Brucella Canis
The Myths and Facts surrounding Canine Brucellosis
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Brucellosis is a serious, highly contagious, zoonotic, bacterial infection caused by the bacterium brucella canis (b. canis). B. Canis can be passed to your dog in several different ways, including: birthing fluids, vaginal secretions, semen, aborted fetus, placenta, urine, and saliva. Puppies can be affected in utero by infected dams. Transmission can also occur with shared food and water bowls and bedding. Research has shown that dogs intermittently shed the bacteria for years once infected. Once the bacterium enters the dog it multiplies and moves into the organs. Infection risk is the highest for stray dogs, breeding dogs, and dogs that live in kennels.

Breeders are encouraged to test for brucellosis frequently. The recommended timeline of testing is as follows:

- Within 30 days prior to a breeding
- At the time of semen collection
- Every 6 months while collecting a dog so long as the dog has not been bred during this timeframe, in which case more frequent testing should be done

According to Dr. Lin Kauffman DVM at Iowa State University,
“Canine brucellosis has a wide range of signs that can mimic characteristics of other diseases. Signs in both males and females include: lethargy; fatigue; unwillingness to breed; joint pain; inflammation of the lymph nodes; eye infections; poor hair coat; exercise intolerance; weight loss; lameness; back pain; and behavioral changes.”

It is important to note that most dogs with brucellosis appear asymptomatic. If a breeder is struggling with a dog losing litters, having poor semen evaluations, or puppies being born with abnormalities, brucellosis testing should always be performed. Brucellosis often causes male dogs to have sperm abnormalities, epididymitis, scrotal enlargement, and scrotal dermatitis. In female dogs, brucellosis can lead to late-term abortions, stillborn puppies, or puppies that die shortly after birth. In addition, females can have more vaginal secretions than normal and have difficulty getting pregnant. Brucellosis can also lead to infertility in both sexes as well as spine or neurologic disease, symptoms including back and/or neck pain. According to the AKC Canine Health Fund, Brucellosis is the leading cause of reproductive disease in dogs. Human infections of b. Canis show similar symptoms including fever and damage to reproductive systems.

In all but 4 states, brucellosis is a reportable disease. To elaborate, if a dog tests positive, the breeder is required to work with the state veterinarian. Every state has different regulations regarding canine brucellosis. Some states require immediate euthanasia of all dogs on the property, while others allow lifetime quarantines of all dogs on the property with state inspections. The consequences for a positive test are incredibly severe.

There are several types of brucellosis testing currently available through various labs in the United States (**Chart 1**). This chart may be incomplete, but encompasses the most common labs testing brucellosis. It is recommended for breeders to ask their primary and/or reproductive veterinarian about options regarding lab testing. Breeders should receive copies of lab results for their own records. There is no longer at home or in office testing available. All brucellosis testing must be sent to an outside laboratory.

It is the responsibility of both breeders and puppy buyers to have confirmation of a negative brucellosis test on both dogs before breeding. This will help protect both the buyer and the breeder if a dog tests positive in the future.

Chart 1.

Michigan State University	Indirect Fluorescent Antibody (IFA)
IDEXX	Indirect Fluorescent Antibody (IFA)
Kansas State University	Canine Brucella PCR
Cornell (Non Export Panel)	Canine Brucella Multiplex Assay
Cornell (Export & Regulatory Panel)	2ME RSAT and AGID II

Currently the SAT and iElisa are being used in the United Kingdom.

Brucellosis Myths

Myth #1
I can test for brucellosis at home.

False! There used to be brucellosis at-home tests and rapid in-office tests available at your veterinarian, these tests are no longer available. Brucellosis testing should be sent to a laboratory and completed at your veterinary office.

Myth #2
All labs run the same type of brucellosis test.

False! There are several different tests available around the world. See **Chart 1** for more information. There are two different types of testing: screeners and confirmatory. Most dogs only require a screener test. Screeners are very accurate for detecting negatives, however false positives can occur. If a screener test shows a positive, it is recommended to follow up with a confirmatory test.

Myth #3
My dogs are healthy and had healthy litters before, I don't need to test.

False! Not every dog affected with brucellosis will be symptomatic. This is why universal screening of breeding dogs is important to avoid transmitting the disease.

Myth #4
There is only one type of brucellosis.

False! There are several different types including b. Abortus that affects cattle and bison and b. Suis that affects pigs. Dogs can get other types of brucellosis but most commonly get brucella canis. Dogs have been infected with b.abortus and b.suis after ingesting an aborted fetus from an infected animal. Hunting dogs are also at a greater risk of contracting other types of bruella. Fun fact: all of the bison in Custer State Park are tested and are negative for brucellosis.

Myth #5
Brucellosis is only a problem in the United States.

False! Brucellosis is a problem around the world. The United Kingdom began strongly recommending testing of all foreign born dogs to receive veterinary care due to the increasing trends of dogs testing positive. There are some countries who are facing serious canine brucellosis problems with over 80% of their dogs testing positive in studies. Mexico, Brazil, Cyprus, and Romania are currently facing higher rates of brucellosis than other countries. Central and South America, China, and Japan also have higher rates of infection. Many dogs are not tested, including rescues, so it is unknown how prevalent brucellosis is around the world. The southern part of the United States is affected at a higher rate than other regions.

Myth #6
Brucellosis is treatable.

False! Once a dog is confirmed positive for brucellosis, that dog will continue testing positive forever. The bacteria doesn't always shed, so the dog may not always be contagious, however the bacteria lives in the body at all times, sometimes dormant in the organs. The most effective way of stopping transmission is spaying and neutering the affected dog. A spayed female is at a much less likely risk of spreading the infection but neutered males can still pass the infection because of how it lives in the prostate. Treatments haven't been proven to be effective at this time.

Myth #7
Brucellosis testing only needs to be done for dogs that have been bred before.

False! Any dog (stud or bitch) should have Brucellosis testing less than 30 days prior to breeding, even if it is their first litter. Unfortunately dogs can pick up b. Canis in several places including at shows, dog parks, or boarding facilities.

Myth #8
I only need to do a brucellosis test for live breedings.

False! Brucellosis testing should be done prior to any type of breeding, including before semen collections.

Myth #9
False positives can't happen.

False! False positives can happen depending on the type of test performed. The way the brucellosis tests work is by screening samples and then doing confirmatory testing on positives. A dog is only considered positive if they test positive on the confirmatory testing. A culture is considered the gold standard and is the only way to show if a dog is currently shedding the disease.

Myth #9
Brucellosis isn't a risk to humans.

False! Brucellosis is zoonotic and can be passed to humans. There is limited research in this area and there are treatments available to humans. Children, immunocompromised individuals, veterinary professionals, and breeders who are coming into contact with possibly infected fluids are at a greater risk of being infected.

The Science of It
What test is right for me?

Polymerase Chain Reaction Test (PCR)

According to Sasha Thomason from Kansas State University, “Our PCR test is a two-target, real-time PCR. One will detect all Brucella spp. The second will detect canis only, so it can differentiate between B. canis and other Brucella spp. It can detect 2CFU/ml, making it a highly sensitive and specific test. This detection level is approximately 5 times more sensitive than blood culture. This test can be used as both a screening test and a confirmatory test.”

The PCR diagnostic sensitivity and specificity were 100%. In the study, *Brucellosis in Dogs and Public Health Risk*, published August 24, 2018 in Emergent Infectious Diseases, the sensitivity of PCR for correctly identifying a negative sample was 100%. Currently, Kansas State is offering PCR testing for b. Canis as both a confirmatory test and a screener.

Indirect Fluorescent Antibody Test (IFA)

According to the *Evaluation of Three Serological Tests for Diagnosis of Canine Brucellosis* published by The National Library Of Medicine and the National Center for Biotechnology Information: Microorganisms August 26, 2023 authored by Dr. Fabrizza Perletta DVM the diagnostic sensitivity of Commercial Immunofluorescence Assay (IFA/IFAT) is 99.3% and the Specificity is 95% (CI 96.2-99.8%).

According to the Marvista Vet in Los Angeles California, “The IFA (Immunofluorescent Antibody” test is a similar screening test {to the rsat} but it must be sent to the reference laboratory. The same guidelines apply: negative means negative.” IDEXX and Michigan State both use IFA technology.

Canine Brucella Multiplex Assay

This is the newest test available and is currently only being offered at Cornell University. Cornell cites that this test is 95% accurate at detecting a positive result.

Agar Gel ImmunoDiffusion (AGID2)

False negatives only occur during the loading period of the disease, 2-4 weeks by most accounts. The AGID2 is the only test with a longer loading period and will not be positive until 8-12 weeks post infection. The AGID2 test is not recommended as a test to be used on puppies under 6 months of age and for dogs who have been recently thought to have contracted the disease. The AGID2 test is only offered at Cornell University. Cornell cites that this test is 99% accurate at detecting a positive result.

Conclusion and Call to Action

I think it is important to point out that no test is 100%. That is why repeat testing or testing at more than one lab is important to make sure that you are protecting your dogs. Brucellosis is a serious life affecting disease that can affect any dog, from any background. Prevention and testing are our best tools currently. Making sure that surfaces are disinfected, wear proper PPE when handling untested dogs fluid. Making sure to not allow your dogs to come into contact with fluids, urine, etc. at shows, dog parks, the vet office. Dogs should be tested before being introduced into a kennel or home so as to not infect other dogs. We all need to do our part to test and make sure that we are pushing for others to test as well. The AKC Canine Health Fund currently has research going towards a b. Canis vaccine which would be a big step in the right direction to protecting our dogs.