

Identifying and Resolving The Lyme Paradox

Darin Ingels, ND, FAAEM



Lyme Disease: What Is It?

Lyme disease is a bacterial infection of *Borrelia burgdorferi* and other species, a bacteria transmitted through the bite of a tick (*Ixodes species*). However, new evidence suggests other biting insects may transmit LD as well.

In the early 1970's, mysterious cases of rheumatoid arthritis developed in several children in Lyme, CT. Many of the children recalled having a rash and/or being bit by a tick.

In 1981, Dr. Willy Burgdorfer who had been studying Rocky Mountain Spotted Fever discovered the spirochete that caused the illness in these children.

Lyme Disease: What Is It?

There are at least 5 subspecies of *Borrelia burgdorferi* and at least 100 other strains of *Borrelia* in the United States. There are more than 300 strains worldwide.

More than 95% of reported cases in the United States come from Connecticut, Delaware, Maine, Maryland, Massachusetts, Minnesota, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, Virginia and Wisconsin.

There are at least 300,000 new cases of Lyme disease reported each year in the United States with now millions of people living with Lyme disease annually.

Lyme Disease: Canadian Stats

In Canada, there have been less than 1000 cases of Lyme disease reported in 2016 (987).

However, there has been more than 6-fold increase in Lyme cases since 2009.

In 2015, 91% of all cases were reported from Ontario, Nova Scotia and Quebec, with Nova Scotia having the most cases (26 per 100,000).

As in the US, the incidence of Lyme is growing rapidly and likely grossly underreported. In Ontario, Public Health officials state Lyme is only caused by *Borrelia burgdorferi*, but research has proven this to be untrue.

Lyme Disease: What Is It?

Ixodes scapularis and pacificus (Blacklegged ticks)



Lyme Disease: What Is It?

Lyme disease is the #1 spreading vector-borne epidemic worldwide.

Borrelia species can infect any tissue or organ system. Therefore, multiple symptoms are observed with patients with LD.

Borrelia species may also change forms and have a relatively slow replication cycle. Most bacteria replicate every 20 minutes to 8 hours. *Borrelia* replicate every 1 to 16 days.

Borrelia species are the ultimate shape-shifters. They can exist as a spirochete (corkscrew form), cyst form, cell-wall deficient form and uncoiled filamentous form.

What Are The Symptoms Of Acute Lyme Disease?

- Headaches and neck stiffness
- Fever
- Arthritis with swollen joints and/or spine pain
- Muscle pain
- Erythema migrans (“bullseye” rash)
- Fatigue
- Chills
- Swollen lymph nodes
- Heart palpitation
- Shortness of breath
- Memory loss
- Facial palsy (Bell’s palsy)

What Are The Symptoms Of Acute Lyme Disease?

Erythema migrans rash



What Are The Symptoms Of Acute Lyme Disease?

Acute symptoms can occur anywhere from 3-30 days following a tick bite.

CDC states up to 70% of people infected with Lyme disease get the erythema migrans (EM) rash, but others suggest less than 40% of infected people get the stereotypical EM rash. The EM rash is pathognomonic for LD, which means there is no other organism that causes this type of rash. ***Most people with LD have no recollection of ever being bitten by a tick!***

Lyme disease symptoms are often vague and resemble numerous other infectious disease and autoimmune conditions. Misdiagnosis is common.

What Are The Symptoms Of Chronic Lyme Disease?

- Fatigue
- Abdominal pain and bowel changes
- Memory loss or cognitive impairment
- Numbness or tingling of extremities
- Sensory distortion of skin (burning sensations), especially in hands or feet
- “wandering” symptoms
- Light or sound sensitivity
- Dizziness or vertigo
- Sleep disturbances
- Rheumatism
- Cardiac problems: MVP, heart block, heart palpitations, chest pain
- Balance or coordination problems. Become “clumsy”
- Newly acquired “dyslexia”
- Endocrine disruption: hypothyroidism, irregular menses, etc.

Lyme Disease: The Great Imitator

- Autism
- Multiple Sclerosis
- ALS (Lou Gehrig's disease)
- Chronic fatigue syndrome
- Fibromyalgia
- Infectious mononucleosis
- Polymyalgia rheumatica
- Reiter's syndrome
- Rheumatoid arthritis
- Lupus
- Parkinson's disease
- Alzheimer's disease
- many, many more...

Coinfections with Lyme Disease

Ticks and can spread numerous other infections, which cause similar symptoms of LD.

1. Babesia
2. Bartonella
3. Anaplasma
4. Ehrlichia
5. Mycoplasma
6. Rickettsia
7. Powassan virus
8. Colorado Tick Fever
9. Heartland virus
10. Tularemia
11. Many others...

Why The Rise in Lyme Disease?

Worldwide, we are seeing an increase the in the number of cases of LD as well as other vector-borne illnesses.

We have already seen epidemics of Dengue virus in South America, Ebola virus in Western Africa and Chikungunya virus in Central and South America (now spreading to North America).

Ticks, fleas, mosquitos, flies and even snails can transmit these illnesses.

The World Health Organization (WHO) anticipates that climate change will result in an increased incidence of vector-borne diseases.

Why The Rise in Lyme Disease? According to the WHO...

Climate change and vectorborne diseases

Many vulnerability assessments anticipate climate change will result in increased incidence of communicable diseases including vectorborne diseases (VBDs). VBDs are transmitted by the bites of infected mosquitoes and other insects (vectors). Their incidence is particularly dependent on climatic factors because:

- Insects have no internal control over their physiological temperatures and the ambient temperature determines their reproduction rate, biting behavior and survival: their distribution may expand as the earth warms.
- Humidity and availability of water for breeding are also determinants of vectors' distribution, longevity and behavior.
- The incubation period of pathogens inside vectors is temperature-dependent (and tends to decrease at warmer temperatures).
- Human behavior is likely to be affected by climate change which will alter our interaction with vectors and the diseases they carry.

http://www.wpro.who.int/mvp/climate_change/en/

Why The Rise in Lyme Disease?



Diagnosis of Lyme Disease

The CDC criteria for LD was designed for surveillance purposes and do not necessarily reflect active infection with *Borrelia species*.

The diagnosis of LD is a **CLINICAL DIAGNOSIS!**

There are over 100 strains of *Borrelia* in North America and more than 300 strains worldwide. Current testing only tests for *Borrelia burgdorferi*. We now know that half of West Coast cases of Lyme disease are caused by *Borrelia miyamotoi*.

Diagnosis of Lyme Disease

Lyme Disease

Lyme Disease Home

Preventing tick bites



Tick removal and testing

Transmission

Signs and symptoms



Diagnosis and testing



Two-step laboratory testing process



Laboratory tests that are not recommended

[CDC](#) > [Lyme Disease Home](#)

Diagnosis and Testing



Lyme disease is diagnosed based on:

- [Signs and symptoms](#)
- A history of possible exposure to infected blacklegged ticks

[Laboratory blood tests](#) are helpful if used correctly and performed with validated methods. Laboratory tests are not recommended for patients who do not have [symptoms](#) typical of Lyme disease. Just as it is important to correctly diagnose Lyme disease when a patient has it, it is important to avoid misdiagnosis and [treatment of Lyme disease](#) when the true cause of the illness is something else.

Diagnosis of Lyme Disease



Centers for Disease Control and Prevention
CDC 24/7: Saving Lives, Protecting People™



GOVERNMENT

Lyme disease is diagnosed based on:

- [Signs and symptoms](#)
- A history of possible exposure to infected blacklegged ticks

[Laboratory blood tests](#) are helpful if used correctly and performed with validated methods. Laboratory tests are not recommended for patients who do not have [symptoms](#) typical of Lyme disease. Just as it is important to correctly diagnose Lyme disease when a patient has it, it is important to avoid misdiagnosis and [treatment of Lyme disease](#) when the true cause of the illness is something else.

test

Diagnosis of Lyme Disease

CDC Criteria

1. Positive ELISA blood test. This is the screening test most doctors use through reference labs.
2. If the ELISA test is positive, they will then run a Lyme Western Blot, which is a more detailed antibody test looking at specific antibodies (called “bands”) associated with the organism. They will look at IgG and IgM antibodies.
3. If 5 out of 10 IgG bands are positive or 2 out of 3 IgM bands are positive, the test is considered “positive”.

These criteria have not changed in more than 40 years of research on LD.

Diagnosis of Lyme Disease

CDC Criteria:

IgM: 23 kd (OspC), 39 kd (BmpA), 41 kd (Fla)

** must have 2 of 3 bands*

IgG: 18 kd, 21 kd (OspC), 28 kd, 30 kd, 39 kd (BmpA), 41kd (Fla), 45 kd, 58 kd, 66 kd, 93 kd

** must have 5 of 10 bands*

Diagnosis of Lyme Disease

Alternative Criteria:

IgM: 23-25 (OspC), 31, 34, 39 (BmpA), 41 or 93 kd bands.

*Equivocal: *one band positive*

*Positive: *2 or more bands positive*

IgG: 23-25 (OspC), 31, 34, 39 (BmpA), 41 or 93 kd bands.

*Equivocal: *1 or 2 bands positive*

*Positive: *3 or more bands positive*

Diagnosis of Lyme Disease

Test	Specimen	Date Collected Comment	Results		Reference/Units/Comments
			Normal	Abnormal	
Lyme disease Western blot (IgM / IgG)		11/29/2016	IgGCDC Neg IgGAIt Equiv	IgMCDC Pos IgMAIt Pos	IgM: 41, 34, 31, 23 IgG: 41, 23 See attached report.
313 Verified 12/3/2016	Serum - 1				
Bartonella henselae IgG/IgM by ELISA		11/29/2016	IgM Neg (Index=0.32) IgG Neg (Index=0.49)		* IgM Index range: Neg: ≤ 0.89 , Equivocal: 0.90 - 1.10, Pos: ≥ 1.11 * IgG Index range: Neg: ≤ 0.89 , Equivocal: 0.90 - 1.10, Pos: ≥ 1.11
355 Verified 12/6/2016	Serum - 1				
Babesia microti IgG/IgM by ELISA		11/29/2016	IgM Neg (Index=0.02) IgG Neg (Index=0.31)		* IgM Index range: Neg: ≤ 0.89 , Equivocal: 0.90 - 1.10, Pos: ≥ 1.11 * IgG Index range: Neg: ≤ 0.89 , Equivocal: 0.90 - 1.10, Pos: ≥ 1.11
433 Verified 12/6/2016	Serum - 1				
Anaplasma phagocytophilum IgG/IgM by IFA		11/29/2016		Positive	Anaplasma IgG antibody detected ($\geq 1:80$).
439 Verified 12/5/2016	Serum - 1				

Diagnosis of Lyme Disease

Lyme IgM Western Blot

This is a membrane immunoassay based on the immunoblot method. As recommended by the CDC, all samples which test positive or equivocal on a serological screening test should be re-tested on a *Borrelia burgdorferi* Western Blot. The *B. burgdorferi* IgM Western Blot assay is recommended for the evaluation of sera from patients believed to be exposed to *B. burgdorferi*.

MDL Number: 7161383-1 ID

Date: 12/02/2016

Examiner: LK

Test: *Borrelia* B31 + OspA/B IgM ViraStripe® IgM

Strip: LL6001144-35

Bands, kD

41	39	34	31	23
147	-	068	069	068

Intensity, % of Cut-off

Patient

32

Band-Locator:

41

Results for this specimen:

For results according to the CDC Criteria, please refer to the attached MDL Test Result form.

Result Interpretation:

IgM	Result	CDC Criteria (Antibody, CDC*)	Alternate Criteria (Antibody, Alt*)
	Negative (Non-reactive)	No bands or less than two bands from: 23, 39, 41 kD	No <i>B. burgdorferi</i> specific bands
	Equivocal	N/A	One band from: 23, 31, 34, 39, 41 kD
	Positive (Reactive)	Two or more bands from: 23, 39, 41 kD	Two or more bands from: 23, 31, 34, 39, 41 kD

Diagnosis of Lyme Disease

Lyme IgG Immunoblot Blot

This is a membrane immunoassay based on the immunoblot method. As recommended by the CDC, all samples which test positive or equivocal on a serological screening test should be re-tested on a *Borrelia burgdorferi* Immunoblot. The B. burgdorferi IgG Immunoblot assay is recommended for the evaluation of sera from patients believed to be exposed to B. burgdorferi.

MDL Number: 7161383-1 ID

Date: 12/02/2016

Examiner: LK

Test: Borrelia B31 + OspA/B IgG ViraStripe® IgG

Strip: LO6001082-35

Bands, kD

95	66	55	45	41	39	34	31	30	26	23	18
-	-	-	-	280	-	-	045	-	-	065	-

Intensity, % of Cut-off

Patient:

35

AWFO 321

Band-Locator:

WMLG 81

Results for this specimen:

For results according to the CDC Criteria, please refer to the attached MDL Test Result form.

Result Interpretation:

IgG	Result	CDC Criteria (Antibody, CDC)*	Alternate Criteria (Antibody, Alt)*
	Negative (Non-Reactive)	No bands or less than five bands from: 18,23,28,30,39,41,45,58,66,93 kD	No B. burgdorferi specific bands
	Equivocal	N/A	One or two bands from: 23,31,34,39,93 kD
	Positive (Reactive)	Five or more bands from: 18,23,28,30,39,41,45,58,66,93 kD	Three or more bands from: 23,31,34,39,93 kD

* Bands presented must have an intensity greater or equal to 60% of the cut-off control band

Diagnosis of Lyme Disease

Test	Specimen	Date Collected Comment	Results		Reference/Units/Comments
			Normal	Abnormal	
Lyme disease Western blot (IgM / IgG)		3/30/2016	IgMCDC Neg IgMAIt Neg IgGCDC Neg IgGAIt Equiv		IgM: No bands present. IgG: 93/83, 41, 34 See attached report.
313 Verified 4/2/2016	Serum - 1				
Chlamydia pneumoniae IgG / IgM by ELISA		3/30/2016	IgM Neg (Index=0.03) IgG Neg (Index=0.37)		* IgM Index range: Neg: ≤ 0.89 , Equivocal: 0.90 - 1.10, Pos: ≥ 1.11 * IgG Index range: Neg: ≤ 0.89 , Equivocal: 0.90 - 1.10, Pos: ≥ 1.11
327 Verified 3/31/2016	Serum - 1				
Mycoplasma pneumoniae IgG / IgM by ELISA		3/30/2016		IgM Pos (Index=1.53) IgG Pos (Index=4.69)	* IgM Index range: Neg: ≤ 0.90 , Equivocal: 0.91 - 1.09, Pos: ≥ 1.10 * IgG Index range: Neg: ≤ 0.90 , Equivocal: 0.91 - 1.09, Pos: ≥ 1.10
340 Verified 4/5/2016	Serum - 1				
Bartonella henselae IgG/IgM by ELISA		3/30/2016	IgM Neg (Index=0.05)	IgG Pos (Index=1.47)	* IgM Index range: Neg: ≤ 0.89 , Equivocal: 0.90 - 1.10, Pos: ≥ 1.11 * IgG Index range: Neg: ≤ 0.89 , Equivocal: 0.90 - 1.10, Pos: ≥ 1.11
355 Verified 4/1/2016	Serum - 1				
Lyme disease C6 Peptide by ELISA		3/30/2016	Neg (Index=0.33)		* Index range: Neg: ≤ 0.90 , Equivocal: 0.91 - 1.09, Pos: ≥ 1.10
417 Verified 4/1/2016	Serum - 1				
Lyme disease IgG / IgM by ELISA		3/30/2016	Neg (Index=0.56)		* Index range: Neg: ≤ 0.90 , Equivocal: 0.91 - 1.09, Pos: ≥ 1.10
427 Verified 4/4/2016	Serum - 1				
Babesia microti IgG/IgM by ELISA		3/30/2016	IgM Neg (Index=0.00)	IgG Pos (Index=1.11)	* IgM Index range: Neg: ≤ 0.89 , Equivocal: 0.90 - 1.10, Pos: ≥ 1.11 * IgG Index range: Neg: ≤ 0.89 , Equivocal: 0.90 - 1.10, Pos: ≥ 1.11
433 Verified 4/6/2016	Serum - 1				

Diagnosis of Lyme Disease

Lyme IgM Western Blot

This is a membrane immunoassay based on the Immunoblot method. As recommended by the CDC, all samples which test positive or equivocal on a serological screening test should be re-tested on a *Borrelia burgdorferi* Western Blot. The *B. burgdorferi* IgM Western Blot assay is recommended for the evaluation of sera from patients believed to be exposed to *B. burgdorferi*.

MDL Number: 6627981-1 ID

Date: 04/01/2016

Examiner: LK

Test: *Borrelia* B31 + OspA/B IgM ViraStrip® IgM

Strip: LL5003068-15

Bands, kD

41	39	34	31	23
065	-	-	-	-

Intensity, % of Cut-off

Patient 15

AMF 42

Band-Locator:

VMLM 41

Results for this specimen:

For results according to the CDC Criteria, please refer to the attached MDL Test Result form.

Result Interpretation:

IgM	Result	CDC Criteria (Antibody, CDC*)	Alternate Criteria (Antibody, Alt*)
	Negative (Non-reactive)	No bands or less than two bands from: 23,39,41 kD	No <i>B. burgdorferi</i> specific bands
	Equivocal	N/A	One band from: 23,31,34,39,41 kD
	Positive (Reactive)	Two or more bands from: 23,39,41 kD	Two or more bands from: 23,31,34,39,41 kD

Diagnosis of Lyme Disease

Lyme IgG Immunoblot Blot

This is a membrane immunoassay based on the immunoblot method. As recommended by the CDC, all samples which test positive or equivocal on a serological screening test should be re-tested on a *Borrelia burgdorferi* immunoblot. The *B. burgdorferi* IgG immunoblot assay is recommended for the evaluation of sera from patients believed to be exposed to *B. burgdorferi*.

MDL Number: 6627981-1 ID

Date: 04/01/2016

Examiner: LK

Test: *Borrelia* B31 + OspA/B IgG ViraStripe® IgG

Strip: LO5004077-15

Bands, kD

93	68	58	45	41	39	34	31	30	25	23	18
072	059	036	..	254	036	072					

Intensity, % of Cut-off

Patient:

15

AWFO 12

Band-Locator:

VMLC 8

Results for this specimen:

For results according to the CDC Criteria, please refer to the attached MDL Test Result form.

Result Interpretation:

IgG	Result	CDC Criteria (Antibody, CDC)*	Alternate Criteria (Antibody, Alt)*
	Negative (Non-Reactive)	No bands or less than five bands from: 18,23,28,30,39,41,45,58,66,93 kD	No <i>B. burgdorferi</i> specific bands
	Equivocal	N/A	One or two bands from: 23,31,34,39,93 kD
	Positive (Reactive)	Five or more bands from: 18,23,28,30,39,41,45,58,66,93 kD	Three or more bands from: 23,31,34,39,93 kD

Diagnosis of Lyme Disease

CDC Criteria: The Pitfalls

1. Many patients with LD are seronegative, which means they do not produce antibodies to the *Borrelia* organism.
2. For a band to be considered positive, the patient antibody must be at least 60% of the control, which mean people who do make a lot of antibody will be considered negative.
3. Most conventional reference labs do not test for the breadth of antibodies associated with LD, so will miss patients who have Lyme-specific antibodies. If you don't look, you won't find it.
4. It can take up to 6 weeks to produce antibodies once someone has been bitten by a tick, so no reliable testing for acute cases.

Diagnosis of Lyme Disease

The International Lyme and Associated Disease Society (ILADS) have established a different set of criteria for diagnosing LD and coinfections.

ILADS doctors often diagnose patients based on their clinical symptoms in conjunction with lab tests that shows that someone has had exposure to a particular organism(s).

Other inflammatory and autoimmune illnesses must be ruled out as well, since LD mimics many other conditions.

Diagnosis of Lyme Disease



**“I already diagnosed myself on the Internet.
I’m only here for a second opinion.”**

Diagnosis of Lyme Disease

Other Labs To Run

1. Coinfections: Bartonella, Babesia, Anaplasma, Ehrlichia, Mycoplasma, Rickettsia, Chlamydia pneumoniae, Strep
2. TFT's: TSH, free T3, free T4, thyroid antibodies
3. Adrenal function: AM cortisol, DHEA-S, aldosterone (if suspect POTS)
4. CBC with diff.
5. Iron panel: ferritin, serum iron, TIBC
6. Comprehensive Metabolic Panel
7. Immune markers: IgG/IgA/IgM, IgG subclasses, T and B cell quant., C4a, TGF- β (some of this is limited in Canada for ND's, but can refer to MD)
8. Inflammatory markers: CRP, ESR, cytokines
9. Nutritional status: vitamin D (25-OH), RBC Minerals, Amino acids

Treatment of Lyme Disease

CDC Recommendations: Based on IDSA Guidelines (2006)

1. Known deer tick bite: treat prophylactically with single dose of 200 mg of doxycycline for adults or children > 8 years old.
2. If someone is symptomatic, has erythema migrans or has a positive blood test for LD, treat with 14-21 days of doxycycline 100 mg 2 times a day for adults and children older than 8 years old and 500 mg 3 times per day of amoxicillin for children under 8 years old or pregnant women.
3. Cefuroxime (Ceftin™) 500 mg 2 times a day may be used for those allergic to amoxicillin.
4. Lyme meningitis: add IV ceftriaxone (Rocephin™) or IV cefotaxime.

Treatment of Lyme Disease

Antimicrobial Therapy: The Good, The Bad and The Ugly

The Good

- Many patients experience clinical benefit from these treatments are are symptomatically improved.
- Patients who have suffered for many years with LD or have been disabled start to function again.
- Even if a patient had been exposed to a tick many years prior, often these treatment regimens help.

Treatment of Lyme Disease

Antimicrobial Therapy: The Good, The Bad and The Ugly

The Bad

- Many patients also experience die-off reactions called Herxheimer reactions (aka “herxing”). These are flu-like symptoms that occur as the organism is being killed and can last days to weeks in some individuals.
- Combinations of antimicrobials can have undesired side effects, including nausea, loss of appetite, diarrhea, abdominal pain, headaches.
- Long-term antimicrobial use can cause liver or other organ damage, so blood count, liver and kidney function need to be monitored closely.

Treatment of Lyme Disease

Antimicrobial Therapy: The Good, The Bad and The Ugly

The Ugly

- Combination antimicrobials can wipe out your normal bacterial flora in the gut, causing *Clostridia difficile* or yeast infections, which then need to be treated with other stronger antimicrobials or antifungals.
- Some antimicrobials suppress your own immune system, making it more difficult for you to fight your own infections.
- We don't fully understand the consequences of long-term antibiotic use in LD and how it disrupts the normal gut microbiome.

Treatment of Lyme Disease

Diet for Lyme Disease

There are many diets out there that promote various health benefits. I find most people with Lyme disease do well when they consume an alkaline diet.

pH is tightly regulated by the body. Blood pH is between 7.2-7.4. With exception to the stomach, bladder and vagina, most of our tissues are alkaline. Our cells and receptors function best at an alkaline pH.

Diet for Lyme Disease

Foods that can be consumed often:

Vegetables (eat all you want):

- *Artichokes*
- *Asparagus*
- *Beets and beet greens*
- *Broccoli*
- *Brussels sprouts*
- *Cabbage*
- *Carrots*
- *Cauliflower*
- *Celery*
- *Chard*
- *Collard greens*
- *Cucumbers*
- *Endives*
- *Garlic*

- *Green beans*
- *Jerusalem artichokes (Sunchokes)*
- *Lettuces*
- *Mustard greens*
- *Okra*
- *Onions*
- *Parsley*
- *Parsnips*
- *Peas*
- *Rutabaga*
- *Seaweeds (Nori, Dulse, etc.)*
- *Scallions*
- *Spinach*
- *Sprouted grains*
- *Sprouts*

- *Tomatoes (raw only)*
- *Turnips*
- *Zucchini*

Vegetables (eat no more than 1 serving a day):

- *Sweet potato*
- *Squash*
- *Yams*

Fruits:

- *Avocado*
- *Grapefruit*
- *Lemon-Lime*
- *Pomegranates*
- *Watermelon*

Diet for Lyme Disease

Grains/Legumes:

- ***Amaranth***
- ***Buckwheat***
- ***Chia***
- ***Kamut***
- ***Lentils***
- ***Lima beans***
- ***Millet***
- ***Mung beans***
- ***Navy beans***
- ***Pinto beans***
- ***Red beans***
- ***Quinoa***

- ***Spelt***
- ***White beans***

Nuts/Seeds:

- ***Almonds***
- ***Brazil nuts***
- ***Coconut***
- ***Flax seeds***
- ***Pumpkin seeds***
- ***Sesame seeds***
- ***Sunflower seeds***

Oils:

- ***Avocado oil***
- ***Coconut oil***
- ***Flax oil***
- ***Olive oil***
- ***Safflower oil***

Beverages:

- ***Alkaline water***
- ***Herbal teas***
- ***Green drinks***
- ***Water***

Diet for Lyme Disease

**Foods that may be eaten in less than 20% of your weekly dietary intake:
(neutral pH or slightly acid-forming)**

Fruits:

- Apples
- Apricots
- Berries
- Cantaloupe
- Cherries
- Grapes
- Honeydew melon
- Mango
- Nectarines
- Oranges
- Peaches
- Papaya
- Pineapple
- Plums

Nuts/Seeds:

- Pecans
- Hazel nuts

Grains/Legumes:

- Brown rice
- White rice
- Oats
- Rye
- Hemp
- Soy (organic only)

Oils:

- Sunflower oil
- Grapeseed oil

Meat, Fish, Eggs:

- Beef
- Chicken
- Eggs
- Farmed-raised fish
- Pork
- Shellfish
- Turkey

Fish (wild only):

- Mackerel
- Perch
- Pike
- Roughy
- Salmon
- Sardines
- Sole, Tilapia

Diet for Lyme Disease

Foods to avoid while on the program:

Dairy Products:

- Cheese
- Ice cream
- Milk
- Sour cream
- Yogurt

Fruits:

- Dried fruits

Nuts/Seeds:

- Macadamia nuts
- Peanuts
- Pistachios

Beverages:

- Alcohol
- Black tea
- Coffee
- Fruit juice

Refined, Processed and Simple carbohydrate Foods:

- All additives
- Artificial dyes, flavorings and sweeteners
- Candy, cookies, doughnuts, crackers
- Canned foods (they tend to contain lots of preservatives and chemicals)
- Chocolate/Cocoa
- Corn and all corn products (corn syrup, corn starch, etc.)
- Chips
- Margarine
- Preservatives (Sulfites, Nitrites, etc.)
- Sugar
- Yeast

Condiments:

- Honey
- Jam
- Jelly
- Mustard
- Soy sauce
- Vinegar

Oils:

- Corn oil
- Cottonseed oil
- Soybean oil
- Vegetable oil
- All hydrogenated oils and trans fats

Treatment of Lyme Disease

Cowden Protocol: developed by Dr. Lee Cowden

1. Amantilla
2. Banderol
3. Burbur
4. Cumanda
5. Enula
6. Houttuynia
7. Magnesium
8. Mora
9. Parsley
10. Pinella
11. Samento
12. Sealantro
13. Serrapeptase
14. Sparga

Treatment of Lyme Disease

Modified Cowden Protocol

Samento (Cat's claw)

- Rich in pentacyclic oxindole alkaloids (POA's), which help stimulate the immune system to fight infection
- Is a potent anti-inflammatory
- Useful for treating coinfections
- Little to no side effects
- Free of TOA's, which may inhibit action of POA's

Treatment of Lyme Disease

Modified Cowden Protocol

Banderol

- Derived from *Otaba* tree in South America
- Broad spectrum activity against Lyme and coinfections
- Is a potent anti-inflammatory
- Works well in conjunction with Samento. Dr. Eva Sapi at University of New Haven showed that Samento and Banderol were able to eliminate all 3 forms of *Borrelia*.

Treatment of Lyme Disease

Modified Cowden Protocol

Cumanda

- Derived from bark of *Campsiandra angustifolia* tree in South America.
- May be the most broad spectrum herb against Lyme and coinfections. Used locally to treat malaria.
- Is a potent anti-inflammatory. Used to treat arthritis and fever.
- Can produce significant Herxheimer reactions.

Treatment of Lyme Disease

Modified Cowden Protocol

Burbur

- Derived from leaves of *Desmodium molliculum*, an Amazonian plant.
- Used primarily for detoxification purposes, especially the liver, kidneys and lymphatics.
- Can protect against toxic effects of other medications.
- Beneficial to minimize or stop Herx reactions.
- Can use every 10 minutes if Herx reactions become intolerable for patients.

Treatment of Lyme Disease

Modified Cowden Protocol

Acute Lyme Disease:

- Start with Samento, Banderol and Cumanda
- Give 15-30 drops 2 times per day in 1 oz water of each for 30 days.
- May add Burbur if Herxheimer reaction is strong.
- If patient starts Herx reaction, keep dose the same. Only increase dose if there is no improvement or reaction.

Treatment of Lyme Disease

Modified Cowden Protocol

Persistent Lyme Disease:

- Start with Samento, Banderol, Cumanda and Burbur
- Give 2-4 drops 2 times per day in 1 oz water of each.
- Increase by 1 drop 2 times per day every 3-4 days if there is no reaction or improvement up to 30 drops twice a day.
- If patient starts Herx reaction, keep dose the same.
- Give 10 drops of Burbur every 10 minutes for severe Herx reaction.

Treatment of Lyme Disease

Cowden Protocol

Combinations of these products are used to help kill the microbes, support detoxification and clear heavy metals.

It is a 5 month protocol with the combination of herbs changing each month.

Since these are liquid extracts and drop doses are administered, it is possible to use in children. Dose can be altered based on body weight.

Treatment of Lyme Disease

Cowden Protocol

Advantages: easy to administer (relatively), clinically beneficial, reasonably cost-effective.

Disadvantages: Herx reactions common, long-term treatment, requires multiple bottles and dosing schedule (labor intensive).

Treatment of Lyme Disease

Let's take a break.....

Treatment of Lyme Disease

Zhang Protocol: developed by Dr. Qincao Zhang, LAc

1. Artemisiae
2. Houttuynia (HH Caps)
3. Circulation P
4. Coptis
5. Cordyceps
6. Pueraria
7. R-5081
8. AI#3
9. Allicin

Treatment of Lyme Disease

Zhang Protocol

Dr. Zhang's protocol helps eradicate the infections, improve circulation, reduce inflammation and improve detoxification. It is one of the most comprehensive herbal protocols to address each aspect of LD.

I use this protocol for 3-6 months, depending on patient's response.

Treatment of Lyme Disease

Zhang Protocol: Allicin Caps

- Allicin is one of the active ingredients in *Allium sativum* (garlic). Allicin Caps contain allitridi, which gets converted to allicin.
- Well-established anti-microbial, but also helps improve circulation and is mild anti-inflammatory.
- Time released caps, so allicin gets absorbed over a longer period of time.
- Patients will definitely excrete it through their skin, so may be socially problematic for some.

Treatment of Lyme Disease

Zhang Protocol: Artemisiae Caps

- Extract of wormwood (*Artemisiae annua*), containing artemisinin. Also contains astragalus (*Astragalus membranaceus*) and codonopsis (*Codonopsis pilosula*).
- Effective against *Babesia* mostly, but also against *Borrelia* as well.
- Helps suppress autoimmune reactions and has anti-inflammatory effects.
- This formula helps modulate the immune system and has adaptogenic properties.

Treatment of Lyme Disease

Zhang Protocol: Coptis Caps

- Extract of coptis (*Coptis chinensis*).
- Has broad anti-microbial activity and has been used to treat bacterial, viral, fungal and parasitic infections.
- In-vitro studies find it as effective as some antibiotics in eradicating bacterial infections.

Treatment of Lyme Disease

Zhang Protocol: Cordyceps

- Medicinal mushroom (*Cordyceps sinensis*) that has been used in TCM for more than 2000 years.
- Is a potent immune boosting herb.
- Helps improve circulation.
- Is useful for persistent fatigue.
- Has blood sugar lowering effects, so be careful with diabetics with LD.

Treatment of Lyme Disease

Zhang Protocol: R-5081

- 7 traditional Chinese herbs, including *Smilax* and *Scutellaria*.
- *Smilax* and *Scutellaria* have long history of treating spirochetes like *Leptospira* and *Treponema*.
- Other herbs in the formula help promote detoxification, reduce inflammation and enhance tissue repair.

Treatment of Lyme Disease

Zhang Protocol: Circulation P

- Combination of 2 TCM herbal formulas with 10 herbs.
- Promotes enhanced circulation by preventing platelet aggregation.
- Boosts immune function and improves clearing cellular debris of bacteria and viruses.

Treatment of Lyme Disease

Zhang Protocol: AI#3

- Combination of *Macunae caulis*, *Sargentodoxae caulis* and *Paederiae caulis*.
- Have anti-inflammatory and analgesic effects.
- Can have immune suppressive effects, so limit use to 3-4 months.
- May alter menstrual cycle in some women, so discontinue 3 months prior to conception.

Treatment of Lyme Disease

Zhang Protocol: Puerarin Caps

- Derived from the root of *Pueraria species*.
- Used to treat high fever, muscle spasms, headaches, stiff joints and diarrhea.
- Help improve blood flow to the heart and brain, so is particularly good for those suffering from brain fog or poor memory.
- Potent anti-inflammatory.

Lee, K.-H., Morris-Natschke, S., Qian, K., Dong, Y., Yang, X., Zhou, T., ... Akiyama, T. (2012). Recent Progress of Research on Herbal Products Used in Traditional Chinese Medicine: the Herbs belonging to The Divine Husbandman's Herbal Foundation Canon (神農本草經 Shén Nóng Běn Cǎo Jīng). *Journal of Traditional and Complementary Medicine*, 2(1), 6–26.

Treatment of Lyme Disease

Zhang Protocol

Acute Lyme Disease

- HH Caps, Coptis, Cordyceps: give 1 cap 3 times a day. May use Allicin if patient tolerates.
- Add AI#3 if joint/muscle pain: give 1 cap 3 times per day or 2 x 1 x 2 for 5 days loading dose.
- Add Puerarin Caps if has fever, myalgia or Raynaud's. Give 1 cap 3 times per day.

Treatment of Lyme Disease

Zhang Protocol

Persistent Lyme Disease

- HH Caps, Artemisiae, Circulation P, Cordyceps, R-5081: give 1 cap 2-3 times a day.
- Add AI#3 if joint/muscle pain: give 1 cap 2-3 times per day or 2 x 1 x 2 for 5 days loading dose.
- Add Puerarin Caps if has fever, myalgia or Raynaud's. Give 1 cap 2-3 times per day.

Treatment of Lyme Disease

Zhang Protocol: developed by Dr. Qincao Zhang, LAc

Advantages: clinically beneficial, Herx reactions not common, few side effects.

Disadvantages: difficult to administer if cannot swallow capsules, long-term treatment, expensive.

Treatment of Lyme Disease

Byron White Protocol: developed by Byron White

**May not be available in Canada*

1. AL-Complex
2. A-Bab
3. A-Bart
4. A-C
5. A-FNG
6. A-Myco
7. A-RMSF
8. Other specific formulas

Treatment of Lyme Disease

Byron White Protocol

Botanical formulas that are specific to the organism being treated (i.e. AL-Complex for Lyme, A-Bab for Babesia, etc.).

These are liquid extracts that use drop dosing, using even fewer drops than Cowden protocol. Extracts are highly concentrated.

Treatment of Lyme Disease

Byron White Protocol

Advantages: clinically beneficial, easy to administer.

Disadvantages: Herx reactions common, long-term treatment, expensive.

Treatment of Lyme Disease

Other Botanical Therapies

Buhner Protocol: protocol consists of Japanese knotwood (*Polygonum cuspidatum*), Cat's Claw (*Uncaria tomentosa*), Andrographis (*Andrographis paniculata*), Wireweed (*Sida acuta*) and Yellow Dye Root (*Cryptolepis Sanguinolenta*).

Other herbs that help support the immune system, have anti-microbial effects, anti-inflammatory and help improve circulation or reduce pain.

Treatment of Lyme Disease

Managing Herxheimer Reactions

- AI#3: take 1 cap 3-4 times per day before meals.
- Burbur: take 10 drops every 15-30 minutes in 1 ounce of water.
- Curcumin (*Curcuma longa*): use companies that have well-studied forms that are well absorbed. Take 2-3 capsules 3 times per day before meals.
- Boswellia (*Boswellia serrata*) 400 mg: this is an herb from India that has a long history of use as an anti-inflammatory. Take 1-2 caps 3 times per day before meals.
- White willow bark (*Salix alba*) 400 mg: this herb contains salicin, a component similar to that found in aspirin. Take 1-2 caps 3 times per day before meals.

Treatment of Lyme Disease

Managing Herxheimer Reactions

Alkalizing your body will also help keep Herxing under control. You can take a bicarbonate formula to help keep you more alkaline. I recommend taking:

- Alka Seltzer Gold: take 1 tablet 3-4 times per day in 2-4 ounces of water and drink.
- Tri-Salts: 2 capsules 3 times per day.
- Baking soda: $\frac{1}{4}$ tsp 3-4 times per day.

Treatment of Lyme Disease

Breaking Down Biofilm

Biofilm is produced by many bacteria, including Lyme and is composed of extracellular DNA, proteins and carbohydrates...AKA “slime”.

Biofilm enhances microbial adhesion to host cells and to each other.

Biofilm protects the microbe against innate and humoral immune responses and can lead to antibiotic resistance.

Treatment of Lyme Disease

Breaking Down Biofilm

- Biofilm busting enzymes – there are several products that contain enzymes that will help digest the biofilm and break it down. I use serrapeptase a lot and find it works well. I give between 40,000-60,000 U per day away from food. Nattokinase is another enzyme derived from natto, a fermented soy product. I give 20,000 FU 2-3 times per day away from food. For more difficult patients, I often use lumbrokinase, an enzyme derived from a type of earthworm. The enzyme activity is about 10 times that of nattokinase, but is also significantly more expensive. I specifically use Boluoke, as it has the best research behind it. Take 1 capsule 2 times per day, which delivers 600,000 U per day in total.
- Interfase Plus: this product contains enzymes with the addition of disodium EDTA and chitosans that also help break down biofilm. Take 1-2 capsules twice a day between meals.

Treatment of Lyme Disease

Breaking Down Biofilm

- Lactoferrin: this molecule binds up iron, which effectively prevents the formation of biofilm. Be careful if patient is already iron deficient or anemic. It is also not to be taken if they have a dairy allergy, as it is derived from dairy and could worsen symptoms. Take 600 mg 1-2 times per day.
- Xylitol: this is a low carbohydrate sweetener that is naturally found in low amounts in some fruits and vegetables. It has been shown to make the biofilm weaker in dental studies. Although it is safe for humans, it is extremely toxic to dogs, so avoiding keeping around pets. Give 1 tsp 3-4 times a day in water or juice to start and you can increase up to 1 Tbsp. 3-4 times a day. Some people get gas and bloating with xylitol, so you may have to ramp up the dose slowly.

Treatment of Lyme Disease

Breaking Down Biofilm

- Coconut oil (organic): coconut oil has been used to treat various infections, including bacterial and yeast infections and contains a compound called monolaurin. It also has the ability to disrupt biofilm formation. Give 1Tbsp twice a day in food.
- N-acetyl cysteine (NAC): this is an amino acid that has been used to help break up mucus in the body and has been shown in numerous studies to break up biofilm. Give 200-600 mg 3 times per day. NAC may deplete zinc and copper when used long-term, so I recommend supplementing with these minerals if you take NAC for more than 2 months. NAC can cause gastrointestinal distress in some individuals and should not be taken by anyone with an active stomach ulcer.

Treatment of Lyme Disease

Boosting Immune Function

1. Vitamin C: vitamin C helps with active infections and may help improve the effect of antibiotics. Test tube studies show large doses of vitamin C may inhibit the growth of bacteria or kill it altogether. Take 1000 mg 2-3 times per day.
1. Vitamin D: many Lyme patients are vitamin D deficient. Vitamin D is a hormone that helps modulate the immune system. Give 2000-4000 IU per day with food. Higher doses may be needed if serum 25- hydroxy vitamin D is still low after supplementation.

Treatment of Lyme Disease

Boosting Immune Function

3. Zinc: It is an effective anti-viral and anti-inflammatory nutrient. Give 30-50 mg per day with food. It is essential to take zinc with food or it can make patient nauseous if they take it on an empty stomach. Long-term use of zinc supplements can induce a deficiency of folate or copper.
4. Andrographis (*Andrographis paniculata*) is a potent anti-microbial and anti-inflammatory herb. I prefer using an encapsulated standardized extract. I recommend taking 300-400 mg twice a day of a 50% andrographolide product. Andrographis is not for people with autoimmune conditions that are not related to Lyme disease, such as lupus or rheumatoid arthritis as it may exacerbate their symptoms.

Treatment of Lyme Disease

Low Dose Naltrexone (LDN)

Naltrexone is an opioid antagonist, but at low doses appears to enhance endogenous opioid production.

Short term blocking of opioid receptors for 4-6 hours leads to increased levels of endogenous opioids for up to 20 hours.

Is used off label for numerous conditions, including cancer, fibromyalgia, MS, Crohn's disease, pain syndromes and autism.

Treatment of Lyme Disease

Low Dose Naltrexone (LDN)

Chronic pain

Younger, J., Parkitny, L., & McLain, D. (2014). The use of low-dose naltrexone (LDN) as a novel anti-inflammatory treatment for chronic pain. *Clinical Rheumatology*, 33(4), 451–459. <http://doi.org/10.1007/s10067-014-2517-2>

Multiple Sclerosis

Rahn KA, McLaughlin PJ, Zagon IS. (2011). Prevention and diminished expression of experimental autoimmune encephalomyelitis by low dose naltrexone (LDN) or opioid growth factor (OGF) for an extended period: Therapeutic implications for multiple sclerosis. *Brain Res.*, Mar 24;1381:243-53. doi: 10.1016/j.brainres.2011.01.036. Epub 2011 Jan 20.

Fibromyalgia

Younger, J., & Mackey, S. (2009). Fibromyalgia Symptoms Are Reduced by Low-Dose Naltrexone: A Pilot Study. *Pain Medicine (Malden, Mass.)*, 10(4), 663–672. <http://doi.org/10.1111/j.1526-4637.2009.00613.x>

Treatment of Lyme Disease

Low Dose Naltrexone (LDN)

Immune Modulation

Bihari, B. (2013). Bernard Bihari, MD: low-dose naltrexone for normalizing immune system function. *Altern Ther Health Med*, Mar-Apr;19(2):56-65.

Quality of Life

Brown, N., Panskepp, J. (2009). Low-dose naltrexone for disease prevention and quality of life. *Med Hypotheses*, Mar;72(3):333-7. doi: 10.1016/j.mehy.2008.06.048. Epub 2008 Nov 28.

Crohn's Disease

Segal D, Macdonald JK, Chande N. (2014). Low dose naltrexone for induction of remission in Crohn's disease. *Cochrane Database Syst Rev*, Feb 21;(2):CD010410. doi: 10.1002/14651858.CD010410.pub2.

Treatment of Lyme Disease

Low Dose Naltrexone (LDN)

LDN has not been studied specifically in Lyme disease, but has been used by numerous practitioners with good clinical success.

It may help modulate the immune system and restore balance in Th1/Th2 system. It also help alleviate pain.

LDN has an excellent safety profile and is well tolerated. Changes in sleep pattern or dreams have been reported by some individuals taking LDN.

Treatment of Lyme Disease

Low Dose Naltrexone (LDN)

Dosing:

Start with 1 mg at bedtime. May increase by 1 mg every 2 weeks up to 6 mg.

Women: often do best at 3 mg

Men: often do best at 4.5 mg

Treatment of Lyme Disease

Pulsed Electro-Magnetic Frequencies (PEMF)

There is recognition that the cells of the body vibrate or “oscillate” and have their own unique resonant energy.

Think of pushing a child on a swing, then when you push in the direction the child is moving, they go higher. If you push in the opposite direction, it will slow or stop the child's motion.

Treatment of Lyme Disease

Pulsed Electro-Magnetic Frequencies (PEMF)

PEMF devices are designed to produce a series of very low electromagnetic frequencies that fall within a biological window that resonate with human cells.

There are over 1 million receptors on any given cell and applying the right EMF may help stimulate these receptors to alter cellular function.

Treatment of Lyme Disease

Pulsed Electro-Magnetic Frequencies (PEMF)

Our bodies are exposed to numerous EMF daily via WiFi, electrical wiring in home or office, cell phones, cordless phones, etc. Some of the frequencies can be damaging, while others are healing.

The goal is to find the right frequencies that help stimulate the body toward better health. Most of medicine focuses on the chemistry of the body and virtually ignores the physics of the body.

Treatment of Lyme Disease

Pulsed Electro-Magnetic Frequencies (PEMF)

Potential benefits include:

- *Improved circulation*
- *Decreased pain*
- *Reduced inflammation*
- Faster recovery after injury or surgery
- Faster healing of skin wounds
- *Acceleration of nerve regeneration*

Treatment of Lyme Disease

Pulsed Electro-Magnetic Frequencies (PEMF)

There are over 1600 studies on the use of PEMF devices and most devices are currently FDA approved in the US. Some devices are designed for home use and others for professional use.

I recommend 2 treatments per week. Each treatment can be short (8 minutes) to longer (75 minutes). This is a great, non-invasive approach that can be customized to the individual.

Treatment of Lyme Disease

Detoxification Therapies

- IR Sauna
- Constitutional hydrotherapy
- Drainage remedies (Unda, Pekana, Marco Pharma, Seroyal)
- Exercise (gentle): yoga, tai chi, stretching, etc.
- Colon hydrotherapy

Even the most difficult Lyme patient can respond to these therapies, even when others have failed!

Treatment of Lyme Disease

Low Dose Immunotherapy (LDI): developed by Dr. Ty Vincent

We recognize that many microorganisms can trigger an autoimmune reactions once someone has been exposed to that organism. Rheumatic fever following strep infection is well-known in the medical community as a consequence of having had strep, even once the infection is eradicated.

Molecular mimicry of a microbe can create an autoimmune reaction against our own tissues.

Treatment of Lyme Disease

Low Dose Immunotherapy (LDI)

If a microorganism is capable of turning on the immune system against our own tissues, how effective will antimicrobial therapy be?

Reducing the load of the microbe may certainly lessen the immune response, but does it completely stop an autoimmune reaction? Does this explain why people flare periodically, even though they have been undergoing antimicrobial therapy for months or years?

Treatment of Lyme Disease

Low Dose Immunotherapy (LDI)

The goal of LDI is to promote tolerance to the offending antigen using homeopathic doses of nosodes mixed with beta-glucuronidase.

Beta-glucuronidase is an enzyme that was found (by mistake) to help build immune tolerance to whatever coexisted with the enzyme. This enzyme has been used with low dose allergy (LDA) therapy for the treatment of allergies to foods, mold, pollens and chemicals.

Treatment of Lyme Disease

Low Dose Immunotherapy (LDI)

The antigen is selected by the doctor depending on what organism(s) are suspicious to be causing symptoms. The dose selected is dependent on the sensitivity of the individual.

Intradermal or sublingual doses are administered every 7-8 weeks depending on patient response. In many cases, clinical improvement has been observed within 24-48 hours. However, it can take a few weeks to see the full benefit of the treatment dose.

Treatment of Lyme Disease

Low Dose Immunotherapy (LDI): Case 1 15 year old girl with autism

Jill has been in treatment with autism since she was 2 years old doing various biomedical and immune modulating therapies, all of which have helped to varying degrees. Her current primary issues are scripting, hyperactivity and lack of focus. She has also has intermittent skin rashes.

Treatment of Lyme Disease

Low Dose Immunotherapy (LDI): Case 1 15 year old girl with autism

Jill had been tested for Lyme disease and coinfections, which none of the tests were positive. She had a history of candidiasis however and had been on antifungal therapy for many years.

I gave Jill Candida Mix 10C sublingually. The next day, her mother called and said that she was completely calm and more mentally “clear”. The scripting was less and her skin was not as itchy. After 2 months, she is stable and has not regressed.

Treatment of Lyme Disease

Low Dose Immunotherapy (LDI): Case 2 9 year old boy with tics

John had been having vocal and neck tics for a few months when the mother brought him to our clinic. He was tested and treated for food allergies, which helped reduce his tics significantly. However, the tics had not completely resolved.

I tested him for PANDAS and he was positive for ASO and DNase B antibodies, despite having had a negative throat culture. He had a history of Lyme disease when he was 3-4 years old, which was treated with antibiotics at the time.

Treatment of Lyme Disease

Low Dose Immunotherapy (LDI): Case 2 9 year old boy with tics

I gave John a Strep Mix 10C and the mother reported no noticeable changes. I gave him a Strep Mix 9C the following week and again, no noticeable changes in his tics.

I then tried the Lyme Mix 10C and that following day he had a severe headache. The following day, the headache dissipated and the tics completely stopped. He has now been tic-free for 3 months

Treatment of Lyme Disease

Low Dose Immunotherapy (LDI): Case 3 47 year old woman with Lyme disease

Susan had a h/o chronic neck and shoulder pain, fatigue and joint pain. She had seen several doctors, including a rheumatologist who ran many labs for autoimmune disease, which were all negative.

Went to a large autoimmune clinic in TX and was put on AI diet and Rx many supplements, which helped, but did not resolve her Sx.

Treatment of Lyme Disease

Low Dose Immunotherapy (LDI): Case 3 47 year old woman with Lyme disease

Susan was tested for Lyme and coinfections and found to have a + Lyme Western Blot IgG and IgM. She was referred to my office for Tx.

I started her on an alkaline diet, Dr. Zhang protocol and gave her LDI Lyme 12C. She reported the next day her neck pain had improved by 90%.

Treatment of Lyme Disease

Low Dose Immunotherapy (LDI): Case 3
47 year old woman with Lyme disease

Over the next month, her neck and joint pain almost completely resolved. Her energy was better and she was becoming more physically active again. She was doing well for about 6 months and then started to have RUQ pain.

She had U/S and MRCP which showed dilated common bile duct, but otherwise negative for cholecystitis or obstruction.

Treatment of Lyme Disease

Low Dose Immunotherapy (LDI): Case 3 47 year old woman with Lyme disease

Over the next month, her neck and joint pain almost completely resolved. Her energy was better and she was becoming more physically active again. She was doing well for about 6 months and then started to have RUQ pain. She denies irregular BM, constipation or diarrhea.

She had U/S and MRCP which showed dilated common bile duct, but otherwise negative for cholecystitis or obstruction. CDSA was unremarkable, except no yeast growth.

Treatment of Lyme Disease

Low Dose Immunotherapy (LDI): Case 3 47 year old woman with Lyme disease

I then gave her LDI Candida 12C and her abdominal pain was 50% improved within 48 hours. I saw her 2 weeks later and gave her a booster dose of Candida 13C, which continued to help her Sx.

After a second dose of Candida 12C, her RUQ pain is gone. She is currently doing well and RUQ pain has not returned.

Treatment of Lyme Disease

The treatment of LD cannot be a single treatment approach. It is a complicated illness and the treatment needs to encompass many aspects of improving immune health.

1. Treat the organism(s) if it is acute.
2. Treat other immune distracters such as food allergies, environmental allergies, etc.
3. Detoxify the body. Eliminate heavy metals.
4. Fix endocrine dysregulation.
5. Get proper sleep.
6. Reduce inflammation.
7. Improve nutritional status.
8. Improve mitochondrial function.
9. Improve circulation.
10. Reduce autoimmunity.

The Lyme Solution

The Lyme Solution

A 5-PART PLAN

TO FIGHT THE
INFLAMMATORY AUTO-IMMUNE
RESPONSE AND
BEAT
 LYME DISEASE

DARIN INGELS, ND, FAAEM

FOREWORD BY AMY MYERS, MD,

author of *THE NEW YORK TIMES*-bestselling
The Autoimmune Solution and *The Thyroid Connection*

For More Information

Website: DarinIngelsND.com

Facebook: [@DarinIngelsND](https://www.facebook.com/DarinIngelsND) or [@LymeExpert](https://www.facebook.com/LymeExpert)

Instagram: [@DarinIngelsND](https://www.instagram.com/DarinIngelsND)

Twitter: [@DarinIngelsND](https://twitter.com/DarinIngelsND)

Wellness Integrative Naturopathic Center

949-551-8751

wellnessintegrative@gmail.com

The End



"You have Lyme's Disease. Do you spend any time in areas where there are a lot of deer?"