Brucellosis

What you need to know

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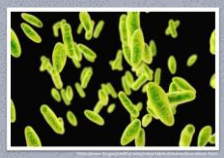
What is Brucellosis?

- It is an infectious disease caused by a type of intracellular, gram-negative bacteria called Brucella.



Brucella Species and Host

- *B. abortus*- cattle
- *B. melitensis*- Goats, sheep, camels
- *B. suis*- Pigs
- *B. canis*- Dogs
- *B. ovis*- Sheep, goats

Brucella Species and Host- Cont.

- *B. neotomae*- Wood Rats
- *B. pinnipediae*- Pinnipeds (seals, sea lions, walruses)
- *B. ceti*- Cetaceans (Dolphins, porpoises, whales)
- *B. microti*- Common Vole

Other Animals Infected

- Deer
- Bison
- Horses
- Moose
- Caribou
- Hares
- Chickens
- Desert Rats
- **HUMANS**

Brucella Species Zoonotic to Humans

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- *B. pinnipediae*- Pinnipeds (seals, sea lions, walruses)
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- Deer, bison, horses, moose, caribou, hares, chickens, and desert rats, humans

Most common way humans contract Brucella

- Drinking unpasteurized milk
- Eating unpasteurized cheese

People Most at Risk

- Meatpackers
- Veterinary professionals
- Hunters
- Farmers
- Animal Producers **(THIS IS YOU)**
- Microbiology Laboratory Technicians

Canine Brucellosis
Brucella canis
B. canis

- Host is Canines
- Not been found in wolves or coyotes

Which Canines are at Risk

- Intact Females
- Intact Males
- Neutered Females
- Neutered Males
- All ages
- All breeds

High Risk Canines

- Breeding dogs
- Dogs who are housed in kennels (multiple dogs)
- Dogs who travel

How is it Transmitted

- Direct contact with **ALL BODILY FLUIDS**
  - Semen
  - Vaginal discharge
  - Aborted or birthing tissue
  - Milk
  - Saliva
  - Urine
  - Feces
- It can be aerosolized while cleaning
- Fomite- shoes, kennels, bowls

Symptoms

- Females
  - Abortion (45-55 days)
  - Early embryonic death
    - Perceived conception failure
  - Endometritis
  - Prolonged vaginal discharge
  - Puppies
    - Born dead
    - Born alive and soon die
    - Some puppies live to become adults

Symptoms

- Males
  - Testicular enlargement (one or both)
  - Testicular atrophy
  - Epididymitis
  - Scrotal dermatitis
  - Infertility
  - Sperm morphology abnormalities
    - By week 20: 90% are abnormal

Symptoms

- Both Female and Male
  - Lethargy
  - Lymphadenitis
  - Ocular disease
    - uveitis
  - Vertebral pain
    - discospondylitis
  - Loss of Libido
  - Asymptomatic (**NO SYMPTOMS**)

Testing Options

- Screening vs. Confirmation

*All of the tests have limitations and should be used in conjunction with one another. Understanding each test's limits is critical in the interpretation of the results.

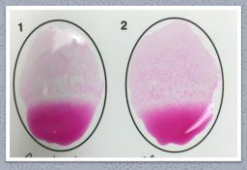
Sensitivity vs. Specificity

- Sensitive- Trust Negatives
- Specific- Trust Positives

Testing

Rapid Slide Agglutination Test (RSAT)

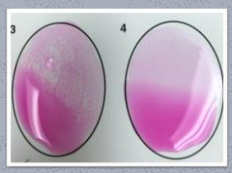
- Antibody test
- 1-4 weeks post infection (RSAT)
- High sensitivity
- Negative results (95-99% accurate)
  - Few false negatives
    - On antibiotics
    - Too early in exposure
- False positives possible
- In-house or mail out
- Good screening test



Testing

Rapid Slide Agglutination Test Mercaptoethanol (RSAT-2ME)

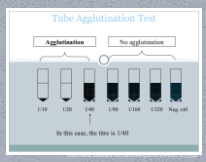
- Run as a secondary test if RSAT is positive
- Antibody test
- 3-4 weeks post infection
- High sensitivity, but lower then RSAT
- Few false negatives
  - On antibiotics
  - Too early in exposure
- False positives possible
- In-house or mail out
- Good screening test



Testing

Tube Agglutination Test (TAT)

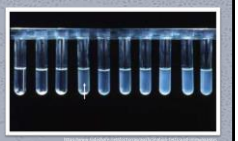
- Antibody test
- Usually 2-6 weeks post infection
- High sensitivity, but lower then RSAT
- False positives possible
- Titers
  - 1:50 may indicate early infection
  - 1:50 to 1:100 suspected infection
  - ≥ 1:200 highly presumptive of active infection
- Mail out
- Good screening test



Testing

Mercaptoethanol Tube Agglutination Test (ME-TAT)

- Antibody test
- Usually 2-8 weeks post infection
- Longer testing time
- False positives possible
- Titers
  - 1:50 may indicate early infection
  - 1:50 to 1:100 suspected infection
  - ≥ 1:200 highly presumptive of active infection
- Mail out
- Good screening test



Testing

Indirect Fluorescent Antibody (IFA)

- Antibody test
- Earliest detection is unknown
- False positives possible
- Lower sensitivity and specificity then RSAT and TAT
- Mail out
- Screening test

Testing

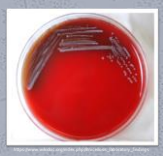
Agar-gel Immunodiffusion (AGID) Internal cytoplasmic protein antigen

- Antibody test
- Usually 8-12 weeks post infection
- Highly specific
- False negative possible
- Mail out
- Good confirmatory test
- Not to be confused with AGID cell wall antigen

Testing

Blood or Tissue Culture

- Organism Detection
- Bacteremia detectable 2-4 week post infection
  - Intermittent bacteremia
- Highly specific
- False negative possible
- Mail out
- Good confirmatory test
  - Poor screening test



Testing

PCR
- Organism DNA Detection
- Detectable at 1.5 CFU/ML
- Highly specific
  - More sensitive than culture
  - Sensitivity and specificity may vary between labs
  - Caution should be used when interpreting the results
- False negative possible
- Mail out
- Poor screening test

Screening
- RSAT
- RSAT-2ME
- TAT
- TAT-2ME
- IFA

Conformation
- AGID
- Culture
- PCR

Who To Screen and When

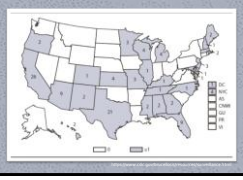
- Female dogs-
  - every 6 months if breeding
- Male dogs-
  - Twice a year if breeding in a closed colony
  - Cool shipping semen or breeding outside bitches- within one month
  - Freezing semen- we will do it every time

Who To Screen and When

- All nonbreeding dogs in the kennel-
  - Once a year
- Any new dog
  - Quarantine, test and retest in one month
- Any dog having any symptoms

Reportable?

- State dependent for animals
- All 57 states and territories for humans
  - Believed to be under reported



Treatment

THERE IS **NO CURE**

Euthanasia
(RECOMMENDED FOR ALL POSITIVE DOGS)

Treatment

- Kennel / Multiple dogs
  - Rehoming is **NOT** recommended
  - Test all dogs
    - Euthanize all positive dogs
    - Retest all dogs in 4 weeks
    - Euthanize all positive dogs
    - Repeat every 4 weeks until you get negatives on all dogs for 2 consecutive tests.
  - Most people cull the entire kennel when there is an outbreak.

Treatment

- Single Pet
  - Spay or Neuter
  - Antibiotics
    - Still sheds
    - Can test negative, even though it is positive
  - Lifestyle Change
  - People entering the house need to be informed
  - Rehoming is **NOT** recommended

Prevention

- No canine vaccine in the United States
  - Vaccines only offer moderate protection
  - Confound serodiagnosis
- Negative test when purchased
  - Quarantine/ isolated
  - Test twice 4-6 weeks apart

Cleaning

- Proper cleaning and disinfection is a MUST
  - Can be stable in environment for up to 2 months
  - Can withstand
    - Drying in organic debris
    - Freezing
    - Water
    - Dust
    - Soil
- Readily inactivated by common disinfectants and sunlight

Cleaning

- Wear personal protective equipment
  - Gloves
  - Mask
  - Goggles
- Use a biodegradable enzyme based kennel degreaser 1st
  - Make sure to rinse after use
- Use disinfectant on all surfaces
  - Allow at least a 10 minute contact time
  - Rinse after use
  - Allow to dry completely

Humans

Call your doctor

Symptoms

- 5 days to several months
  - 2 weeks average
- Intermittent fever persists for 1 to 5 weeks
- Anorexia
- Weight loss
- Abdominal and joint pain
- Headache
- Backache
- Weakness

Symptoms- Cont.

- Irritability
- Insomnia
- Depression
- Emotional instability
- Constipation
- Splenomegaly (enlarged spleen)
- Enlarged Lymph nodes
- Hepatomegaly (enlarged liver)

Symptoms- Cont.

- Orchitis (swollen testicles)
- Osteomyelitis (bone infection)
- Miscarriage
- Fatal
  - Endocarditis (heart infection)
  - Severe CNS complications

Testing Options

- Culture
  - Blood
  - Bone marrow
  - Cerebrospinal fluid
- No serologic test for *B. canis*

Treatment

- Combination of antibiotics
- Might need pain medication

- Prolonged treatment might be necessary
- Relapse is possible
- Humans can clear the infection

Conclusion

- It is Zoonotic
- Symptoms are variable
- No single test
- No treatment

It is a devastating disease

Questions?

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