Lyme Disease: A Look Beyond Antibiotics

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In the last decade alternative medicine observed a major shift in the field. We realized that it was neither the lack of vitamins or growth hormone that made our patients ill. We discovered that toxicity and chronic infections were most often at the core of the client's suffering. We watched the discussion, which infection may be the primary one: mycoplasma, stealth viruses, HHV-6, trichomonas, Chlamydia pneumoniae, leptospirosis, mutated strep, or whatelse?. The new kid on the block is Borrelia Burgdorferi and some of us have looked at it for a long time as possibly the bug that opens the door for all the other infections to enter the system. Since none of the treatments are specific to either one of the microbes, we can never assume that we really know what we treated once a patient has recovered. Microbiologist Gitte Jensen, PhD had shown, that the older we get, the more foreign DNA is attached to our own DNA. Somewhere along the line pathogenic microbes invade the host's DNA and become a permanent part of it. Since we use only 2% of our DNA, it may not be a problem. In fact, it may make us who we finally become. It may also cause a number of symptoms and chronic illness. Guenther Enderlein's discoveries take us off the hook: if one microbe can change into another given the right environment, why bother to find out, who we are infected with?

In this journal I published the "Enderlein" treatment of Lyme disease in an earlier issue. Since then, we have learned a lot more.

Making the Diagnosis

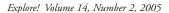
My experience is based on

- a) using direct microscopic proof of the presence of the Borrelia burgdoferi (Bb) with the method developed by Lida Mattman PhD
- b) the information many affected clients have brought to me
- c) my own clinical experience and
- d) ART testing (autonomic response testing), which is the most advanced and scientifically validated method of muscle testing.

Bb tends to infect the B-lymphocytes and other components of the immune system which are responsible for creating the antibodies, which are then measured by an Elisa test or Western Blot test. Since antibody production is greatly compromised in infected individuals, it makes no sense to use these tests as the gold standard or benchmark for the presence of Bb. We also are aware of the literature which has proven, that 12 % of mosquitoes, also many spiders, flees, lice and other stinging insects carry spirochetes and co-infections.

Making the history of a tick bite a condition for a physician to be willing to even consider the possibility of a Bb infection seems cynical and cruel.

To use conventional diagnostic tests such as the Western Blot, one has to think in paradoxes: the patient has to be treated with an effective treatment modality first before the patient recovers enough to produce the antibodies, which then are looked for in the test. A positive Western Blot proves that the treatment given worked to some degree.



A negative Western Blot does not and cannot prove the absence of the infection.

Having taken another route altogether, we have recognized the following:

Today many if not most Americans are carriers of the infection. Most infected people are symptomatic, but the severity and type of the symptoms varies greatly. The microbes often invade tissues that had been injured: your chronic neck pain or sciatica really may be a Bb infection. The same may be true for your chronic TMJ problem, your adrenal fatigue, your thyroid dysfunction, your GERD and many other seemingly unrelated symptoms.

Usually the diagnosis of an active Bb infection is made only, if the symptoms are severe, persistent, obvious and many non-specific and fruitless avenues of treatment have been exhausted. Acute new cases of Bb infection are rare in my practice.

Frequently, if the patient is fortunate enough to see a practitioner who is "Lyme cognizant", the diagnosis of a supposedly fresh case of symptomatic Lyme disease is made when a significant tissue toxin level has been reached (threshold phenomenon) or when a new co-infection has occurred recently. The symptoms can mimic any other existing medical, psychological or psychiatric condition. The list of significant co-infections is limited: roundworms, tapeworms, threadworms, toxoplasmosis, giardia and amoebas, clostridia, the herpes virus family, parvovirus B 19, active measles (in the small intestine), leptospirosis, chronic strep infections and their mutations, Babesia, Brucella, Ehrlichiosis, Bartonella, mycoplasma, Rickettsia, Bartonella and a few others. Molds and fungi are always part of the picture. The pattern of co-infections and the other preexisting conditions such as mercury toxicity determine the symptom-picture but not the severity.

The severity of symptoms correlates most closely with the overall summation or body burden of coexisting conditions and with the genetically determined ability to excrete neurotoxins. The genes coding for the glutathione S transferase and for the different alleles of apolipoprotein E (E2, E3 and E4) play a mojor role. E2 can carry twice as much sulfhydryl-affinitive toxins (such as mercury and lead) out of the cell as the E3 subtype, E4 carries out none. Trouble in the methylation, acetylation and sulfation pathways are also common. Other factors, such as diet and food allergies, past toxic and electromagnetic exposures, emotional factors and unhealed ancestral trauma, scar interference fields and occlusal jaw and bite problems are also important.

Therefore, we do not distinguish between people who have the Bb infection and those who don't. We distinguish between people who have Lyme disease and those who don't.

- a) patients who are infected with Bb and are symptomatic have "Lyme" disease
- b) healthy people who are not symptomatic often have the Bb infection already as well. They may or may

not be disasters waiting to happen. But they do not (yet) have Lyme "disease". Most often several of the "co-infections" are already present prior to the infection with Bb.

In treatment we focus on exploring the difference between symptomatic and asymptomatic Bb carriers. We treat what the symptomatic person is missing (such as enough magnesium in the diet) or has extra (such as mercury) compared to the asymptomatic one. The group suffering most are newborn babies and young children, who rarely are diagnosed correctly and therefore are not treated appropriately. They often carry the labels ADHD, autistic spectrum disorder, seizure disorder and others. Detoxifying these kids with transdermal DMPS and treating the chronic infections is often curative. The Enderlein remedies are often the key.

The 3 Components of Lyme disease

Lyme disease has 3 components, which should be recognized and addressed with treatment:

Component #1: The presence of Bb-spirochete *infection and co-infections*

The co-infections are bacterial, viral, fungal and parasitic. Since Bb paralyzes multiple aspects of the immune system, the organism is without defenses against many microbes. Many - if not most - of the co-infections are really a consequence of the Bb infection and not truly a simultaneously occurring "co-infection".

For this aspect of treatment we use pulsed electromagnetic fields (KMT-microbial inhibition frequencies), herbs, minerals, bee venom (neuraltherapy.com) and - sometimes - antiparasitic medication and antibiotics.

The KMT microcurrent technology is new and revolutionary. It uses 4 different - but simultaneously applied - high frequency superimposed biological waveforms. The interference pattern is creating thousands of harmonics which are then manipulated into the specific published microbial inhibition frequencies (against Bb, mycoplasma etc.). The microcurrent travels freely through the body reaching every tissue. The instrument measures the skin conductance over a 100 times/second adjusting the amperage constantly (so that the body never creates resistance against it). The microbes are inhibited in their metabolic and sexual activity and gradually die out or disappear from the body. The instrument looks not much different then a TENS unit and is applied via 4 electrodes to the skin or used by translating the electric field into a vector force field using signal enhancer technology. (ART/neuraltherapy.com). The KMT frequencies are designed to not only interfere with the reproductive mechanism of the microbes and parasites, but also to awaken the immune system, entrain the white cells to recognize the invaders and at the same time help to absorb and shuttle the effective medication to the body compartment, where the infection actually is. Otherwise, most treatment substances given never reach the target in sufficient concentration.

Component #2: The illness producing effect of microbial *exo- and endotoxins*

Most of these are neurotoxins, some appear to be carcinogenic as well, others block the T3 receptor on the cell wall, etc. Decreased hormonal output of the gonads and adrenals is a commonly observed neurotoxin mediated problem in Lyme patients. Central inhibition of the pineal gland, hypothalamus and pituitary gland is almost always an issue that has to be resolved somewhat independently from treating the infection. Furthermore, biotoxins from the infectious agents have a synergistic effect with heavy metals, xenobiotics and thioethers from cavitations and NICO lesions in the jaw and from root filled teeth. I have published my neurotoxin elimination protocol in an earlier issue of this journal (www.neuraltherapy.com).

For this component we use toxin binding agents such as fiber rich ground up raw vegetables, chlorella, cholestyramine, beta-Sitosterol, propolis powder, apple pectin and mucuna bean powder (biopure@aol.com). A solid heavy metal detoxification program should be used simultaneously with the first phases of the Lyme treatment (ask for transkript Heavy Metal Detoxification Seminar, Seattle, July 2004 from aant@neuraltherapy.com).

The more difficult objective is to choose agents and methods to trigger the release of neurotoxins from their respective binding sites. Only then can they be transported to the liver, processed and enter the small intestine from where they can be carried out by the binding agents. The toxins occupying the T3 receptor are competitively displaced by oral T3 - cycled with the Wilson protocol (available at most compounding pharmacies). The toxins blocking the cortisol receptor are mobilized with the herb forskolin. BioPure CGF chlorella (a sophisticated mix of chlorella and chlorella growth factor) and cilantro given together with a non-irradiated mucuna bean powder mobilize most everything else. I also use alternate day dosing of Phospholipid Exchange from BioPure (currently the most tolerated and effective form of phospholipids for the Lyme patient).

The KMT microcurrent frequencies dramatically increase the speed of toxin mobilization and access body compartments the biochemical compounds cannot. Psychotherapeutic intervention (Applied PsychoNeurobiology – aant@neuraltherapy.com) to uncover and treat old trauma is most profoundly effective in triggering a neurotoxin release when none of the other methods appear to work anymore. After each APN session we pre-medicate the patient with CGF-chlorella (BioPure). Sometimes the extraction of a devitalized tooth or the injection of one of the facial/cervical ganglia with glutathione or another detox agent can trigger a major neurotoxin release. Lymph drainage in combination with colon hydrotherapy accesses toxins stored in the lymphatic body-compartment.

Component #3:

The **immune reactions** provoked by the presence of both toxins and microbes (there are 3 sub-possibilities, which have to be recognized and addressed)

The immune reactions are largely depending on host factors, such as genetics, prior illnesses, mental-emotional baggage, early childhood traumatization, current exposure to electromagnetic fields (sleeping location, use of cell phones, poor wiring in car or home, etc), food allergies and diet, socio-economic background, marital stress etc.

- A: Anergy the absence of reaction due to the successful evasion of the host-defenses. One of the more known mechanisms the microbes use to create anergy is hypercoagulation. The microbes tend to live in the endothelium, where the food is most abundant. They trigger the host's coagulation mechanism to lay down a layer of fibrin on top of them to evade recognition by the immune system. etc. For this aspect we use 3 techniques:
 - a) the KMT-microcurrent technology and homeopathics to wake up and entrain the immune system
 - b) Rechtsregulat ("right rotatory fluid") which is an enzyme rich extract of fermented fruits and vegetables (BioPure). It has outperformed the s.c. injection of heparin in our own trials. Lumbrokinase is far more effective then Nattokinase. Both appear weak when compared to Rechtsregulat. We also work on recognizing and eliminating those factors that block the client's system (geopathic stress, EM stress, food allergies, emotional factors, interference fields such as scars and disturbed ganglia and we substitute vitamins and minerals based on ART testing).
 - c) the Enderlein remedies (especially the haptens)
- B: Allergy appropriate or exaggerated immune reactions (both cellular TH1-reaction and TH2-cytokine activation). In Lyme disease the TH2 (humoral portion of the immune system) is overly active, TH1 is asleep (the cellular immune system). Nothing works better then the APN-desensitization procedure (Applied Psychoneurobiology): while the patient is exposed to the allergen (we use a glass-carrier fixated culture of the offending microbes) the ANS is kept in a state of equilibrium, using tapping of acupuncture-points, hypnotherapeutic trauma-recall and intervention techniques and our proprietary psychokinesiology (muscle-biofeedback psychotherapy). The most effective technique to turn TH1 back on is auto-urine therapy: the patient's urine concentrates the antigens (disposed cell walls and cell fragments of offending microbes which the immune system has successfully eliminated). By passing the client's urine through a micropore filter and injecting it i.m, the lymphocytes on patrol in the connective tissue

are brought in contact with the antigen and quickly mount a specific and appropriate immune response. We use 2 ml of filtered urine once weekly for 12 weeks. All other similar approaches (autohemotherapy, homeopathic autonosodes, manipulating the immune system with supplements) are far less effective.

C: Autoimmunity – the toxins and microbes often act as haptens - marking the cell, cellwall or tissue in which they are hiding as foreign and therefore for destruction. This happens especially against a back drop of pre existing heavy metal toxicity, which has to be addressed aggressively and prior to treating the microbes themselves. We use the MELISA test (memory lymphocyte immune-stimulation assay) to establish which metals the patient is reactive to. The same lab also offers the most sensitive Bb test. The KMT microcurrent technology is very effective in helping the immune cells to mount a specific and targeted attack on the invaders, sparing the body's own tissues. It breaks through one of the prime mechanisms the offending germs are using: molecular mimicry (the pathogens present antigens on their surface that are indistinguishable from a normal body tissue).

The novice in the field tends to treat component #1 only. We have only rarely observed lasting improvement when course after course of antibiotics is given. Because of the defense mechanisms inherent in the Bb and co-infections, current wisdom suggests that 18 months of antibiotics would be curative in many cases. We have observed severe, lasting and unacceptable side effects from this approach (such as tinnitus, kidney failure, intractable immune system breakdown and others). By using the synergistic effect between treatment modalities which simultaneously address the 3 issues outlined above, lasting improvements are the norm rather than the exception. By using the synergy principle and abandoning the arrogant idea of being able to eradicate all of the microbes in the system "for good", chronic Lyme patients can often live a normal healthy life again.

The Mineral Issue

To feed, fuel and perk up the cells of the immune system (especially NK cells and macrophages) numerous interventions have been tried, mostly based on orthomolecular and herbal medicine principles. We found that amongst those approaches, abundant mineral substitution based on the red cell mineral analysis is most rewarding. Rarely medical drugs should be used.

Amazingly, the most depleted minerals in our Lyme patients are often copper, magnesium, manganese and iron. Copper and iron have all but disappeared from most of our supplements based on faulty interpretation of hair analysis. The immune system uses those 2 metals in the process of phagocytosis. They are the main constituent of

the enzymes or bullets the immune cells use in the battle against the invaders. Oxidized used-up iron and copper get displaced into the extracellular compartment and body fluids and appears in the hair and skin as the body's most efficient way of excreting toxins without hurting the kidneys. This has led to the dangerous and in it's consequence catastrophic assumption, that these metals are the enemy and need to be restricted. It is true, that oxidized metals pose a danger and have to be reduced or eliminated. However, when copper and iron are needed and substituted appropriately, major improvements have been observed. Appropriate antioxidant treatment can reduce these metals. Homeopathic copper and iron will lead to redistribution of these metals and makes them bio-available again.

Lithium in low doses (15 mg/day) has been shown to protect CNS structures from neurotoxin damage. Patients almost always benefit clinically from frequent treatment with parenteral magnesium. It is most meaningfully given in a modified Meyer's cocktail, where we use a 5:2 ratio of folic acid (not folinic) and hydroxycobolamine (not methyl- or cyano-).

Many Lyme patient's suffer from Pyrroluria, a metabolic illness where abnormal porphyrins carry out significant amounts of needed zinc and vitamin B6. Diagnosis is made with the appropriate test at the Pfeiffer institute in Chicago. Even though it is assumed that this illness is hereditary I have my doubts, since most Lyme sufferers have a degree of it. I suspect that the appearance of kryptopyrroles in the urine is induced by the illness. However, I am carefull with excessive substitution of zinc. Zinc has a synergistic effect with mercury in the brain and also promotes the growth of the herpes viruses.

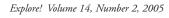
If clients show abnormal high losses of sex steroid hormones in the urine, the patient may be cobalt deficient. The urine hormone test and cobalt drops are available at the *Tahoma clinic Renton*, *Wa*. Selenium should be given in high doses to suppress viral replication and render bioavailable mercury non-reactive.

The element most critical in the Lyme patient however is iodine. A 2 inch square of Lugol's iodine is painted on the patients skin and should remain visible for 24 hours. The sooner it is absorbed the more deficient the patient. An oral form of Lugol's is available under the name Iodoral (Optimox, Torrance, Ca).

Filling up the body's mineral reserves has always been the most essential part of our heavy metal detox program. It is also the most essential part of our Lyme treatment.

Sequencing

There is an inherent order in which the microbes should be treated. If the order is correct, gentle methods work. Treatment should always combine electromagnetic interventions, using specific microbial inhibition frequencies (KMT technology) with the appropriate herb, antibiotic or other antimicrobial strategy. It should also



always be combined with a toxin elimination program, good psychotherapy and general life style hygiene (all the stuff, that alternative Medicine stands for).

The Lyme ABC

A. We start with **deworming** our clients. We often use the seasalt/Vit C protocol published on the internet. It is now known that as a side effect also the enzyme elastase is increased which has a strong antimicrobial effect on the Lyme spirochetes.

Protocol: 1.5 grams of seasalt per 10 lbs of body weight in 4 divided doses per day for 3 weeks. With each dose also give 1-4 gms of Vit C (dose has to be just below bowel tolerance). Three 3-6-week cycles with a 2 week break inbetween. The BP should be monitored and not elevate outside acceptable levels. 5 % of the population are salt sensitive and react with a significantly increased blood pressure. In the off weeks we give ½ tsp of sea salt first thing am in a glass of water. Sometimes we enhance the program by using the "Arise-and-Shine" herbal program. Often I will add in a course of Albendazole or Biltricide. We developed antiparasitic CDs for entrainment of the immune system. The frequencies were obtained by German physicists by taping the sounds of microbes in their respective live activity in an underground lab which was soundproof and electromagnetically completely shielded.

- B. the next step is the treatment of giardia, entamoeba histolytica and trichomonas, which most often are overlooked. Lab detection of large parasites in most US labs is hopeless. Amoeba and giardia trophozoites can only be detected in a fresh stool for about 20 minutes. None of the labs available to us comply with this necessity. The detection rate is so substandard that only ART testing, a therapeutic trial or abdominal palpation by an experienced practitioner are capable of establishing the diagnosis. Protocol: organic freeze dried garlic (BioPure) treats all of the above astoundingly successfully. Sometimes we add Tinidazole 500 mg bid for 10 days always followed by long term garlic therapy (3 caps tid after meals).
- C. Next we attend to the chronic strep infections, which often coexist with the herpes viruses. No other treatment has been as successful as Pleo Not from Enderlein followed by a 6 month course of Pleo Sancom. We always look at the tonsils: if they are scarred with crypts, or lymph tissue has regrown since the tonsillectomy ("tonsillar tags"), surgical intervention is needed. Otherwise these patients (which are most of them) never get well. We recommend a procedure developed by a Russian medical doctor specializing in ENT and Pediatrics (Sergej Dorochov, MD, PhD) called "regenerative cryotherapy". It involves freezing

- the surfaces of all lymphatic tissue of the head/neck region which creates a barrage of growth factor and cytokine responses, that often lead to dramatic improvements in our Lyme patients. Lymph drainage using the KMT technology has been superb in speeding the healing of the sinus/head/neck/region.
- **D.** The next step is the treatment of **Babesia**. There are now at least 17 subtypes of this intracellular Malarialike organism. Eye, brain and dental symptoms are most often caused by this mean microbe.

Protocol: Frequency #2 in the KMT 22 TENS unit inhibits the metabolic activity of Babesia and is used 3 times weekly.

I also use Artemisinin, 2 cap 2times/day. 3 weeks on, 1 week off. Always with ½ glass of grapefruit juice. 3 cycles. Watch manganese and iron levels! Artemisinin provokes the intestinal wall to secrete an enzyme which destroys the medication before it can be absorbed. This process builds up over 3 weeks. After a one week pause the enzyme has disappeared and takes another 3 weeks to reemerge. Grapefruit juice prevents formation of this enzyme. Alternatives are the Malaria drug Riamet (1 course) which is very well tolerated and Mepron, which is forbiddingly expensive.

- E. The next step is to start the client on a systemic antiviral treatment. I use the ayurvedic drug Trifal - Indian Gooseberry, Chebulic and Beleric myrobalan from BioPure (425 646 6449), which has given the most profound and lasting effect on the viruses of the herpes family, which flourish in the immune suppressed Lyme patient. The Japanese mushroom extracts have also been helpful. Olive leaf, virox and other chaparral-derivatives have been disappointing. The insomnia of Lyme disease is often herpes viral in nature (EBV, VZ or HSV 1, HSV II). As a diagnostic trial I often use 1000 mg Valtrex at bedtime. If there is a dramatic improvement, herbal antiviral treatment has to be considered for a long time. We have designed an antiviral program for the KMT instruments (frequency #4) and an anti viral CD, which s played through a walk man or regular sound system at low volume 3 times/week. This has been extremely effective. Zinc fosters the growth of HSV I and II, copper and selenium inhibit it.
- F. Simultaneously I address the **fungal/yeast** component which is most often present, especially if clients had prior antibiotic treatment. Fungi and viruses seem to support each other in yet unknown ways. I use the antifungal CD, the KMT frequencies in program #4 contain all known anti-yeast and anti-mold frequencies (both from AANT 425 822 2509). With ART technology we could show that the most successful and well tolerated antifungal is either the drug

amphotericin B (250 mg bid) or the combination of freeze dried garlic and oil of oregano. The Enderlein remedies are effective in the long run. Substitution with effective microbes is important. We use "Matrix Flora" from BioPure which contains over 80 lesser known beneficial microbes. Every patient is also on a more traditional acidophilus/bifidus/FOS product. Eating a low carb diet is often a must. We monitor the fasting insulin level. If it is low, we are ok. If it is high, we restrict the carbs. Do not restrict the carbs if it is not necessary. We have seen dangerous mistakes in this field. Metabolic typing is a safeguard, but time consuming. Most successful is the ART food sensitivity test for every single item in the client's diet. It may take 15 minutes, is more sensitive then the ELISA, MELISA and other lab tests - and it does not incur lab fees. The rotation diet by Sally Rockwell prevents relapses.

- G. Mycoplasma responds well to enzymes, when it is treated in sequence with the other microbes as outlined here. The most effective strategy is the German product Rechtsregulat. This simple drink has been extremely effective in eradicating mycoplasma and other cell wall deficient microbes. It also has a heparin like anti-fibrin effect that surpasses injected heparin by far. It has just like heparin, a strong biological effect against Babesia as well. Dosage: 1 tbs/2 times per day. The KMT program #4 is designed for treatment of mycoplasma.
- H. The spirochetes and their close relatives (Rickettsia, Ehrlichiosis, Brucella abortis) are best treated with antimicrobial herbs and German thymus extracts. I eported in an earlier issue on the Enderlein treatment of Lyme disease, which should be pulsed for several weeks at a time. We also use Echinacea root tincture, 1 tsp bid. We use an alternating course of teasel root tincture (15 drops 3 times per day) for 6 weeks and then TOS free cat's claw tincture (10 drops tid). When the sequence outlined here is observed, few people have severe Herxheimer reactions, which are the rule in other approaches. Frequency #1 in the KMT TENS unit inhibits the microbial growth, simultaneously activates specific immune responses and aids the uptake of antimicrobial herbs. I like the North American product "Pro Boost" (thymus extract) to help awaken the cellular immune system.

Outlook

Most clients will need some support for several years, before they have found and adapted to a new life style in which the symptoms are absent. Lyme disease is marked by cyclic rythms and unexpected returns of the symptom from time to time. Once a patient has figured out what works for him or her best, most of my patients learn how to manage the illness with very little help - on their own, living normal healthy lives worth living. In the course of conquering the illness there has been a lot of personal growth and a lot of learning. Many treatment modalities have been surprisingly ineffective: ozone, hyperbaric oxygen, ICHT (intracellular hyperthermia) and many others. Some treatments have been unexpectedly effective: dental splints, colortherapy, Tomatis therapy and neurosensory stimulation, elevating the body temperature with T3 supplementation, regular bee venom injections, tonsillectomies and cryotherapy and many others. After 12 years of dealing consciously with this illness, Lyme disease is still a mystery to me. Its impact far outweighs issues like heavy metal toxicity, unresolved psychological issues and nutritional deficiencies.

There has been much speculation, why Lyme disease seems to be increasingly common. The book "Lab 257" is an investigative report on the issues involved. The insects which are the vectors for these microbes thrive in warmer climates. I have no doubt, that to a large degree the greenhouse effect is responsible and will be confronting us with the onslaught of more and more aggressive microbes. The partial pressure of oxygen on the earth at sea level has decreased from 30% 100 years ago to 19%. The response of the public health system so far has been denial and anger towards those who try to uncover the puzzle and help the afflicted patients. This will certainly change in the near future. I expect that by the time the institutions discover Lyme disease as a far more important factor in chronic illness then currently acknowledged, we will be confronted with new, far more dangerous microbes. Antibiotics have disappointed in the treatment of Lyme disease as a single modality. Antibiotics alone will not help us to cope with the coming plagues.

All of us "alternative" practitioners have to start looking beyond antibiotics for help and for hope. The microbes have always been with us. They are not the enemy. It is us who have altered the environment so severely and in a way which facilitates the growth of lower evolved species like cell wall deficient microbes and viruses - and ends the life for many more evolved species. Extinction may be forever.

Lyme disease is a messenger. If we don't change, someday not too far from now we may be on the endangered species list. \(\psi \)