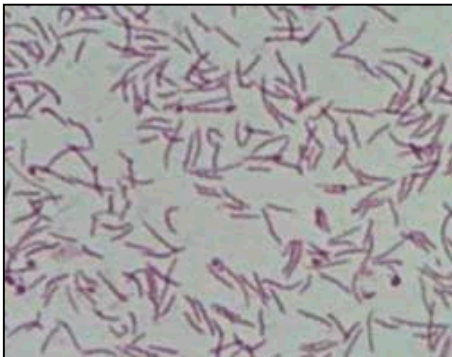
- Brucellosis is a zoonotic disease that can be transmitted to humans via contamination with:
 - **Blood of an infected animal**
 - **Milk of an infected animal - boil or pasteurize milk from potentially infected animals**
 - **Fetal and maternal fluids – wear gloves when handling an aborted fetus**
 - **Placenta – the placenta is usually very contaminated with the organism**





Campylobacteriosis-Vibriosis

- **Etiology**
 - *Campylobacter fetus venerealis* (cattle) or *C. fetus fetus* (sheep,goats,cattle)
 - The disease is transmitted during breeding
- ***C. fetus venerealis* causes endometritis**
- ***C. fetus fetus* causes placentitis**





Campylobacteriosis

- **Clinical Signs**

- Infertility
 - **Animals pregnant late in the breeding season or not pregnant after cycling during the breeding season**
- Abortion occurring at 4-8 months of gestation
- Early embryonic death, typically prior to pregnancy diagnosis
- Stillbirths and/or premature lambs born as result of infection
- Vaginal discharge
- General signs of infection
 - **Fever**
 - **Diarrhea**
 - **Depression**
 - **Animals can be systemically normal**





Campylobacteriosis

- **Epidemiology**

- Infection occurs during breeding and can be transmitted from male to female or female to male
- Ingestion of the organism can occur when cows ingest the infected fetal membranes or placenta
- Contaminated instruments or bedding can spread the organism
- Semen used for artificial insemination can be contaminated and infected susceptible cows
- Organism is very labile and is destroyed quickly by heating, drying, and exposure to the atmosphere
- Recovered animals can become carriers for up to 2 years or clear infection completely

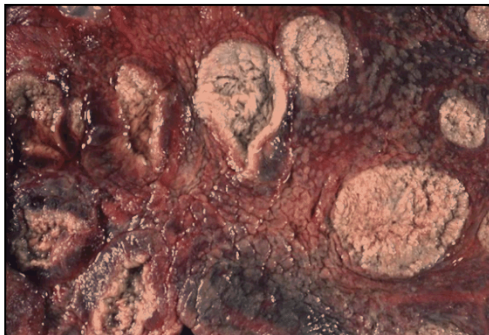




Campylobacteriosis

- **Diagnosis**

- Isolation and culture
 - **Samples of fetal tissues, placenta, cervical mucus, or swabs of the external genitalia of the infected male can be used to isolate the organism**
- Microscopy can also be used in combination with clinical signs
 - **Samples obtained from fetal tissue, placenta, cervical mucus, or swabs of the external genitalia of males**
- Pathological and histological examination
 - **Necrosis of placenta**
 - **Infections of the joints of the fetus**
 - **Liver necrosis in the fetus**





Campylobacteriosis

- **Treatment**

- Infected usually recover and clear organism within five months
 - Recovered animals are resistant to reinfection
 - Some of those infected become chronic carriers
 - Vaccination of infected animals can hasten elimination of organism
 - Administration of intrauterine or penile infusions of streptomycin and penicillin can help hasten recovery

- **Control**

- Vaccination one month before breeding season starts
 - Revaccination halfway through breeding season due to slow antibody response





Chlamydiosis

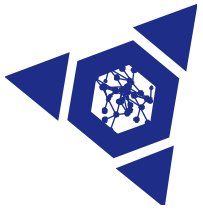
- **Etiology**

- A reproductive disease of sheep and goats that is caused by *Chlamydia psittaci*

- **Clinical signs**

- Abortion in the 4th or 5th month of gestation is the most common clinical sign
- Stillbirths occur with chlamydiosis
- Bloody vaginal discharge before and after birth may be seen
- Does may have retained placentas
- Infected animals seldom show signs of infection other than abortion
- Others in the flock may show signs of arthritis or pneumonia

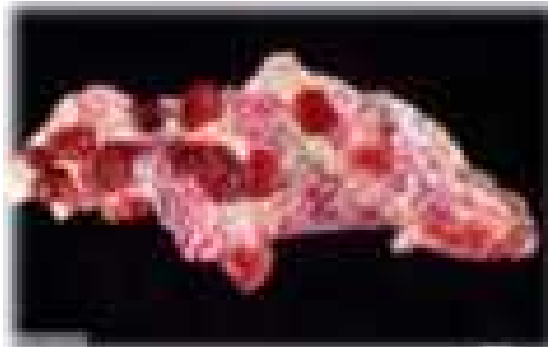




Chlamydiosis

- **Diagnosis**

- Diagnosis is based on the presence of atypical placental lesions and identification of the organism
 - **Necrosis of the cotyledons with thickening of the intercotyledonary placenta**
 - **The organism can be identified by collecting an impression smear and staining**
 - **The organism can also be identified using immunological staining of tissue**





Chlamydiosis

- **Epidemiology**

- The organism is usually acquired by ingestion
- The organism normally resides in intestinal tract and can be shed from the reproductive tract of infected animals before and after birth
- Animals ingest organisms from feces, vaginal discharges, or fetal membranes of infected

- **Treatment**

- Consists of segregation of infected and animals that have aborted
- All fetal membranes should be removed from the area
- Antibiotics can reduce the number of abortions in sheep during an outbreak
 - **Oxytetracycline 20 mg/kg twice weekly until the last month of gestation reduces the number of abortions and stillbirths in sheep**
 - **Post exposure or recovery can protect against abortions for 3 years**
- No vaccine available for protective immunity





Chlamydiosis

- **Public health**
 - Can cause abortions and flu like symptoms in humans
 - Limit contact of pregnant women with animals or contact with pregnant women during outbreak





Q Fever

- **Etiology**

- *Coxiella burnetti* (Rickettsia bacteria)
- Rickettsial organism that can cause abortions in sheep, goats, and cattle
- Many ruminants carry the organism in their gastrointestinal tract
- The organism can infect humans and is a public health concern

- **Clinical signs**

- Many infections are asymptomatic
- Late term abortions, stillbirths, retained placenta, endometritis, infertility and small or weak offspring can be seen in sheep, goats and cattle

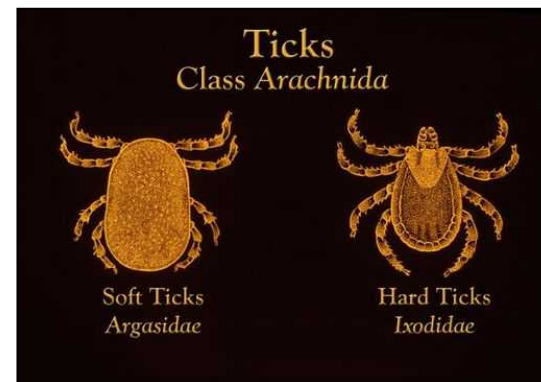
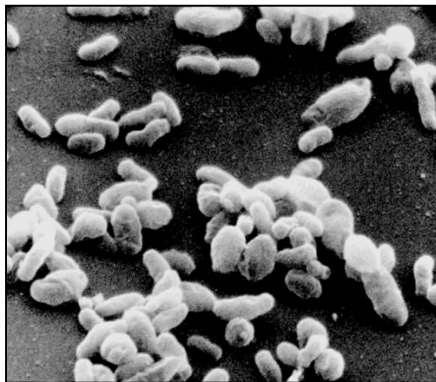




Q Fever

- **Epidemiology**

- Infection can also result from ingestion of the organism in afterbirth or residual contamination of the environment
 - **Organisms localize in the mammary glands, lymph nodes, uterus, placenta and fetus of pregnant animals**
 - **Bacterial can be shed in the milk, fetal fluids, and placenta**
- Animals can remain infected and shed virus for several years
- In wildlife, Q Fever is spread by the bite of Ixodid or Aragasid ticks

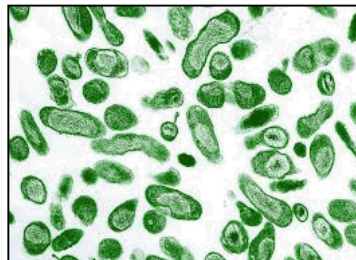




Q Fever

• **Diagnosis**

- Placentitis is characteristic – the placenta is leather like and thickened with creamy exudate on the outer edges of the cotyledons
- Agent detection can be accomplished using ELISA or PCR
 - **Collect fetal membranes, vaginal discharge, blood, or milk from the dam**
 - **Collect fetal liver, lung, and stomach from the fetus**
- A diagnosis can be made by characteristic changes to the placenta and identification of the organism using Giemsa stain
 - **Small coccoid or filamentous organism**
 - **Impression smears of exudate on the placenta can be used to look for the organism**
- Serology is useful to screen herds for infection
 - **Serum is collected in a tube that does not have anticoagulant**





Q Fever

- **Treatment and Control**

- No therapy exists
- Aborting does and ewes use should be isolated from the herd
- Infected fetal membranes and tissues should be removed





Q Fever – Public Health

- **Public health**

- Q fever has been detected in humans in Afghanistan
- Acute and chronic forms of Q fever can be seen in humans
- The organism is transmitted to humans through inhalation, ingestion, or direct contact with birth fluids or placenta
- The organism can be ingestion through consumption contaminated dairy products that have not been pasteurized
- Proper use of protective gear when handling animals suspected of infection
 - **Gloves and laboratory coats**
- Exercise caution when handling animals during abortion storms affecting whole flocks





Q Fever – Public Health

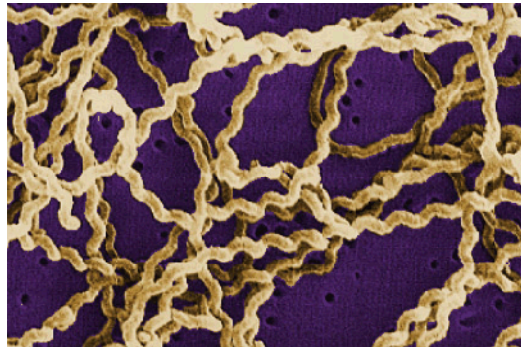
- **Clinical signs - humans**
 - Dry cough
 - Fever
 - Headache
 - Joint pain
 - Muscle pains
 - Abdominal pain
 - Chest pain
 - Rash
 - Yellow skin (icterus)

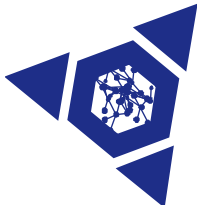


Leptospirosis

- **Etiology**

- Caused by many types of *Leptospira interrogans*
 - *Leptospira hardjo*
 - *Leptospira pomona*
 - *Leptospira canicola*
 - *Leptospira icterohaemorrhagiae*
 - *Leptospira grippotyphosa* among others
- Leptospiral abortion more common in cattle than in sheep or goats
 - *Leptospira pomona* and *Leptospira hardjo* major isolates from sheep and goats





Leptospirosis

- **Clinical signs**
 - Abortions from 4 months gestation to term
 - Early embryonic death
 - Infertility
 - Weak calves
 - Icterus-yellow tinted skin and eyes
 - Hemoglobinuria-dark brown urine
 - Anemia
 - Fever
 - Mastitis
 - **Flaccid udder and thick ropy secretions from all four quarters**





Leptospirosis

- **Pathogenesis**

- Organisms spread to gravid uterus, kidneys and genital tract by means of the blood stream
- Infection with *Leptospira* usually causes early abortion

- **Transmission**

- Animals carrying the organism in their kidneys spread the bacteria in the environment in urine
- Direct contact with infected urine, placental fluids, or milk can result in infection
- Transmission during breeding and transplacental transmission can occur





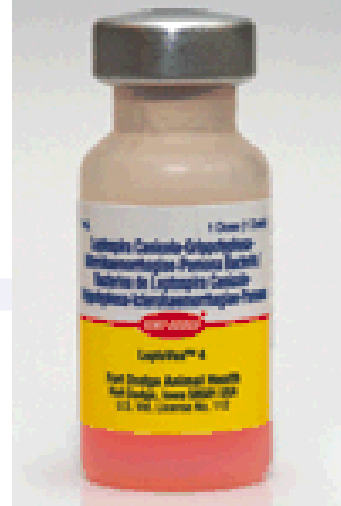
Leptospirosis

- **Diagnosis**
 - Serology is the best method of diagnosis
 - **ELISA**
 - Dark field microscopy from infected fetal tissues or placenta





Leptospirosis



- **Treatment and Control**

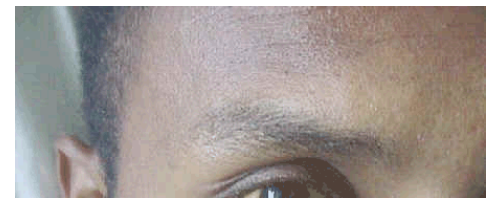
- Vaccination

- Vaccination can be used for prevention in high risk areas
- Vaccination in combination with oxytetracycline can be used in pregnant animals to prevent abortion during abortion storm
- Herd vaccination recommended at 6 month intervals

- Vaccines usually contain several strains

- Cows that are aborting or have aborted should be isolated from the rest of the herd
- Aborted fetuses and fetal membranes from should be removed from the premises
- Prevent exposure to swine and rodents, they can carry the organism
- Prevent exposure to contaminated water

- **Zoonotic!**





Leptospirosis

- **Public health**
 - Leptospirosis is a zoonotic disease
 - The organism can be transmitted to humans through contamination of unpasteurized milk and direct contact with infected placenta, fetus, and fetal fluids
 - Use caution when handling aborted feti and their placentas
 - Always wear gloves when possible





Bovine Viral Diarrhea (BVD)

- **Bovine Viral Diarrhea Virus (BVDV) can cause abortions, stillbirths, and congenital defects**
- **Pathogenicity depends on gestational time of infection, the viral strain, and fetal immune system**
 - Infection at time of breeding results in infertility
 - Infection during the first four months of gestation results in fetal death and abortion
 - Feti that survive infection prior to 125 days gestation become persistently infected
 - **Antibody tests are negative at birth but animals are infected and continuously shed virus**
 - Infection at 100-150 days results in birth defects of the brain, skin, or lungs
 - Infection after 150 day and recover without lesions are more likely to experience infertility as heifers or develop more serious infections





Public Health Summary

- **Remember that many of the infections agents that cause abortion in cattle, sheep, and goats are infectious to humans**
- **Remember to wear gloves when handling the fetus, fetal membranes, and the uterine fluid**
 - If disposable gloves are not available purchase heavier rubber gloves and disinfect after each use
- **Dispose of or disinfect contaminated materials to prevent environmental contamination**

