Treatment for Lyme Disease with Liposomal Vitamin C, Diet, Neurotransmitter Support Supplements, and Herbs

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Althea Northage-Orr **has been actively involved for over 30 years in the study of Taoism and Traditional Chinese Medicine, which she has practiced since 1981. She believes passionately in taking a universalist approach, and is dedicated to interweaving the knowledge of both the East and the West. In 2000 she founded her school, The Chicago College of Healing Arts, where she created curricula for bodywork, Chinese Medicine, herbalism, psychophysical re-education, and other healing modalities, blending both Eastern energetic approaches and Western sciences. She served on the governing council of the American Herbalists Guild and currently sits on their professional admissions committee. In addition to writing about and teaching the use of Western herbs, she has an 80-acre country sanctuary where she cultivates over 140 species of herbs and does much of her spiritual teaching.**

Lyme disease is a complex disease that has many controversial aspects: its transmission, the methodologies used for testing, whether or not there is a chronic aspect (and if so, how to treat it) are all subject to debate. The official line presented by the Centers for Disease Control and Prevention (CDC) is that it is a tick-borne disease with no other route of transmission, that it is fully treatable by a short course of antibiotics, and that there is no such thing as chronic Lyme disease, although there is a vaguely known condition called "post-Lyme syndrome" (CDC 2012).

The other end of the spectrum is represented by "Lyme–literate doctors" (LLDs), various Lyme support organizations and alternative practitioners specializing in Lyme treatments. Their positions vary, the extreme end being that Lyme disease is epidemic, almost impossible to treat without serious long-term antibiotic therapy in very high doses, and that it can be passed through breast milk, sexual contact and also by fleas, mites, mosquitoes and blood/body fluid contact. Treatments include herbal regimens, heat therapies, energetic treatments with devices such as the Rife machine, and of course antibiotic therapies in a variety of combinations and usually long duration, frequently in the form of intravenous treatments. In this paper I will address many of these issues, and suggest a protocol for treatment that steers a middle course between these two positions.

Transmission of Lyme Disease

Lyme disease is caused by a spirochete. There are three recognized genotypes: *Borellia burgdorferi* sensu strictu (occurring in North America, hereafter *Bb*), *Borellia garinii and Borellia afzellii* (the latter two occurring in both Europe and Asia, although *Bb* sensu strictu can occur there as well). The primary vector of infection is the deer tick, specifically the *Ixodes scapularis* or *Ixodes pacificus* in its nymph stage, although the adult is also capable of passing the infection. The most likely time of year is the spring/summer (Sider 2012).

While research exists documenting the presence of *Bb* in mosquitoes, fleas and mites, reported cases of individuals contracting the disease from them does not appear in the literature other than one or two isolated reports (Drisdelle 2012). Insects other than ticks are unlikely to be good transmitters of the disease because part of what favors *Bb* in the tick is its use of a tick-produced protein, Salp15 (Schwalie and Schultz 2009).

When the tick bites, there is a time period of up to 36 hours during which infection is unlikely. First the tick injects a minute amount of blood thinners into the site in order to facilitate blood flow; it then secretes another substance over an extended period of time building a gummy seal between its mouth and its victim. Only after it

has completed this process does it begin feeding. During this preparatory period, the *Bb* spirochete is doing work of its own, coming out of latency and secreting its own chemicals and binding with the tick protein Salp15 in order to make an end run around the endothelial cells of the tick's gut in order to migrate to the salivary glands and into its new host (Schwalie and Schultz 2009).

The CDC has recently acknowledged that there may be a problem with blood transfusion and has asked that active Lyme patients refrain from giving blood (CDC 2012). As latent Lyme forms are capable of later becoming virulent under the right conditions, one wonders if it is ever safe at all. Likewise, women are assured that breastfeeding is safe, although *Bb* has been isolated in breast milk, semen and tears. There is a growing body of research that inclines one to at least not to dismiss these concerns out of hand. (In the references I have included a number of scientific studies that address these issues. However, I think at this time that no conclusive evidence exists.)

Prevention and Tick Removal

The best prevention against Lyme is to protect the skin via clothing and repellants, and to check the skin thoroughly after coming in from outdoors. Those with animal companions should take extra precautions, as pets will carry ticks indoors.

Ticks don't embed themselves immediately, so immediate tick check and removal will prevent infection. Tick nymphs are so tiny that they are easy to miss when performing visual inspection.

If a tick is located, it should be removed by gently pulling it loose with tweezers. Squeezing or tearing at it may cause the tick to regurgitate the contents of its stomach into the host, thus passing the infection. I often use essential oils near the site, which cause a tick to release its hold. An effective additional technique for removal is to wrap wide tape, adhesive side facing out, around the hands and pat the entire surface of the skin (this can be done with a partner).

Symptoms and Stages

The symptoms of Lyme disease typically appear from three days to three weeks after infection. They can resemble flu or be so mild as to be undetectable in some individuals. One of the first signs of infection is often the characteristic *erythema migrans* "bull's-eye" rash. This rash does not always occur; estimates of how many infected individuals will have the rash range from 30 to 70 percent.

The initial stage of the infection may present symptoms such as fatigue, chills, fever, headache, muscle and joint pain, and swollen lymph nodes. The second stage may last several months and symptoms may include: multiple skin rashes, central and peripheral nervous system disorders, heart palpitations, arthritis and neuralgia, extreme fatigue and general weakness. Other symptoms could be pericarditis or other serious heart problems, optic ataxis, psychosis, depression, hallucinations, memory loss, meningitis, paralysis, and neuropathy. The third stage may last for months or years with recurring neurological problems, organ failures and arthritis. This is sometimes referred to as "post-Lyme syndrome" (PLS) and/or chronic Lyme infection. This third stage is controversial, with some agencies (such as insurance companies) denying that it exists at all. The CDC and Public Health Ontario (PHO) accept the current definitions as defined by the Infectious Disease Society of America (IDSA). In spite of a growing body of serious scientific studies, the current stance is as follows:

> There is no well-accepted definition of post-Lyme disease syndrome. This has contributed to confusion and controversy and to a lack of firm data on its incidence, prevalence, and pathogenesis. . . .There is no convincing biologic evidence for the existence of symptomatic chronic *B. burgdorferi* infection among patients after receipt of recommended treatment regimens for Lyme disease. Antibiotic therapy has not proven to be useful and is not recommended for patients with chronic (>6 months) subjective symptoms after recommended treatment regimens for Lyme disease (CDC/IDSA 2012).

When one studies the effectiveness of the *Bb* spirochete at avoiding antibiotic and immune system activity, and weighs the risks of long-term intravenous antibiotics, the therapies of LLDs begin to look unsustainable for what is probably a life-long battle.

The proposed treatments are short-term antibiotic therapies (usually no more than three weeks) of doxycycline, amoxycycline or cefuroxime axetil; for those with more serious complications such as Lyme meningitis, neuroborreliosis, central nervous system involvement or heart symptoms, intravenous regimens (also short-term) are recommended using ceftriaxone, or parenteral therapy with either penicillin G or cefotaxime. Because these therapies are not well tolerated by some, high dose oral doxycycline is also used. Patients with lesser symptoms who relapse can be treated with a second course of four weeks of antibiotics; late stage Lyme patients with neurological symptoms are advised to do two to four weeks of intravenous antibiotic therapy (CDC/IDSA 2012). Beyond these recommendations, IDSA condemns many of the standard therapies employed by Lyme-literate doctors (LLDs) and alternative practitioners:

Therapeutic modalities not recommended.
Because of a lack of biologic plausibility, lack of efficacy, absence of supporting data, or the potential for harm to the patient, the following are not recommended for treatment of patients with any manifestation of Lyme disease: first-generation cephalosporins, fluoroquinolones, carbapenems, vancomycin, metronidazole, tinidazole, amantadine, ketolides, isoniazid, trimethoprim-sulfamethoxazole, fluconazole, benzathine penicillin G, combinations of antimicrobials, pulsed-dosing (i.e., dosing on some days but not others), long-term antibiotic therapy, anti-*Bartonella* therapies, hyperbaric oxygen, ozone, fever therapy, intravenous immunoglobulin, cholestyramine, intravenous hydrogen peroxide, specific nutritional supplements, and others (CDC/IDSA 2012).

As a clinician who has seen Lyme patients who have tried accepted therapies and then went on to have huge problems ranging from kidney failure, heart attack, temporary paralysis, Parkinsonian symptoms, and inflamed joints, one is inclined to be dismissive of IDSA and the CDC. However, their caution is not entirely unjustified. When one studies the effectiveness of the *Bb* spirochete at avoiding antibiotic and immune system activity, and weighs the risks of long-term intravenous antibiotic therapies employing a rotating cocktail of drugs that must be used in sufficient quantities to get across the blood-brain barrier if they are to be of any use at all, the therapies of LLDs begin to look pretty dangerous and unsustainable for what is probably a life-long battle. It is my belief that the best strategy is to develop a program that can drive the *Bb* into latency and then keep it there by using safe bacteriostatic, dietary, botanical and targeted neurotransmitter supports.

The Protocol

My own clinical approach to Lyme disease has undergone many stages, in part driven by my own four-year exhaustive battle with a severe form of neurologically active Lyme. In the last three years, I have treated numerous cases of chronic Lyme. Most of them had opted not to do intravenous antibiotic treatments, and they responded very well to this protocol. A smaller number either had tried the IV antibiotic protocols and had not been successful, or were on them when they came in.

In one notable case, the patient arrived in a wheelchair, with massive pain and Parkinson's-like symptoms, widespread cognitive issues and muscular weakness. She was receiving daily IV drugs and was severely debilitated. Within six weeks on the following protocol, she was off the drugs and out of the wheelchair; at three

months out she was able to return to work. Eighteen months later, she remains stable.

The protocol that I am about to describe possesses the benefit of adhering to the Hippocratic maxim of "Do no harm" and is based upon my own clinical experiences and upon the scientific information we have about Lyme disease. In addition to being effective, the protocol minimizes (if not completely eliminates) the dreaded Herxheimer effect caused by the inflammatory action of the endotoxins emitted when the spirochetes die.

The treatment is composed of four elements, each of which addresses different aspects of the disease. They are: the bacteriostatic effects of high-dose Vitamin C, dietary support, neurotransmitter support, and botanical medicine.

Bacteriostatic Therapy and Vitamin C

Studies of the replication cycle of *Bb* indicate that in order to be truly effective in eradicating the spirochetes, it would be necessary to do high-dose antibiotic therapy (sufficient to cross the blood/brain barrier) for no less than 18 months (Bradford 2006). In addition to the length of the treatment with its attendant risks of blood infection via the peripherally inserted central catheter (PICC) line, the antibiotics need to be given in alternating combinations in order to evade the genetic capabilities of the spirochete to alter its DNA structure and to kill the cystic forms. Antibiotics taken for this long and at this dosage ravage the body. While good arguments can be made for the early administration of antibiotics in short bursts, in chronic Lyme other methods of treatment are urgently needed. I do feel that if there is a safer, more natural long-term bacteriostatic available, it is foolish not to use it. There is—and it is relatively inexpensive and does not generally require installing a semi-permanent IV line as it does not need to be administered daily.

Vitamin C therapy has been shown to be effective against a wide range of illnesses, including polio, other tick-borne diseases such as Rocky Mountain spotted fever, and in some cases, cancer (Klenner 1949). Numerous studies exist as to its effectiveness as an antibiotic and also, more interesting in light of the inflammatory effects of Lyme endotoxins, on its ability to bind with the endotoxins of pathogens such as tetanus, rendering them harmless (Stone 1972). (The amount of research available on the treatment of bacterial infections with IV Vitamin C is substantial. A good summary of these studies is given in chapter 12 of Stone's work). In addition to being demonstrated as potentially very useful, Vitamin C is very safe. Even when given in very high doses it had almost no side effects other than transitory hypoglycemia in some cases, and minor dehydration (Levy 2012). The only caveat is that prior to its use, a simple blood test must be done to make sure that the patient is not one of those rare individuals who lack glucose-6-phosphate-dehydrogenase, an enzyme needed to utilize Vitamin C safely. Earlier concerns about Vitamin C causing kidney stones have proven to be false, although it is still contraindicated in cases of iron overload (hemachromatosis) (Levy 2002).

Vitamin C and Morphology of *Borrelia*

Dr. Lida Mattman, a Nobel Prize-winning scientist who devoted her life to the study of cell wall deficient pathogens, was able to demonstrate that Lyme can readily shift back and forth between forms, based upon whether circumstances were favorable for the thriving of the pathogen (Mattman 2001). Other researchers have since replicated her work (Proal 2007).

Study of *Bb* has shown us that it is very hard to kill because it is able to assume a variety of forms. It can appear in its motile **spirochete form**, a characteristic spiral-shaped bacteria with a complex cell wall structure studded with foreign proteins that allow it to digest the walls of healthy cells and either kill them or hijack them, collapsing them around itself and thereby evading detection by the immune system. In addition to its attack proteins, it has a thick biofilm coating that makes it difficult for immune cells and antibiotics to effectively attack it. It has the ability to morph its genetic structure in the presence of innate immune response (or an antibiotic), thus becoming hard to identify.

Another of its forms is the **bleb form**. A bleb results when a spirochete breaks off

small pieces of its DNA which float in the blood stream and bind with immune cells, leaving the parent cell freer from assault.

When *Bb* invades other cells and hides within them, it is in a **cystic form**. While it is non-motile and does not cause symptoms in this form, it is undetectable, and it can maintain dormancy for up to 15 years before exploding whenever the immune system is compromised or when conditions are favorable. Active cases occur when the encysted forms morph back into spirochete form, a change which can happen very quickly. Spirochetes will encyst themselves when under assault or when they are in conditions where there is a lack of nutrients. Early experiments in vitro demonstrated both of these capabilities (Embers et al 2004). This accounts for the prolonged latency and reappearance and disappearance of the disease state, a characteristic which it shares with other similar spirochetes such as *Treponema* (syphilis) and *Mycobacteria* (tuberculosis).

Most alarming of all is its **cell wall deficient (CWD) form**, a form which both the immune system and most antibiotics are unable to combat because their mechanism of action is to target the foreign proteins on cell walls, which *Bb* does not have in this form.

In order to successfully combat Lyme, one needs to employ different strategies for the different stages. During acute flares, high-dose intravenous Vitamin C administered under medical supervision allows the blood levels to attain a high saturation point of the vitamin, which can effectively kill the spirochete and possibly the cystic forms. Whether it kills the CWD forms is less certain.

During maintenance periods, most dosing can be done orally with liposomal Vitamin C. Liposomal C is an effective tool against encysted forms as it has been demonstrated to penetrate readily through cell walls and even into organelles within the cells (Levy 2002). Liposomal C is made by wrapping a phospholipid around the vitamin and creating a hydrophilic layer very similar to cell membranes. It is easily absorbed through the gut and passes readily into cells, which absorb the lipids (the cells can then use the lipids to repair their own walls, thus releasing their load of the vitamin) (Hickey 2008). Liposomal Vitamin C has about five times the bioavailability of regular oral forms.

Many protocols suggest taking Vitamin C and salt, but in acute stages it is unlikely that oral doses will attain high enough saturation levels. Klenner protocols for polio, and later for other diseases (including one case of tetanus), showed high-dose intravenous Vitamin C was usually given twice a day for up to one week, with high oral doses in between (Klenner 1949). When first reading them I was curious as to why he felt the need to dose orally at all. My own clinical experience with patients is that oral doses are needed in order to deal with the endotoxins *Bb* emits when dying. Vitamin C has a remarkable ability to bind with endotoxins of all sorts and render them harmless (Levy 2002, Stone 1972). Indeed, one remarkable aspect of Vitamin C

Administration of Vitamin C

Any family doctor can administer intravenous Vitamin C, but a good resource for patients who are looking for a doctor in their area familiar with the practice is the American College for Advancement in Medicine (www.acam.org).The amount needed to maintain comfort on liposomal C will again vary; the ideal is to take enough of the vitamin to approach bowel tolerance. This amount will decrease as the patient improves, until doses of 1 to 6 g three times a day becomes the norm. Even if a patient does not do intravenous Vitamin C, in milder cases liposomal C can be very useful in driving the disease into latency and in managing the Herxheimer effects caused by herbal or antibiotic therapy. (Unfortunately, commercial liposomal C can be expensive at these doses; for patients who want to make their own I offer a fairly easy and inexpensive recipe at www.ccphchicago.com.)

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is that one can tell how sick a patient is by how much Vitamin C they can take without exceeding bowel tolerance. If spirochetes are dying an individual may be taking up to 60 g of liposomal C with no ill effects at all. Once the acute phase is over, Vitamin C therapy can become oral only, although I often suggest one IV treatment of 125 g a month as a safety measure for several years.

I do not know if one can truly ever say that they have eradicated Lyme disease due to its ability to survive in a dormant state for long periods. But as long as a person has a method for remaining asymptomatic, then they have, for all intents and purposes, succeeded in defeating the disease. Vitamin C therapy can provide this, and with a minimum of cost and hardship.

Diet

Another known aspect of the Lyme spirochete and its replication cycle is that if it lacks appropriate nutrients, it passes into latency (only to re-emerge when food appears). What is interesting is what the pathogen uses as fuel. Studies have shown that it has two main food sources: sugars and, unfortunately, N-acetyl glucosamine (Bradford 2006). This means that glucosamine sulfate, a substance frequently used to treat joint issues, is contraindicated in the treatment of Lyme disease. More importantly, one needs to deprive the pathogen of its sugar source. This forms the basis of the dietary aspect of the protocol.

An effective way of driving the disease into latency is for the patient to follow a ketogenic diet, a diet in which ketones become the cellular fuel source rather than glucose. This has the additional benefit of also helping combat other side effects of the disease, such as autoimmune flares caused by *Borrelia* outer surface protein A (OspA) antibodies interacting with human neural tissues (this is the reason why Lyme is often mistakenly diagnosed as an autoimmune problem). Opportunistic infections such as *Candida albicans* are also effectively treated.

Remaining in ketosis limits the amount of glucose available to very small levels, which is important for Lyme disease and a host of other problems. In acute cases I often will recommend a ketogenic fast, which is to say that one consumes only 400 calories a day of only protein for one week. An easy way to do this is to eat three eggs in the morning and two in the evening. Since the life cycle of the spirochete is 12-24 hours, die-off occurs pretty quickly and significant relief is often felt after four or five days. After the week is complete the patient can return to eating a normal number of calories, but the carbohydrate load initially should be very low, staying at 20 g or less.

Studies have shown that the Lyme spirochete has two main food sources: sugars and N-acetyl glucosamine.

When the patient feels they are in remission, they can begin to experiment with raising their carbohydrate load; but they should remain in ketosis, or at the very least maintain a low glycemic index diet. This may mean anywhere from 40-100 g of carbohydrate a day, depending on the person. I recommend purchasing a ketone meter and performing finger stick blood tests twice a day for a month until they have a clear idea of what works best for them. Alternatively (and less stringently), they can purchase ketone strips and urinate on the test strips after meals. This is less accurate but often works well.

A very simple way to stay in ketosis is to simply follow the directives for the first two weeks of the Atkins diet, which offers many helpful tools such as books that list the protein, fats and carbohydrates in foods, recipes, and even apps such as http://www.atkins.com/Free-Tools/Mobile-App.aspx which help a person keep track of meals and food values. It is a good idea to research foods or consult a competent nutritionist.

Contrary to popular belief, this need not be a diet containing excessive amounts of protein. Nor does it need to have huge amounts of saturated fat. Normal amounts of protein should be eaten; what the diet is high in is fat. Fats break down into ketones, which provide cellular fuel. Carbohydrates break down into glucose, which we want to avoid. One can eat all the greens and non-starchy vegetables one wants, although fruits must be

eaten in very moderate quantities, and should be the lower glycemic fruits such as berries.

Some concerns may exist about the "dangers of ketosis." Normal ketosis is a natural state for human beings, and for most of our history we existed in ketosis quite naturally due to the limited supplies of sugars and starches in the hunter-gather diet. Normal ketosis should not be confused with acid ketosis, which is a pathological state which occurs in diseases such as diabetes. Ketogenic diets have been utilized in medical settings (especially in the treatment of epilepsy) for a long time, and numerous resources on their benefits and how they should be structured are available. However, the ketogenic diet is contraindicated in cases of kidney disease, in which protein consumption needs to be quite limited. In the treatment of children, a nutritionist familiar with ketogenic diets should be consulted due to the specialized needs of their growing bodies.

Neurotransmitter Support

The third aspect of treating Lyme is to remove and/or limit the severe neurological effects caused by acetylcholine depletion in the synaptic spaces. *Bb* toxins interfere with the SNAP 25 enzyme causing the interruption of acetylcholine across the synaptic space carrying nerve impulses (Bradford 2006). This depletion is what causes the paralysis, weakness and neuropathies demonstrated in many Lyme cases. The greater the depletion, the more paralysis there will be, but even in milder forms most

Calculating Calories from Protein, Carbohydrates and Fat in a Ketogenic Diet

Technically speaking, a strict ketogenic diet involves either a 4:1 or 3:1 ratio of fat calories to combined carbohydrate and protein. Here is an easy formula to follow:

1. Determine how many calories a day you want to consume, and determine what your preferred level of protein is in grams (protein is 4 calories per gram).
2. Divide the total number of calories by 4 if using a 3:1 ratio (divide by 5 for a 4:1 ratio). This gives you the number of calories allowed from protein and carbs.
3. Convert this number of calories into grams. (There are 4 calories per gram in protein or carbs).
4. Subtract the amount of protein/carb calories allowed to get the amount of calories you will need to get from fat.
5. Convert the number of fat calories into grams. (There are 9 calories per gram of fat.)
6. Determine the amount of carbohydrate allowed by subtracting the desired number of grams of protein from the allowed number of grams of protein and carbs.

For example,
on a 2,000 calorie-a-day diet:

- 2000 calories divided by 4 = 500 calories allowed for protein and carbs. The remaining 1,500 calories are reserved for fat.
- If the person is shooting for 50 grams of protein per day, that would be 200 calories a day of protein.
- 300 calories would be left for carbohydrate. This would translate to 75 grams of carbohydrate (300 calories divided by 4), which is actually about 25 grams per meal, a generous amount.

This is probably unnecessarily complex for most patients. I mostly just give them lists of "OK" foods and recommend that they follow the Atkins diet induction phase until they are asymptomatic, then adjust their carb load gradually. This is not for the faint of heart, but it does really work, and it is actually quite a healthy diet. If the client is craving, they probably need to increase their fat intake – eating an avocado, or some coconut oil, or adding olive oil to their greens will often solve the problem.

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patients have shooting nerve pains that can be quite debilitating, as well as the characteristic depression and brain fog of the disease.

Providing the building blocks for acetylcholine can greatly reduce or eliminate these issues. In addition, several other supplements such as fish oil and Vitamin D ought to be added, as well as a good multivitamin. The biggest problem is the number of pills (and the expense) involved. In fact, one of the problems with chronic Lyme treatment is the difficulty that many patients have with dealing with the burnout that serious treatment plans involve. In the interests of keeping things manageable one ought to minimally work with the following regimen. The acute phase treatment is a daunting number of pills, but the maintenance phase is bearable. Patients should be wary of cut-rate supplements, since many of them are in poorly absorbable forms or are improperly made.

In my own clinical experience, I have noticed deficiencies of many of the important nutrients in Lyme patients by running micro-nutrient status tests. Typically, deficiencies of vitamins B, C, D and CoQ10 are quite common. One can tailor supplementation by testing, or if the patient is suffering neurological symptoms, proceed with the protocol. None of the suggested doses in the protocol are in toxic ranges. Patients can drop off the regimen when neurological symptoms subside, or when testing shows that they are in normal ranges. My own patients report significant relief fairly quickly.

SUPPLEMENT REGIMEN
All phases:

Resveratrol
250 mg, once a day
Resveratrol (which occurs naturally in *Polgonum cuspidatum*, Japanese knotweed, often used to treat Lyme and other similar ailments in Traditional Chinese Medicine) is a known anti-inflammatory and antiviral. In addition, it helps to thin the blood of Lyme patients, which is important because one of the known effects of the disease is that it thickens the blood. Resveratrol is also useful in keeping herpetic afflictions such as Epstein-Barr virus, shingles and herpes simplex 1 and 2 at bay. This is important because underlying herpetic diseases greatly potentiate the rapid dissemination of Lyme in the early stages, and because chronic flares are likely in Lyme disease. In fact, sometimes it is difficult to differentiate between Lyme neuropathy and chronic shingles.

Lysine
1000 mg, twice a day
This is one of the precursors for acetylcholine, but it is also important as an anti-herpetic and antiviral.

Multivitamin
As directed on label
The importance of a multivitamin cannot be overstated. Mineral levels need to be high enough to support detoxification pathways, and many other essential vitamins may be lacking due to digestive disturbances caused by the illness. Choose one that is well formulated and doesn't require consumption of too many pills.

Vitamin B complex
1 pill, 3 times a day
B vitamins are vital for healthy nerve function. When I have done micronutrient tests on Lyme patients they are nearly always deficient. Supporting the brain, neurotransmitters and nerve conduction is always important, but especially when Lyme is active.

Vitamin D3 with iodine
5000 IU, once a day
Fish oil or EFA supplement
As directed on label
Vitamin D3 and essential fatty acids (EFA) are useful in treating the brain and joint aspects

Bb toxins deplete acetylcholine in the synaptic space carrying nerve impulses. This depletion causes the paralysis, weakness and neuropathies demonstrated in many Lyme cases. Providing the building blocks for acetylcholine can greatly reduce or eliminate these issues.

Maintenance Doses

Morning	Midday	Evening
Resveratrol (1)	Vitamin D (1)	CoQ10 (1)
Lysine (1)	EFA supplement (1)	Lysine (1)
Multivitamin	Probiotic	
B complex (1)	B Complex (1)	B Complex (1)
Cognicare (1)	Cognicare (1)	Cognicare (1)

of Lyme. The iodine can help as well because Lyme toxins bind on thyroid receptor sites and will often cause intermittent or continuous hypothyroidism.

Probiotic

As directed on label

There are many good probiotics on the market, and anyone who is taking this many pills needs to be on one. Probiotics are also essential to maintain gut flora when dealing with the after-effects of antibiotic therapy usually required for Lyme patients.

CoQ10

200 mg, once a day

This is one of the vital compounds depleted by Lyme, and supplementing it helps with the fatigue caused by the disease. Get one made with ubiquinol, which in doses of over 150 mg will double saturation rates in the tissues.

Cognicare

1 pill, 3 times a day

While expensive, this product by Researched Nutritionals has phosphatidyl serine, acetyl-L-carnitine and B vitamins, thus reducing the overall number of pills and actually saving some money.

Acute Phases/Early Phase

Artemisinin

2 pills, twice a day

Artemisinin is important in treating the antibiotic-resistant coinfections of Lyme such as *Babesia*. While *Artemisia annua* (sweet Annie) contains artemisinin, one would have to drink a liter of it a day to really get an adequate dose. Artemisinin pills are a convenient way to get it in.

Lyme Plus

First week, 1 pill a day, thereafter 2 pills a day

This is a powerful immune booster product made by Researched Nutritionals that I have found useful in the first six weeks of treatment.

ATP Fuel

5 pills, 3 times a day

Some of the extreme fatigue associated with Lyme and other chronic fatigue syndromes such as fibromyalgia are caused by impairment on the mitochondrial level of the Krebs cycle. Typical signs will include extreme exercise intolerance. ATP Fuel, another Researched Nutritionals product, really works well for this but it is an expensive protocol because it involves a loading dose of 5 pills, 3 times a day, for several months.

BOTANICAL TREATMENTS

The fourth leg of treatment involves the use of botanicals. Many protocols exist such as the Buhner protocol (www.buhnerhealinglyme.com), the Cowden protocol (www.nutramedix.ec/ns/lyme-protocol) and various Traditional Chinese Medicine (TCM) regimens. I think their main usefulness is in symptom amelioration and in immune support, both of which they do very well and which complement the bacteriostatic effects of the Vitamin C. Botanical support can be the ultimate maintenance program as well; once the disease is well in control I think it can be kept in abeyance with herbs and a low glycemic index diet.

TCM and the Herbal Treatment of Lyme

In TCM, the diagnosis is that the condition is one of toxic Damp-Heat, and the emphasis is on clearing Heat, immune modulation and tonification of Qi and Blood. Because the Chinese had already developed strong protocols for treating similar spirochetal infections (such as syphilis, tuberculosis and leptospirosis), the protocols for Lyme disease are well established and often quite effective.

Typically the most common herbs used in varying combinations are: *Phellodendron*

*amurense (huang bai), Coptis chinensis (huang lian), Scutellaria baicalensis (*scute, *huang qin*), *Isatis tinctoria, (ban lan gen), Polygonum cuspidatum (*Japanese knotweed*, hu zhang), Andrographis paniculata (chuan xin lian), Forsythia suspensa (lian qiao),* and *Gardenia jasminoides (zhi zi)*. The first three belong to a small but very effective category of herbs used to clear Heat and drain Dampness. Each addresses a different burner, and together with *Gardenia* (which is in the category of herbs that quell Fire) can be found in the common patent formula *Huang Lian Jie Du Tang* (Coptis and Scute Combination).

Isatis and *Forsythia* are used to clear Heat and poison, in general for any really hot disease. In addition, they have been used for another spirochetal infection (leptospirosis) and for encephalitis, which is a common complication of Lyme (Dharmananda 2003, 2004). *Polygonum cuspidatum* and *Andrographis* are also commonly used by both TCM and Western herbalists as important tools in fighting the infection. Water and ethanol extracts of the herbs above could be used, but in the case of scute the ethanol extract is better (Zhu, 1998).

One tincture formula that I have found helpful is equal parts of: *Eleutherococcus senticosus* (eleuthero), *Withania somnifera* (ashwagandha), *Uncaria tomentosa* (cat's claw), *Hypericum perforatum* (St. John's wort), *Scutellaria baicalensis* (scute) and *Glycyrrhiza glabra* (licorice). I use *Polygonum* and *Andrographis* with it in encapsulated form, and administer the tincture in doses of 2-5 mL, five times daily during early or acute episodes, and use the lower dose three times a day as maintenance. I use other herbs as needed to manage symptoms.

Below is a summary of herbs commonly used in Lyme and their indications. Because Lyme has so many different manifestations, one can use them in varying combinations at different times. I have found *Actaea racemosa* (black cohosh) very useful in treating small joint pain in the hands and feet, a suggestion that my esteemed colleague David Winston gave me. During the worst of my brain fog I tried *Dipsacus fullonum* (teasel), which has a reputation for being effective for the memory issues of Lyme. While this has a widespread and enthusiastic following, I have seen little evidence other than anecdotal about this herb.

Various companies make claims about the special processing of their herbs to make them more effective, such as tetracyclic oxindole alkaloid (TOA) free cat's claw; in general I find these claims dubious and prefer whole plant extracts.

***Astragalus membranaceus* (Astragalus)**
Dried root tincture, 1:5, 50%: 3 mL tincture 3 times daily, or 2 cups daily of decoction
Astragalus is touted as a Lyme prophylactic. It is a deep immune activator, Qi tonic and warming herb. It is useful in combating the fatigue and anorexia of Lyme, and has been used to treat tuberculosis in TCM. It is particularly useful in the early stages of the disease, although I have used it in nearly every stage. Because it stimulates the immune system, some clinicians feel one should avoid its use in late stage chronic Lyme if there is an autoimmune process present (Buhner 2005).

***Withania somniferum* (Ashwagandha)**
Dried root tincture, 1:5, 50%: 5 mL tincture 3 times daily
Ashwagandha is a febrifuge, deep tonic, and alterative that has been demonstrated to lower the release of stress hormones, and is definitely useful for general debility. It has a history of use in Ayurveda for the treatment of tuberculosis. It treats Damp-Heat conditions. I use ashwagandha throughout treatment for combating fatigue and aiding in promoting restful sleep.

***Dipsacus fullonum* (Teasel)**
Dried root tincture, 1:5, 50%: 2-5 mL tincture 3 times daily
Teasel root has been praised by many herbalists such as Matthew Wood for the treatment of Lyme. Anecdotal reports are that it is especially known for helping cognitive and inflammatory symptoms. I have not had much personal success in using it clinically, but it is hard to discount the many anecdotal reports of its usefulness.

***Polygonum cuspidatum* (Japanese Knotweed)**
3-4 500 mg capsules, 3 times daily
Traditionally used as a neutral laxative, today knotweed is best known for containing resveratrol, a powerful compound with antibacterial and anti-inflammatory effects. Although resveratrol is part of my protocol, I still like to use *Polygonum cuspidatum*; whole plant extracts cannot be reduced to their known constituents and so this is an herb that I think should be used in its whole form as well. It has a long history of use in TCM for the treatment of Damp-Heat conditions and is in most modern protocols for Lyme disease. Note: dose carefully, as too much of this herb will cause diarrhea due to the emodin content.

Botanical support can be the ultimate maintenance program; once the disease is well in control it can be kept in abeyance with herbs and a low glycemic index diet.

***Andrographis paniculata* (Andrographis)**
2 450 mg capsules once a day; 5-6 g daily taken as an infusion; or dried root tincture, 1:5, 50%: 3 mL twice a day
Long used in Asia, andrographis is credited with helping control the 1919 flu pandemic. It possesses potent immune-stimulating properties, both in antigen production and in more general macrophage-stimulating effects. Andrographis is bitter, cooling and draining. It is also antimutagenic 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, which often hides in the brain as an evasive strategy to circumvent antibiotics or the body's innate immune response.

***Eleutherococcus senticosus* (Siberian Ginseng, Eleuthero)**
Dried root tincture, 1:5, 50%: 5 mL doses during acute stage Lyme, up to 5 times a day
Eleuthero is an adaptogen, adrenal tonic, circulatory stimulant, Qi tonic, and deep immune tonic. This herb helps fight infection and is a valuable aid to flagging energy. Because of its impact on the adrenals, it can help with the agitation of an over-stimulated nervous system.

***Uncaria tomentosa* (Samento/Cat's Claw)**
Dried bark tincture, 1:50, 50%: 1.5 mL (30 drops) 3 times a day
Cat's claw has been used to treat rheumatoid and osteoarthritis. It supports the immune system, treats fevers, ulcers, and respiratory infections, and has a strong track record in treating similar symptoms in Lyme disease. Some experts insist the TOA-free forms are best; my own clinical experience is that the whole plant extract works just fine. It combines well with banderol in maintenance regimens (see below).

C*ordyceps sinensis* (Caterpillar Fungus)
3-9 g in decoction, or the more convenient encapsulated forms can be taken twice daily. It also can be taken in tincture form, 2.5 mL, 3 times a day
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. It is a known antibacterial, Qi tonic, anti-mutagenic and is used to treat anemia.

***Grifola frondosa* (Maitake)**
Available in extract, capsules or press pills, 500 mg, 2 times a day
Used to treat Damp-Heat in TCM, maitake is a deep immune stimulant, anti-mutagenic, has been demonstrated to increase appetite, and aids in mental alertness. However, it is contraindicated in cases where hypotensive drugs are in use, and in diabetes (it can depress blood sugars thus throwing off insulin). It has been implicated in some cases of arthritis. As a result, I would be cautious with maitake, but the hypoglycemic effect is actually useful in Lyme disease (Levy 2012).

***Ganoderma lucidum* (Reishi)**
1 500-650 mg pill or capsule, 2-3 times a day
Called the "herb of immortality," reishi has

been used to treat liver diseases, nephritis, neurasthenia, arthritis, and asthma. It is an important immunomodulator and anti-mutagenic, inhibits histamine release, and has been used to treat Alzheimer's disease. Like all mushrooms, it is rich in polysaccharides and is antibacterial. It seems to be a very safe herb, although its hypotensive effects could present difficulties in those with hypotension. Generally when I dose with mushrooms, I use a commercial capsule as traditional decoctions take a long time to prepare (especially with reishi, due to its woody structure).

***Artemisia annua* (Sweet Annie)**
1 cup infusion, at least 3 times a day
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 coinfections (especially *Babesia*). This is a cooling and powerful antibacterial, containing the chemical constituent artemisinin. It is a bitter febrifuge, vermifuge, hemostyptic, and it clears heat rashes. I have 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 often recommend taking the pill form (see supplement section above).

***Otoba spp.* (Banderol)**
Begin at 5 drops of banderol bark tincture and increase by a drop a day until at 30 drops in water.
Banderol is an antiviral, antibacterial, antimicrobial, anti-inflammatory known to work against *Bb*, *Bartonella*, *Babesia* and many other tick-borne pathogens. It has no known side effects (other than the Herxheimer found with die-off; for this I would use liposomal C in conjunction with the treatment). Many clinicians feel it is also effective at removing biofilms and in killing *Bb* in the dormant stage (which antibiotics do not do). It works synergistically with cat's claw (Datar, Kaur et al 2010). Nutramedix makes an affordable standardized extract.

Herbs for Joint Inflammation and Joint Repair

Because glucosamine sulfate is a prime food source for Lyme spirochetes, it is contraindicated in treatment. However, the three top herbs for regulating inflammatory pathways for Lyme arthritis are *Boswellia serrata*, *Scutellaria baicalensis* and *Curcuma longa*. Many people also find quercetin and bromelain helpful, and they are often contained in commercial preparations with these herbs.

Andrographis paniculata, Acanthaceae, inflorescence; Botanical Garden KIT, Karlsruhe, Germany.

Photo © H. Zell

Artemisia annua (sweet Annie). Image by Kristian Peters (CC BY-SA 3.0). Source: http://commons.wikimedia.org/wiki/File:Artemisia_annua.jpeg

***Boswellia serrata* (Indian Frankincense)**
1-3 300 mg capsules per day
Clinical trials have confirmed the usefulness of *Boswellia* in treating arthritic conditions. It has been used in Ayurveda for the treatment of many types of inflammation. Modern studies have concentrated on its ability to modulate inflammatory cascades. It is valuable in treating the pain and inflammation of Lyme.

***Curcuma longa* (Turmeric)**
1-3 500 mg capsules per day
Where *Boswellia* works on one set of inflammatory pathways, turmeric gets the others. As a result, the combination can be potent. In addition to its modulation of inflammatory effects, turmeric also possesses antibacterial and antiviral properties. It helps reduce platelet aggregation, which may be helpful in treating the thickened blood of Lyme patients. It can also be included in one's diet.

Conclusion

When all is said and done, treating chronic Lyme disease is a complicated and often frustrating experience. Even in early cases it can be problematic. While many people become symptom-free after a four-week course of oral antibiotics (estimates are generally in the range of 70-80 percent), one cannot know whether it has been truly eradicated or if it has simply gone dormant only to explode later in some form which may go unrecognized as Lyme. Each case is unique, complex, and needs to be treated by tailoring the protocol to the individual. I now have enough cases of recovered patients to feel much more hopeful that after two years the supplementation and Vitamin C regimens can be dropped for most patients. I do recommend that they remain on supportive herbal therapy and that they maintain a low-glycemic index diet of whole foods.

While I do not recommend refusing the initial course of antibiotics in the treatment of Lyme, it might be wise to consider keeping even asymptomatic individuals on Vitamin C and botanical remedies for up to 18 months. This would do no harm, but might prevent further problems down the road. In the treatment of chronic Lyme, the long-term programs with their alternating combinations of antibiotics in chemotherapy-like doses seem unnecessarily dangerous, especially given their dubious track record in producing cures.

The importance of studying and understanding long-term botanical and lifestyle protocols in treatment seems to me a very important task given the rapid increase

in these types of infections. Lyme could be the "poster child" for the problems that occur when a devastating disease becomes a political battleground for competing theories of medical treatment. In this battle where innovative protocols are held hostage by the polarized climate of medicine in America today, the real loser turns out to be the patient. Botanical medicine with its history of treating the whole person with nutritive therapies, and its rich tradition of treating pathogenic infectious diseases in the long history of humans on this planet, needs to be an important part of the complex and evolving fight against infectious disease. Simply relying on therapies that purport to destroy pathogens without regard to their effects on the overall health of the patient is neither an acceptable nor sustainable solution. We need to develop therapies that are supportive, flexible, and that honor the body.

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