

Lab Reports Associated with Tickborne Diseases



Jodi Reber, RN
2011 Communicable Disease Conference



SFG (RMSF), Anaplasmosis and Ehrlichiosis Laboratory Criteria

Laboratory confirmed:
Serological evidence of a fourfold change in immunoglobulin G (IgG)-specific antibody titer reactive with *(insert organism name)* antigen by indirect immunofluorescence assay (IFA) between paired serum specimens (one taken in the first week of illness and a second 2-4 weeks later), or

Detection of *(insert organism name)* DNA in a clinical specimen via amplification of a specific target by PCR assay, or

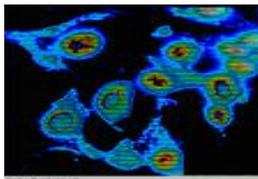
Demonstration of spotted fever group antigen in a biopsy or autopsy specimen by IHC, or

Isolation of *(insert organism name)* from a clinical specimen in cell culture.

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Rickettsia Microscopy



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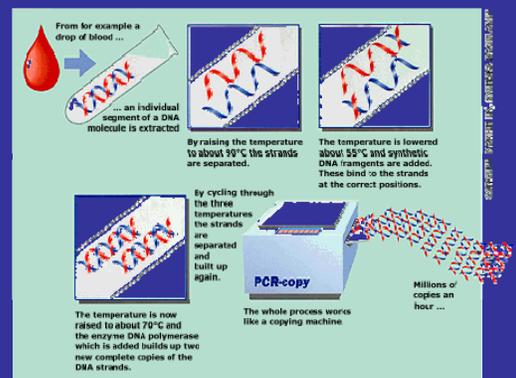


Common Laboratory Tests Tickborne Disease

PCR- Polymerase chain reaction

This test will detect the genetic material (DNA) of the bacteria. Standards for PCR testing are still under development and it currently requires more technical skill and expense than the IFA testing.

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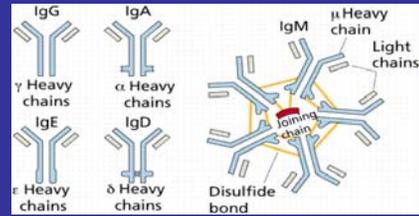
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Immunoglobulins



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IgM

Is manufactured 1st and peak production is usually within 4 weeks. In general, this immunoglobulin will stay in circulation for about 6 months.

IgG

Is manufactured 2nd, and usually forms in 4-8 weeks. The peak production is usually 6 weeks and usually will leave circulation by 12 months.

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Relative value of IgG and IgM Testing as Indicators of Spotted Fever, Anaplasmosis and Ehrlichiosis

IgM tests are not strongly supported for use in serodiagnosis of acute disease, as the response may not be specific for the agent (resulting in false positives) and the IgM response may be persistent.

IgG tests are considered more reliable.

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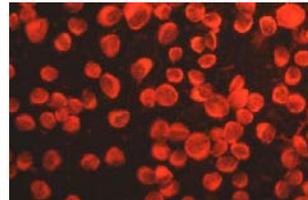
IFA – Indirect fluorescent antibody

This is a manually performed lab test. Takes a specimen and tests it with a reagent that contains antigen for RMSF. If an antibody is present in the specimen, it will attach to the antigen in the reagent and the combination will "light-up".

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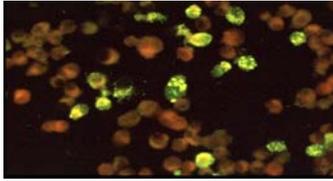
SEROLOGY: Indirect Fluorescent Antibody Negative



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SEROLOGY: Indirect Fluorescent Antibody Positive



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Lab Data in NC EDSS

Rickettsia IgG Titr Ser IF || Rickettsia rickettsii
Ab.IgG: IF, 1:64, Neg <1:64, RMSF, IgG, IFA, 016174,
Final Results, Negative <1:64 Positive 1:64
Recent/Active >1:64 . Titers of 1:64 are suggestive of
past or possible current infection. Titers >1:64 are
suggestive of recent or active infection.
Approximately 9% of specimens positive by EIA
screen are negative by IFA

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IFA – Indirect fluorescent antibody

If you start to dilute the specimen then there should be less antibody available to attach and "light-up" when the reagent is added.

The process of diluting will continue until nothing "lights-up".

If there is a lot of antibody present, you see the specimen "light-up" over many dilutions.

IFA results are reported as titers (1:16, 1:32, 1:64, 1:128, etc.)

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Fourfold change

When an IFA test is performed 2 to 4 weeks apart, is there at least a **fourfold change (4x)** in the titer?

Examples:

1st specimen is 1:64 and 2nd specimen is 1:256

or

1st specimen is 1:1024 and 2nd specimen is 1:256

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Paired Specimens

The 1st specimen & 2nd specimen tests are performed at the
–same time
–in the same lab
1st specimen is held until the 2nd is present

Draw blood on first visit and store in refrigerator or freezer in serum separator tube. When second specimen is obtained, send both at the same time to testing lab.

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SFG (RMSF), Anaplasmosis and Ehrlichiosis Laboratory Criteria

Laboratory confirmed:

Serological evidence of a fourfold change in immunoglobulin G (IgG)-specific antibody titer reactive with *Rickettsia rickettsii* antigen by indirect immunofluorescence assay (IFA) between paired serum specimens (one taken in the first week of illness and a second 2-4 weeks later), **or**

Detection of *R. rickettsii* DNA in a clinical specimen via amplification of a specific target by PCR assay, **or**

Demonstration of spotted fever group antigen in a biopsy or autopsy specimen by IHC, **or**

Isolation of *R. rickettsii* from a clinical specimen in cell culture.

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Laboratory is supportive if:

there is serologic evidence of elevated IgG or IgM antibody reactive with *R. rickettsii* antigen by IFA, enzyme-linked immunosorbent assay (ELISA), dot-ELISA, or latex agglutination.

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Ehrlichiosis/Anaplasmosis

Diagnostic tests

Examination of Peripheral Blood Smear

Ehrlichia Monocyte Anaplasma Neutrophil

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Positive Culture for *B. burgdorferi*

“Gold Standard”

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Common Laboratory Tests Lyme Disease

Two-tiered testing is the most commonly used:

1. EIA/ELISA testing

followed by

2. IgM Western blot testing

IgM Western Blot if less than 4 weeks from onset of S&S.

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Enzyme-linked immunosorbent assay

Positive Reaction

Antigen (virus) binds to antibody.
Antibody binds to antigen (virus).
Enzyme reacts with substrate to form a yellow color.

Add antibody binds to bottom of well.
Blocking agent is added to fill in areas not bound by antibody.
Tap from samples is added.
Antibody with enzyme attached added.
Substrate added.

Negative Reaction

No binding occurs if antigen (virus) not present in cap.
Antibody is added but has no antigen to bind to and is washed away.
Substrate is added but no reaction is present to react. No color appears.

only Screen indicates a weak cap.

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Multiple specimens after EIA testing

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The Western Blot Test is more specific and measures the antibody/antigen response. The test attempts to identify disease specific proteins in the antibody.

