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### **Up-date on Tick Borne Diseases** **Written by: Linda Aronson DVM**

I recently attended lectures given by Ed Breitschwerdt, DVM, Dipl. ACVIM from North Carolina State College of Veterinary Medicine that I found stimulating and interesting. The Vector Borne Diseases Diagnostic Laboratory at NCSU offers the most comprehensive veterinary panel for vector (tick and other insect) borne diseases. At some point I would love to go into a great deal more detail on his seminars, but for now I will restrict myself to a few important points he raised, as well as some others I gleaned from a lecture on the Epidemiology of Tick Borne Disease East of the Rockies by Michael Dryden, DVM, MS, PhD. I had to miss the companion lecture on TBD West of the Rockies.

Lyme and many other vector borne diseases (*Anaplasma*, *Babesia*, *Bartonella*, *Ehrlichia* and *Leishmania spp.*) as well as other microorganisms (*Chlamydia*, *Mycoplasma spp.* and retroviruses) can set up long-term or even permanent house-keeping in the body, and while treatment may control symptoms they will not eradicate the disease. Transmission of more than one disease by a single vector is not uncommon. These diseases can result in chronic, insidious disease – glomerulonephritis (glomerular kidney disease), polyarthritis) or acute decompensation – immune-mediated hemolytic anemia (AIHA), immune-mediated thrombocytopenia (IMTP). While these can occur in dogs of any age, breed or sex, infection in older animals will likely be more severe and atypical of expectations for a particular disease. The interactions between the various organisms in a multiple disease infection can also contribute to the range of symptoms.

A word about AIHA and IMTP would be appropriate as they are of particular interest to Bearded Collie owners. While we have been led to believe that these diseases are always genetic in origin, this is not necessarily the case when they are induced by vector borne diseases. There is some evidence that some dogs may be more susceptible to developing these manifestations of the diseases, and genetics can play a role, but other factors are involved. Dr. Breitschwerdt pointed out that the presence of AIHA, IMTP and glomerulonephritis may obscure diagnosis of the underlying vector borne disease. Once immunosuppressive treatment has been begun for suspected AIHA, ITP or SLE (systemic lupus erythematosus – which can manifest as glomerulonephritis and polyarthritis) low or non-existent titers for tick borne



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disease may sky rocket. It is always advisable to retest for tick borne diseases after starting treatment, lest the underlying cause be missed.

The reason these diseases make us and our dogs sick is that we are non-reservoir hosts. Parasitic diseases will not survive if they kill their host species, and so have evolved in conjunction with reservoir hosts – insects, mammals etc – in which they do not cause disease. Only when they end up in the wrong place is disease created. It has recently been shown that *Ehrlichia* and *Anaplasma* species can inhibit white cell apoptosis (natural cell death) and so prolong the life span of the cells they inhabit. Chronic infection can not only complicate diagnosis of these illnesses, it can also influence and complicate other illnesses that a patient experiences over time – whether they are degenerative, immune-mediated, allergic or neoplastic. As the incidence of these illnesses increases with age, so will the severity of bizarre presentations from vector borne and other persistent infections. These organisms could also influence the body's response to normal bacteria that colonize the skin, gastrointestinal system or urinary tract.

It has been demonstrated that many animals are co-infected with Lyme disease and *Anaplasma phagocytophilum*. Dogs with both organisms are far more likely to become severely ill than those infected with only one of the two. The same is true of other co-infections. Toxicity, nutrition and genetics as well as the burden of multi-organism infection are all factors in determining whether or not a dog will develop immunity to the disease organisms or become sick. Antibody titers cannot determine whether a dog becomes sick or not, they only tell us that the dog has been exposed to the disease.

Many people believe that ticks jump onto passing dogs from trees and tall bushes, but most ticks are found on plants under 18" in height. There they wait upside down for a carbon dioxide secreting organism to pass and drop off onto it. Most ticks will therefore be found on the front end of the dog, which is the part they are most likely to encounter. People have reported ticks persisting well into the winter this year, and they can be expected to be active if there is no snow cover whenever temperatures rise over 35 oF. Further disturbing news is that the Lone Star Tick, which as its name implies used to be primarily resident in Texas is now found in virtually all states east of Texas up to and throughout New England. The distribution of other tick species is also expanding. Different ticks serve as hosts for different diseases, and we need to improve our ability to identify the different tick



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species in our area. We also need to expand our testing for tick borne diseases to include diseases which in the past were ignored.

Lyme disease goes hand in hand with the deer population. When settlers pretty much eradicated the white tailed deer, they also saw virtually no ticks. The white tailed deer population is soaring so is that of the tick. Other factors are at play though. Ticks acquire the spirochetes of Lyme disease from blood meals taken as larvae and nymphs from small mammals, most often the white footed mouse. In Florida, instead of mice most larvae and nymphs get that blood meal from lizards that do not host the spirochetes. So despite the burgeoning populations of deer and ticks in Florida the incidence of Lyme is only about 20% of that in states with similar deer densities where mice are the preferred snack. Another interesting fact is that humans are primarily infected by ticks in the nymphal stage, much smaller than the adult, which is also pretty small, and explaining why so few people know they were bitten by the tick. Dogs, OTOH, are almost always infected by the adult tick. How long it takes for the tick to infect the dog is unclear, but it is probably less than 40 hours, much faster than we used to believe.

Dr. Breitschwerdt likes to quote Voltaire: "Doctors put drugs of which they know little, into our bodies of which they know less, to treat disease of which they know nothing at all." We have made a little progress since the 18 th century, but we still have a long way to go.