

An Overview of Lyme Disease and Its Treatment Protocols

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Myths about Lyme Disease

- It is local, modern and American.

Fact: It was discovered in Germany in 1883, and it exists on every major continent worldwide

Myths about Lyme Disease

- It is rare, and it is only spread by the deer tick.

Fact: It is epidemic. It is possibly spread by ticks, mosquitoes, mites, flies, and human-to-human contact via blood, breastfeeding and possibly sperm.

Evidence for other transmission vectors

- Bb survives in/ and has been found in banked blood
- Bb has been found in organ transplants
- Bb has been demonstrated to be in human semen, tears, saliva, breast milk and body fluids
- Transmission by human to human contact is unclear

The CDC and transmission

- It is most heavily concentrated in 13 states: CN., DE., MD., ME., MA., MN., NH., NJ., NY., PA., VT., VA., WI.
- It is the most common vector born illness in the US, the 6th most common “nationally notifiable disease”

CDC and transmission

“Lyme disease acquired during pregnancy may lead to infection of the placenta and possible stillbirth; however, no negative effects on the fetus have been found when the mother receives appropriate antibiotic treatment. There are no reports of Lyme disease transmission from breast milk.”

CDC and transmission

- “Although no cases of Lyme disease have been linked to blood transfusion, scientists have found that the Lyme disease bacteria can live in blood that is stored for donation. Individuals being treated for Lyme disease with an antibiotic should not donate blood.”

CDC and transmission

- “Individuals who have completed antibiotic treatment for Lyme disease may be considered as potential blood donors. Information on the current criteria for blood donation is available on the Red Cross website at <http://www.redcross.org/donate/give/>. “

Review of the sequence of Lyme transmission from tick to humans

- Tick feeds on infected animal during larval stage, *or* tick may be infected by parent.
- After molting to nymph, it feeds again
 - a) Attachment occurs, tick secretes minute amount of anti-coagulants and proteins to repel host's immune response
 - b) Tick builds dam from its mouth to skin.

Tick to human transmission

c) After 36 hours, Bb migrates from mid-gut region to salivary glands and into human

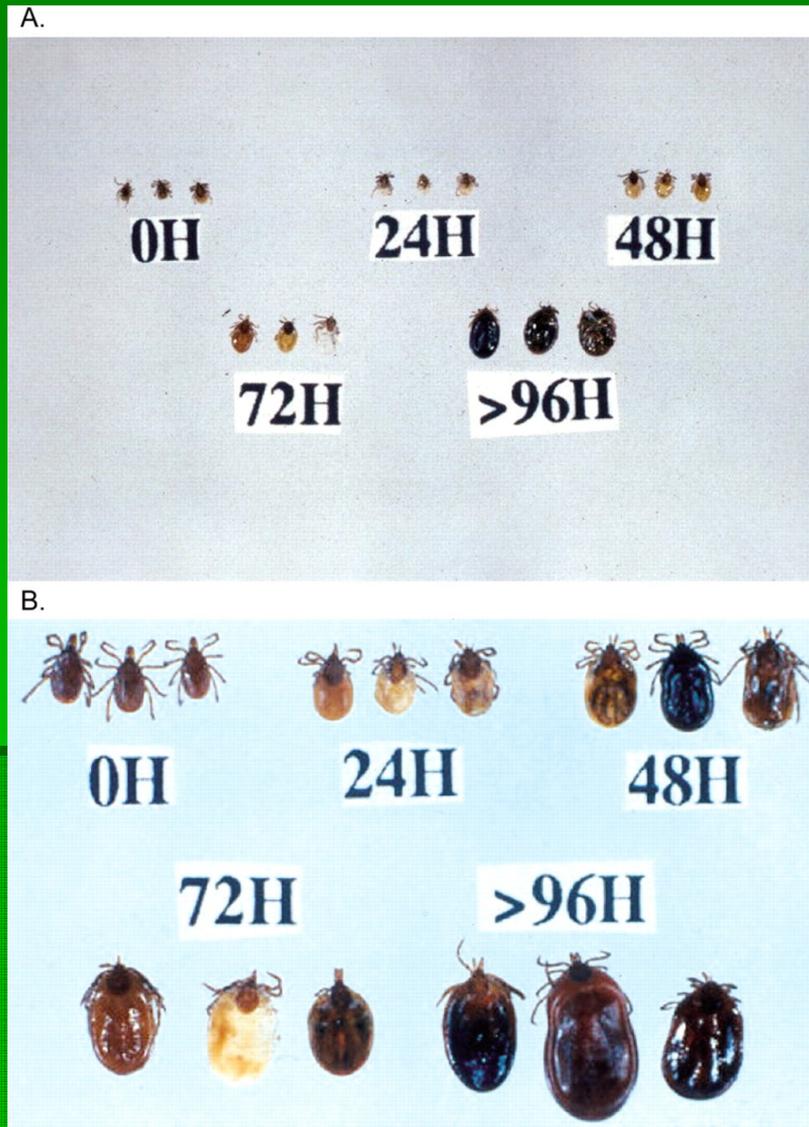
While third stage ticks (adult) can also infect humans, this is unlikely

From left to right, an *Ixodes scapularis* larva, nymph, adult male tick, and adult female tick.



Wormser G P et al. Clin Infect Dis. 2006;43:1089-1134

***Ixodes scapularis* ticks demonstrating changes in blood engorgement after various durations of attachment.**





Lyme Disease Prevention

Spirochete Transmission and Ticks

DEPARTMENT OF
EPIDEMIOLOGY AND
PUBLIC HEALTH
YALE SCHOOL OF
MEDICINE

The spirochetal agent of Lyme disease, *Borrelia burgdorferi*, is transmitted to humans through a bite of a nymphal stage deer tick *Ixodes scapularis* (or *Ixodes pacificus* on the West Coast). The duration of tick attachment and feeding is a key factor in transmission. Proper identification of tick species and feeding duration aids in determining the probability of infection and the risk of developing Lyme disease.

Many kinds of ticks will bite people, but only *Ixodes scapularis* (or *I. pacificus*) carries *Borrelia burgdorferi*.

I. Scapularis can be recognized by shape, size, and coloring. Adult stage ticks are about the size of an apple seed.

Nymphs are tiny, about the size of the head of a pin. About 25% are infected and nymphs cause about 95% of the Lyme disease cases.



FEMALE



NYMPH

Infected nymphs begin to transmit *Borrelia burgdorferi* 36 hours after attachment. The nymph increases in size as feeding progresses (see below).

Any attached nymph should be promptly removed. Its appearance and size indicates the duration of feeding and probability of *B. burgdorferi* transmission.

SCALE:  1 mm



FEEDING DURATION
IN HOURS

0

24

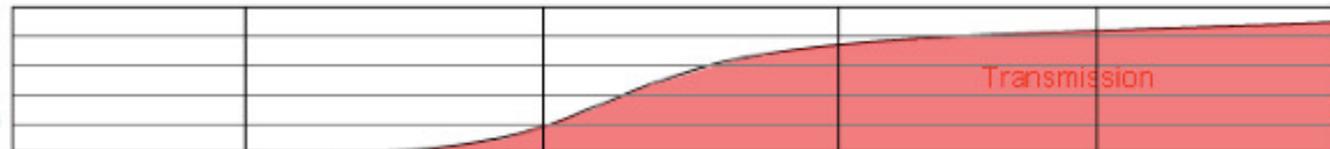
48

72

>96

PROBABILITY (%)
OF TRANSMITTING
Borrelia burgdorferi

100
80
60
40
20
0



NOTE: TICKS APPEAR LARGER THAN ACTUAL SIZE. REFER TO SCALE.

Prepared by Durland Fish, Richard Falco & John Koethe © 2006

CDC and transmission

- “Ticks **not** known to transmit Lyme disease include Lone star ticks (*Amblyomma americanum*), the American dog tick (*Dermacentor variabilis*), the Rocky Mountain wood tick (*Dermacentor andersoni*), and the brown dog tick (*Rhipicephalus sanguineus*).”

CDC and transmission

- “There is no credible evidence that Lyme disease can be transmitted through air, food, water, or from the bites of mosquitoes, flies, fleas, or lice.”

Summary of controversy about insects

- While found in other insects, there is evidence that it is highly unlikely that transmission can occur, due to the absence of:
 - a) The tick salp 15 protein
 - b) The absence of time between host infection and feeding

Myths about Lyme Disease:

- Everyone who gets it has a bull's eye rash.
Fact: Only 30-40% of infected persons get the rash, less than 10% of children
- Lyme Disease can be treated with a 3-week course of antibiotics.
Fact: This is controversial. Official sources such as the CDC and Canadian organizations such as Public Health Ontario support IDSA guidelines. Many other Lyme experts feel antibiotics need to be used for anywhere from 6-18 months continuously.

What is Lyme?

- A spirochete (*borellia spp*) high-end bacterial closely related to syphilis (treponema)
- *Borellia burgdorffii* (*Bb*) can mutate its genetic structure in the presence of antibiotics or endogenous immune response. 2
- *Bb* occurs in three main forms: Spirochete, cystic and cell wall deficient

The Spirochete

- High end bacteria, similar to Treponema (syphilis) and the tuberculosis spirochete
- Long, filament shape with flagella that move in corkscrew fashion
- Affinity for viscous regions: cerebrospinal fluid, eyes, synovial capsules, blood (least)

The Spirochete

- Affects nervous system, joints, brain, skin, heart and occasionally other organs
- In the presence of host immune response or antibiotics will morph into more cystic or non-cell wall form
- The spirochetes can be killed by bacteriostatic agents

Cystic Lyme Forms

- Non-motile and dormant
- Do not produce symptoms
- Exist within cells, often of the immune system itself
- Can survive antibiotics, starvation, Ph changes, hydrogen peroxide, temperature variation
- Convert back to spirochete forms quickly when provided favorable conditions

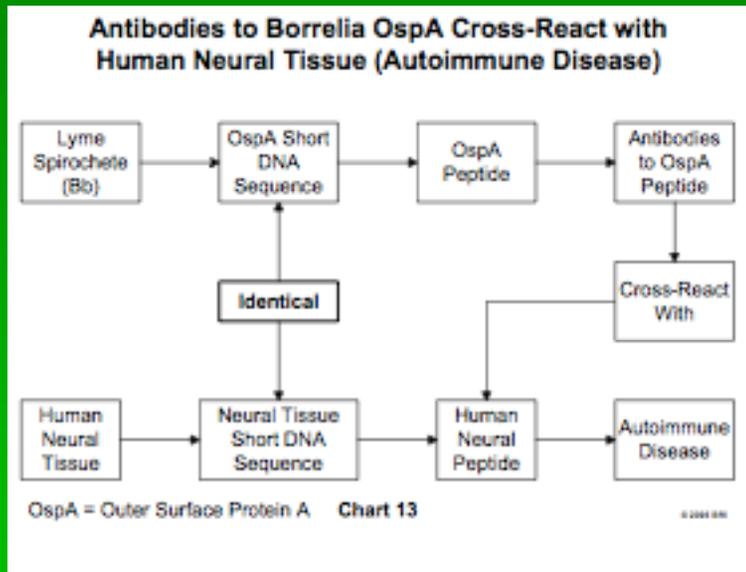
Cell Wall Deficient form (CWD) also called bleb, granular and “L form”

- Hard for immune system to see, or antibiotics to kill (because they target/ recognize proteins on cell wall)
- Capable of intracellular infection
- Causes autoimmune and inflammatory responses
- Forms biofilm colonies, dense layers with inner layers protected from immune system and antibiotics

Cell Wall Deficient form (CWD) also called bleb, granular and “L form”

- Will survive in tissues, even after spirochetes are wiped out in blood
- Are believed to cause multiple neurological diseases such as ALS, Alzheimer's, Bell's Palsy, Parkinson's disease, Post-Lyme syndrome

Chart 13



The mechanism of Bb

- Bb deplete acetylcholine in the nerve synapses, causing an interruption of the nerve impulse. Results range from paralysis, weakness, neuropathy and parkinson's like symptoms
- Bb emits an endotoxin, especially if undergoing apoptosis, which causes inflammation in the tissues

The mechanism of Bb

- Bb additionally causes arthritis by consuming glucosamine in the joint capsules

Chart 1

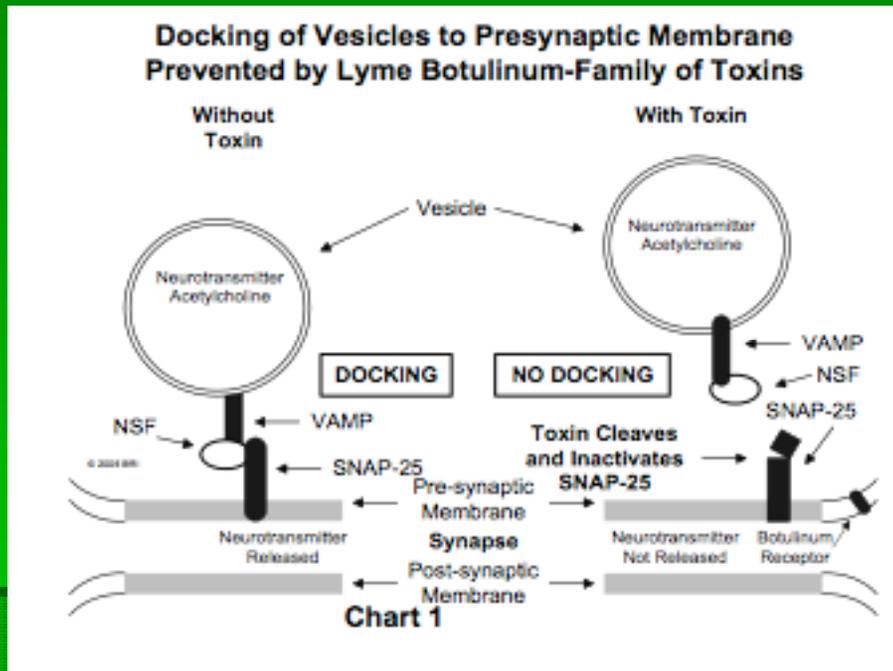


Chart 2

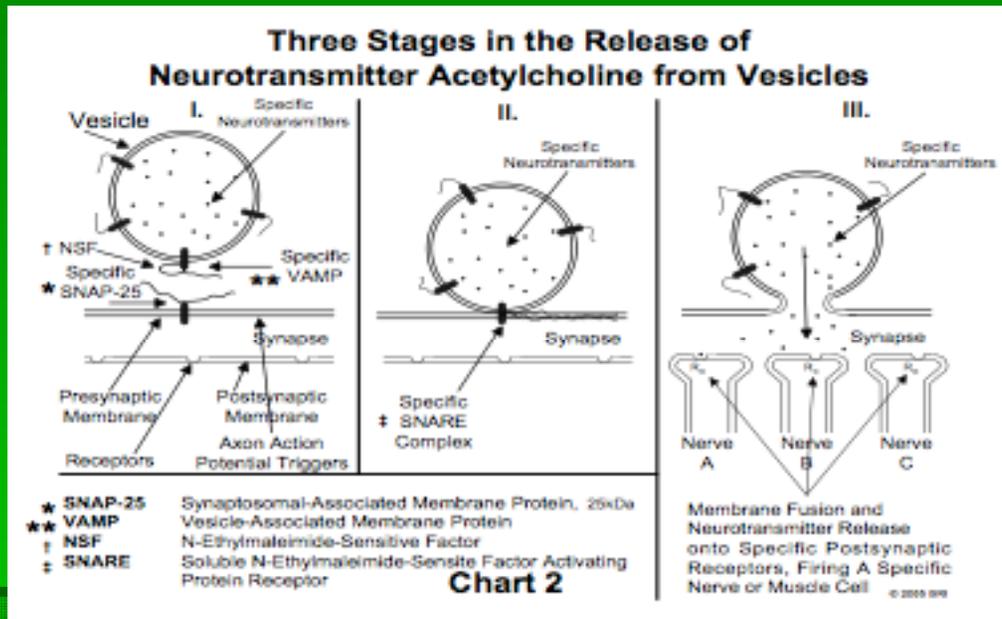
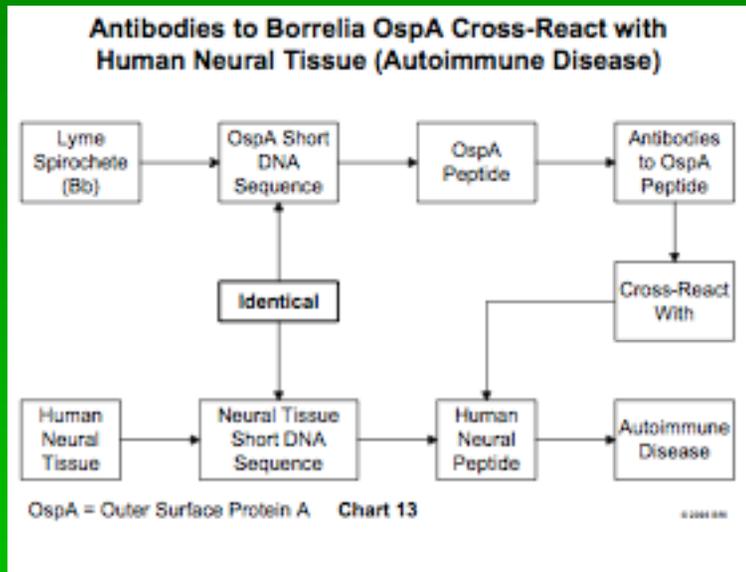


Chart 13



Problems with Conventional Therapies

- Antibiotics work by targeting bacterial cell walls. Additionally, the spirochete needs to be in mitosis.
 - a) Lyme spirochetes have a very long life cycle, and to ensure getting all of them in their mitosis phase would take up to 18 months
 - b) CDC/ IDSA guidelines recommend 2-4 weeks of antibiotic treatment

Problems with Conventional Therapies

- When it has retreated to the brain it takes massive doses to cross the blood/ brain barrier, which generally requires IV antibiotics
- The CDC/IDSA guidelines recommend only 2-4 weeks of IV therapy, and only for neurologic forms or heart

Problems with conventional therapies

- Cystic/ CWD or “L” forms are hard to get with antibiotics unless one switches to antibiotics that inhibit proteins, such as Biaxin. The CDC/ IDSA specifically denies their efficacy

Symptoms of Lyme and its stages:

Stage one: Localized disease - early stage, possible rash, no other symptoms

- Appears 3 days- 3 weeks after infection
- May appear as mild flu
- May be undetectable
- May have rash (erythema migrans) that may look like a “bull’s eye”
- Rash appears only 30-40% of the time, less than 10% in kids.

Symptoms of Lyme and its stages

- Other symptoms: fatigue, chills, fever, swollen lymph nodes, headache, joint/ muscle pain
- Second stage: Disseminated early stage spirochete migrates from blood to surrounding tissues
 - widespread inflammation
 - flu-like symptoms
 - rash in some victims

Symptoms of Lyme and its second stage:

- Early/late disseminated stage- lasts several months
- the more severe the symptoms, the more likely it is to be hard to treat
- Fatigue (extreme, and weakness)
- Headache/ meningitis
- Weakness/ paralysis
- muscle aches/ neuropathies
- joint pain and swelling/ arthritis

Symptoms of Lyme and its second stage:

- sore throat
- fever
- Chills
- nausea, vomiting
- Bell's palsy
- profuse sweats
- Optic ataxis/ optical migraines
- Multiple skin rashes

Symptoms of Lyme at any stage

Other symptoms that may occur at any stage

- nausea, vomiting
- Bell's palsy
- profuse sweats
- irregular heartbeat
- seizures
- blurry vision
- memory loss and psychosis
- meningitis
- bladder and kidney problems
- hepatitis
- skin disorders

Third stage: Disseminated late disease often called “Post Lyme Syndrome”

- may be organ damage
- may be impaired body systems
- joint pain with deterioration
- spinal/brain involvement (central nervous system)
- mental and cognitive impairment
- wasting or weight gain
- Weakness

15% of Lyme patients develop serious problems. Some Lyme Disease will not manifest until up to 15 years after infection

CDC/ IDSA stance on Post Lyme Syndrome

- Does not support any testing other than Elisa/ Western Blot
- Refuses evidence of culturing/ blood microscopy (which identifies CWD forms)
- Says there “is no convincing biological evidence for the existence of symptomatic chronic Bb infection among patients after receipt of recommended treatment regimens for Lyme disease.”

CDC/ IDSA stance on Post Lyme Syndrome

- Says “antibiotic therapy has not proven to be useful and is not recommended for patients with chronic (16 months) subjective symptoms after recommended treatment regimens for Lyme disease”

Lyme and co-infections

- Commonly occurs with 3 co-infections: Babesia, Ehrlichia and Bartonella
- Commonly causes other opportunistic infections such as candida albicans, herpes outbreaks and parasites to become more present
- The presence of other common infections, especially Epstein Barr virus, will potentiate Lyme and make it much harder to treat

Tests and Lyme Disease

- IFA (indirect fluorescent antibody): this is the earliest Lyme test and one that is frequently still used. It has a high risk of error.
- ELISA uses enzymes to detect Lyme antibodies, while it can detect whether one has been exposed, it doesn't tell whether the infection is current. It may provide false positives, and it may not be positive during early stages of the disease

Tests and Lyme Disease

- Western Blot - uses fragments of a strand of Bb, separates it out into bands and then checks for antibodies. Usually it is only read for five bands; some labs do a more comprehensive reading of more bands. This allows for a more accurate measure of the waxing and waning of Lyme. The CDC disallows this expanded testing.

Tests and Lyme Disease

- Q RIBb test (rapid identification of Bb) this is a highly purified fluorescent antibody stain specific for Bb to detect the actual organism. Results are within 20-30 minutes, allowing for immediate treatment upon detection of the disease. This test, endorsed by Dr. Lida Mattman, has been discredited by mainstream sources. The CDC disallows this test

Tests and Lyme Disease

- PCR- Polymerase chain reaction

Detects bacterial DNA in fluid drawn from an infected joint or spinal fluid. It is not as effective at detecting infection of blood or urine. Used for chronic Lyme or neuroborreliosis.

Tests and Lyme Disease

- Mattman Blood Culture

“A live wet mount is prepared using the patients blood on a wet slide with acrodine orange dye to stain the nucleic acids. It is stained with monoclonal antibody fluorescent stain that is specific for *Borrelia burgdorferi*. It is examined under a microscope.”

The CDC policy on testing

- The CDC recommends a two tier testing method, beginning with the Elisa test. If the ELISA is positive then the test is followed by the Western Blot. Only if both tests are positive is a positive diagnosis of Lyme Disease made.

The CDC policy on testing

- The CDC disallows other methods of testing, including the Q Ribb, the Mattson Blood Culture and tests that include more bands in the Western Blot
- The CDC also states that there must be clear clinical symptoms of Lyme

Treatment of Lyme as recommended by CDC

1. Antibiotic therapy

- Usually treatment begins with a short course of Doxycycline (2-4 weeks)
- Other antibiotics: amoxicycline or cefuroxime axetil

Treatment of Lyme as recommended by CDC

- For serious complications such as meningitis, CNS involvement of heart symptoms IV regimens of 4 weeks using Ceftriaxone, or parenteral therapy with either Penicillin G or Cefotaxime. For those who can't tolerate this high dose oral doxycycline is used
- Patients with lesser symptoms who relapse can receive a second course of 4 weeks of antibiotics; late stage Lyme patients with serious symptoms of CNS or heart are advised to do 2 to 4 weeks of IV antibiotics

Lyme Literate Docs

- Current medical opinion suggests 3 weeks of antibiotic therapy after any tick bite
- Stopping antibiotics too soon will result possibly in a more resilient infection
- Commonly used antibiotics include: tetracyclines, penicillins, cephalosporins and macrolides

Lyme Literate Docs

- LLD's use very long term IV therapy, usually for a minimum of two years in order to catch the spirochete in replication phase
- Other therapies include drug combinations using drugs such as Biaxin, Metranidazole, fluoroquinolones, antimicrobials etc

Other Alternative Therapies

- Rife Machine
- Hyperbaric oxygen
- Hydrogen Peroxide therapy
- Ozone therapy
- Fever therapy (Hydrotherapy)
- Various Herbal Therapies such as the Marshall, Cowden, Buhner Protocols

Four Pillars of Treatment of Lyme Disease

1. High Dose Vitamin C to kill the pathogen
2. Ketogenic Diet to deprive it of the conditions for replication and proliferation
3. Targeted Neurotransmitter support and other nutritional supplementation as needed
4. Botanical Strategies

Vitamin C and Treatment

- Vitamin C is best used in frequent doses to obtain saturation levels
- Liposomal C can be used in aggressive treatment stages at levels of 6 grams five times a day

Vitamin C and Treatment

- In acute phases two IV Vitamin C drips of 125gm per week work well, with Liposomal C used on days without IVs, to be continued for 1 month
- When symptoms remit, Liposomal C should be reduced by determining bowel tolerance
- Vitamin C therapy has no side effects other than its laxative effect, which helps to determine the level of need for the vitamin

Vitamin C Therapy

- Vitamin C kills the Lyme Spirochete and will also prevent Herxheimer effects by binding the endotoxins emitted by Bb and carrying them out of the body
- Vitamin C can be used intravenously in acute phase, in doses of up to 125 grams

Vitamin C Therapy

- Liposomal C can be used to kill cystic and CWD forms because of its ability to readily penetrate into cells, and even into cell organelles
- Liposomal C can be taken in much higher amounts before causing bowel intolerance
- The level at which bowel intolerance occurs indicates the activity of the Bb

A Brief History of Vitamin C Therapy

- Dr. Frederick R. Klenner pioneered the use of IV C for the treatment of Polio, Rocky mountain spotted fever and other bacterial and viral infections in the forties
- Klenner later was able to demonstrate the use of Vitamin C in binding endotoxins and rendering them harmless, from snake venoms to the endotoxins produced by pathogens

A Brief History of Vitamin C Therapy

- Vitamin C has been used in very high doses in cancer patients without any harmful effects
- The only contraindication for Vitamin C use is in a small subset of the population that lacks glucose-6-dehydrogenase

Treatment of Lyme Disease with Botanicals

4. Herbal Supports

- Ashwaganda
- Astragalus
- Andrographis
- Polygonum cuspidum (Chinese knotweed)
- Eleutherococcus senticosus
- Teasel

Treatment of Lyme Disease with Botanicals

4. Herbal Supports

- Cat's Claw
 - Ginseng
 - Maitake
Banderol
-
- Reishi
 - Milk Thistle
 - Cordyceps

Astragalus (Astragalus membranaceus)

- Deep Immune activator, Qi tonic that aids in anorexia, helps with fatigue
- Astragalus has been used to treat tuberculosis, another similar spirochete
- Astragalus is particularly useful in the early stages of Lyme, but I have used it at every stage. It helps with energy as well as supporting immune force

Ashwaganda

- Actions include febrifuge, deep tonic, alterative, “refills the cauldron”
- I use ashwaganda at doses of ½ tsp 3xday throughout treatment
- Useful for the general debility. It has a history of use in Ayurveda for the treatment of tuberculosis. It treats damp/heat conditions which is what active Lyme disease is.

Teasel (**Dipsacus fullonum**)

- Teasel root has been praised by many herbalists such as Matthew Wood
- for the treatment of Lyme
- It is especially known for helping the cognitive symptoms and inflammatory symptoms
- Dosage of up to ½ to 1 tsp 3xday

Japanese Knotweed (*Polygonum cuspidum*)

- Traditionally used as a neutral laxative, today knotweed is best known for containing resveratrol, a powerful compound with antibacterial and anti-inflammatory effects
- Dosing is tricky, since too much will cause diarrhea. I recommend Planetary Herbal's capsules, 2 pills 3xd

Andrographis paniculata

- Long used in Asia, andrographis is credited with helping in the 1919
- Flue pandemic
- It possesses potent immune stimulating properties, both in antigen production and in more general macrophage stimulating effects
- A bitter, it is cooling and draining.

Andrographis paniculata

- It is also mutagenic and stimulates white blood cells
- Unlike many compounds, Andrographis has been demonstrated to cross the blood/brain barrier, making it especially valuable in the treatment of Lyme

Siberian Ginseng (*Eleutherococcus senticosus*)

- Actions include: adaptogenic, adrenal tonic, circulatory stimulant, Qi tonic
- Deep immune tonic
- This herb helps fight both infection and is a valuable aid to flagging energy

Siberian Ginseng (Eleutherococcus senticosus)

- I use this in 1tsp doses during acute stage Lyme, up to 5xday
- Because of its impact on the adrenals it can help with the agitation of the
- Overstimulated nervous system

Samento/Cat's Claw (*Uncaria tomentosa*)

- The TOA –free form is best
- Cat's Claw has been used to treat rheumatoid and osteoarthritis,
- Support the immune system, treat fevers, ulcers, respiratory infections
- And has a strong track record in treating Lyme

- Dose: 30 drops 3xday

Cordyceps Sinensis

- This polysaccharide rich fungus has immune stimulating properties,
- and is particularly good for exhaustion after long illnesses
- Cordyceps helps with the neurasthenic aspect of Lyme

Cordyceps Sinensis

- It is a known antibacterial, Qi tonic, antimutagenic and is used to treat anemia.
- Use 3-9gm twice daily

Maitake (*Grifola frondosa*)

- Used to treat damp heat in TCM
- Deep Immune stimulant and antimutagenic, increases appetite, aids in mental alertness

Reishi (**Ganoderma lucidum**)

- Called the “herb of immortality” Reishi was used to treat liver diseases,
- Nephritis, neurasthenia, arthritis and asthma.
- It is a big immunomodulator and anti-mutagenic, inhibits histamine release

Reishi (**Ganoderma lucidum**)

- Has been used to treat Alzheimers and liver disease
- Like all mushrooms, it is rich in polysaccarides and is antibacterial

Sweet Annie (*Artemisia annua*)

- *Artemisia annua* has become one of the most important herbs in the treatment of malaria, and is now considered very important in the treatment of Lyme and its co-infections (especially Babesia)
- This is a cooling and powerful antibacterial, with the chemical constituent Artemisinin. Its actions are bitter, and it is a febrifuge, vermifuge
- hemostyptic and it clears heat rashes.

Sweet Annie (*Artemisia annua*)

- I found it very helpful for the excessive sweating of the acute stage.
- Because one would have to drink huge quantities of the tea in order to
- get a significant dose of Artemisinin, I recommend taking the pill form, which is produced by Researched Nutritionals.

Banderol (Otoba spp)

- Antiviral, antibacterial, antimicrobial, anti-inflammatory
- Is know to work against Bb, bartonella, babesia and many other pathogens
- No known side effects

Banderol (Otoba spp)

- Begin at 1-2 drops and increase by a drop a day until at 15 drops in water
- Nutramedix makes a good version

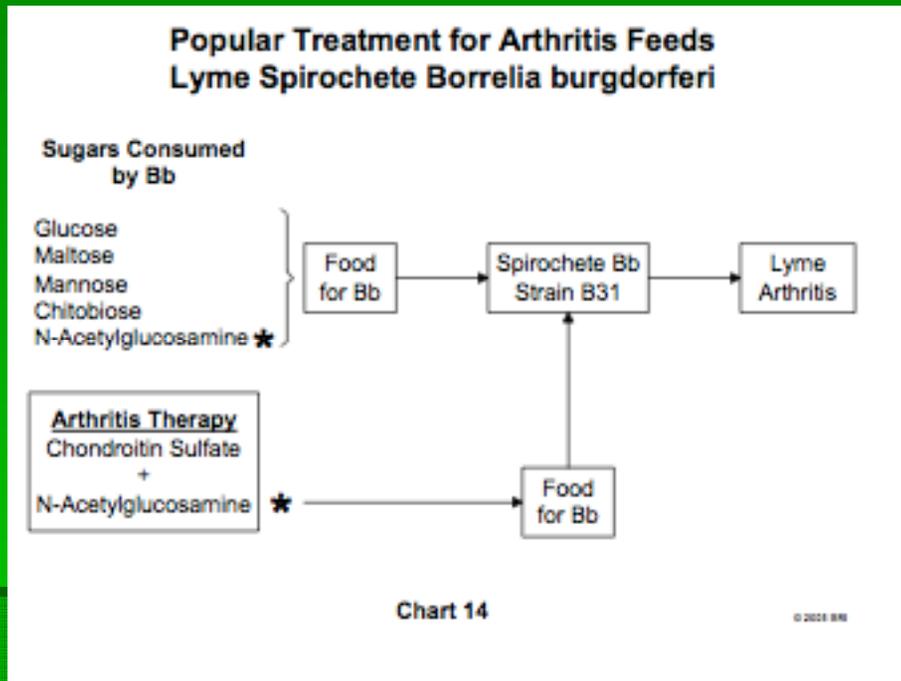
Treatment of Lyme: the Diet Connection

Bb feeds on sugars! Going into ketosis and staying there will starve it

The ketogenic/fast and maintenance diet

- less than 400 calories, composed of only protein, per day, one week in duration. An easy way to do this is to eat 5 eggs a day.
- less than 20 grams of carbohydrate per day for up to three months past the remission of symptoms or for as long as needed.
- Remain on a low glycemic index, whole foods diet for maintenance

Chart 14

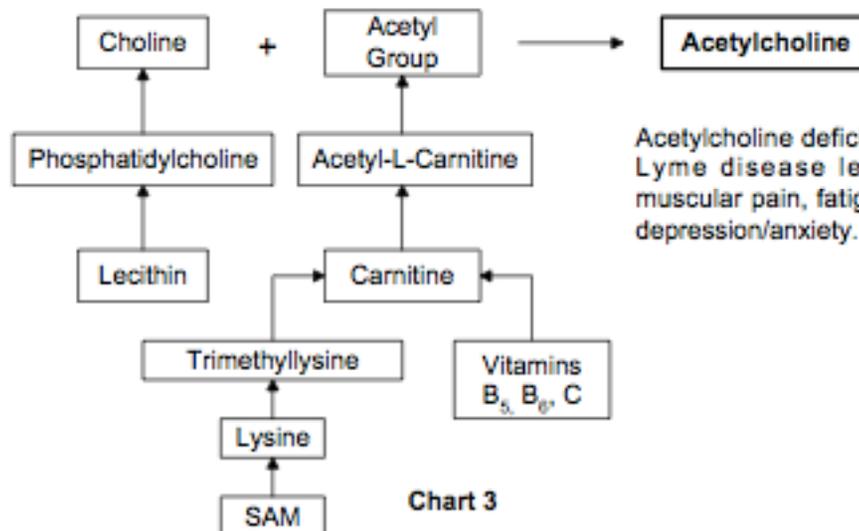


Treatment of Bb: targeted supplementation

- Support acetylcholine formation using the building blocks: Vitamins B6, B5, Lysine, Carnitine, Phosphatidylcholine
- Support overall cognitive function (I use Life Extension's Cognitex) CoQ10

Chart 3

Formation of Neurotransmitter Acetylcholine from Precursors and Dietary Supplements



Acetylcholine deficiency in Lyme disease leads to muscular pain, fatigue and depression/anxiety.

Chart 3

TCM herbs used to treat Damp Heat

- The following herbs are being used in various combinations by many TCM practitioners to treat Lyme: Isatis, Hu-chang, andrographis, Forsythia, gardenia, scute, phellodendron and coptis.
- Seven Forests two formulas Isatis 6 and Forsythia 18 contain most these herbs (as well as others) and could be used
- Doses would be 3-5 pills 3xd

Treatment of Lyme Disease

9. Joint Inflammation fighters and Joint Repair

- Boswellia
- Baical skullcap
- Tumeric
- Quercitin
- Bromelain

Treatment of Lyme Disease

9. Joint Inflammation fighters and Joint Repair continued

- Glucosamine Sulfate is contraindicated due to the fact that it is food for Bb
- “Bone Broth” soups