Tests for Tick-Borne Diseases

Lyme Disease Tests:

- Antibody Response (or Serology): measures antibody levels produced in response to the disease. Includes: ELISA, OPTIFEN (IFA rarely used), IFA-ELISA, IFA, Western Blots. In the first year after a tick bite, less than 60% of patients produce antibodies & they may not last by year 2. In a study with less than 50% of patients still have an antibody response. Antibody response tests are most effective starting 4-12 weeks after a tick bite, & accuracy rates vary considerably. If antibiotic treatment is inadequate, antibody levels may remain low causing tests to be negative.
- Antibody Capture: an antibody test with the same problems as the test listed above.
- Culture - grows actual organism. Difficult to do, but when positive, it confirms a Lyme infection.
- Antigen Capture - a highly defined antibody captures pieces of the Lyme organism. Actually checks for the presence of a piece of Lyme bacteriophage (or hybridization) and PCR may be ordered. PCR results are meaningless. Can be performed on all body tissues.
- LDA (Lyme Dot Antigen Assay for Urine and CSF). The test measures antigen levels. It confirms a Lyme infection. The results are qualitative rather than quantitative. Antibody titers & accuracy rates vary considerably. If antibiotic treatment is inappropriate, antibody titers may remain low causing tests to be negative.
- Antibody & Antibody Response: includes ELISA, C6Peptide, IFA (rarely used), Antigen Capture, Western Blot, IFA (IgM & IgG), Antibody Response, LFA. Recommended to use ELISA.
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Lyme patients often get worse before getting better while on long-term antibiotic treatment. May switch from spirochete form to L-form (cell wall deficient) and revert back to the spirochete. Have been found in patients after long-term antibiotic treatment. After treatment, may become new research calls, persisters cells.

**Lyme Symptoms & Symptoms**

**Lyme**

**Symptom**

- Go intracellular & hide, go dormant.
- Become sequestered in sites that immune cells do not usually enter (central nervous system, joints, eyes).
- Kill T-cell straight to brain, dizyness.
- May switch from spirochete form to L-form (cell wall deficient) or cystic form (giant L-body) - not susceptible to antibiotics that kill spirochete form that can clearly understood.
- Have been found in patients after long-term antibiotic treatment.
- After treatment, may become new research calls, persisters cells.

**Other Tick-Borne Diseases**

One tick bite can give you many different diseases at the same time (co-infections). Treatments vary, examples provided as information only.

- **Babesiosis** - Malarial-like illness caused by a parasite. Babesia microti, other Babesia species. May produce divergent symptoms such as chills, headaches, fever, and weight loss. Diagnosis is by blood smear and treatment is doxycycline.

**Tick Testing for Tick-Borne Diseases**

- If testing tick, don't put in tape, save alive if possible.
- Place in alright container, put tick big.
- Put in moist with cotton ball (no alcohol).
- Send with check to testing lab.
- Tick testing labs include:
  - IGeneX Labs, 800-832-3200
  - An example: Tick Box Technology Corporation, www.tickboxtcs.com
  - Check out clothes which protect against ticks.
  - Tuck pants into socks.

**Tick Testing for Tick-Borne Diseases**

- See tick testing for tick-borne diseases. Check out methods for property protection.
- For tick testing, see below.

**Prevention**

Always follow manufacturer’s directions. The LDA does not make specific product recommendations or give any grants.

- Perform frequent, thorough tick checks.
- Wear light-colored clothes.
- Use insect repellent containing DEET.
- Put clothes in dryer for 30 minutes to kill ticks.
- Check DEET-containing products, picaridin, IR3535 for skin.
- Pay attention to manufacturers of tick products for consumers.
- Check out clothes which protect against ticks.
- Check out facts for methods for property protection.
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**Elves Facts**

- You can get many tick-borne diseases from one tick bite.
- The longer a tick is attached, the greater the risk of disease.
- Lyme: a clinical diagnosis based on symptoms, history & exam.
- You can test negative & still have Lyme.
- CDC criteria are for surveillance reasons, not diagnosis.
- According to the CDC surveillance criteria, an erythema migrans (EM) rash in a high-risk area is enough for a diagnosis.
- In a low incident state, rash requires a positive test.
- Not everyone who contracts Lyme disease gets a rash.
- Lyme symptoms can develop days or months after a tick bite.
- Lyme patients often get worse before getting better while on long-term antibiotic treatment (Jarisch-Herxheimer reaction).
- Lyme bacteria can cross the placenta & infect the fetus, which may result in fatal death, & its DNA has been found in breast milk.
- Lyme can cause death.

**Lyme Bacteria: Borrelia burgdorferi**

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- Become sequestered in sites that immune cells do not usually enter (central nervous system, joints, eyes).
- Kill T-cell straight to brain, dizyness.
- May switch from spirochete form to L-form (cell wall deficient) and revert back to the spirochete. Have been found in patients after long-term antibiotic treatment.
- After treatment, may become new research calls, persisters cells.

**Other Tick-Borne Diseases**

- **Q Fever** - Caused by Coxiella burnetii. Can be disease, Q fever, from Rocky Mt. or wood ticks, most cases result from inhaling aerosolized spores, animal-manure, or rodent excreta. Q fever is tick-borne, from EM-like rash, fever, fatigue, muscle & pain. No tests currently available. Treatment is doxycycline ever for kids.
- **STARI (Southern Tick-Associated Rash Illness)** - Transmitted via a low tick bite. STARI can occur days or weeks after a bite. Symptoms are very similar to Lyme disease including EM-like rash, fatigue, headache & muscle pain. No tests currently available. Treatment is doxycycline ever for kids.
- **Tick paralysis** - Caused by a neurotoxin secreted by American Rocky Mt. Wood ticks. STARI begins 2-6 days after attachment & primarily involves a paralysis that begins in the feet & spreads upward. May be fatal respiratory muscles involved. Paralysis resolves when tick is completely removed.
- **Tularemia** - Caused by Francisella tularensis. Multiple transmission routes including: Arthropod, Rodent, Avian, Tick-bites. Symptoms include: fever, headache, meningitis, rash, unwell, fever, sweating, weight loss & depression. Stool analysis at site. Treatment: streptomycin or gentamicin.
- **Alpha-ga ally** - Caused by the bite of Amblyomma anamericanum, low risk. The tick saliva triggers an immune response to a carbohydrate, alpha-gal, found in red meat. Can cause anaphylaxis. Not always recognized by doctors as cause of meat allergy since symptoms may occur 3-4 hours after bite. Symptoms may include hives, itchiness, anaphylaxis. Must refrain from eating certain meats/products such as beef, lamb, venison, pork. Other tick bites may cause it.
- **Tularemia** - Caused by Francisella tularensis. Multiple transmission routes including: A. americanum, L.殖地mus, D. variabilis/ticks. Symptoms include: headache, chills, vomiting, aching pains, fever, swelling, weight loss & depression. Stool analysis at site. Treatment: streptomycin or gentamicin.
- **Bourbon virus** - Caused by a bunyavirus, with first 2 cases in Kansas & Oklahoma in 2006. May be transmitted by ticks. Symptoms include: headache, fever, nausea, vomiting, myalgias, rash, chills, fever, vomiting, aching pains, fever, swelling, weight loss & depression. Not tests or treatment to date except for symptom management.
- **Heartland virus** - Caused by a phlebovirus discovered in Minnesota in 2009, 9 cases documented. May be transmitted by ticks. Symptoms include: headache, fever, vomiting, myalgias, rash, chills, fatigue, muscle aches & chills. Diagnosis is by serology, all current strains available. Treatment is doxycycline.
- **Rocky Mountain spotted fever** - Caused by Rickettsia rickettsii. Transmitted by Dermacentor variabilis (American dog tick), D. andersoni (wood tick), & Amblyomma americanum (brown dog tick). Symptoms include: fever, headache, myalgias, rash, neck stiffness, vomiting, abdominal pain, desquamation. CDC suggest use of RMSF tests. Treatment with doxycycline.
- **Q Fever** - Caused by Coxiella burnetii. Disease can be tick-borne, from Rocky Mt. or wood tick but most cases result from inhalingChlamydia psittaci. Symptoms are very similar to Lyme disease including high fevers up to 105°, severe headache, malaise, myalgias and/or chills, cough, nausea, vomiting, diarrhea, abdominal pain, chest pain. Rarely tested for. Diagnosis: usually treated with doxycycline.
- **Rocky Mountain spotted fever** - Caused by Rickettsia rickettsii is transmitted by Dermacentor variabilis (American dog tick), D. andersoni (wood tick) & Amblyomma americanum (brown dog tick). Symptoms include: fever, headache, myalgias, malaise, nausea, vomiting, abdominal pain, desquamation. CDC suggest use of RMSF tests. Treatment with doxycycline.
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