

## Snap 4Dx Test Results

What did your dog just get tested for, and what does it mean?

We recommend that you have your dog tested for Lyme disease, Heartworm, Anaplasmosis, and Ehrlichiosis antibodies annually. This test takes 8–10 minutes and determines if your dog has antibodies to one of these diseases. Below is interpretative information for you, for the following disease.

- **All negative.** No concerns with any of these four diseases.
- **Heartworm antigen positive.**

This is an unusual result for dogs that have not lived in the south earlier in their lives. This is a parasite that is transmitted by mosquitoes, and gradually moves from the bite site to the circulatory system, clogging vessels in the cardiopulmonary circulation, and injuring the heart and lungs. A positive test indicates that an adult female heartworm may exist in your dog's cardiovascular system, and further testing is indicated to verify the infection. Typically, the 4Dx Snap test is done by a reference laboratory, and if found to be positive, an additional test is performed to detect immature heartworms (termed microfilaria). If both of these tests are positive, we will review treatment options for heartworm disease with you. While this disease is rare in Vermont, as more dogs are adopted out of the south, we are seeing more heartworm positive dogs. Still, almost all of the positive dogs have spent time in the south. If a dog never leaves Vermont, it is quite unlikely (far less than 1%) that it will contract the disease.

- **Ehrlichiosis positive**
- **Anaplasmosis positive**

*Ehrlichia canis*, and *Anaplasma phagocytophilum* (don't worry, there won't be a test) are infectious agents transmitted by ticks, sometimes in conjunction with *Borrelia* infections, such as Lyme disease. Both of these diseases have the potential to cause anemia, decreased blood clotting, fever, and arthritis in infected individuals. Therefore, if a positive test is found, a complete blood count (CBC) and chemistry profile should be performed to determine if anemia or low platelet counts exist. There are other serological tests that can be performed to determine:

- 1) How active and recent these infectious agents may be in your dog
- 2) If other tick-borne diseases are present in your dog as well

### What is Qi?

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- Lack of appetite, generally lethargy
- Arthritis (often with a fever)
  - Characterized by a swollen joint, shifting leg lameness, etc. but not usually chronic lameness
- And can manifest, less commonly, as inflammation in the kidneys, heart, nervous system, and eyes

If your dog tests positive for *B. burgdorferi* antibodies, be aware of the symptoms listed above, as they could develop in the future. If so, then we may suspect *Borreliosis* as a cause of your dog's symptoms, however, there are other causes for these symptoms as well, which we will discuss with you. If your dog is currently experiencing some of these symptoms, a treatment course of doxycycline may be prescribed. Additionally, treatments for Lyme's disease may be prescribed as well (see separate handout: *Treating Lyme's Disease*).

If your dog is asymptomatic, as the vast majority of dogs are, no treatment is recommended. In Vermont about 40% of dogs tested are Lyme antibody positive (rates vary by region), and indiscriminately using antibiotics (doxycycline) on these dogs is unwarranted, and potentially harmful. It may cause nausea, esophageal inflammation, and antibiotic resistance to doxycycline. **However, we do recommend staunch tick prevention be used during any time of year without snow cover, and when temperatures exceed freezing.** Ticks can become active immediately in these conditions, and begin feeding as they merge from dormancy, **potentially during any season.** Heavy winters likely do not significantly impact tick populations negatively, as these parasites are extremely hearty, and simply 'hibernate' longer in cold temperatures.

#### Follow up testing:

Labradors, Golden Retrievers, and Shelties are genetically predisposed to Lyme Nephritis, or inflammation of the kidneys. Additional blood and urine tests can be performed to screen these breeds, and potentially others, for early kidney inflammation which could signal Lyme Nephritis is beginning. Specifically, CBC, chemistry, urinalysis, and microalbuminuria (a sensitive test for leakage of protein into the urine, indicating kidney inflammation) can be run.

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Our veterinarian may recommend one of these additional tests, depending upon how your dog is doing. These agents are often “co-infections” along with Lyme’s disease, and are generally treated in the same way, with doxycycline (or another antibiotic); however other treatments may be recommended, such as supportive herbal medicines.

Dogs with signs of Ehrlichiosis (bleeding, secondary bacterial infections, hyperviscosity syndrome, nephrotic syndrome, uveitis, polyarthropathy, CNS signs, etc.) may have laboratory changes on CBC (thrombocytopenia, anemia, and/or leukopenia), biochemical profile (hypoalbuminemia, hypercholesterolemia, hyperglobulinemia), urinalysis (proteinuria) and may have effusions, edema, epistaxis, or other petechial or ecchymotic bleeding, neurologic signs due to vasculitis, synovitis, plasmacytic meningitis, etc. Dogs with Ehrlichiosis may even have a monoclonal gammopathy and/or bone marrow plasmacytosis, mimicking multiple myeloma.

Arthritis or polyarthropathy, fever, cytopenias (especially thrombocytopenia), and perhaps other signs have been attributed to *A. phagocytophilum* infections in dogs. CBC, Chemistry panel, and urinalysis including screening test for proteinuria, should be part of the diagnostic work-up. Buffy coat smears or joint tap cytology may reveal neutrophilic intracytoplasmic inclusion bodies (morulae).

All dogs with clinical signs suggestive of Ehrlichiosis and Anaplasmosis should be treated with doxycycline (10—20 mg/kg/day) for at least 1 month, although they may not always be cleared of the carrier state. Dogs with leukopenia may have secondary bacterial infections which may not be sensitive to doxycycline, and multiple antibiotics may be required, based on culture and sensitivity of infections found, e.g. urinary tract infections.

- **Lyme antibody positive**

This indicates that your dog has been exposed to a naturally occurring agent of “Lyme disease,” or, more appropriately termed *Borrelia burgdorferi* infection. The test will not be positive in response to a previous *B. burgdorferi* immunization. Note that a positive antibody level *does not* mean that your dog has this disease, but rather, has been exposed to the disease. Most dogs (90—95%) that are exposed to the disease, identified by a positive test result, do not develop clinical signs of the disease, which could include:

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The Canine Lyme Multiplex test from Cornell can be performed in the event that there are symptoms which could be ascribed to *B. burgdorferi* infection, which have come up recently. The Multiplex test essentially provides quantification (actual amounts) of antibody present in the system, correlated with acuteness or chronicity of infection. In other words, if the Lyme was encountered a short time ago, so called “acute phase” antibodies will be present in higher amounts; in contrast, if the Lyme disease was encountered months to years ago, the “chronic phase” antibodies will be present in higher amounts.

Preventing *B. burgdorferi* infection in asymptomatic dogs is best achieved by:

- ✓ Proactive tick prevention, year-round (or any month with above freezing temperatures)
- ✓ Optimum nutrition for your animal’s constitution, based upon your veterinarian’s recommendation
- ✓ Maintaining ideal body condition, and an active lifestyle

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