

# **Integrative Treatments for Lyme Disease**

*Arthur Gertler, M.D.*  
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## **Arthur Gertler MD.**

### ***Lyme Literate Medical Doctor***

- Dr. Gertler is Board-Certified in gastroenterology and internal medicine with over thirty years clinical. He is a Lyme literate Medical Doctor, who specializes in diagnosis and treatment of Lyme disease with the most advanced, individualized holistic techniques
- Dr Gertler is a Lyme Literate physician and has treated Lyme disease with antibiotics, supplements and IV therapy



**Geoff D'Arcy, Lic. Ac., D.O.M.**

## ***Acupuncture and Herbal Medicine***

Geoff has been a practicing Traditional Chinese Medicine (TCM) Herbalist and Acupuncturist for over 33 years.

Geoff brings the wealth of Eastern philosophy and training to the healing arts of acupuncture and herbal medicine to the treatment of Lyme Disease.

He began his training in Japan in the mid-1970s, and returned to England to gain his licentiate in traditional Chinese acupuncture. Geoff went on to study Traditional Chinese Medicine (TCM) in hospitals and colleges in China, and received a doctorate in Oriental Medicine in the United States.

# Integrative Lyme Disease Treatment Possibilities



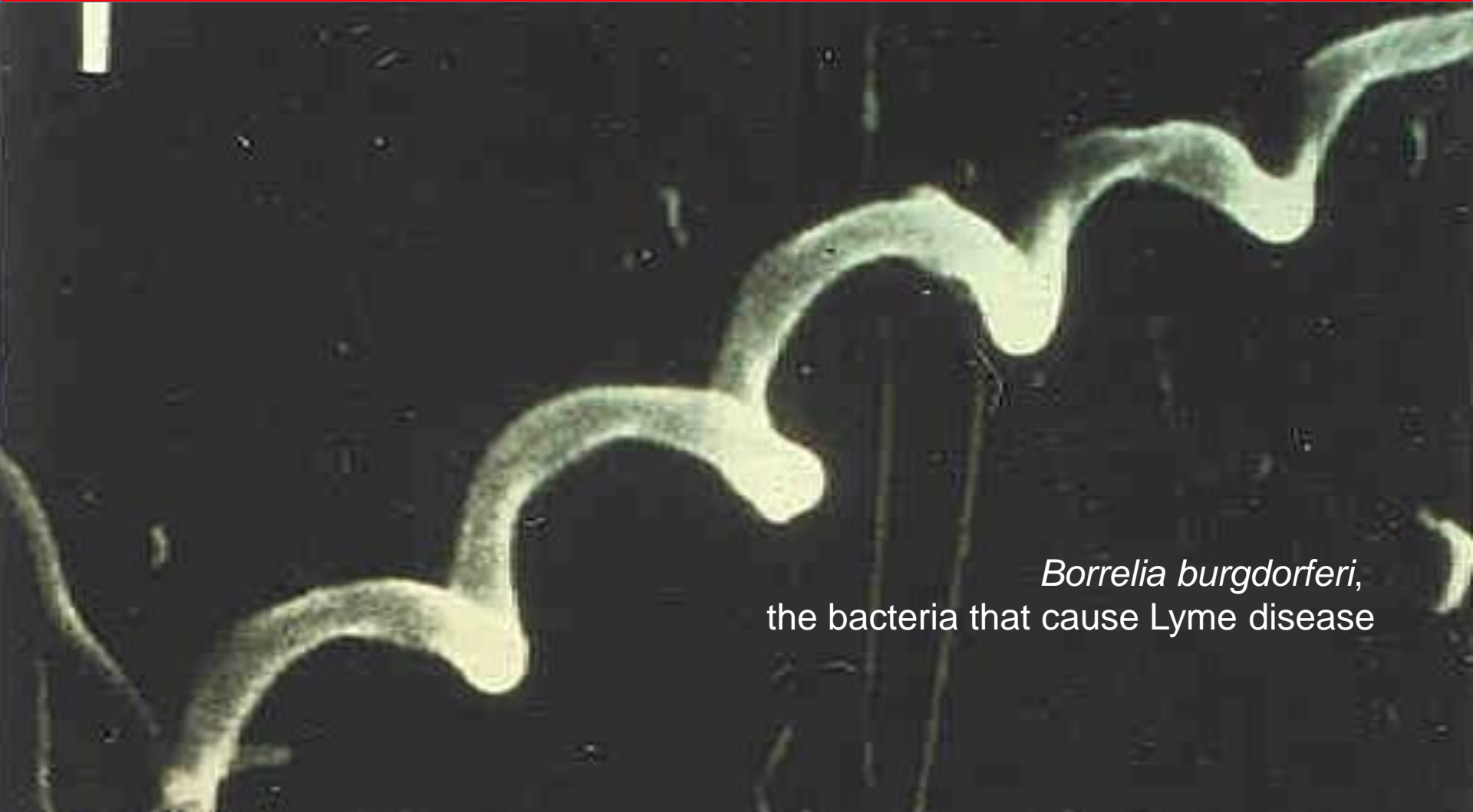
- Antibiotics
- IV Antibiotics
- Herbal Protocols
- Supplements
- Acupuncture
- Diet
- Movement
- Stress-Relief

# Lyme Disease



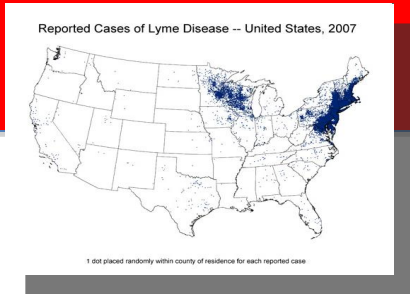
- **There will be 40,000 new infections of Lyme disease this year in Massachusetts. 12,000 of those infected, will go on to Chronic persistent Lyme disease!**
- Lyme disease (LD) is a multisystem infection caused by *Borrelia burgdorferi*, a type of bacterium called a spirochete that is carried inside the stomachs of ticks.
- These ticks are in turn, carried by deer, mice and chipmunks. The reservoir for the bacterium is believed to be white footed mice.

# Borrelia burgdorferi



*Borrelia burgdorferi*,  
the bacteria that cause Lyme disease

# Lyme Disease in the US



- **More than 300,000 cases of Lyme disease are reported to CDC every year**, (the most commonly reported tick-borne illness in the United States), the CDC says. But some reports have suggested it is far more common than that.
- **Up to 20 percent of patients have long-term symptoms**, (CDC).
- **At least 40,000 new infections a year in Massachusetts.** (Boston Globe)

# Lyme Disease in the US

Reported Cases of Lyme Disease -- United States, 2007

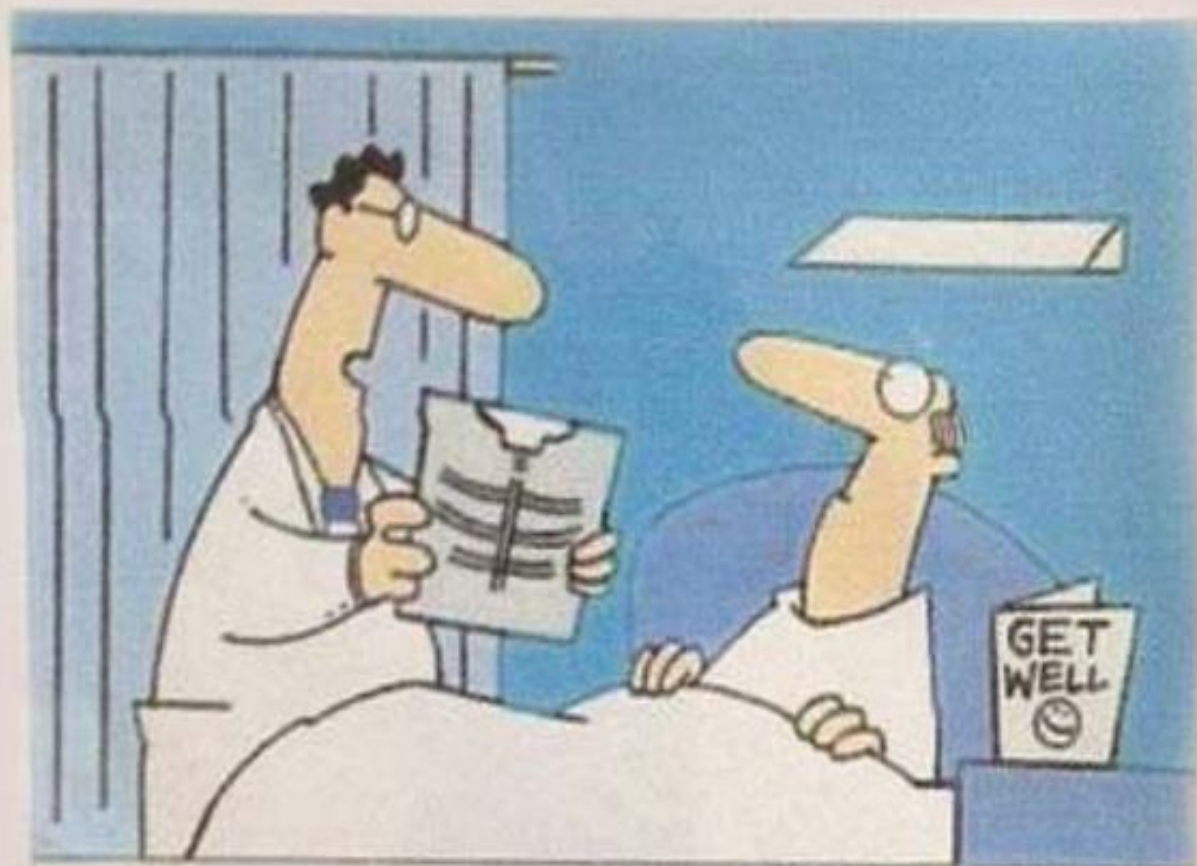


1 dot placed randomly within county of residence for each reported case

In 2012, **95% of Lyme disease cases were reported from 13 states:**

Connecticut  
Delaware  
Maine  
Maryland  
**Massachusetts**  
Minnesota  
New Hampshire  
New Jersey  
New York  
Pennsylvania  
Vermont  
Virginia  
Wisconsin





**The bad news is...you have  
Lyme disease. The good news is,  
I don't believe in that disease  
so you're fine!**

# Antiquity of *Borrelia burgdorferi*

DNA preserved in amber in the Dominican Republic

- **15 Million Years Ago:**  
15-million-year-old tick has revealed that the bacteria that causes the disease has been around much, much longer than the human race.

- The discovery was made by George Poinar, Jr. from Oregon State University, and the findings were published in [Historical Biology](#).



# Antiquity of *Borrelia burgdorferi*

DNA preserved in Iceman in the Austria/Italian Alps

- **5,300 Years ago**  
Austria and Italy about 5,300 years ago. DNA evidence revealed that Ötzi was in poor health prior to his death and was infected with Lyme disease.
- This is the **oldest known evidence of a human to have the disease.**



# Antiquity of *Borrelia burgdorferi*

DNA in saved ticks and skin of mice

- **1884 Europe:**

Lancet 1995 Nov 18; 346(8986): 1367. Antiquity of the Lyme-disease spirochaete in Europe [letter]. Matuschka et al.

In **1884-88 Ixodes ticks** attached to a fox are collected and preserved in Austria. Two of them are later found to be infected with *B. burgdorferi*.

- **1894 USA:**

J Infect Dis 1994 Oct; 170(4): 1027-32. Detection of *Borrelia burgdorferi* DNA in museum specimens of *Peromyscus leucopus*. Marshall et al.

In **1894** a researcher from a Massachusetts museum collects and preserves **white-footed mice**. DNA from *B. burgdorferi* (*ospA*) was later detected in ear skin samples from 2 mice from Dennis, Massachusetts.

# Lyme Disease

- Lyme disease is a bacterial infection caused by the spirochete *Borrelia burgdorferi*.
- This organism attacks various organ systems in the body:
  - Nervous System (*Bell's palsy, meningitis, jabbing pain*)
  - Activity System (*arthritis, migratory, joint pain, swelling*)
  - Circulatory System (*heart block, rhythm abnormalities*)



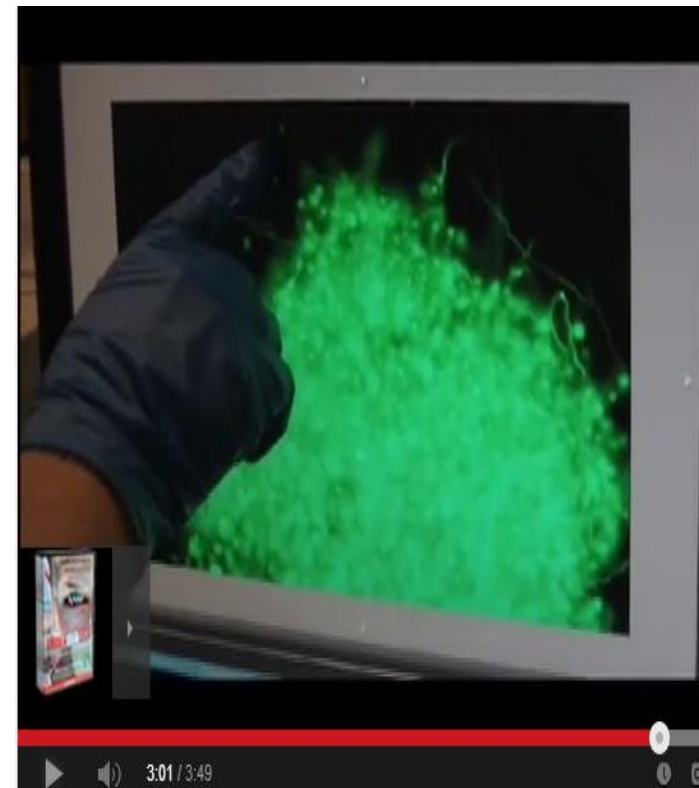
# Lyme Disease Spirochete.. Video

- <https://www.youtube.com/watch?v=F9B60gsCg4w>
- This is video of spirochetes and biofilm found in infected ticks throughout BC from Dr. Kindree and Dr. Banergee from the BC CDC. This video was given to Dr. Murakami by Dr. Kindree



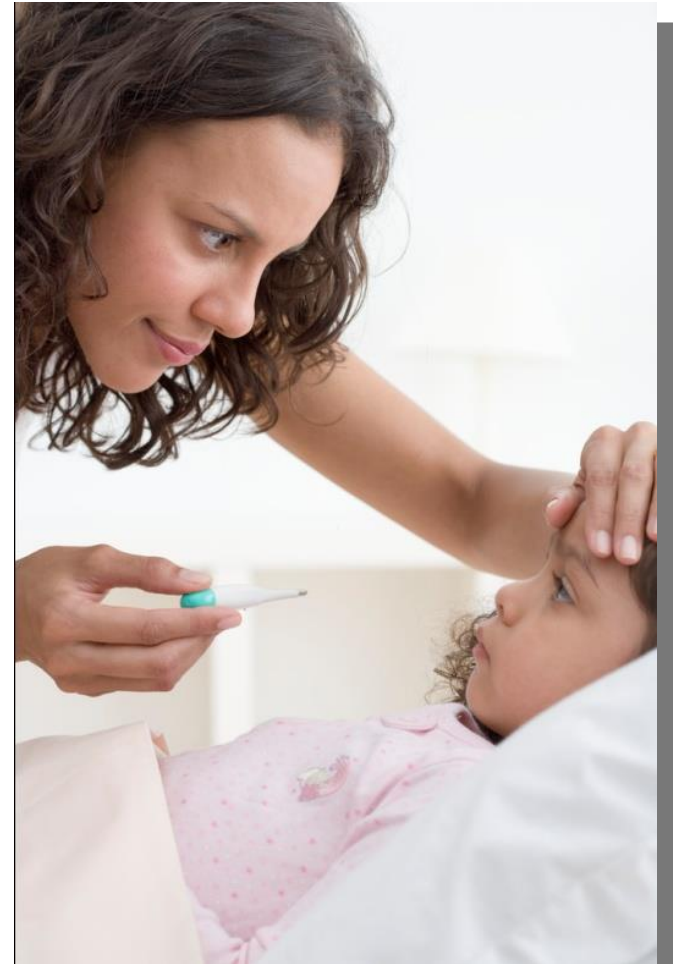
# Lyme Disease Spirochete in Biofilm mass... video

- <https://www.youtube.com/watch?v=a4uNDWdChM8>
- Start at 2:08 minutes
- Lyme bacteria are able to shroud their colonies with protective biofilms and this may explain why these pathogens can be so difficult to eradicate with short courses of antibiotics



# Lyme Disease Symptoms

- Symptoms typically appear 2 – 30 days after the bite of an infected tick.
- Early symptoms:
  - Expanding "bull's-eye" rash
  - Flu-like Symptoms
  - Fever
  - Malaise
  - Fatigue
  - Headache
  - Muscle aches
  - Joint aches





# Lyme Disease Symptoms (cont.)

Late symptoms of Lyme may include:

- Nerve damage
- Encephalopathy (brain disease)
- Meningitis symptoms
- Heart abnormalities
- Severe joint pain or swelling



*Swollen knee of a youth with Lyme arthritis.*

# Lyme Disease; Bull's eye rash

“Bull's eye rash,” the known indicator that we've had a tick bite.  
The “bull's-eye” usually appears 3 to 30 days after infection;  
however this is not fool proof; only 30-50% of those infected  
have had such a rash.



# Lyme Disease Symptoms, Acute and Chronic



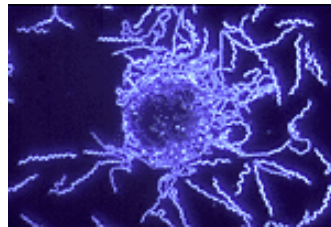
- Arthritic-like symptoms
- **Chronic Symptoms** can range from:
- Meningitis
- Bell's palsy
- Heart problems
- Nervous system abnormalities
- Neurological complications
- Headaches
- Depression
- Memory
- Insomnia

# Clinical Features

*Ixodes* tick



*Borrelia burgdorferi*  
(Bb)



*Erythema migrans*



Arthritic knee  
(Single joint)



## Early Lyme Disease

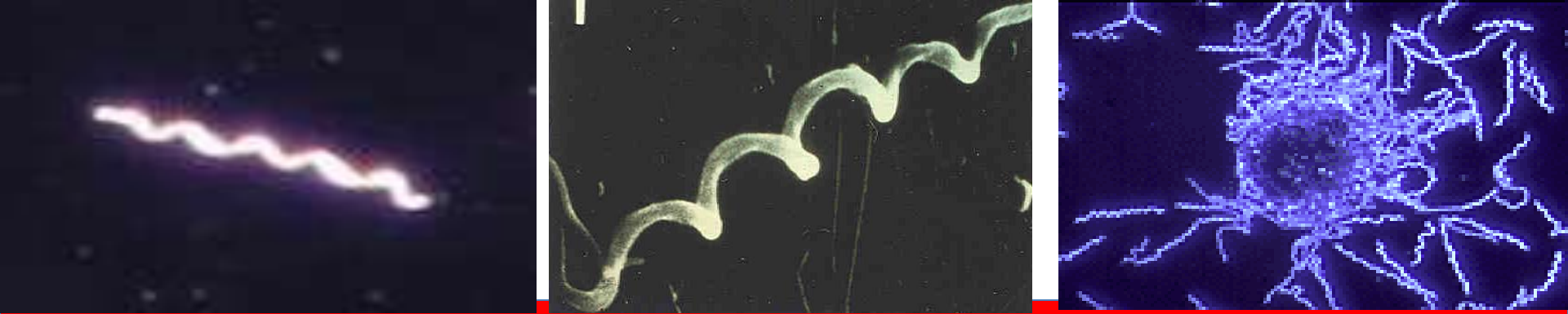
- Erythema migrans (localized and multiple)
- Flu-like illness

## Early Disseminated Lyme Disease

- Neurologic – cranial neuropathy, meningitis, radiculoneuropathy
- Joint – Acute, inflammatory large joint arthritis
- Carditis

## Late Lyme Disease

- Neurologic – peripheral neuropathy, encephalopathy
- **Chronic arthritis**



## LD is called the “*New Great Imitator*”

Like syphilis, it attacks multiple organ systems and mimics many diseases. (Both diseases are caused by a spirochete.) If ignored, the early symptoms may disappear but more serious problems can develop months, even years later. LD has been linked to over 300 diseases including Parkinson’s, MS, ALS, Chronic Fatigue Syndrome and Fibromyalgia.



# Prevention



- **Pets** should **Not** be allowed in bedrooms or on furniture.
- **Landscaping**, remove leaves and clear brush and tall grass.
- **Reduce and manage deer and White Footed Mice** populations.
- **Avoid tick-infested areas**, especially in May, June, and July.
- **Wear light-colored clothing, use insect repellent.** (Red Cedar Oil or Rose Geranium oil is an option.)
- **After being outdoors, remove clothing and wash down.**

# Black-Legged Ticks

## **Adult Female:**

Reddish body size comparable to a sesame seed

## **Adult Male:**

Slightly smaller than female completely dark brown

## **Nymphs:**

Size comparable to that of a poppy seed

## **Larva:**

Size smaller than that of a pin head

**Larva cannot transmit Lyme Disease!**



From left to right: Adult female, adult male, nymph, larva

# American Dog Tick



- Reddish-brown coloring
- Silver-grey marking on its back
- Moves around vigorously
- May cause Rocky Mountain Spotted Fever, but does not carry the Lyme Disease bacteria



# Lone Star Tick



Male and female Lone Star Tick

- Conspicuous white marking
- Reddish-brown color
- More circular in shape
- Elongated mouthparts
- May transmit Ehrlichiosis or STARI

# The Tick Life Cycle

## Year One

## Year Two

Spring

Summer

Autumn

Winter

Spring

Summer

Autumn

Winter

eggs

larvae

nymphs

adults



Adults mate,  
produce eggs & die

# Borrelia burgdorferi



# Borrelia burgdorferi



- Lyme bacteria normally lives in mice, squirrels and other small rodents. White footed mice maybe the reservior.
- Transmission to pets and people is by the deer tick (Ixodid).
- Deer transport the tick but apparently do not get the infection, they are not th reservoir of LD.
- Increased deer populations in small areas in heavily populated states.

# Presence of co-infections that go along on LD's ride

- Other tick-borne infections can further complicate an already complex picture.
- Bb may be co-transmitted with ***Babesiosis***, ***Ehrlichiosis***, and ***Bartonella*** co-infections.
- One study found, that 1-in-5 were seropositive for Bb also ***Ehrlichiosis*** (DeMartino, Carlyon et al. 2001).
- 10%-to-60% for ***Babesiosis*** (Rubel, 2003c; Kraus, McKay et al, 2002).

# D'Arcy Integrative Lyme Disease

## 'Stagnation is the Enemy'

**Heat, Diet, Exercise, Herbs Acupuncture and  
Stress Relief**

“Every organism tries to create the optimum environment within which it will thrive”

Lyme loves...

- stagnation,
- inactivity,
- lack of circulation of blood(& Qi),
- hypo thyroidism
- slow metabolisms,

# **D'Arcy Integrative Lyme Disease**

## **'Stagnation is the Enemy'**

“Deny the Lyme spirochete, the environment that supports it.”

### **Six Points for movement and circulation..**

- #1. Heat,
- #2. Diet,
- #3. Exercise,
- #4. Herbs
- #5. Acupuncture
- #6. Stress Relief

# D'Arcy Integrative Lyme Disease

## #1. Heat Against Lyme

### #1. Heat Against Lyme

Heat can kill off the Lyme bacteria at 107 degrees. Fevers kill off bacteria. 1920 Syphilis treatments in European sanitoriums gave patients malaria. We need to use heat to creat circulation

- Far Infra Red Sauna
- Baths, epsom salts.
- Steam



# D'Arcy Integrative Lyme Disease

## #2. Hard Exercise Against Lyme

### #2. Hard Exercise Against Lyme

Hard exercise, responsibly, proportional to your energy level. Do not overdo, Daily regular routines that are incrementally increased little by little, over weeks and months.

Exercise increases circulation of blood and energy.



# D'Arcy Integrative Lyme Disease

## #3. Diet Against Lyme

### #3. Diet Against Lyme

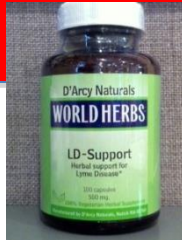


Anti-Inflammatory Diet. A Diet high in Fruits and Veggies, without processed foods, low in animal protien.

- **Green Power Formula**
- Juicing daily, Anti-inflammatory compounds
- 5 to 10 Portions of fruits and veggies.

# D'Arcy Integrative Lyme Disease

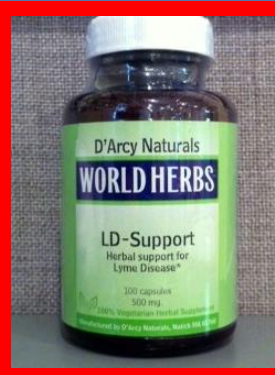
## #4. Herbs Against Lyme



- 1. Lyme Support Herbs Protocol 3- 6 months**  
(*LD Support, BioFilm Breakdown, Brocco SGS, Teasel, San Qi*)
- 2. LD Co-infection Support Herbs Protocol 3 months**  
(*LD Co*)
- 3. Immune Support Herbs Protocol 3- 6 months**  
(*Power Mushrooms, Immu Health*)
- 4. Multi-Probiotics and Supplements**

# D'Arcy Integrative Lyme Disease

## #4. Herbs Against Lyme



## #4. Herbs Against Lyme

### Herbal Support Possibilities **Against Lyme**

- **LD Support Formula**
- **LD Co Formula**
- **Biofilm Breakdown Formula**
- **Brocco-SGS**, support againsts 'Herz' reactions
- **Minor Bupleurum**
- **Teasel**
- **Tienchi Notoginseng**

# D'Arcy Integrative Lyme Disease Herbal Treatment



## #4. Herbs Against Lyme

Herbal Support Possibilities: **Immune System**

- Immu-Health Formula
- Power Mushrooms Formula
- Tienchi Notoginseng

# D'Arcy Integrative Lyme Disease Supplements



## #4. Herbs Against Lyme Vitamin Support Possibilities

- Opti EPA Fish Oil
- Co-Q 10
- Vitamin C
- Vitamin D
- B Vitamins

# D'Arcy Integrative Lyme Disease

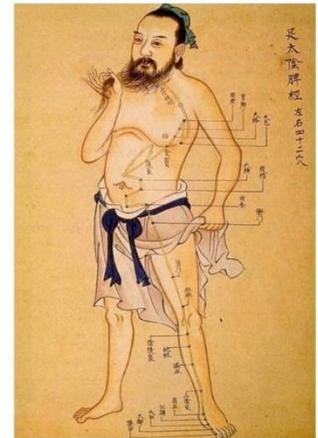
## #5. Acupuncture Against Lyme

### #5. Acupuncture Against Lyme

Acupuncture is great to treat all of the various symptom pictures of the various stages of Lyme.

**Moving stuck 'Qi'** (energy), gets stuck that forms areas where Lyme infections can escape the immune system.

Moving stuck 'blood' taking away symptoms of pain and stagnation.



# D'Arcy Integrative Lyme Disease

## #6. Stress Relief Against Lyme

### #6. Stress Relief Against Lyme



### **Switch-off Stress, Switch-on the Immune System!**

20 minutes a day of a progressive relaxation technique. It takes 5 weeks daily to be able to produce a relaxation-response at will and turn-off the switch that produces the fight-or-flight response.

**Relaxation = Alkalinity, Anti Inflammatory, Anti  
Angiogenic & Anti-Bacterial environment.**

Free Resource Mind-Body Stress-Relief at [www.true-wellness.com](http://www.true-wellness.com)

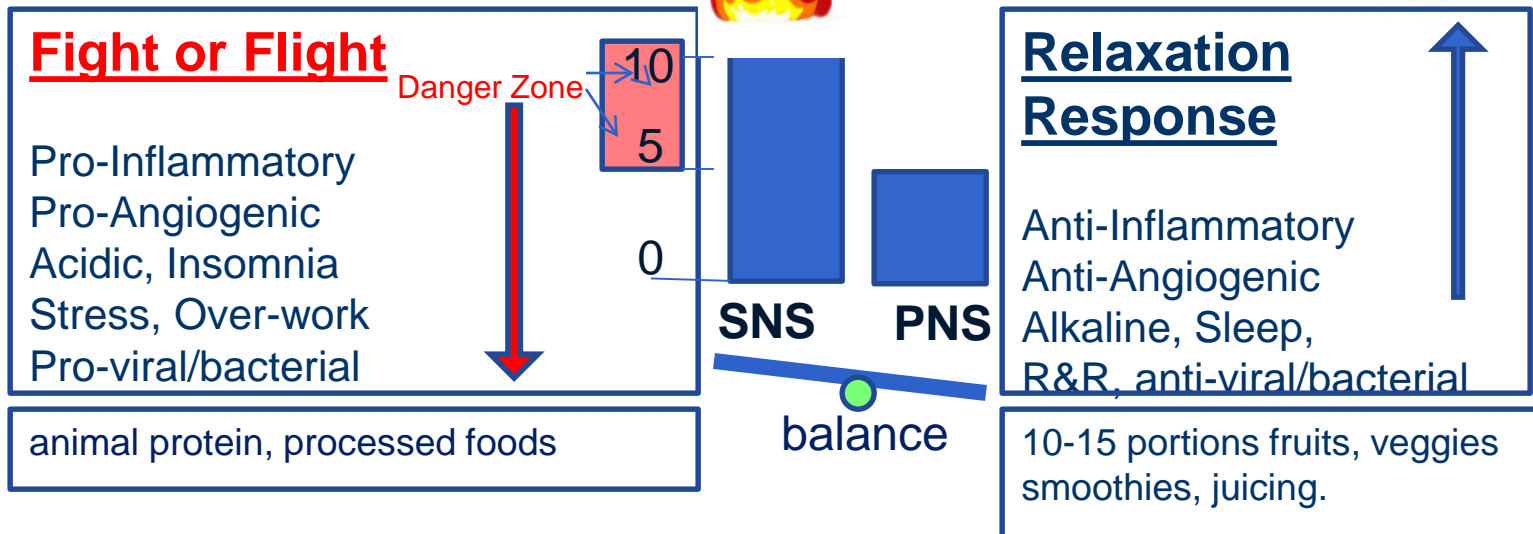


# D'Arcy Integrative Lyme Disease

## #6. Stress Relief Against Lyme

### We are hardwired from Caveman days

All our immune resources are robbed by our fight-or-flight (SNS), no need to fight-a-spirochete if we are going to die in the next few minute. Stress may flare our F&F (SNS) many times a day.





# LD herbal Support

## Andrographis,

### *Andrographis Paniculata.*

Studies have demonstrated its use as a remarkable anti-bacterial, anti-spirochetal and anti-viral herb. These studies have proven its use as an anti-parasite herb with a wide range of use against infection in the body, particularly against the following at the following sites:

- **Leptospira spirochetes**, (*infects a wide range of tissues*) causing leptospirosis. leptospira spirochetes have surprising similarities to LD, and recently found by practitioners to be effective against LD., Andrographis was found to be 80% effective against leptospirosis spirochetes.
- **Malaria**, (*blood*), great for co-infection of *Babesia*, similar to malaria parasite.
- **Leishmaniasis**, (*skin and internal organs*) such as human roundworm.
- **Dipetlonema** (*connective tissue*) as in canine parasitic worm.



# LD herbal Support 'top 10'

## Andrographis, *Andrographis Paniculata.*

1. It is anti-spirochetal;
2. It is protective and healing for neurological aspects of LD
3. Anti-inflammatory: *Andrographolide*, the major active component from *Andrographis*, has shown to possess major anti-inflammatory activity.
4. It is used for the central nervous system, reduces swelling and fights Bb in the collagen at joints (another favorite of Bb);
5. Counteracts periodic/intermittent parasitic diseases (Bb and babesia);



## LD herbal Support

### Andrographis,

### *Andrographis Paniculata.*

6. Immune enhancement: increases white cell
7. Cardio-protective: it protects heart muscles, dissolves clots, and decreases heart muscle damage after heart attacks, normalized EEG readings; (Bb like heart tissue)
8. Supports liver and detoxification of Bb's neuro-toxins
9. Has a broad protective activity throughout the body protecting and killing Bb spirochetes where they may lodge. Studies show extracts have the ability to enhance DNA repair;
10. Due to its ability to treat rashes and other skin disorders, by aiding in the reduction of heat and elimination of toxins from the body,



# LD herbal Support

## Cats Claw, *Uncaria tomentosa*..

Helps the larger white blood cells (more specifically the CD-57 subset) that destroy the Lyme spirochetes. The problem is finding them, because the spirochetes don't like hanging out in the blood (too dangerous for them) and prefer to hide out and find their way to certain nerve & tissue cells.

Cats Claw helps boost our specific immune response, to-get-out-there and fight the stealth bacterium Bb. A study showing Cat Claw, *Uncaria tomentosa*, to be remarkably effective in treating chronic LD (Cowen et al.) found 100% of patients experienced marked clinical improvement; and 85% were sero-negative for LD at the end of study. Unfortunately, this study is not definitive and has some flaws (Buhner). Several other studies show Cats Claw's immune stimulating qualities and major anti-inflammatory abilities; (22 of 100 studies and papers on Pub Med database).



# LD herbal Support

## Japanese Knotweed,

*Polygonum cuspidatum*

Japanese Knotweed's relevance to LD (Buhner):

1. Stimulates microcirculation, esp. to the eyes, knees, heart and skin which helps deliver active constituents to these locations;
2. Reduces inflammation;
3. Protects and correcting the heart function;
4. Provides wide-spectrum antibiotic/antiviral action;
5. Reduces auto-immune responses to LD;
6. Immune enhancement;
7. Protects endothelial integrity from LD's spirochetes and co-infections;
8. Reduces reactive oxygen species production in the CNS and brain.

# Herxheimer Healing Reaction

The die-off of toxin-producing micro-organisms releases toxins into the body and as one takes treatment to get better, they feel temporarily worse.

During Herxheimer reactions, support Liver to help Detoxification, use detoxification supportive supplements such as broccoli sprouts.



# Broccoli Sprouts Powder Stimulates Detoxification, Supports Herzheimer

- Broccoli Sprouts grown with up to 5,500 parts per million, of sulforaphane ground into sprout powder.
- "Three-day-old broccoli sprouts consistently contain 20 to 50 times the amount of sulforaphane (SGS) support better detoxification by stimulating phase II Liver enzymes



# Broccoli sprouts, SGS, Stimulate phase 2 Liver enzymes

- Here are a few of the papers and publications

- Powerful and prolonged protection of human retinal pigment epithelial cells, keratinocytes, and mouse leukemia cells against oxidative damage: the indirect antioxidant effects of sulforaphane. <http://www.pnas.org/cgi/doi/10.1073/pnas.261572998> Proc. Natl. Acad. Sci. USA, Vol. 98, Issue 26, pp. 15221-15226, December 18, 2001 Xiangqun Gao, Albenia T. Dinkova-Kostova, and Paul Talalay
- The impaired glutathione system and its up-regulation by sulforaphane in vascular smooth muscle cells from spontaneously hypertensive rats. <http://www.jhypertension.com/article.asp?ISSN=0263-6352&VOL=19&ISS=10&PAGE=1819> Hypertension, Vol. 19, pp. 1819-1825, 2001. Lingyun Wu; Bernhard H. J. Juurlink
- Potent induction of Phase 2 enzymes in human prostate cells by sulforaphane. <http://cebp.aacrjournals.org/cgi/content/abstract/10/9/949> Cancer Epidemiology, Biomarkers & Prevention, Vol. 10, pp. 949-954. Sept. 2001. James D. Brooks, Vincent G. Paton and Genevieve Vidanes
- Sensitivity to carcinogenesis is increased and chemoprotective efficacy of enzyme inducers is lost in nrf2 transcription factor-deficient mice <http://www.pnas.org/cgi/content/short/98/6/3410> Proc. Natl. Acad. Sci. USA, Vol. 98, Issue 6, 3410-3415, March 13, 2001 Minerva Ramos-Gomez, Mi-Kyoung Kwak, Patrick M. Dolan, Ken Itoh, Masayuki Yamamoto, Paul Talalay, and Thomas W. Kensler JHMI Press release: Studies Show Powerful Natural Anti-Cancer System Exists: Goal Now: Fine Tune It
- Potency of Michael reaction acceptors as inducers of enzymes that protect against carcinogenesis depends on their reactivity with sulfhydryl groups <http://www.pnas.org/cgi/content/short/98/6/3404> Proc. Natl. Acad. Sci. USA, Vol. 98, Issue 6, 3404-3409, March 13, 2001 Albenia T. Dinkova-Kostova, Michael A. Massiah, Richard E. Bozak, Ronald J. Hicks, and Paul Talalay. The chemical diversity and distribution of glucosinolates and isothiocyanates among plants Phytochemistry 2001, 56:5-51. Fahey, Jed W., Zalcmann, Amy T, Talalay, Paul.
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- Broccoli sprouts: An exceptionally rich source of inducers of enzymes that protect against chemical carcinogens <http://www.pnas.org/cgi/content/abstract/94/19/10367> Proc. Natl. Acad. Sci. USA, Vol. 94, pp. 10367-10372, September 16, 1997. Jed W. Fahey, Yuesheng Zhang, and Paul Talalay



# Boneset, *Eupatorium perfoliatum* supports against Bartonella and Babesia

- Bartonella recognized as early as 1899 (Cat-Scratch disease,) its symptoms include low grade fever, fatigue, enlarged spleen, anorexia, headache pharyngitis. Bartonella is evolving and morphing recently on Martha's Vineyard as an unusual variant was found in a tick.
- Boneset is exceptionally useful against Bartonella and Babesia. (Buhner) It stimulates the immune system, normalizes CD4/CD8 ratio, actively protects bone marrow macrophages, and stimulates their production. It reduces severity of the periodic fevers and pains



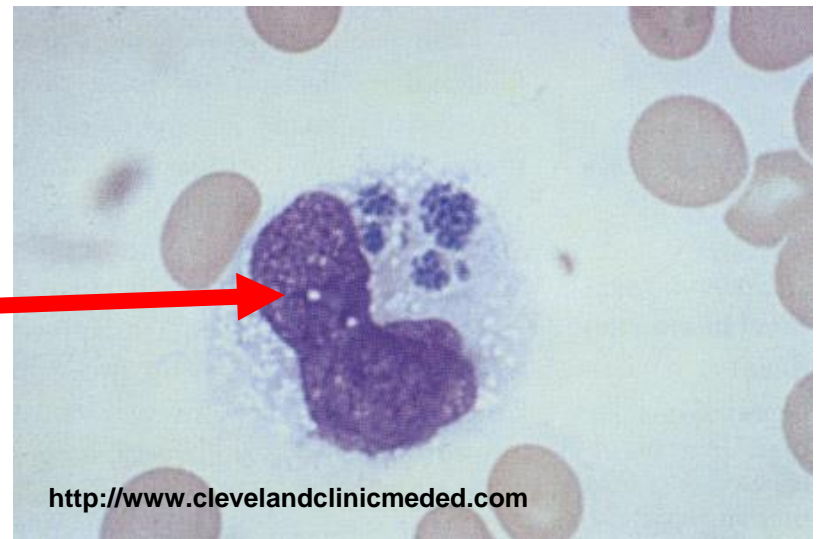
# Astragalus supports against Anaplasmosis (Ehrlichia)

- This herb has been used in TCM for around four thousand years; described in the Shen Nong Cao Jing text two thousand years ago as being one of the superior tonic herbs of TCM. Today, especially with all of the studies documenting its superior status (799 citations on Medline, 2 patents), modern TCM certainly still agrees with this status, two millennia later.
- Astragalus is not about getting rid of the infection, but rather about boosting or modulating the host's own immune function to better fight Bb.
- The TCM principle of treating infectious disease applied for centuries says:  
—fu zheng qu xie support the righteous and dispel the evil meaning to  
—boost the immune system, expel the pathogen.
- Ehrlichia are small, gram-negative bacteria that invade leukocytes, white blood cells, producing human granulocystic ehrlichiosis (HGE) and human monocytic ehrlichiosis (HME). Symptoms can include fever, headache, myalgia, malaise, thrombocytopenia leucopenia, etc.

# Ehrlichiosis

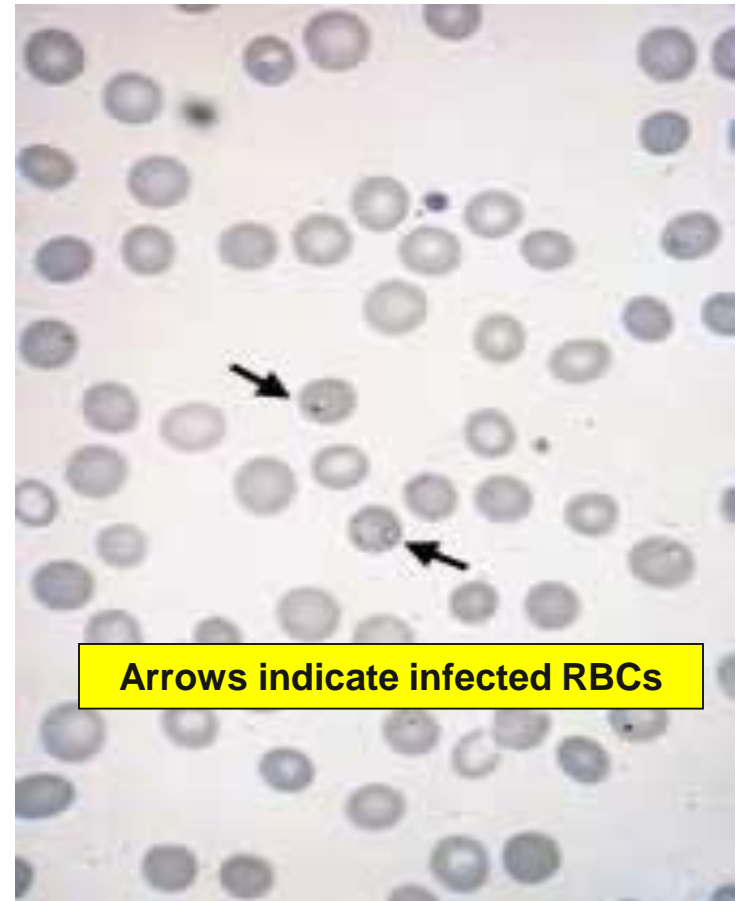
A disease caused by several bacterial species of the genus *Ehrlichia*, which attack specific white blood cells in the body.

Note the clumps of Ehrlichia in a white blood cell



# Babesiosis

A malaria-like illness caused by parasite of the genus *Babesia*, which attacks red blood cells



Arrows indicate infected RBCs

# Babesiosis Symptoms

## Early symptoms:

- Tiredness
- Loss of appetite
- General ill feeling

## Late symptoms:

- Spiking fever
- Drenching Sweats
- Muscle Aches
- Headache

\*Symptoms may take 1-6 weeks to appear after a tick bite  
(Babesiosis is less common than Lyme disease)



# ***Artemisia.* *Artemisia annua*** ***Supports against Babesia***

- This LD co-infecting agent is a protozoa and a distant cousin of malaria.
- *Artemisia* is one of the most effective herbal agents for treating malaria; Malaria is a parasitic disease (though a very different pathogen) introduced directly into the blood stream by an insect (usually mosquito).
- Artemisinin, one of the active compounds of *Artemisia*, has a 100% clearance rate for Malaria (Zhang).
- Artemisinin has become the treatment of choice for malaria worldwide due to its effectiveness against drug-resistant strains.

# Western blot bands

Band	IgG	IgM	Band Definition
18 kDa	X	X	Flagellin fragment
22 kDa	X		Immunogenic integral membrane lipoprotein. Cross-reactive with other spirochetes/bacteria. (Depending on source, may be specific for Bb or cross-reactive.)
23-25 kDa	X	X	Osp C, 25 kDa is <u>specific for Bb</u>
28 kDa	X		Osp D, Oms28
30 kDa	X		Osp A, substrate binding protein
31 kDa	X	X	Osp A, <u>specific for Bb</u>
34 kDa	X	X	Osp B, <u>specific for Bb</u>
37 kDa	X		Fla A gene product
39 kDa	X	X	Bmp A, <u>specific for Bb</u>
41 kDa	X	X	Fla B
45 kDa	X		Appears for HGE (Ravyn)
58 kDa	X	X	Cross reactive
66 kDa	X		Oms 66 Hsp outer/integral membrane protein
83 kDa-	X	X	High molecular mass protein. <u>specific for Bb</u>
93 kDa	X	X	An immuno dominant protoplasmic cylinder antigen, associated with the flagellum. <u>specific for Bb</u>



# IgM WESTERN BLOT

## IGeneX Reference Laboratory

- 23-25 kDa (Osp C)
- 31 kDa (Osp A)
- 34 kDa (Osp B)
- 39 kDa
- 41 kDa (Flagella)
- 83-93 kDa

## CDC/ASPHLD

- 23-25 kDa (Osp C)
- 39 kDa
- 41 kDa (Flagella)

# IgG WESTERN BLOT

## IGeneX Reference Laboratory

- 23-25 kDa (Osp C)
- 31 kDa (Osp A)
- 34 kDa (Osp B)
- 39 kDa
- 41 kDa (Flagella)\*
- 83-93 kDa

## CDC/ASPHLD

- 18 kDa
- 23-25 kDa (Osp C)
- 28 kDa
- 30kDa & 39kDa
- 41 kDa (Flagella)\*
- 45 kDa
- 58 kDa
- 66kDa
- 83-93 kDa



## Laboratory Tests are often Misleading

“ Target antigens (used in most laboratory tests) are not necessarily the in vivo antigens of importance”

Jennifer L. Hallisey, MPH  
Anthropod - Borne Disease Program  
NY State Department of Health



## Proof Statement That IGeneX Western Blot are Sensitive and Specific

- As part of Quality Assurance we reviewed 327 patient results for all the Lyme tests performed on patients with Lyme-like symptoms and positive for at least one of the following co-infections – Babesia, Human Monocytic Ehrlichia and Human Granulocytic Ehrlichia. 238 patients were positive by Lyme Western blots by IGeneX criteria, where as only 112 were positive by CDC criteria. Thus more than 50% of the patients would be missed if only CDC criteria were used.
- To ensure that by IGeneX criteria, we were not reporting false positives, we reviewed the Western blot data from 70 New York Proficiency samples tested between 2001 and present using both criteria, IGeneX and CDC. Lyme Disease vs. IGeneX Criteria was 100% match. There were no false positives.

SAMPLE ID: 317478

DRWN: 11/02/10  
RCVD: 11/04/10  
PRNT: 11/17/10

DIRECTOR: JYOTSNA SHAH, PhD

Tests performed at 795 San Antonio Rd, Palo Alto, CA, except portion of the PCR which is performed at 797 San Antonio Rd, Palo Alto, CA

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TEST NAME                      RESULT                      UNITS  
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LYME IgM WESTERN BLOT

-----REVISED 9/23/10--  
IGeneX interpretation is based on internal validation studies. By IGeneX criteria, IgM WB is considered positive if two or more of the double starred bands below are present. The IgM WB is considered negative if less than 2 starred bands are present. A positive result suggests exposure to B burgdorferi. By CDC/NYS criteria, IgM WB is reported positive if 2 of the following bands are present: 23-25, 39, 41kDa. The IgM WB is negative if less than 2 bands are present.

LIMITATION: Positive result for 31 and/or 34kDa may be present after Lyme vaccination in uninfected persons. Infection with HSV, EBV, HCV and/or syphilis (RPR+) may give false (+) results.

\*\*\*\*PRESENCE OF ONLY ONE DOUBLE STARRED BAND OR INDETERMINATE DOUBLE STARRED BANDS IN A NEGATIVE REPORT MAY INDICATE CLINICAL SIGNIFICANCE.\*\*\*\*  
THEREFORE, WE RECOMMEND TESTING WITH ANOTHER METHOD AND/OR RETEST IN 4-6 WEEKS.

BAND INTENSITY: Negative (-): No band detected. Indeterminate (IND):  
Band present with intensity < calibration standard. Positive (1+ to 4+):  
Band present at an intensity > = to calibration standard.

IGENEX IGM RESULT	POSITIVE
CDC/NYS RESULT	POSITIVE
18 kDa.	-
22 kDa.	-
**23-25 kDa.	-
28 kDa.	-
30 kDa.	-
**31 kDa.	++
**34 kDa.	+
**39 kDa.	+
**41 kDa.	+
45 kDa.	-
58 kDa.	-
66 kDa.	-
73 kDa.	-
**83-93 kDa.	+

Diagnosis should not be based on laboratory tests alone. Results should be interpreted in conjunction with clinical symptoms and patient history.

Continued on next page

**Patient:**

**35 year old female**

**Complained of "Lyme symptoms" for over well over 6 months.**

**Referred to neurologist for possible MS workup**

# False Negative Serology in Chronic Lyme

- 41 patients with late Lyme disease confirmed by culture or positive PCR. ( 54% had been sick for over a year)
- 63.5% had negative or equivocal ELISA

*Oksi J, et al, J Clinical Microbiology sept 1995*

*“A patient with active Lyme disease may have a negative test result...”*

*Brown SL, et al, JAMA July 1999*

*“..Only 50% of patients with late Lyme are frankly seropositive”*

*“Late-phase ocular Lyme borreliosis is probably under diagnosed because of weak seropositivity or seronegativity in ELISA assays..”*

*Karma A, et al., Am J Ophthalmology Feb 1995*



# Testing For Initial Lyme Workup

## Available Lyme Tests

Elisa

C6 Elisa

IFA

Western Blots IgG and IgM

## Initial Lyme Panels:

Lyme IFA &

Western Blots IgG and IgM

Lyme IFA,

Western Blots IgG and IgM

Blood PCR

# CD 57+ NK

**Not all CD 57's are  
“created equal”!**

## **CD = Cluster of Differentiation**

- glycoproteins found on the surfaces of immune cells.
- Over 300 CD's have been identified
- Enhance the actions of the immune cells
- CD 57 appears on both T cells and NK cells!



***CD 57+ NK cells have been shown in some cases to be suppressed in a number of patients who may have chronic lyme disease***



# Co-Infections: Clinical Presentation

- **Anaplasmosis**
  - Profound fatigue
  - Headache (sharp)
  - Severe muscle soreness
  - Low WBC
- **Babesiosis**
  - Headaches (global)
  - Chills / Night Sweats
  - Air Hunger
- **Bartonella**
  - Tender skin nodules
  - Cognitive Difficulties
  - Pain in Soles of Feet