Sheep Issues in California

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Multidisciplinary Approach for Best Diagnostic Results

- Pathology: Gross and Histopathology
- Immunology (blood):
  CAEV, *Toxoplasma, Corynebacterium*,

  Bluetongue, *Leptospira*, RSV, Johne's
- Molecular biology/Virology/Electron Microscopy:
  BTV PCR, West Nile PCR,

  Direct EM (Orf virus, rotavirus)
- Microbiology:
  Aerobes (*Pasteurella, Corynebacterium*)

  Anaerobes (*Clostridia*)

  Fastidious organism (*Mycoplasma, Chlamydophila*)
- Immunohistochemistry:
  Q Fever, RSV, *Chlamydophila*, *Toxoplasma*, Scrapie
- Toxicology:
  Plant IDs, Toxins (plant toxins, mycotoxins etc),
  Heavy metals (Se, Cu, Pb, Zn)

Abortions:

- 44% chance of finding cause of the abortion in sheep:
- Find 49% cause of abortion in goats
- Find 52% cause of abortion in cattle
- Send fetus and **placenta** for examination from 3 different dam abortions
- Placenta submitted increases the chance of identifying the cause of the abortion
- Remember no diagnosis would suggest the aborting cause is not infectious

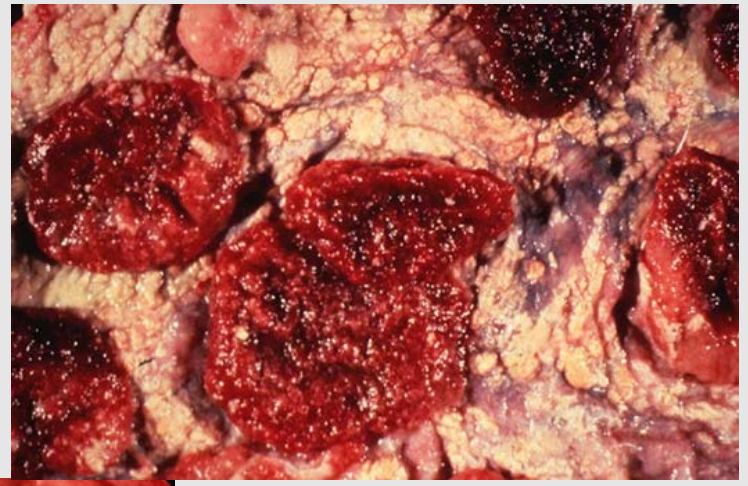
Sheep abortions:

- Chlamydia abortions (Chlamydophila abortus) :
- Coxiella burnetii:
- Campylobacter abortions

-- C. fetus ssp fetus, C. jejuni, C. lari

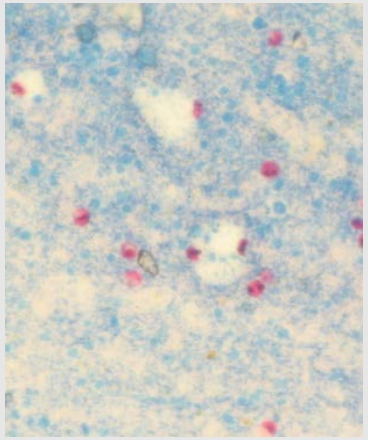
- Listeria monocytogenes
- Yersinia pseudotuberculosis:
- Bluetongue
- Cash Valley Virus
- Toxoplasma gondii
- Most important ones in California:

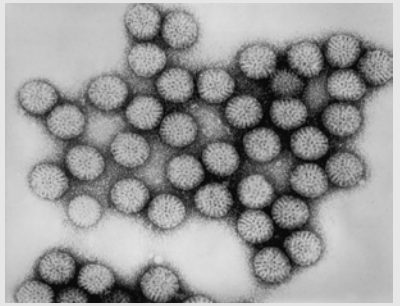
-- Chlamydia, Coxiella and Campylobacter

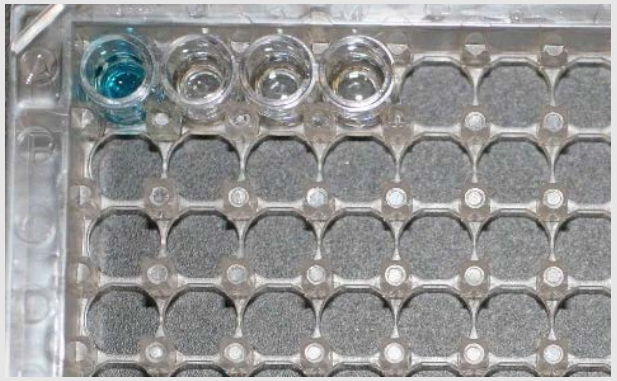


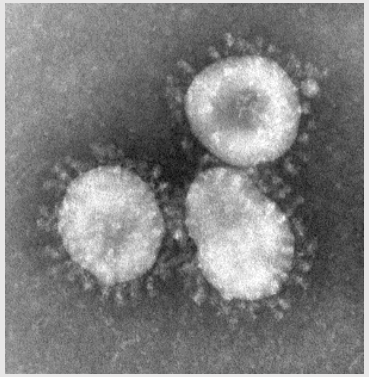
Diarrheal diseases
Neonatal

- *Cryptosporidia*: 5 to 30 days of age
- Rotavirus: 2 to 21 days of age
- *E. coli*: less than 10 days of age with most 1to 4 days of age
  - Attaching and effacing E. coli, and K-99 like E. coli
  - Watery mouth: *E. coli* septicemia, usually less than 2 days old
- Coronavirus: 1 to 2 week old animals
- Clostridium perfringens: Young animals with hemorrhagic enteritis
- Salmonella: 1 to 2 weeks old; diarrhea and septicemia
- Giardia: 2 to 4 week old
- *Campylobacter fetus* ssp *jejuni*: Lambs less than 1 week
- Adenovirus: 1 to 7 days, diarrhea and pneumonitis



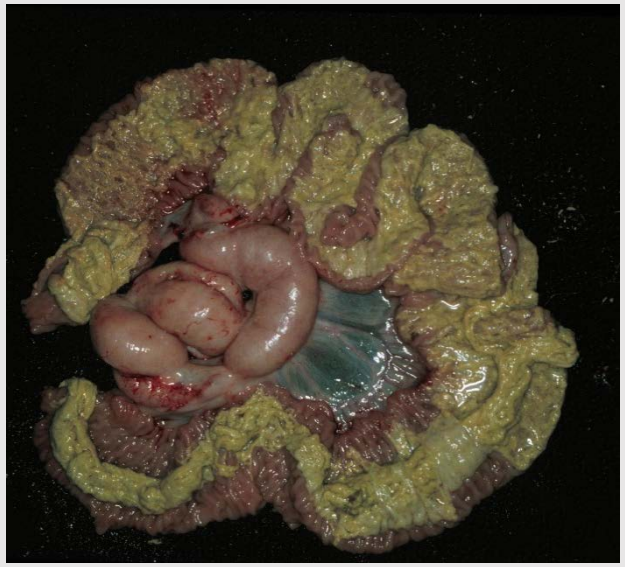






Other Diarrheal Disease
Juvenile and adults

- **Salmonella (*Salmonella* Typhimurium, *S*. Brandenburg, *S*. Arizona and *S*. Enteritidis) cause enteritis and septicemias**
- **Yersinia pseudotuberculosis**
- **Both associated with contaminated environment and feed**
- **Rodents concern with Yersinia**
- **Seen primarily in young sheep and goats**

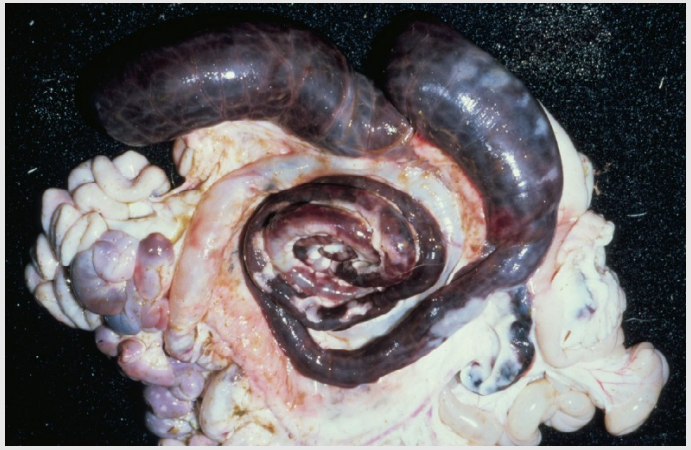


Salmonella

Yersinia pseudotuberculosis

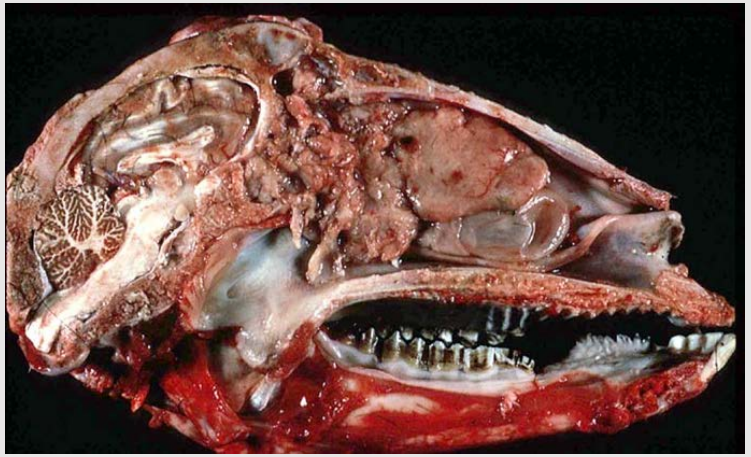
Coccidiosis

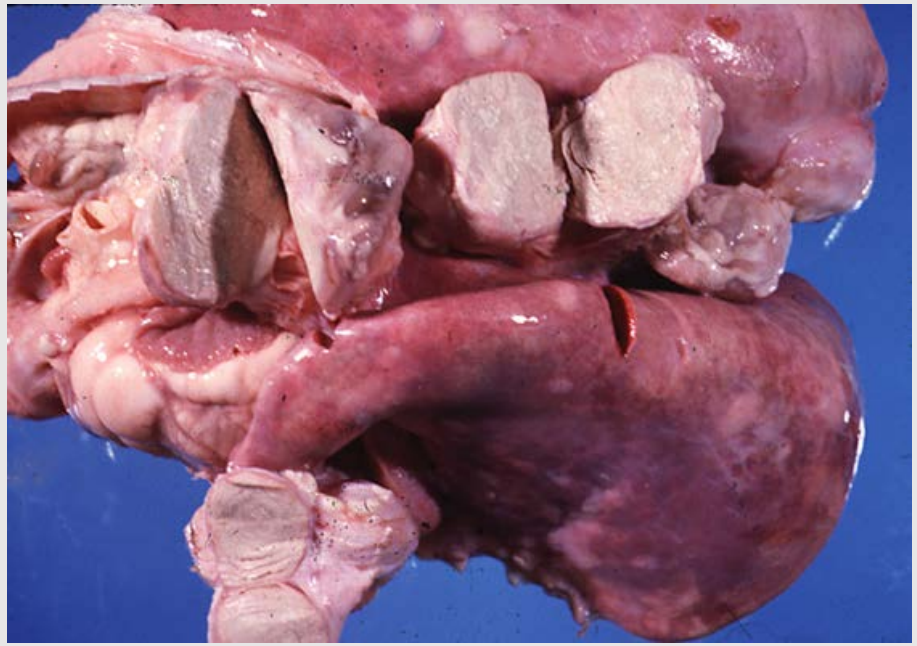
- *Eimeria ovinoidalis* : sheep
- *Eimeria arloingi* and *E. ninakohlyakimovae* : goats
- Diarrhea in any age of animal but mostly young animals
- Diarrhea with excessive mucus to blood
- Ileum and colon most common area affected
- Nervous coccidiosis usually in animals with diarrhea, tenesmus during cold weather (more of a cattle problem)
- Often associated with copper deficiency



Sheep Respiratory Diseases

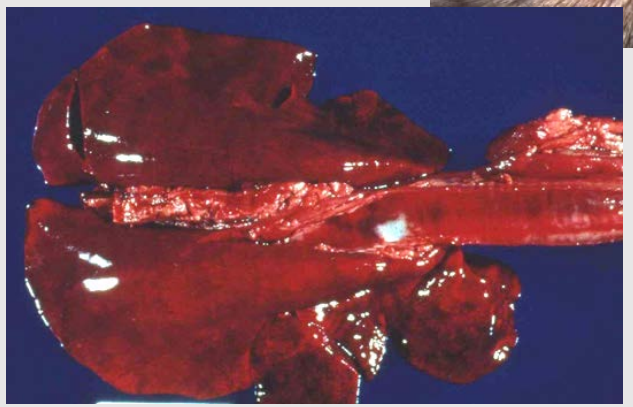
- *Mannheimia haemolytica, Pasteurella multocida, Bibersteinia (Pasteurella) trehalosi, Histophilus somni*
- *Corynebacterium pseudotuberculosis*
- *Mycoplasma ovipneumoniae* (rare)
- Ovine RSV and Parainfluenza virus (rare)
- Ovine progressive pneumonia (Maedi) (rare)
- Pulmonary Adenomatosis (Jaagsiekte) (rare)





Bluetongue Virus

- Orbivirus within Reoviridae
  - 24 serotypes (BTV-1 to BTV-24)
  - USA Serotypes are 2, 10, 11, 13, 17
  - Recently serotypes 1, 3, 5, 6, 14, 19, 22 discovered in US
  - Serotypes 6 and 8 causing problems in Europe
- *Culicoides sonorensis* vector in US
- Sheep and deer most affected
- Sheep infectious for Culicoides for 21 days
- Cattle and goats rare disease
  - Cattle infected up to 180 days
- Incubation period in sheep: 2 to 7 days
- Fever, facial and tongue edema, swelling feet/lameness, ulcers on tongue/oral cavity, pulmonary edema, heart failure
- Diagnosis: Clinical signs, RT-PCR testing, virus isolation
- Whole blood and spleen good for PCR testing



Clostridium perfringens

- Significant problem in sheep and goats
- Classified by toxin type production

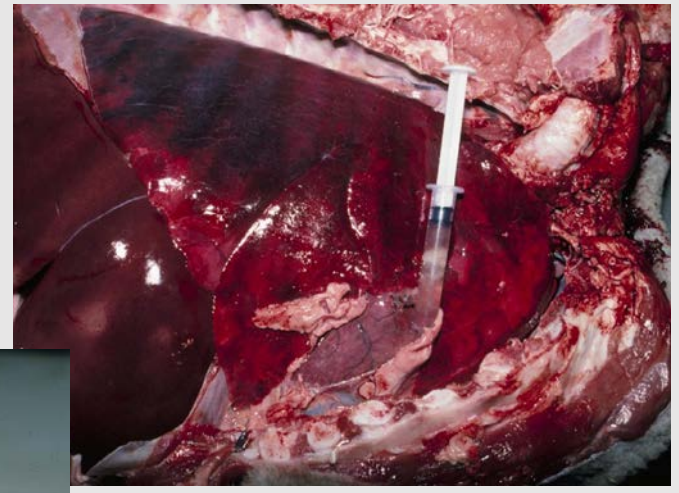
  - Alpha, Beta, Epsilon, and Iota toxins:

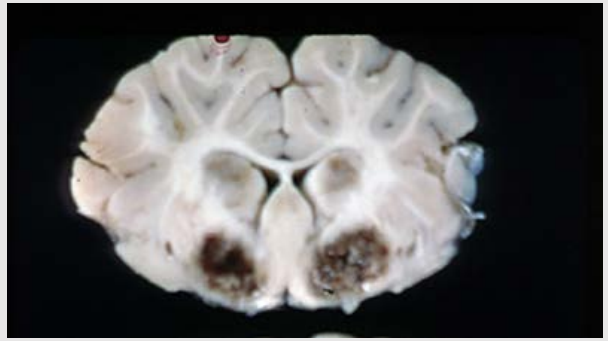
- Type A: Lambs/calves: acute intravascular hemolysis; hemorrhagic enteritis
- Type B: Lambs/calves: Hemorrhagic enteritis
- Type C: - Lamb/kids: catarrhal to hemorrhagic enteritis

  - Adult sheep/goats: Struck

- Type D: Enterotoxemia

- Sheep: enterotoxaemia with neurological signs
- Goats: enterotoxaemia and diarrhea with no neurological signs

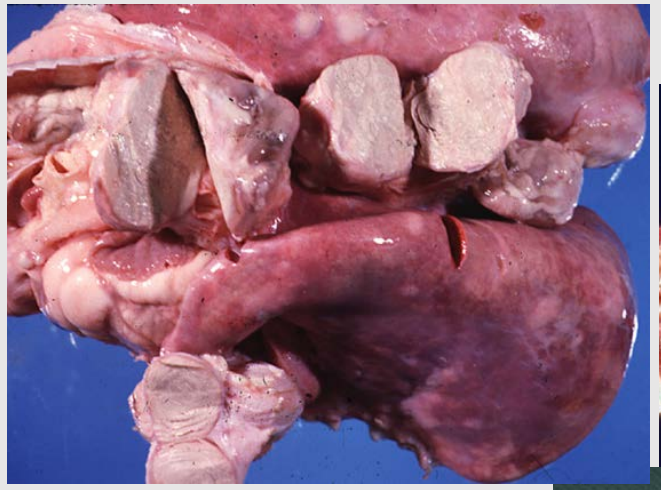


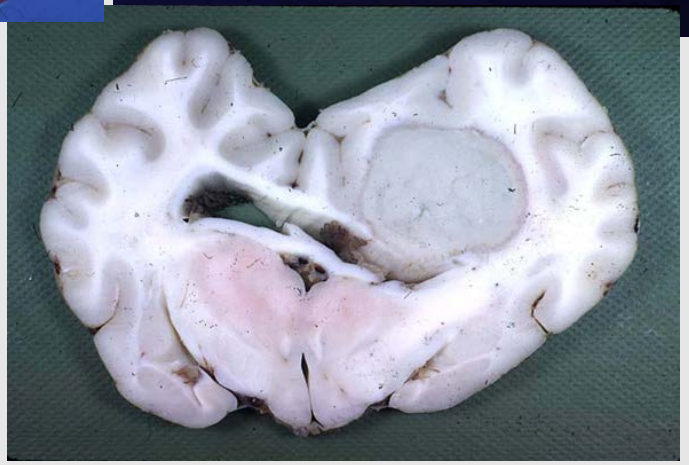


- Sheep vaccinated yearly, goats more often best every 6 months

Corynebacterium pseudotuberculosis

(Caseous lymphadenitis, CLA, Boils)



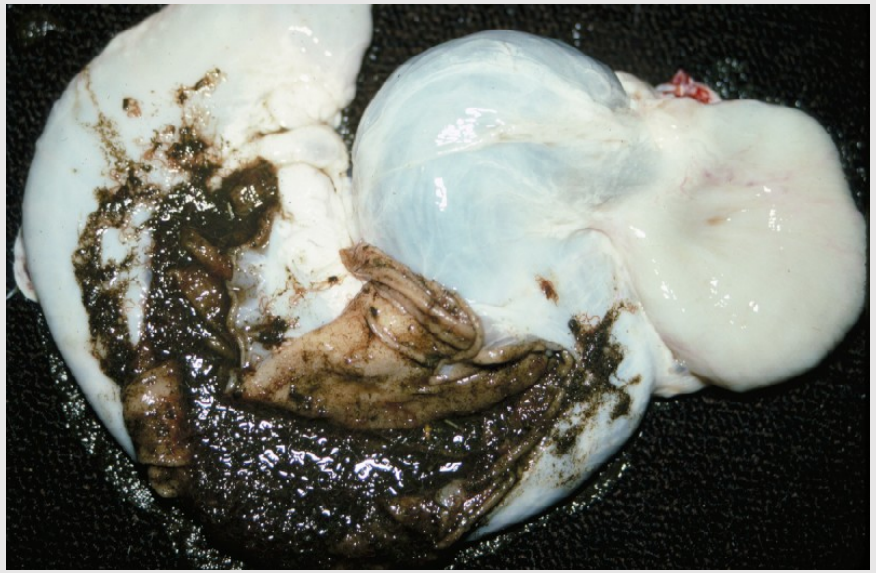


- Abscessation of external and internal LN's
- Sheep and goats most commonly affected
  - Usually greater than 3 months of age
- Cattle, horses and camelids less affected
- Contact with contaminated fomites
  - Water, feed, soil, housing, searing
- Contact with infected animals
  - Draining abscess, pneumonic animals
- Bacteria travel in blood stream and localize in LN's
  - Bacteria resists phagocytosis due to lipids in cell wall
- Bacteria often affect LN's at site draining original infection
- Culture and serology: Titers >1:256 suggest internal abscesses

Clostridium tetani

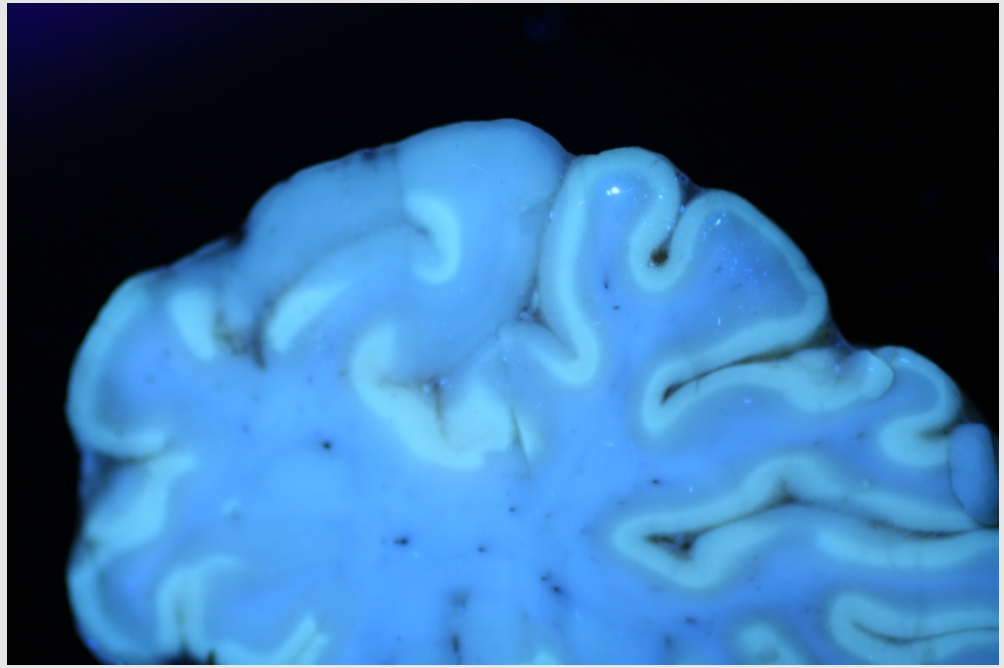
Abomasal Parasites

Haemonchus/Teladorsagia



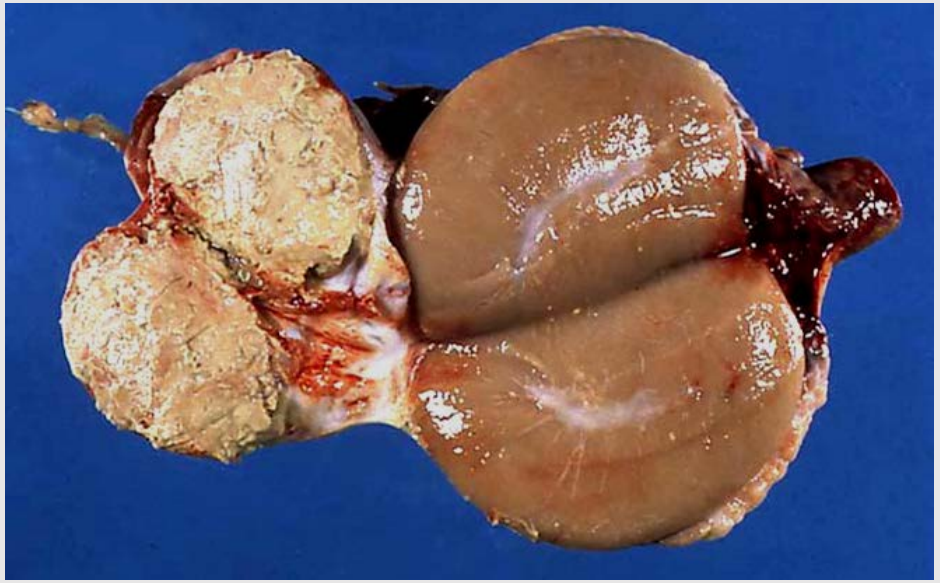
Polioencephalomalacia:
Thiamine Deficiency

- **Weanlings to 2 years most affected**
- **Causes: Sulfur (molasses, sugarbeet pulp, Brassica sp, water, acidifiers, treatments), Amprolium, rumenal acidosis, thiaminase plants (Bracken fern)**
- **>0.3% sulfur diet; >2000 ppm sulfur in water**



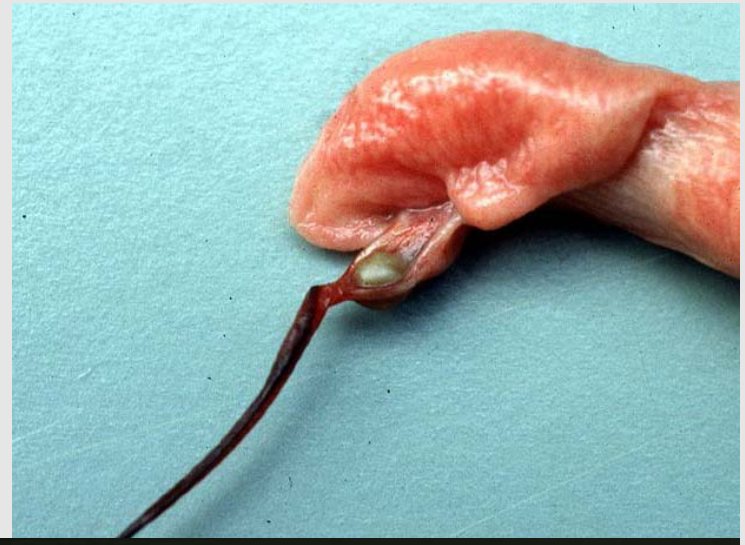
Brucella ovis

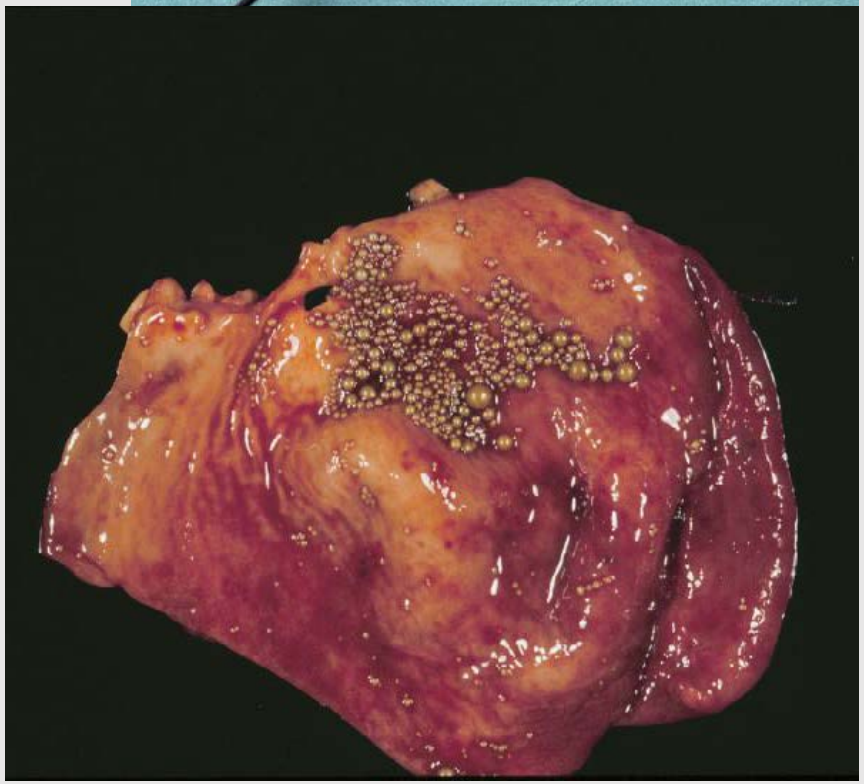
- Mostly a male infertility problem
- Cause early abortions in ewes
- Palpate rams for lesions
- Serological screening test for disease
- Test rams 45 days after breeding and then every 60 days until all rams negative twice
- Common to have false positive
- Retest valuable animals
- Do not breed to positive rams



Urolithiasis

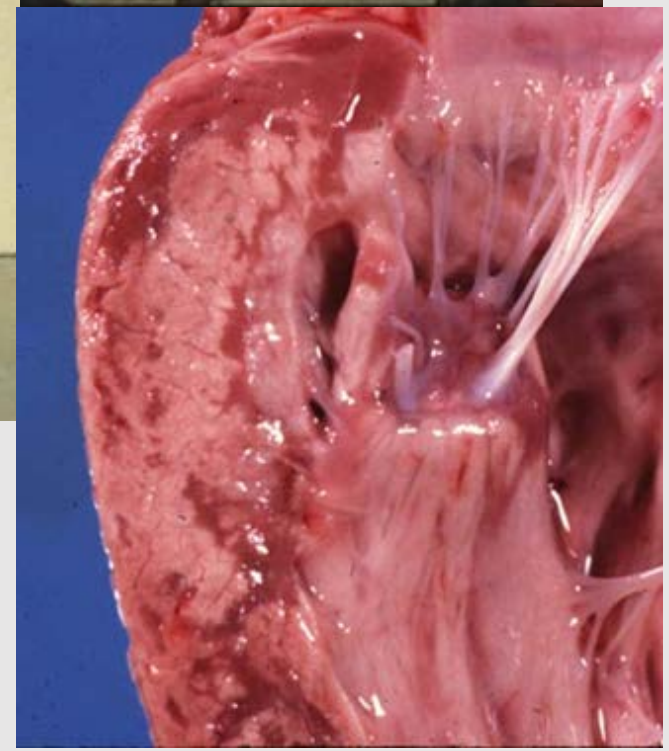
- Form from renal pelvis to urethra
- Causes: multifactorial
  - High grain diet (Phosphorus)
  - Urine Ph (solubility of participate)
  - Water deprivation (concentration of urine)
  - Infection in area of formation
  - Foreign body as nidus
- Common types:
  - Silica: white/brown radiopaque
  - Struvite: white/grey, radiopaque
  - Oxalate: white/yellow, single stones common
  - Clover stones: yellow soft material in the renal pelvis:
  - Carbonate: White to yellow, found in alkaline Ph
- Treatment acidify urine: Ammonium chloride





Copper & Selenium deficiencies

- Copper deficiency:
- Illthrift & increased infections
- Poor reproductive performance
- Poor hair coat
- Increase in coccidia infections
- Poor bone and joint development
- Sudden death
- Selenium deficiency:
- Illthrift & increased infections
- White muscle disease
- Poor reproductive performance
- Stillbirths

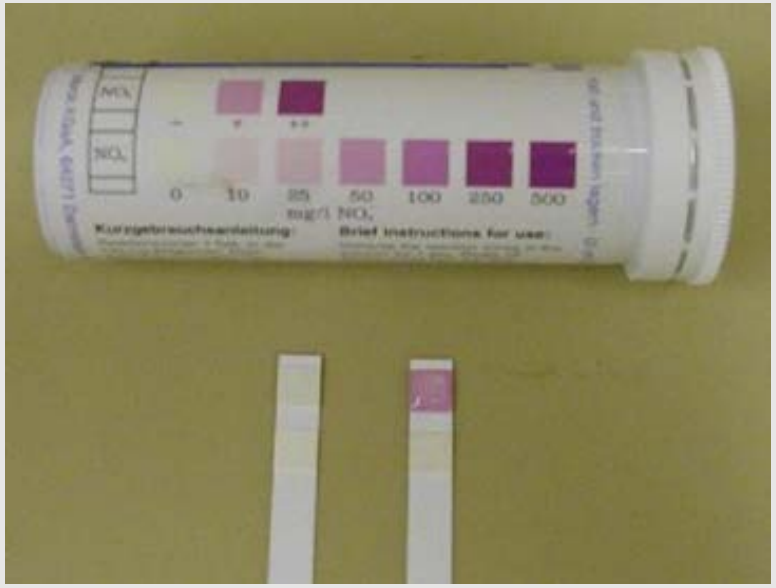


Copper Toxicity:

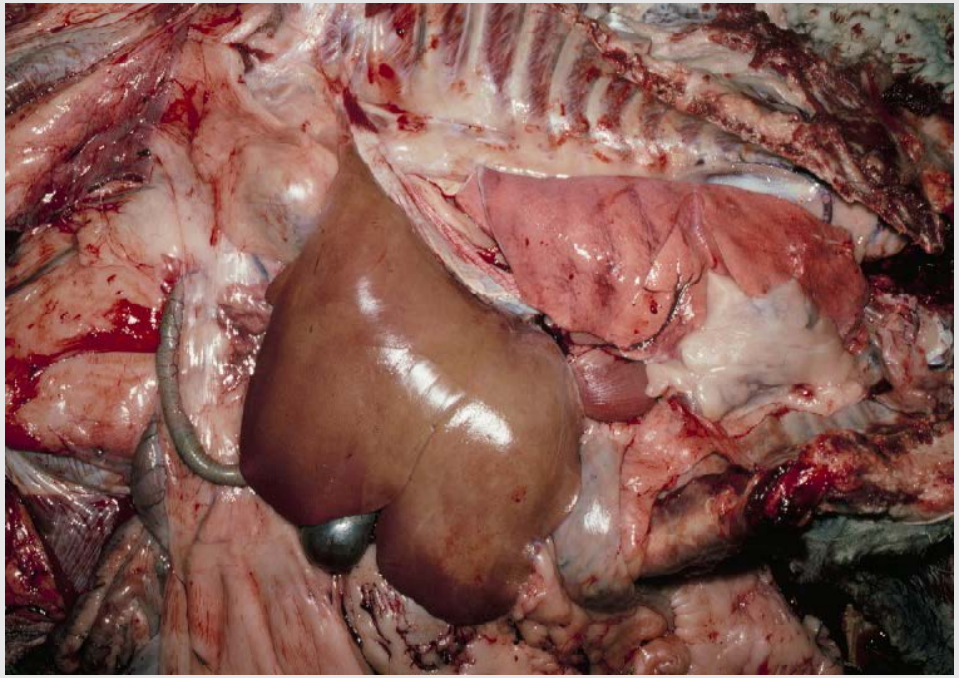
- All breed very susceptible
- Feeding cattle diet (high in copper)
- Access to copper footbaths
- Sudden death often after change in weather (hot/cold/rain)
- Red urine (hemoglobinurea)
- Brown kidneys
- Yellow body surfaces (icterus)
- Severe liver necrosis
- Need liver and kidney for toxicology

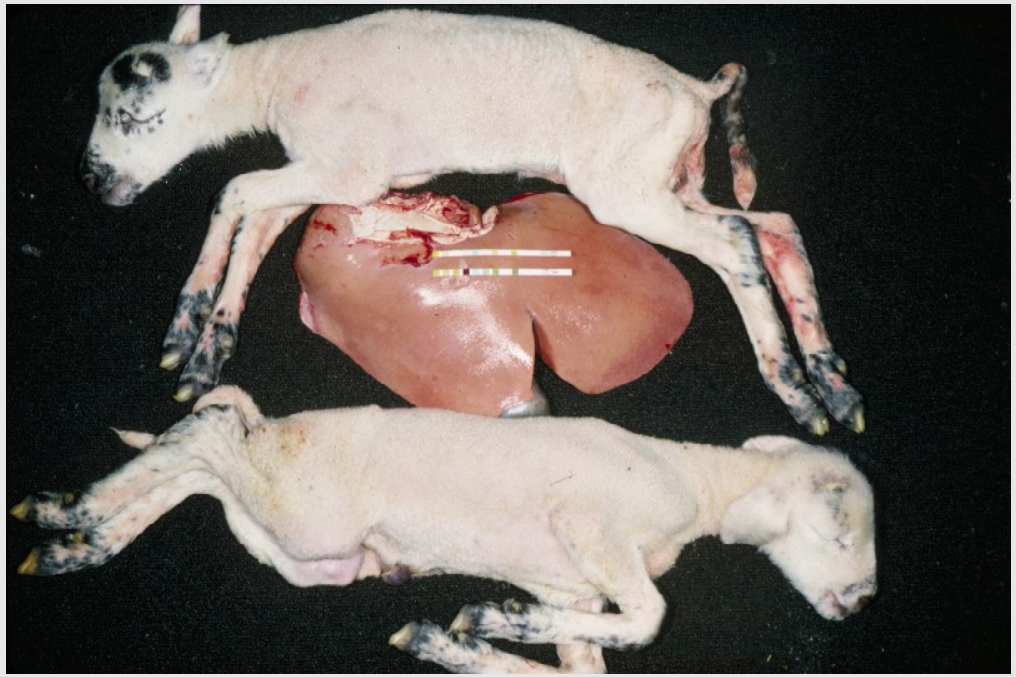
Nitrate toxicity

- Feeding oat hay, Sudan grass, lambs quarter
- Excessive nitrates in water
- 0-44 ppm: safe
- 45-132 ppm: considered safe but?
- 221-600: animals at risk
- >600 ppm: unsafe to drink
- Using fertilizer tanks to haul water
- Send blood or eye to test for nitrates



Pregnancy toxemia





Contributors

- Dr.s Adaska, Rimoldi, Blanchard, Uzal, King
- Thank you to sheep producers for bringing to the laboratory great cases for the pathologist to work up and take photos to share with Veterinary students and our producers

Questions ???