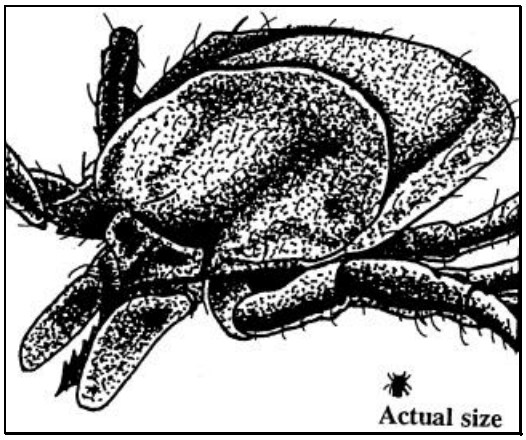
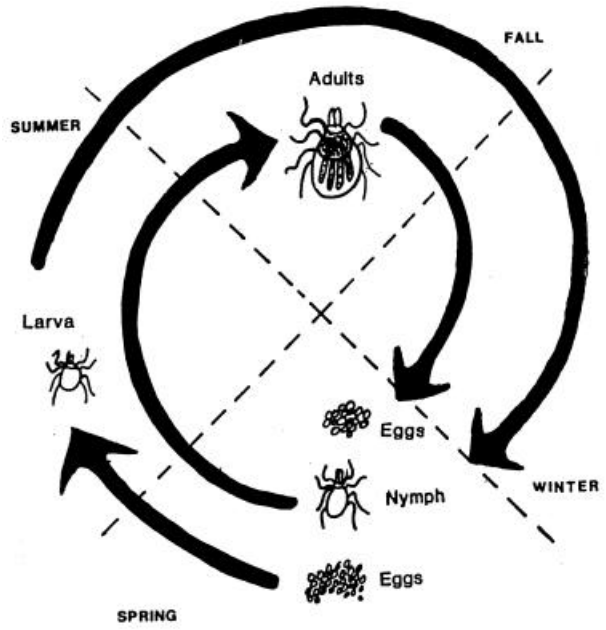
Testing for
Tick Borne
Diseases



Lyme Disease
Ehrlichiosis
Babesiosis

Sonoma County
Department of Health Services
Public Health Laboratory
3313 Chanate Road
Santa Rosa, CA 95404
(707) 565-4711

Life Cycle of the Tick



The life cycle of the Western Black-Legged tick, *Ixodus pacificus*, takes two years to complete. In the nymph stage, ticks are very small, about the size of a poppy seed, and are most prevalent in spring and summer. Adult ticks are larger, about the size of a sesame seed, but can expand to the size of an apple seed when engorged. Adults are most prevalent in the fall and winter. Ticks are most likely to be encountered in cool moist grassy areas, in leaf litter, and along animal trails.

Certain ticks found in California carry organisms which can infect humans and animals. The prolonged bite of a tick may transmit disease agents which cause Lyme disease, Ehrlichiosis, or Babesiosis. It is believed that a tick must be attached for more than 24 hours in order to transmit sufficient organisms to cause infection. Use of proper outdoor clothing, tick repellents, and thorough body checks following outdoor activity are important measures to prevent tick bites.

Locally, about one percent of adult ticks and three percent of nymphs are found to be infected with *Borrelia burgdorferi*, the Lyme disease agent. A recent study involving over 200 Sonoma County residents who are frequently exposed to ticks, found that some of them had antibodies to *Borrelia burgdorferi* (the agent of Lyme disease), *Ehrlichia chaffeensis*, Human Granulocytic Ehrlichiosis (HGE) agent, or *Babesia sp.* (WA- 1).

Tick Testing

Whole ticks can be tested for the presence of Borrelia burgdorferi, the Lyme disease agent. Results from testing ticks may help guide the treatment decision. Early detection is important. The whole tick which has bitten a human should be submitted as soon as possible to the Public Health Laboratory. Best results are obtained if the body part of the tick is intact, and is transported in a small bottle or plastic bag along with a water-moistened piece of cotton. The geographic place where the tick is likely to have been encountered, and the location on the body where the tick was found attached, is important to note in the request for tick testing.

Serologic Testing

Lyme disease

Hundreds of cases of Lyme disease have been reported in Northern California. Lyme disease is a common infectious disease in Northern California, caused by the bacterium, *Borrelia burgdorferi*. Early symptoms of Lyme disease include a red, circular spreading rash (erythema migrans) which usually appears three days to one month after the bite of an infected tick. Fever, aches, and fatigue may accompany this. Later complications of Lyme disease include inflammation of the heart, nervous system, and joints.

Specimen requirements for serological testing for the presence of antibodies to *B. burgdorferi:*

Collect 5-10 mls. of blood in a red top tube, 4 to 6 weeks after the tick bite. Store blood in the refrigerator prior to delivery to the Public Health Laboratory. Send within 2 days of blood draw.

Ehrlichiosis

Ehrlichiosis has only recently been recognized in humans, and has rarely been reported in California. The disease may be caused by one of two types of organism: *Ehrlichia chaffeensis*, or the agent of Human Granulocytic Ehrlichiosis.

Most people infected with *Ehrlichia* are asymptomatic or mildly symptomatic and do not develop full-blown disease. Some infected patients exhibit common but non-specific and self-limited symptoms such as fever, chills, headache, nausea, malaise, and muscle aches. Severe disease is rare but may progress to respiratory failure and death.

Specimen requirements for serological testing for the presence of antibodies to *Ehrlichia chaffeensis*, or HE agent:

Collect 10 mls. blood in one sterile red top tube. Transport to the Sonoma County Public Health Laboratory within 48 hours. Refrigeration or room temperature storage is acceptable.

Babesiosis

Babesiosis is a rare tick-transmitted disease caused by the protozoal parasite *Babesia sp.*. Only a few cases of human Babesiosis have been reported in California. Babesiosis can cause flu-like symptoms and hemolytic anemia; other symptoms may include fatigue, shaking, chills, dark urine, headache, sweats, high fever, muscle aches, and vomiting. Asplenic, elderly, chronically ill, or immunocompromised patients are at greatest risk for severe complications of Babesiosis.

Specimen requirements for collection and submission for testing for antibodies to *Babesia microti*, or *Babesia sp.* (WA-1):

If acute Babesiosis is suspected, testing for both *Babesia sp.* (WA-1) and *Babesia microti* is recommended. A clinical history is required for confirmatory testing of positives.

Serologic tests for antibodies:

Serologic tests for Babesiosis antibodies require 10 mls. blood in a red top tube. Transport this specimen to the Sonoma County Public Health Laboratory within 48 hours, accompanied by either (a) or (b) described below.

Testing for parasites in blood cells:

(a) If possible, draw 5 mls. blood in a purple top tube, during a febrile episode or shaking chills. Transport blood to the Public Health Laboratory within 2 hours.

(b) Within one hour of blood draw, make four thin blood smears on clean glass slides. Allow the smears to air dry, then fix with 100% methanol for 15 minutes. Transport slides in a holder to the Sonoma County Public Health Laboratory.

For more information contact:

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Tests for Tick Borne Diseases
at the Sonoma County Public Health Laboratory

HUMAN SEROLOGIC TESTS

Disease/Organism	Type of Test	Specimen Requirements
1. Lyme disease	ELISA test	Patient's blood in red top tube 10 ml. Acute and/or convalescent sera.
2. Lyme confirmation*	Western Blot Test	Same aliquot of serum as above
3. *Ehrlichia chaffeensis*	IFA test**	Patient's blood in red top tube 10 ml. Acute and/or convalescent sera.
4. HGE agent	Serology	Same as above.
5a. *Babesia sp*. (WA- 1)	Serology***	Patient's blood in red top tube 10 ml. Acute and/or convalescent sera.
b. *Babesia microti*	Serology***	Patient's blood in red top tube 10 ml. Acute and/or convalescent sera. Also include: Patient's thin blood smear (x4), on slide fixed with methanol (or 5 ml. blood in purple top tube).
6. Tick Diseases Panel Screen Test	Serology (Tests 1, 3,4,5a,5b)	Two red top tubes (@ 20 ml.) for all serologic tests (1,3,4,5a,5b) and thin blood smear.

TICK TEST

Disease/Organism	Type of Test	Specimen Requirements
Borrelia burgdorferi	IFA test	Ticks (dead or alive, kept moist in small container).

Ticks are tested every Wednesday. Send tick specimens by mail or deliver in person to:

Sonoma County Public Health Laboratory
3313 Chanate Road
Santa Rosa, CA 95404
Phone: (707) 565-4711

Make check payable to: Sonoma County Health Services Dept. Please phone lab for cost of testing.

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*Done only if Test No. 1 is positive.

**The *Ehrlichia chaffeensis* serology tests, reagents, and procedures are supplied by the CDC, Atlanta.

***The *Babesia* test procedure developed by Dr. Pat Conrad's Lab at UC Davis is used in the Sonoma County Lab.