Etiology

- Family Leptospiraceae
  - Genus *Leptospira*
    - *L biflexa* and *L parva*: saprophytes
    - *L interrogans*: pathogens
      - 23 serogroups, > 250 serovars
  - Genus *Leptonema*: nonpathogens
- Host-adapted and non-adapted strains
  - Contact of *maintenance host*/*urine* with *incidental host* → severe disease
  - Incidental hosts not reservoirs

Most widespread zoonosis in the world?

Dairy farmers, milkers

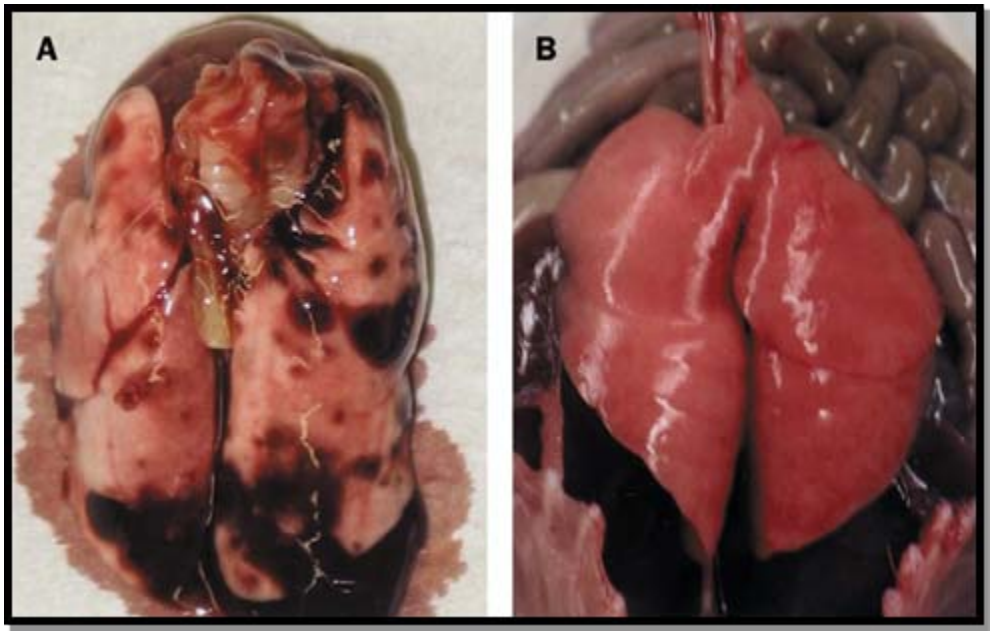
Slaughterhouse workers, meat inspectors

Veterinarians

Military personnel

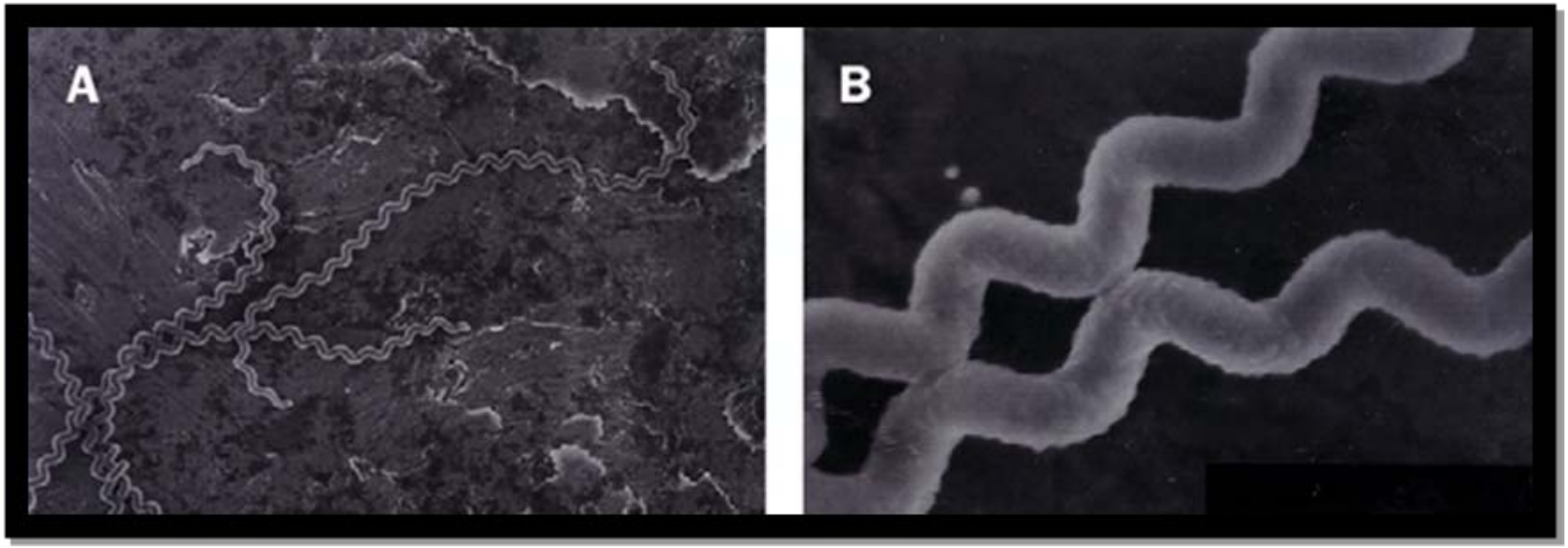
Phase I (Septicemic)

- Spiking fever, headaches, myalgia, arthralgias, damage to blood vessels: 4 – 7 days



Phase II (Immune)

- Induction of IgM Antibodies
  - Complement-mediated lysis of organisms
- Organ dysfunction, fever, CNS signs
- Leptospiruria



Diagnosis

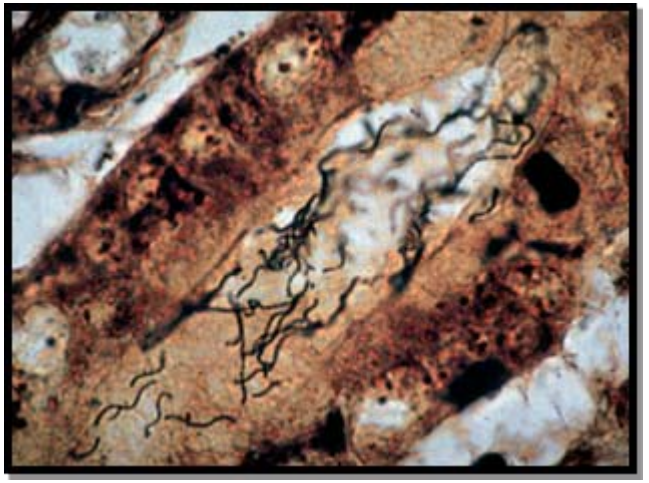
Culture

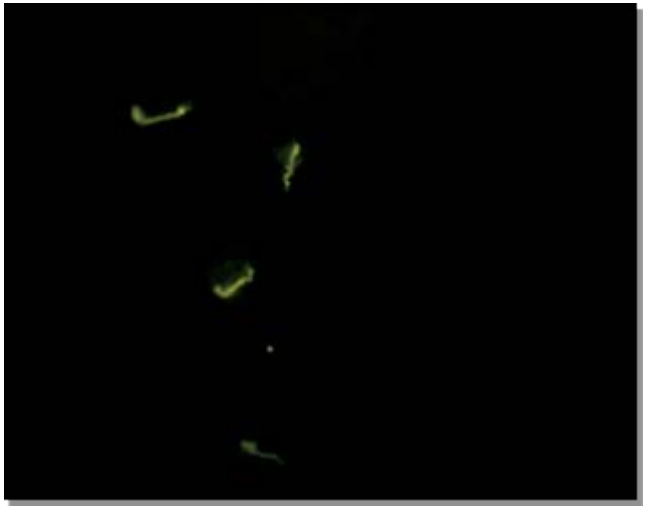
Serology: MAT

Convalescent titers

IgM vs IgG

Dark-field microscopy





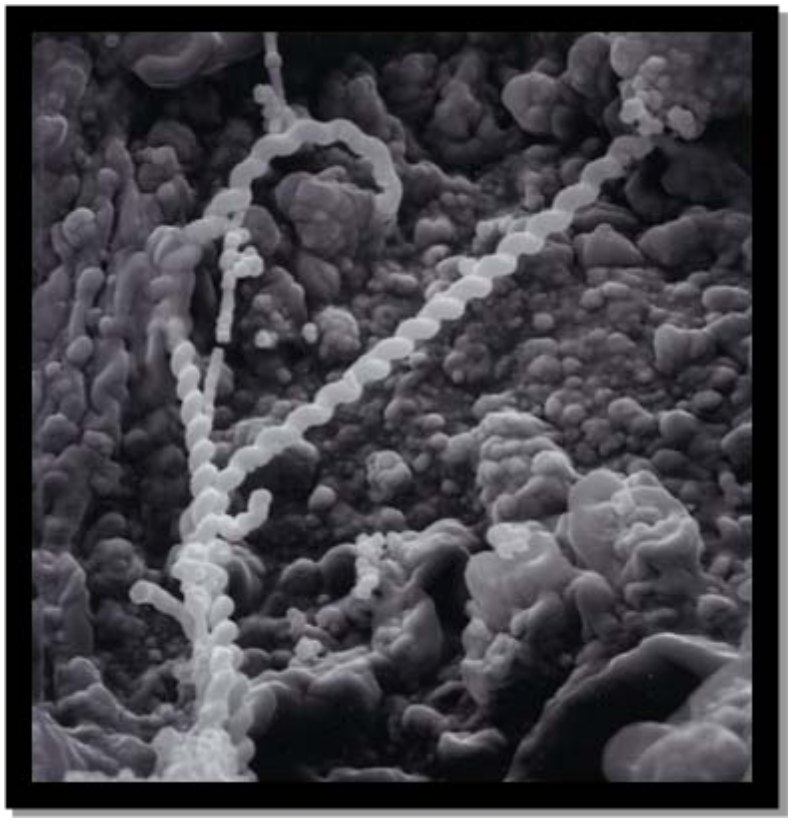
Reservoirs

- Rodents: wild, urban
- US: dogs, livestock (cattle, horses, pigs) = major risk factors
- Leptospirae live in proximal convoluted tubules

Prolonged leptospiruria without signs

Transmission

- Source: urine
- Exposure via:
  - nasal, oral mucus membranes
  - conjunctivae
  - abraded skin
  - droplet aerosols



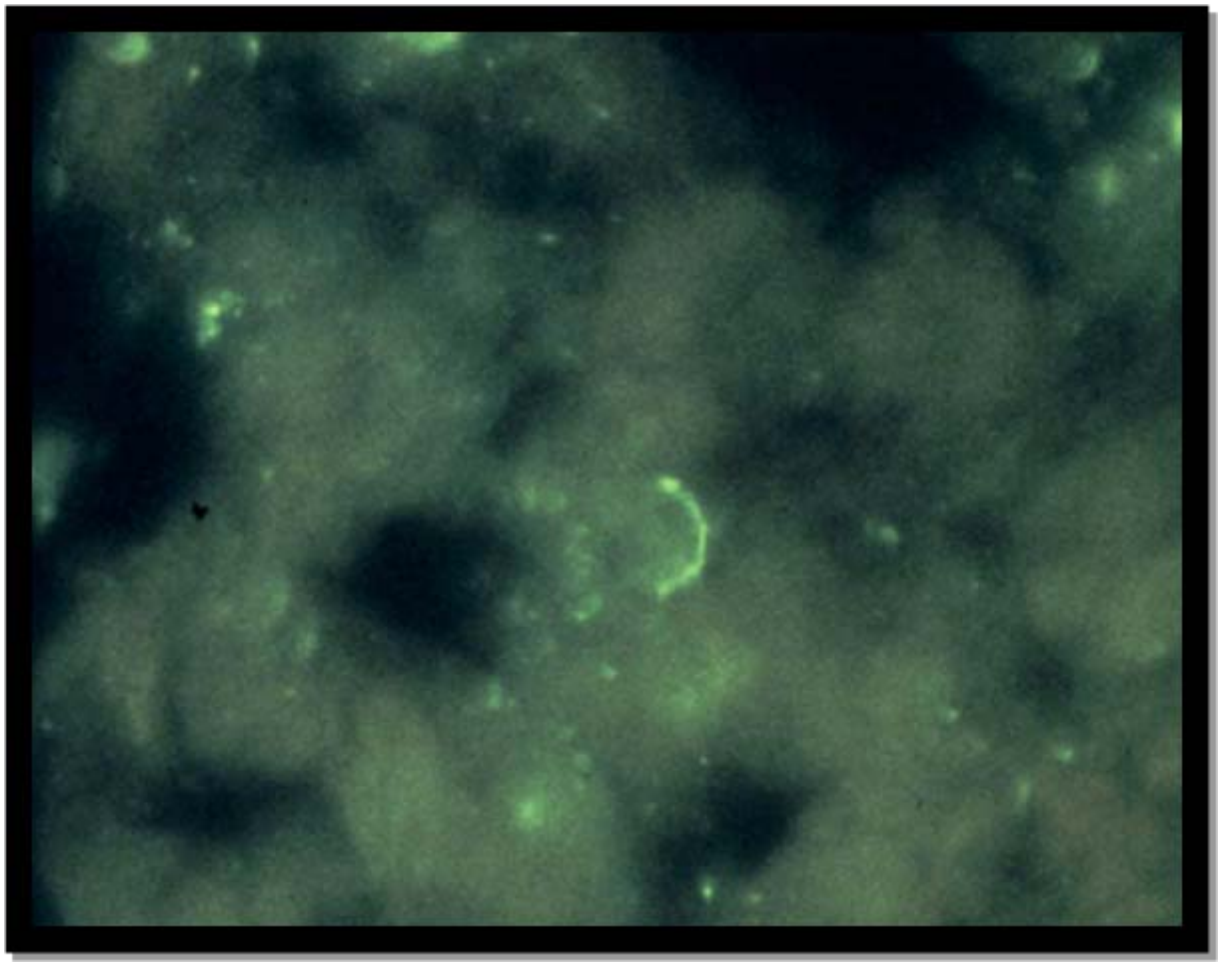
Rodent Leptospirosis in Arizona

- Few culture positives (serovar *ballum*; all feral *Mus musculus*)
- Silver-stained organisms detected in ~ 10% of rodent kidneys (most feral *Mus musculus*)
- Antibody titers suggest presence of serovars *autumnalis, ballum, bratislava, canicola, grippotyphosa, hardjo, icterohaemorrhagiae, pomona*
- Lesions in ~ 60% of kidneys

Bovine Leptospirosis

Abortion, still births, weak calves

Repeat breeders, dysgalactia

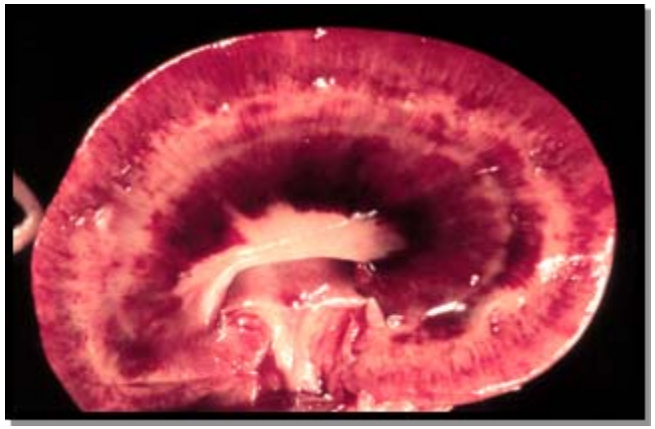


Bovine Leptospirosis in Arizona

- Host-adapted strains in dairies (even with vaccination): venereal transmission
  - Sporadic abortions, infertility
  - Transmission to humans elsewhere in world
- Exposure to wildlife strains not adapted to cattle occurs at water sources
  - Extensive abortion storms
- Beef cattle at slaughter: 20% culture positive
  - Serovars *hardjo* and *pomona*
- Under-recognized route of human exposure?

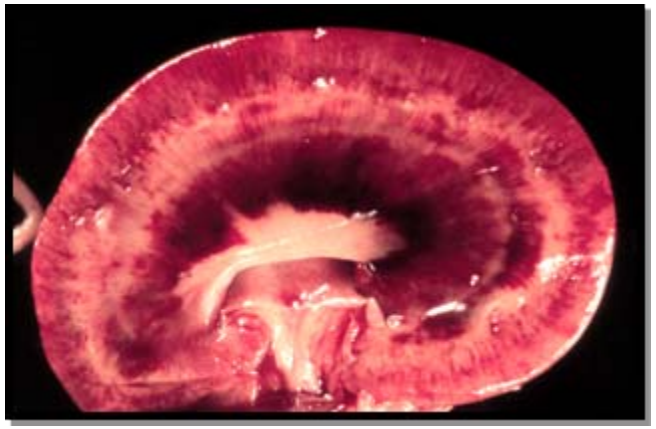
Canine Leptospirosis

- Fever, anorexia, vomiting, dehydration,
- Reluctance to move, hyperaesthesia
- Petechial, echymotic mucosal hemorrhages
- Renal changes
  - PUPD
  - May progress to oliguria, anuria



Canine Leptospirosis

- Liver inflammation
  - Cholestasis (acholic feces)
  - Icterus, hepatoencephalopathy
- GI signs: diarrhea, ileus (intussusception), melena



Canine Leptospirosis

- Maintenance hosts of *L. canicola*
  - Endemic pre1970, eradicated by routine Vx
  - Dog derived cases in children in USA, early 1970s
- Increased infection in wildlife vectors (raccoons, skunks)
  - *icterohaemorrhagiae* incidental infection
  - Rat derived
- Other serovars
  - *autumnalis, bratislava, grippotyphosa, pomona*

Even vaccinated dogs can pose zoonotic threat (symptom-free, lifelong shedding in urine)

In Sum

- We may not see leptospirosis every day in Arizona, but it's around every day.
- Nonvaccinated dogs interacting with some rodents may develop severe/fatal disease.
  - Wild rodents: low risk
  - Feral rodents: much higher risk
  - Wildlife with leptospirosis expose beef cattle at watering sites
  - Host-adapted/non-adapted strains cause sporadic/epidemic abortion
  - Risk for ranchers/dairymen, veterinarians, abattoir workers