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PUBLIC HEALTH ALERT

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Considerations in the Clinical Treatment of Lyme Coinfections

by Stephen Harrod Buhner

Although prominent physicians in the mid to late twentieth century announced with great fanfare the end of infectious disease for all time such has not turned out to be the case. In fact infectious disease is becoming more of a problem in the industrialized world every year. Resistant bacteria are making massive inroads in hospitals; one of the more common sentences in newspaper obituaries is "died of complications following surgery." They rarely say that in nearly all cases those "complications" are resistant bacteria the patient picked up in the hospital.

It has also become clear that many new infections, and others, simply not recognized as being infections (e.g. endocarditis from *Bartonella* infection or arthritis from Lyme bacteria), are emerging with greater frequency and virulence in the human population.

One major grouping of these types of infections are those that are often coinfectious with Lyme disease. This includes, but is not limited to, infections caused by *Babesia, Bartonella, Ehrlichia, Anaplasma, Mycoplasma, Coxiella,* and *Rickettsia* organisms.

Clinicians specializing in Lyme disease treatment have long been aware of the complex problems attendant with treating someone with multiple coinfections. Though slow on the uptake, as usual, this awareness is now becoming more common among researchers. In consequence, some good information is emerging on the synergy between coinfectious agents during active infections. This is a brief look at some of the factors that need to be taken into account when treating coinfections.

Studies on the complex interactions that occur between co-infectious bacteria are uncommon but, when combined with the experience of clinicians, they are revealing. Coinfective bacteria interact both in the vector that spreads them and then in the host they are transferred to and those interactions have a great deal of impact on patient outcomes.

One of the first things to understand is the tremendous genetic flexibility of coinfectious organisms.

Genetic Flexibility and Evolution Among *Bartonella*

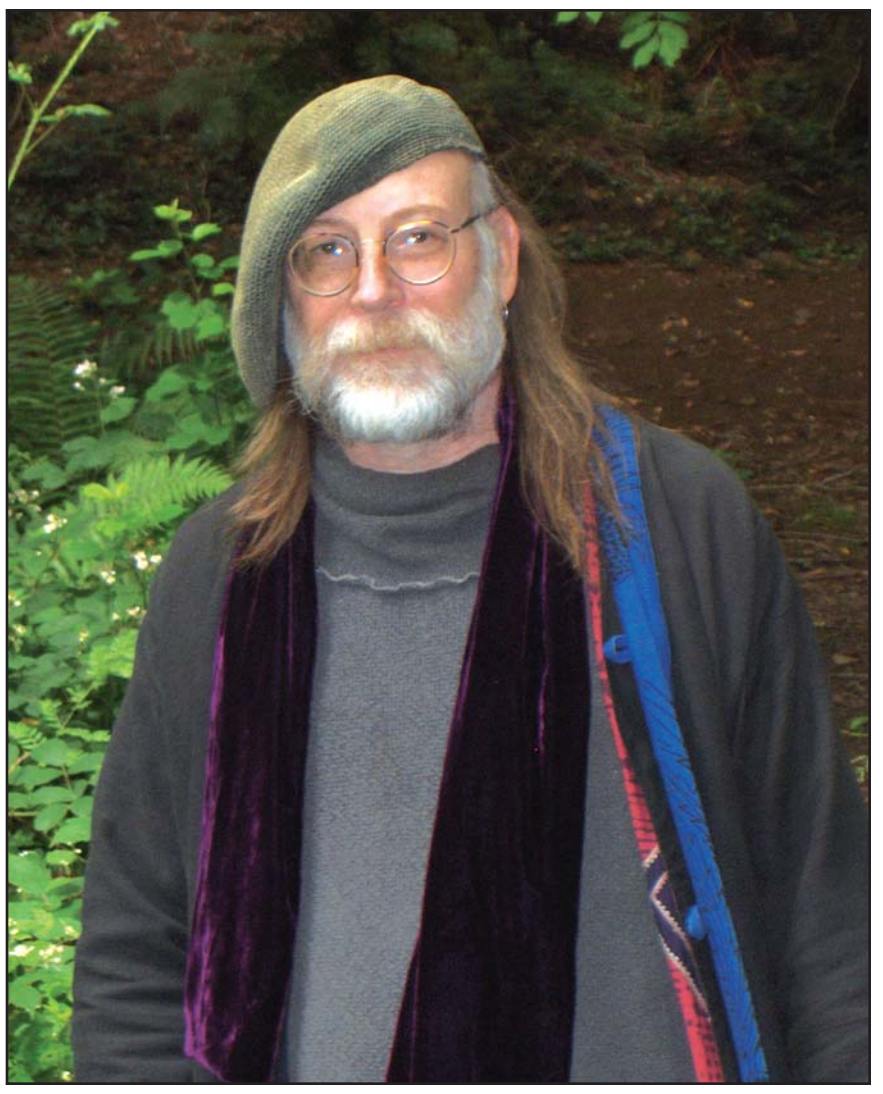
Bartonella organisms, like many related members of the proteobacteria (among whom are coinfectious agents such as *Ehrlichia* and *Anaplasma*), are undergoing rapid genetic alterations in response to environmental factors such as climate change, habitat damage, and human population increase. As Bruno Chomel, et al, note in their paper, "Ecological fitness and strategies of adaptation of *Bartonella* species to their hosts and vectors:"

Massive natural or man-made changes to historically stable ecosystems that result in alterations in vector biology and reservoir host density, increased international movement of a wide range of reservoir hosts across continents, recent human behavioral and societal changes that bring animals into increasingly close human contact, as well as medical interventions, HIV infection and an aging immunosenescent human population contribute to ongoing and dynamic interactions among *Bartonella* species and their hosts and vectors." (Chomel, et al, 2009)

Studies have found that *Bartonella* exists within infected hosts as a mosaic of different genetic variants. This kind of variation is not found during in vitro studies, only in living hosts. In response to the immune system of the host *Bartonella*, much like Lyme spirochetes, generate a number of genetic variants in order to maximize survival in the host. The various variants are able to live within different niches of the host more easily than others, e.g. the bone marrow or the lymph system, in order to maximize survival over time. It is not uncommon that several variants can be found within those niches, the several strains exchanging genetic material in order to stay ahead of the immune response. The outer membrane proteins on the exterior of the bacterial cell are often altered (as are many of the adhesion molecules such as BadA) which makes the variants harder to recognize by the immune system. Simple rearrangements of certain portions of the genome can create as many as 420,000 variants of a species of bacteria in a short period of time. As Chomel, et al, observe, "When the host produces antibodies targeted against the invading microorganisms, the infecting pathogen is usually killed. However, if the pathogen alters the protein expressed (antigenic variation), or no longer expresses the protein on its surface (phase variation), the microorganism can survive and multiply in the host." (Chomel, 2009) In those with persistent or chronic *Bartonella* infection, both phase variation and antigenic variation appear to be the norm, with the immune system unable to keep up. Study has found that the immune system is compromised in chronic cases, at least minimally.

All Bartonella species contain a very similar, fairly small, core genome and multiple accessory genome structures that they can weave into the core genome if needed. Most of the accessory genomes exist as genomic islands and were obtained through horizontal gene transfer from other bacteria. Some of these genomic islands are host specific, much as they are in Lyme spirochetes. Upon entry into a new host, the necessary genomic island can be incorporated into the core genome to facilitate host infection. As Chomel, et al comment, the horizontal gene transfer of so many genomic islands has "facilitated the remarkable evolutionary success of the modern lineage [of *Bartonella*] by conferring host adaptability" . . . and has stimulated "the adaptation of the generally host-restricted bartonellae to novel hosts." (Chomel, 2009)

The impetus for genetic rearrangement come from both the organism itself and the immune environment in which it finds itself. Examination of the *Bartonella* genome has found a number of segments that are prone to rearrangement under environmental stress. In addition, *Bartonella*, like most bacteria, are able to both give and receive plasmids, strands of genetic material that can be woven into the genome to alter phenotype. Essentially, they can alter their physical form to make themselves more resistant to antibiotics, become more virulent, or more resistant to immune responses. Plasmids are exchanged with other bacteria, both inside of and outside the genus. In general, about 25 percent of the population of any mammal



Stephen Harrod Buhner

species, including humans, that can act as hosts for *Bartonella* will be infected, only a small portion of which will become symptomatic. Genetic variation in the mammal species is huge, over 22 genetic variants being found in one study.

Many of the arthropod vectors of *Bartonella* (i.e., ticks, fleas, and so on) contain multiple species of the bacteria, all of whom exchange DNA segments in order to facilitate their adaptation to new hosts. Variants develop in infected hosts such as humans, vectors take a blood meal, ingesting the new variants. The new variants, taken as blood meals from multiple species, interact in the gut of the vector, alter their genome structures, and then are injected into new hosts. There is a continual and very elegant genetic recombination occurring.

Research in 2007 found "that isolates responsible for human disease are not drawn randomly from the feline reservoir." (Arvand, 2007) In other words, there are specific human-infectious *Bartonella* held in the cat that are generated inside the cat to infect the human hosts that own the cats. (In fact, *B. quintana*, which is considered to be human specific, is an evolved offshoot of *B. henselae* - a generally cat-specific species - that adapted itself to specialize in infecting humans. Research has found that *B. henselae* is still easily able to shift its outer membrane proteins to allow it to infect human red blood cells.) Lindroos, et al, note, "the variable gene pool in the *B. henselae* population plays an important role in the establishment of long-term persistent infection in the natural host by promoting antigenic variation and escape from immune response. . . . the results suggest multiple sources of human infection from feline *B. henselae* strains of diverse genotypes." (Lindroos, 2006) In spite of numerous comments to the contrary, *Bartonella* infection of human beings is not a random or accidental event; we are not inadvertent hosts. All mammals are potential hosts for all *Bartonella* species and *B. henselae* (along with others that infect human companion animals) is not "accidentally" infecting humans. And the infection is wide spread, much more so than is commonly recognized among physicians or the CDC. As Mietze, et al note, in their research among Germans: "The prevalence of barteonellosis among humans in Germany appears to be high and severe clinical cases have been described." (Mietze, 2011)

There is tremendous genetic shifting occurring in response to multiple environmental factors. Coinfectious organisms that congregate inside ticks or other arthropod vectors are exchanging information with each other, including how to alter DNA in order to avoid both antibiotics and host immune responses. It should be assumed whenever a chronic case of Lyme or Lyme coinfections is encountered that multiple genetic variants exist and are being

"Coinfections" ...cont'd pg 2

FEATURE

"Coinfections" ...cont'd from pg 1

regularly generated within the infected person. This is becoming the norm rather than the exception. Treatment has to become more sophisticated in order to be successful. Looking at cytokine cascade is one way to get to a more sophisticated, approach.

Coinfections and Cytokine Cascades

One of the better articles on cytokine cascades is Andrea Graham, et al. "Transmission consequences of coinfection: cytokines writ large" that appeared in *Trends in Parasitology*, volume 23, number 6, in 2007. The authors propose a unique approach to understanding the dynamics of coinfections. Instead of focusing on the organisms themselves, they suggest focusing on the cytokine cascades that the organisms produce in the body. They comment that "When the taxonomic identities of parasites are replaced with their cytokine signatures, for example, it becomes possible to predict the within-host consequences of coinfection for microparasite replication" as well as symptom picture, treatment approaches, and treatment outcomes.

Cytokines are small cell-signaling molecules secreted by the immune system and the glial cells of the nervous system that are important in intercellular communications in the body. They tend to produce unique forms of inflammation and alteration in the cell surface structure, depending on what is occurring during the infection. In practical terms, when a bacterium touches a cell, the cell gives off a signal, a cytokine, that tells the immune system what is happening and what kind of help that cell needs. Each type of infectious bacterium initiates a particular kind of cytokine cascade.

When treating a coinfection, it is important to take the time to understand the cytokine cascade that occurs from each organism. This determines many of the most effective approaches to treat the condition. For example, if the infectious bacteria, say *Bartonella* for example, stimulate high levels of interleukin-8 in the body, then reducing interleukin-8 levels through the use of phytomedicinals that have that particular action will in fact reduce many of the symptoms associated with *Bartonella*.

It is moderately easy to explore the cytokine cascade that one organism initiates but when you have two or more bacteria involved in an infection, each causing unique cytokine cascades, the dynamic becomes a great deal more complex. Most coinfectious bacteria have learned to work synergistically with each other. This means that the outcomes are not just additive; the bacteria actually work together and, just as with people working together, produce a much more powerful outcome than if merely one bacterial species is involved. As well, most bacterial species have learned how to use the host's own cytokine immune responses for their purposes.

As Graham, et al, note: "The influence of cytokines on effector responses is so powerful that many parasites manipulate host-cytokine pathways for their own benefit," as is indeed the case with Lyme and its coinfectious agents such as *Bartonella*. Most crucially, they continue, "the magnitude and type of cytokine response influence host susceptibility and infectiousness. Susceptibility to a given parasite will be affected by cytokine responses that are ongoing at the time of exposure, including responses to pre-existing infections." In other words, if you are already suffering some inflammatory condition, however mild, the bacteria will use it to facilitate their spread in the body. If more than one microorganism is involved such spreading is enhanced considerably. As Graham, et al, put it "coinfection increases the reproductive number for the incoming parasite species and facilitates its transmission through the host population." While the immune system is often compromised by the cytokine dynamics initiated by one type of bacteria, multiple, simultaneously initiated cascades are even more potent in their impacts. In addition, you begin to get assaults on multiple body systems.

If *Bartonella* is a coinfection with Lyme, for example, what you then get is assault on and resultant degradation of the collagen systems of the body by the Lyme spirochetes and a simultaneous assault on red blood cells along with continual subversion and abnormalization of endothelial cells and their functions. Since Lyme spirochetes damage collagen tissues, for instance in the joints of the knee, the body will send CD34+ cells to that site to help repair the damage but some of those cells will be infected with *Bartonella* (which has a tendency to infect those precursor cells in the bone marrow). The *Bartonella* will take advantage of the local inflammation to establish a colony in that location that itself will contribute to collagen degradation the Lyme spirochetes are causing. If the person were to be already suffering with a preexisting inflammation in that joint location, the process is even easier for the bacteria.

If you add other coinfectious bacteria to the mix, the picture is even more complicated. For example, if *Babesia* are present, then the red blood cells are going to have two organisms infecting them (*Bartonella* and *Babesia*), thus increasing the deleterious impacts on the red blood cells. This is, as Graham, et al, comment, more common than not. "Hosts that are coinfected by multiple parasite species seem to be the rule rather than the exception in natural systems and some of the most devastating human diseases are associated with coinfections that challenge immune response efficacy."

The foundations of this are ecological more than anything else. As those researchers observe: "Coinfections could, thus, increase vulnerability to the emergence of new parasites by facilitating species jumps if the coinfected portion of a population provides favorable conditions for an emerging parasite to adapt to a new host species." And research is bearing out that such adaptation is in fact occurring.

Another very fine paper on the dynamics of coinfections is by Telfer, et al, "Parasite interactions in natural populations: insights from longitudinal data," in Parasitology, volume 135, number 7, 2008. They echo Graham, et al, when they note, "in natural populations 'concomitant' or 'mixed' infections by more than one parasite species or genotype are common. Consequently, interactions between different parasite genotypes or species frequently occur. These interactions may be synergistic or antagonistic with potential fitness implications for both the host (morbidity and/or mortality) and parasite (transmission potential)."

They continue:

There is mounting evidence from experimental studies that the outcome of interactions during co-infections (for either the host or the parasite) is context dependent, potentially varying with different host or parasite genotypes or environmental conditions. Perhaps most critically, outcome can depend on the timing and sequence of infections. . . . Susceptibility is a property of an individual host at a given time. . . . the ability of a parasite to establish an infection successfully will depend on the initial immune response of the exposed host. On entry into the host, a parasite will experience an "immunoenvironment" potentially determined by both previous and current infections, as well as intrinsic factors such as sex, age, nutritional status and genotype. The immediate immuno-effectors in a naive host will be dominated by cells and molecules that comprise the innate immune response, and thus the efficiency of this arm of host immunity at reducing and clearing an infection will be influential in determining susceptibility.

In other words, attention to the health of the immune system is essential when dealing with coinfections. Resto-Ruiz, et al, emphasize this as well, as do so many other researchers, "The reduced ability of the host's immune response to control bacterial infection apparently results in a bacteremia of longer duration. . . people with intact immune function who become infected with *B. henselae* usually" do not experience severe symptoms. (Resto-Ruiz, et al, 2003)

The immune status of someone with coinfections must be addressed as part of any treatment protocol. Due to the synergistic nature of coinfections there is an inescapable truth: The weaker or more compromised the immune system, the more likely someone is to become infected and the more likely they are to have a debilitating course of illness. Improving the immune status of those with chronic bartonellosis, for instance, allows the immune system, refined over very long evolutionary time, to do what it does best, which is to use very elegant mechanisms to control and clear infection. Eventually, the healthy immune system begins to identify the outer membrane proteins of the bacteria and creates antibodies to them. Due to the sophistication of the bacteria's subversion of the host immune system this often takes anywhere from 4-8 months with *Bartonella* infections. In those whose immune systems are compromised it may take longer, how long is directly proportional to the health of the immune system. Once the immune system creates the proper antigens, the bacteria are then eliminated fairly rapidly from the body. Reinfection is difficult as the antibodies remain in the body for some time.

The synergy of the coinfections' impacts on immune function has to be addressed as well. As Telfer, et al, comment, "Attempts by the immune system to simultaneously counter the multiple parasite species involved in a co-infection can lead to immunopathological disease and pathology that are more than the simple additive pathogenic effects of the different parasite species."

For example, infection with both *Babesia* and *Bartonella* are synergistically impactful on red blood cells and can reduce red blood cell counts up to 25 percent, leading to anemia, fatigue, breathlessness, and general weakness. (One positive note, because both bacteria are competing for red blood cells, longer studies have found that the *Babesia*, over time, tends to clear the *Bartonella* infection by outcompeting them. In the initial stages, however, the impact on red blood cells is immense.) *Babesia* are thought to sequester themselves in the capillary networks of the spleen and liver. *Bartonella* species sequester themselves in the endothelial cells of the capillary networks of the spleen and liver. Both then seed the blood stream from those locations at regular intervals. The impacts of infection with both parasites on the spleen and liver are much greater than either alone and this has to be taken into account in any treatment approach.

"Coinfections" ... cont'd pg 4

Public Health Alert

The PHA is committed to researching and investigating Lyme Disease and other chronic illnesses in the United States. We have joined our forces with local and nationwide support group leaders. These groups include the chronic illnesses of Multiple Sclerosis, Lou Gehrig's Disease (ALS), Lupus, Chronic Fatigue, Fibromyalgia, Heart Disease, Cancer and various other illnesses of unknown origins.

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Telfer, et al's, research also found that infection with *Anaplasma* for example made subsequent infection by *Babesia* much more certain, in fact, it made it twice as likely to occur. Reversing the order of infection found the same rate of increase. As well, animals infected with one *Bartonella* species who were also infected by other *Bartonella* species were much more likely to have long term infections. Coinfection with *Anaplasma* and *Bartonella* (or *Babesia* and *Ehrlichia*), for example, are often more severe in the disease progression in that both white blood cells and red blood cells are infected. Specifically, *Anaplasma* and *Ehrlichia* infect neutrophils, the most abundant form of white blood cell in the body and an essential part of the innate immune system. Thus the immune system is fighting not only bacteria in the red blood cells and vascular tissues but bacteria inside itself.

In my experience, the technological medical community tends to downplay both the impact and occurrence of coinfections in the people they see while the alternative community tends to exaggerate it. Oddly, in spite of their training, most physicians don't really understand bacterial organisms very well, nor how to treat them. They usually tend to look for a pharmaceutical that is active for the bacteria in question and apply it, a fairly superficial approach that is increasingly failing in practice. If they have not definitively identified the cause of the condition they will generally prescribe a broad-spectrum antibiotic that will, as often as it helps, do more harm than good. The alternative community often fails at rigor of analysis and the focus, and courage, needed to confront deadly or life-debilitating infections. Both make too much money off people's suffering though, in fairness, most (not all) of the alternative community tends to make much less - I just don't see that many herbalists with their own private airplanes.

In treating coinfections, the approach should be depth based with rigor of analysis. The bacterial infections need to be identified (and no, muscle testing is not reliable enough, but then, neither is Elisa - neither should be relied upon as diagnostically definitive) and then a treatment protocol initiated. In some cases antibiotics are very effective and with diseases as debilitating as Lyme and its coinfections they should be considered. However, if that kind of superficial approach fails, then a depth understanding of the cytokine cascades and the likely interactions between the coinfections should be undertaken and a treatment protocol initiated that addresses it in depth. The most important thing in treating coinfections is to reduce the inflammatory processes the bacteria initiate and reduce the cytokine cascades that occur. That stops the majority of symptoms right there especially if treatment protocols are initiated that are designed to protect the areas of the body that are affected. As Telfer et al, observe, "An immune response that effectively cleared the infection from endothelial cells would therefore ultimately control an infection [by *Bartonella*]." This applies as well to any intervention that will protect endothelial tissue from the bacteria. The bacteria can't survive if they are not able to initiate their particular form of inflammation in the body; it is how they make habitat and scavenge food. Enhancing immune function then allows the body to deal with the infection on its own. The addition of protocols to reduce the specific symptoms that are occurring (e.g. arthritis) and help restore quality of life are also important. Antibacterials can help but comprehensive treatment protocols that address these initial three conditions are essential:

1) reducing the cytokine cascade

2) enhancing the exact immune function that is depressed

3) addressing symptom picture

Relying on a "kill the invaders" approach is going to become increasingly ineffective as time goes on. In fact, it is already failing. The bacteria are evolving. We should, too.

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About the Author

Stephen Harrod Buhner (http://www.gaianstudies.org) is the award-winning author of 18 books of nonfiction and one of poetry. For the past 30 years he has taught throughout the U.S., Canada, and the Western European Isles (UK/EU) about medicinal plants and Earth relationship. Among other contributions, Stephen is one of the early pioneers in understanding the non-linear source of indigenous plant knowledge; has been instrumental in bringing to prominence unhopped, herbal beers and ancient gruit; developed the first depth understanding of systemic herbal antibiotics and plant synergists; created the first comprehensive exploration of the function of medicinal plants in ecosystem homeodynamis; initiated the development of phytoandrogens in herbal practice, published the first meta-analysis of the dynamics of Lyme spirochetes in the human body; developed the first understandings necessary for the herbal treatment of cytokine cascades in disease complexes; generated the first comprehensive exploration of the use of heart field dynamics in human/plant relationships; created the first depth analysis and exploration of herbal antivirals; and is one of the foremost writers on the nature of emerging infections and ecosystem disruption. There is a reason that Rosemary Gladstar calls him one of the "plant geniuses of our time."

A slightly different version of this article comprises a chapter in the author's upcoming book Healing Lyme Disease Coinfections: Complementary and Holistic Treatments for *Bartonella* and *Mycoplasma*, to be published early April 2013 by Inner Traditions.

You can pre-order the book on Amazon at http://www.amazon.com/Healing-Lyme-Disease-Coinfections-Complementary/dp/1620550083. *pha*

I Love Miracles: A Lyme Patient Case Study

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In December 2010, a 29 year old female (Miss S.) began a series of EESystem sessions at my wellness center to counter the effects of Lyme disease and associated symptoms that had increasingly deteriorated her quality of life since she was 10 years old. Here is her story, as told to me over a 12-week period during her EESystem sessions.

By the age of 10, Miss S. was a trained semi-professional athlete preparing for the Olympics, regularly performing for audiences of up to 30,000 people. She developed fatigue, depression and body aches. Lyme was only considered a possible cause of her shift from a vibrant and active adolescent with a brilliant future as an Olympic champion to a young girl riddled with a malaise she didn't understand or know how to express. She tested negative for Lyme which prompted traditional medical and psychiatric professionals to treat her for fibromyalgia, lupus, psycho-somatic disorders and "growing pains."

Her symptoms of fatigue and body aches continued and her athletic performance diminished. Another Lyme test was run with positive results. Miss S. was now only 11 years old. She received a regime of antibiotics and over time, six medications for depression and mood disorders. Her symptoms were managed with medication until she was 19 years old.

Periodically, for various reasons, she wasn't able to receive her antibiotics. Her symptoms rapidly progressed to the degree of disability. She forced herself constantly to manage life and work, feeling sick and tired every day. She felt no one understood that she had to physically push herself twice as much as anyone else to meet her responsibilities at work and in life. In addition to the symptoms of Lyme, she experienced deeper depression, frustration and nightmares. She alienated herself from friends and activities. Her diet changed from vegetables, fish and poultry to one of predominantly sugar.

When Miss S. arrived for her first EESystem session in December 2010, her treatment plan included Effexor, Ambien and bi-monthly acupuncture sessions. Locating a medical professional to receive treatment was increasingly more difficult. She applied for state disability and struggled with minimal medication and no antibiotics for 2 years. Effexor was the only medication she received. Lyme symptoms returned full force. She moved in with family because her condition prevented her from maintaining employment and self-care. Nightmares returned and were partially subdued with sleeping pills. She preferred to stay in bed more so due to the depression rather than the body aches and pains. Social interaction was challenging, so thus avoided. Cognitive function and memory were impaired.

Miss S. found the acupuncture treatments twice a week provided partial relief, however, the acupuncturist found the liver meridians hardening and more difficult to access. Miss S. sensed the heavy regime of antibiotics had interfered with healthy liver function so she stopped taking antibiotics. She also received tremendous benefits from meditation and positive thought in the past, but discarded alternative practices due to increasing difficulty with focus and lack of motivation.

When Miss S. arrived for her first EESystem session in December 2010, the dark circles under her eyes and gray toned skin were most note-worthy. She wore a downward facial expression, her voice was weak and pupils displaced. While in the EESystem, she stated she slept briefly and had pleasant dreams for the first time in many years. She felt more energetic and alive. Her eyes were balanced and facial skin was pink and flushed. Miss S. received EESystem sessions on an average of 2 sessions per week, 2 hours per session over a 12 week period. During the first 2 weeks she experienced symptoms of detoxification similar to what she experienced after acupuncture treatments - headache, fatigue, increased muscle aches, increased mood swings, increased night sweats, facial acne. Her energy level increased and stabilized for longer periods of time. She found herself laughing and 'happy,' more social. After the 3rd week, her acupuncturist was able to insert the needles in the liver points. Gall bladder points also softened and were no longer painful. The acupuncturist noticed an overall better response to treatment.

Miss S. shared with me, that for as long as she remembered, she never was happy, never had fantasy dreams as most people do - she had only nightmares. The nightmares ceased after the 2nd week of EESystem sessions. She experienced dreams that felt 'good.' She began to consider the possibility of returning to work and related education. Her appetite increased as well as her desire for healthy food. She effortlessly drove 25 miles to my office for her EESystem session without fatigue, and met friends and socialized after the session. She said "I've been running with energy like I haven't experienced for years!" Miss S. voluntarily discontinued Ambien after the 3rd week of EESystem sessions. She experienced only slight anxiety and was able to sleep without nightmares. She traveled to the local beach and then took the challenge to take on Disney World in Florida - something she thought she'd never be able to do again. She arranged all her travel plans without difficulty. She tired the same as her friends but felt 'normally' tired rather than exhausted. She started the project of sorting through papers and notes to reorganize the last 10 years of her life. She traveled to California, reconnected with old friends and made plans to resume her educational pursuits.

Her energy increased weekly. She created goals, looked forward to the future and maintained an overall good feeling. Her energy level surprised her, mainly because it lasted through-out the day. She pursued activities such as walking to burn

"Case Study" ...cont'd pg 6

Beyond Lyme Disease

Laura Wild Interviews Connie Strasheim

by Laura Wild

LW: *What is Beyond Lyme Disease* about?

CS: *Beyond Lyme Disease* is about discovering and healing the underlying causes of chronic illness in people with Borreliosis and co-infections. Through my eight years of researching Lyme disease and the causes of chronic illness today, I have learned that many people, perhaps a majority, who have Lyme disease aren't just suffering from symptoms of tick-borne infections (as they are often referred to, even though these infections can be transmitted through other means other than through the bite of a tick). Many have co-morbid conditions which caused them to become to susceptible to symptoms from tick-borne infections, or which are just as important in the overall symptom picture as the infections.

Many people with chronic Lyme disease know that Lyme causes a multitude of problems in the body; endocrine, gastrointestinal, neurological, cardiac and autonomic nervous system dysfunction, for example, as well as damage to organs and tissues. Yet I have observed a tendency for doctors and patients to attribute most of this dysfunction and damage to *Borrelia* and other infections, when often, other factors are causing disease. These factors may have preceded Lyme disease, and may have been what enabled the infections to gain a foothold in the body, or they may be conditions that emerged because of Lyme disease. In any case, they are major causes of illness, and not "ancillary" or "adjunct" conditions to Lyme. I believe that the distinction is important because if these factors/conditions are treated as being the result of Lyme, or it is assumed that they will disappear once the infections are taken care of, then less attention may be given to eradicating them, or mitigating their influence upon the body. Consider this: many Lyme-literate doctors believe that a significant percentage of the population carries *Borrelia* and other common tick-borne infections, but not everyone has symptoms, because some people's immune systems are able to keep the infections under control. People with chronic Lyme disease are often sick because other factors-stress, toxins and other disease processes-predisposed them to illness.

LW: What are the topics in this book, and can you describe each one?

CS: The book covers some of the major causes of chronic illness in people with Lyme disease, although it is not inclusive of every cause, since people are unique and many things can cause illness. Among the topics described in the book are:

1) Adrenal fatigue and hypothyroidism. Endocrine, or hormonal dysfunction, is a complex topic, but I have chosen to focus upon adrenal fatigue and hypothyroidism, specifically, because they cause major symptoms in people with Lyme, and often precede Lyme. Many people in our society today suffer from adrenal fatigue, which weakens immune function and creates susceptibility to infection and toxin retention. While many doctors treat their Lyme disease patients' adrenal fatigue, healing from the condition, if it isn't directly caused by Lyme, requires much more than just a casual approach--taking a glandular formula or some Vitamin C, for example. *Beyond Lyme Disease* describes causes of adrenal fatigue and the hypothyroidism that can result from that, and what's required to heal from it.

2) Nutrient Deficiencies and Toxic Food. Toxic food-that which is genetically modified, and contains antibiotics, hormones, pesticides and other harmful substances, is making many people sick today. It isn't just that people with Lyme disease need "special diets"; conventionally processed food is a major cause of disease! Unfortunately, it can be difficult to know how to eat well, since food labels are confusing, and opinions conflict about the best diet for people with Lyme. *Beyond Lyme Disease* describes how to identify foods which are healthy for most people with chronic illness, along with how to remedy some of the most common nutrient deficiencies caused by chronic illness, and why it is important to take the issue of diet seriously in order to fully heal.

3) Electromagnetic Pollution. Every year, the amount of electromagnetic radiation in the environment doubles. Over two thousand studies have proven electromagnetic fields (EMFs) to negatively alter cellular behavior and harm the body's beneficial bacteria. Dr. Thomas Rau of the Paracelsus clinic in Switzerland suggested in an on-line article that EMFs can cause the body to become susceptible to symptoms from Lyme disease infections, since they destroy beneficial bacteria in the gut that are meant to defend against incoming pathogens. *Beyond Lyme Disease* describes sources of dangerous electromagnetic pollution, how to identify them and mitigate their impact upon the home and working environment.

4) Mold. Over fifty percent of homes in the USA have mold, according to some estimates. Fully one-quarter of people with Lyme disease cannot eliminate mold toxins from their bodies, which means that mold toxicity can be a major cause of chronic illness in people with Lyme. As other conditions in this book, symptoms of mold toxicity mimic those of Lyme disease, making it difficult to identify the primary cause of illness. Removing mold and the inflammatory responses that it causes is essential for healing from chronic illness involving Lyme disease, and *Beyond Lyme Disease* describes some ways to do that.

5) Pyroluria/Heavy Metal Toxicity. By some estimates, 50-80 percent of people with Lyme disease suffer from a condition known as pyroluria, in which the body does not effectively synthesize heme (used to make hemoglobin) and instead creates a mauve-like substance that binds with essential minerals and carries them from the body. Pyroluria creates severe nutrient deficiencies and, as a byproduct, heavy metal toxicity; both of which weaken immune function and predispose the body to infections. Beyond Lyme describes why treating pyroluria is essential for recovery, and provides general guidelines for how to treat it, along with heavy metal toxicity.

6) Parasites. The role of parasites in people with Lyme disease has typically been underestimated, yet parasitic infections can weaken the body even more than *Borrelia*, *Babesia*, *Bartonella* and other common Lyme disease infections. Parasites are intelligent and tenacious, and eradicating them often involves more than just taking a few weeks of wormwood. *Beyond Lyme Disease* details the role of parasites in chronic Lyme, as well as how to treat them and prevent their return to the body.

Author Connie Strasheim

7) Emotional Trauma. Thousands of studies have revealed emotional trauma to be a major predisposing factor to chronic illness. Trauma thrusts the body into a state of "fight or flight", and when this state is prolonged, it weakens immune function. Unfortunately, trauma is often treated as a secondary condition to Lyme, or as the result of Lyme, although it's a principal reason why infections are able to establish a foothold in the body. Healing from trauma often requires more than just spending twenty minutes a day in meditation, or seeing a counselor once a week. This is because trauma is stored in all of the organs and tissues of the body, and roots itself in a person's beliefs, thoughts and behavioral patterns. Beyond Lyme offers suggestions for healing from the complexity of emotional trauma, in order to heal from infections and other aspects of chronic illness.

Other topics described in *Beyond Lyme Disease* include: gastrointestinal dysfunction, opportunistic infections, Candida and other fungal infections, structural problems, and dental foci infections. I personally know of two people who were radically healed from Lyme after having the infections removed from their mouths! Foci infections, as well as the other aforementioned factors, can play an important role in illness involving Lyme infections, so it's important to discover whether they are present and to treat them, if so.

Finally, *Beyond Lyme Disease* contains a bonus Appendix of updated Lyme disease treatment guidelines, based on my notes from recent Lyme disease conferences. The guidelines offer basic diagnostic and treatment information for healing from *Borrelia* and other common co-infections.

LW: Do you have any specific dietary recommendations that Lyme patients should follow to help inflammation?

CS: Any allergenic food will cause inflammation, so it's important to avoid all foods that cause allergic reactions in the body. If you are tired, your heart races, you get a headache, or become achy or grouchy after a meal, such symptoms can indicate that you just something that you were allergic to. Because people all have different food allergies, it's hard to make specific dietary recommendations for lowering inflammation. Most people with

"Connie" ...cont'd pg 7

"Case Study"....cont'd from pg 5

off the excess energy. She increased her walking time because she could now stand fully upright without any pain.

After 10 sessions in the EESystem, Miss S. stated: "My exhaustion used to be every day. Now it's about once every two weeks. It could be the 3 week cycle of Lyme or maybe the full moon. I expect to have some bad days because that's what Lyme does to you. I never thought I would find a way to feel better and go back to living my life. The years lost in Lyme will never be replaced but at the very least, now I know I have a chance."

Miss S. continued her program of sessions for 3 additional weeks. She moved to California, returned to school and maintains her health and wellness through weekly EESystem sessions and Qi Gong with Dr. Effie Chow at East West Academy of Healing Arts, San Francisco, CA.

In June 2011, I received the following e-mail from Miss S.:

"A lot has changed since I last saw you. I moved to CA in April. I'm living in Sacramento. I've connected with Dr. Effie Chow and I have been driving to San Francisco about once a week to use the EES. I get 4 hours in while I'm there. Dr. Chow has inspired me to practice Qigong, which I have been doing for a few months now. My health and mental state have really improved- I'm even able to study for my veterinary technician board exam now! I'm hoping to return to work in the next few months. I saw Dr. Michael at the Qigong conference in San Francisco at the end of April, which was very exciting."

"I hope you are doing well. I think about you often. You really played a huge part in my recovery and helped me to have a better outlook on life in general..." *pha*

"Connie" ...cont'd from pg 6

chronic illness tend to have allergic reactions to gluten, dairy, soy, sugar, and all refined and processed foods, so these should all be avoided, as should high-carbohydrate and high-glycemic foods. A good rule of thumb is to eat only 100 percent organic food in its natural state. Animal protein that is free of antibiotics, hormones and pesticides is good, as are non-starchy vegetables, some nuts, low-glycemic fruits and occasionally, legumes and brown rice. Vegetarian diets are difficult, since many chronically ill people cannot eat grains of any type, which then severely restricts the food options available to them. People with dairy, wheat, eggs, corn and soy allergies should consume only non-GMO, natural, unprocessed organic food, since conventional and processed food almost always contain some corn and/or soy. Free-range, antibiotic and hormone-free animal protein, including turkey, chicken, beef, buffalo and lamb, are good choices for such people, as are non-starchy vegetables, low glycemic fruits, nuts (except for peanuts) and coconut and olive oil. While this diet may seem restrictive, it is essential until the body, particularly the gut, has reached an advanced stage of healing. The Paleo diet is often a good one to follow.

LW: You mention many different supplements in *Beyond Lyme Disease*, if you had to pick 5 of them that you could not live without, what would they be?

CS: I could not live without my omega-3 essential fatty acids, Vitamin C, magnesium, trace minerals, and pantothenic acid. Everyone's nutritional needs are somewhat different; however, I believe that most people with severe health challenges need all of the above, in addition to other nutrients, such as probiotics, digestive enzymes and Vitamin D.

LW: What advice would you give to people who suspect that their symptoms aren't entirely due to tick borne illness? Do you rely on Zyto technology?

CS: Besides reading this book, I would suggest consulting with a holistic doctor who uses sophisticated testing technology, such as a Zyto machine, along with lab tests and a clinical diagnosis, to determine the cause of symptoms. Traditional lab tests alone are insufficient for this purpose. I would also advise receiving treatment from an experienced doctor who thoroughly understands all of the issues in this book, as well as other factors that cause chronic illness. Many people today are becoming ill as a result of the factors described in this book, because we live in a very toxic world where increasing levels of pathogens, environmental toxins, and fast-paced lifestyles are compromising the health of our bodies. Therefore, it's important to consider multiple causes of illness when treating chronic illness involving Lyme disease.

LW: Yeast overgrowth is a common issue impacting Lyme patients. Can you help explain how a patient can tell the difference between Lyme symptoms and yeast overgrowth symptoms?

CS: Determining the difference between Lyme and yeast symptoms can be challenging, since they often overlap with one another. Many people with Lyme, especially those on antibiotics, have yeast overgrowth, so it's often important to treat both Lyme infections and the yeast. Lab tests are inadequate for diagnosing both fungal and Lyme infections; doing a bioenergetic scan on the body using a Zyto machine or Applied Kinesiology can detect both types of infections and help the practitioner to determine which infections are more prominent in the symptom picture, and how to treat them. Doing an empirical trial of treatment for either yeast or Lyme infections can also be useful.

LW: If a Lyme disease patient's #1 symptom is chronic fatigue, which is waking up from unrefreshed sleep, and feeling exhausted all day, every day, what do you recommend they do both treatment wise and supplement wise?

CS: This is difficult to answer, since chronic fatigue can be caused by many factors, including adrenal fatigue and hypothyroidism (which may or may not be primarily caused by infections and/or toxins), inefficient detoxification processes, and other abnormalities caused by toxins/infections, such as mitochondrial dysfunction and insomnia. I have done a lot of research on adrenal fatigue and I personally believe that this is the number one cause-or most common cause-of daytime fatigue for many people, especially if the fatigue is worse in the morning.

Therefore, I would generally recommend supporting the adrenal glands with nutrients, rest and lifestyle modifications (which are explained in *Beyond Lyme Disease*), as well as supporting the thyroid gland with bioidentical supplemental thyroid hormones, or thyroid hormone precursors such as iodine. Taking nutrients to sleep is also essential for many people. I have found 5-HTP, melatonin, and progesterone, to be especially important. D-ribose and COQ10 can help with cellular energy when the source of the fatigue is mitochondrial dysfunction.

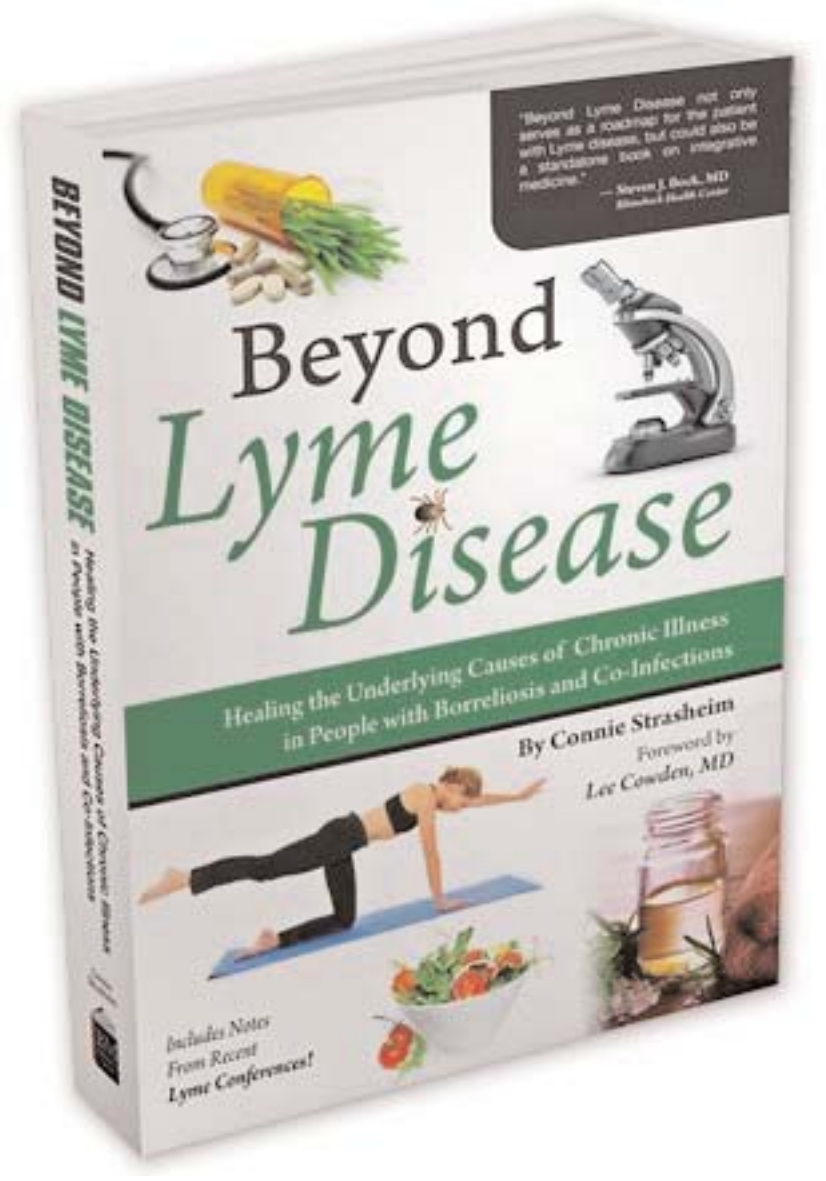
LW: What do you think of the recent surge in the use of LDN (low dose naltrexone) for chronic Lyme disease patients?

CS: I think that pharmaceutical remedies, when used appropriately, can be beneficial for short periods of time, when a person is in a crisis situation or the early stages of healing, when symptoms are strong and the person needs a lot of emergency support just to be able to function throughout the day. That said, I believe that many pharmaceutical remedies, over the long term, can compromise the body's natural healing and metabolic processes, and so should only be a short term solution, until the body has reached a stage whereby it can heal without such remedies. Therefore, I think LDN may be helpful, and even essential for some people, until their immune systems are balanced enough to properly regulate inflammation without the use of medication.

LW: I absolutely loved reading Chapter Eight about Emotional Trauma and Depression. The important point you bring up is about how we all must heal the original trauma that caused the Lyme patient's immune system to weaken in the first place. Do you think this is the most important factor in whether a patient can recover? Many people want to know if a traumatic emotional event can trigger Lyme, or cause a relapse.

CS: Yes, I believe that resolving emotional trauma is the most important factor in healing for many people, (though not all), especially for those that have a history of severe trauma and/or an immune system that was weakened prior to being infected by Lyme and other toxins. Emotional trauma thrusts the body into a state of fight or flight, which, when prolonged, weakens immune function and causes the body to become susceptible to infections and toxins. The health of the body's terrain is everything; when it is weakened by stress; infections and toxins easily gain a foothold and cause symptoms. When the immune system is strong, and the inner terrain of the body is healthy, the body can more easily withstand environmental assaults.

The body's pH is also strongly influenced by trauma; it becomes acidic under conditions of stress, and many studies have established that disease thrives in an acidic body. Earlier this year, I interviewed Bernie Siegel, MD, who is well-known for his work in researching the mind-body connection. He contends that 80 percent of his former cancer patients had child-



hood trauma, and that "happy people are healthy people."

Many studies have substantiated the link between trauma and disease, and traumatic emotional events can also trigger Lyme and cause relapse, because such events weaken immune function. For this reason, it's important, at all costs, to resolve past traumas, not only on a conscious, but also subconscious level. It's also important to cultivate a mindset that fosters peaceful, positive thoughts, as well as a lifestyle that promotes rest-both on a physical and emotional level. This is not easy to do, but I believe that *Beyond Lyme Disease* offers some valuable suggestions for how to do this.

Emotional trauma and living in a state of perpetual "fight or flight" were the impetus for my own battle with chronic illness, so I have learned a lot about healing in this area. Cultivating a personal relationship with God has been most important for my own healing, as meditative prayer has taught me a lot about how to develop healthy beliefs, thoughts and behaviors, as well as how to value myself and set healthier boundaries in my relationships with others. Doing such things has had a positive effect upon my healing.

LW: What do you want people to get out of this book?

CS: My desire is that this book would offer hope to people who have not been healed, even after years of antimicrobial and antibiotic treatments for Lyme disease. I pray it would be a source of encouragement and wisdom to those who have suspected that other conditions are making them sick besides Lyme, but haven't known how to identify, explore or treat those conditions. I also hope that it would provide insights to practitioners who treat Lyme disease, so that they may more effectively help their patients.

LW: Thank you Connie for sharing your knowledge and research with all of us, can you tell us what inspired you to write *Beyond Lyme Disease*?

CS: I am a Lyme disease survivor, and for years, I and my doctors focused mostly upon treating the Lyme disease infections in my body, but I did not feel much better after many years of intense antimicrobial regimens. In 2010, Zyto scans, lab results and Applied Kinesiology tests revealed that my physicians had effectively treated these infections. *Borrelia, Bartonella, Babesia, Ehrlichia, Mycoplasma*, as well as other infections, were found to be remission, but I was still unwell. (*Bartonella* re-emerged in 2011 but it is once again in remission, after I spent several months doing an aggressive herbal and biofilm-busting regimen). Up until 2010, I and my doctors had supported and detoxified my body with a number of remedies, but I achieved only minimal improvement. Suspecting that my main problem was not Lyme anymore (if it ever was), I began to focus more heavily upon healing from some of the conditions that I describe in this book, and have since then achieved greater success in my healing. What I have learned from experienced holistic health care practitioners confirms what I instinctively knew years ago, which is that, when it comes to Lyme disease, "it's not all about the bugs."

To learn more about *Beyond Lyme Disease*, the book can be found at: http://www.lymebook.com/beyond-lyme-connie-strasheim, as well as on You Tube, and Connie's blog: http://www.lymebytes.blogspot.com.

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