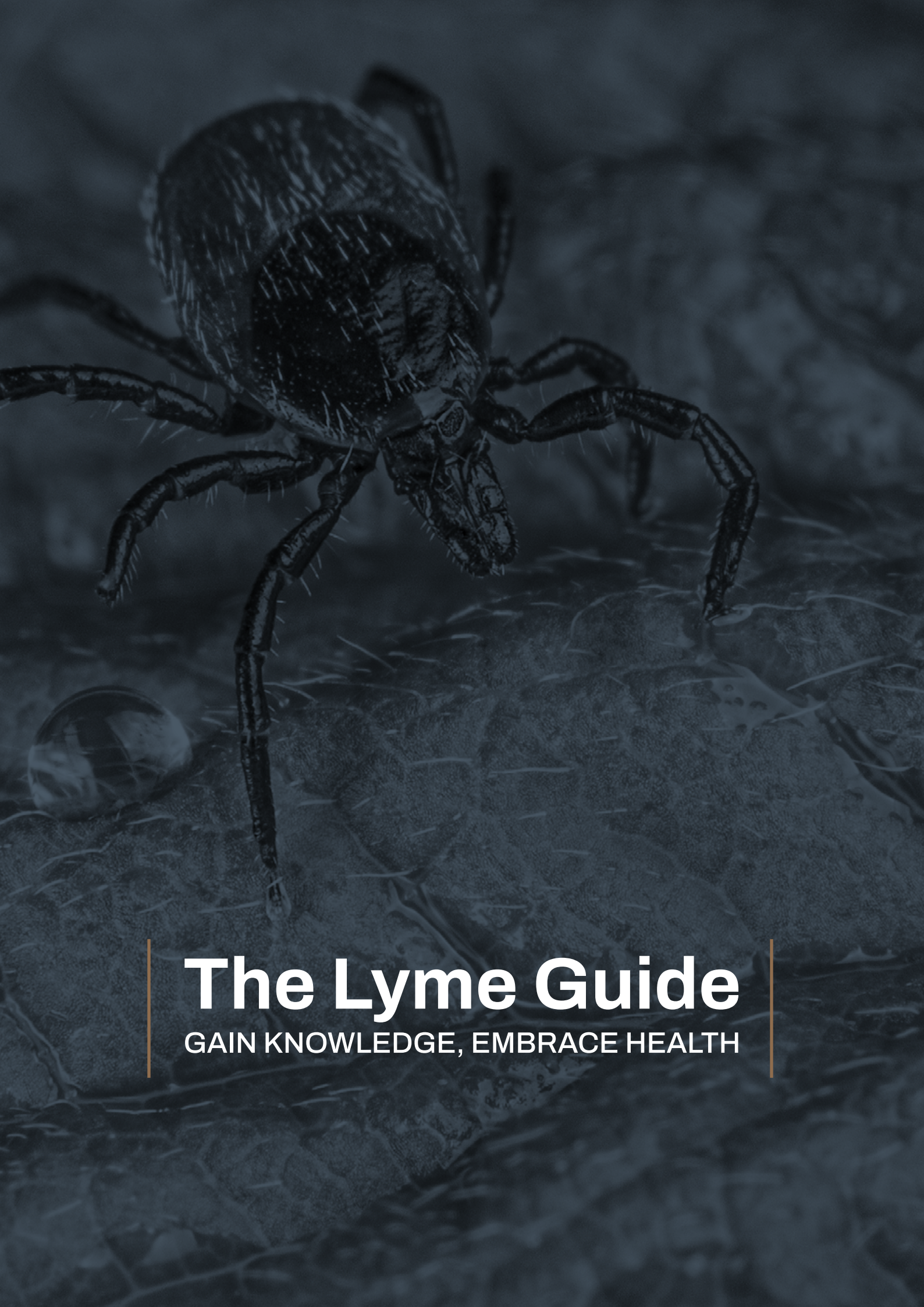

The Lyme Guide

GAIN KNOWLEDGE, EMBRACE HEALTH

THE LYME GUIDE

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INTRODUCTION

Dr. Wilhelm Burgdorfer. The Father of Borrelia Burgdorferi (June 27, 1925 - November 17, 2014)

INTRODUCTION

Build your own insight and spread the word

Lyme disease is not new, it's been around for over 5,000 years and infects aprroximately 476,000 people per year reported in the U.S. alone. In 1977 three Connecticut communities reported an epidemic of **oligoarticular arthritis**. Several years later in 1982, **Dr. Burgdorfer** discovered there was a **spirochete bacteria** in the tick, which was named after him — **Borrelia Burgdorferi**.

The spirochete can be transmitted through the bite of an infected black-legged tick. The longer a tick is attached the greater the chances are of it transmitting a disease. As the tick feeds on the blood of its host it releases the Borrelia burgdorferi bacteria, as well as other co-infections, into the bloodstream. Anyone can become infected with Lyme disease.

Identifying Lyme disease is not so easy for a number of reasons. Laboratory tests are often unreliable and the number of infectious diseases carried by ticks has grown significantly. Also, hallmark signs of Lyme disease aren't always present and many of the symptoms vary greatly from patient to patient and are similar to other medical conditions. There have been many cases where patients with Lyme disease have been incorrectly diagnosed with multiple sclerosis, thyroid disease, psychiatric disorders, fibromyalgia, chronic fatigue syndrome, autoimmune diseases: including lupus, rheumatoid arthritis and polymyalgia rheumatica among others.

This `Lyme guide´ has been put together so that we can spread the necessary knowledge to everyone affected, their family, friends and/or others interested and by doing so, we can assist and help in detecting a possible tick borne disease. If we do so before the complications begins or even in an early phase where the treatments are less aggressive and less harsh, the road back to regained health is much shorter. So help us support the Lyme community by spreading the word.

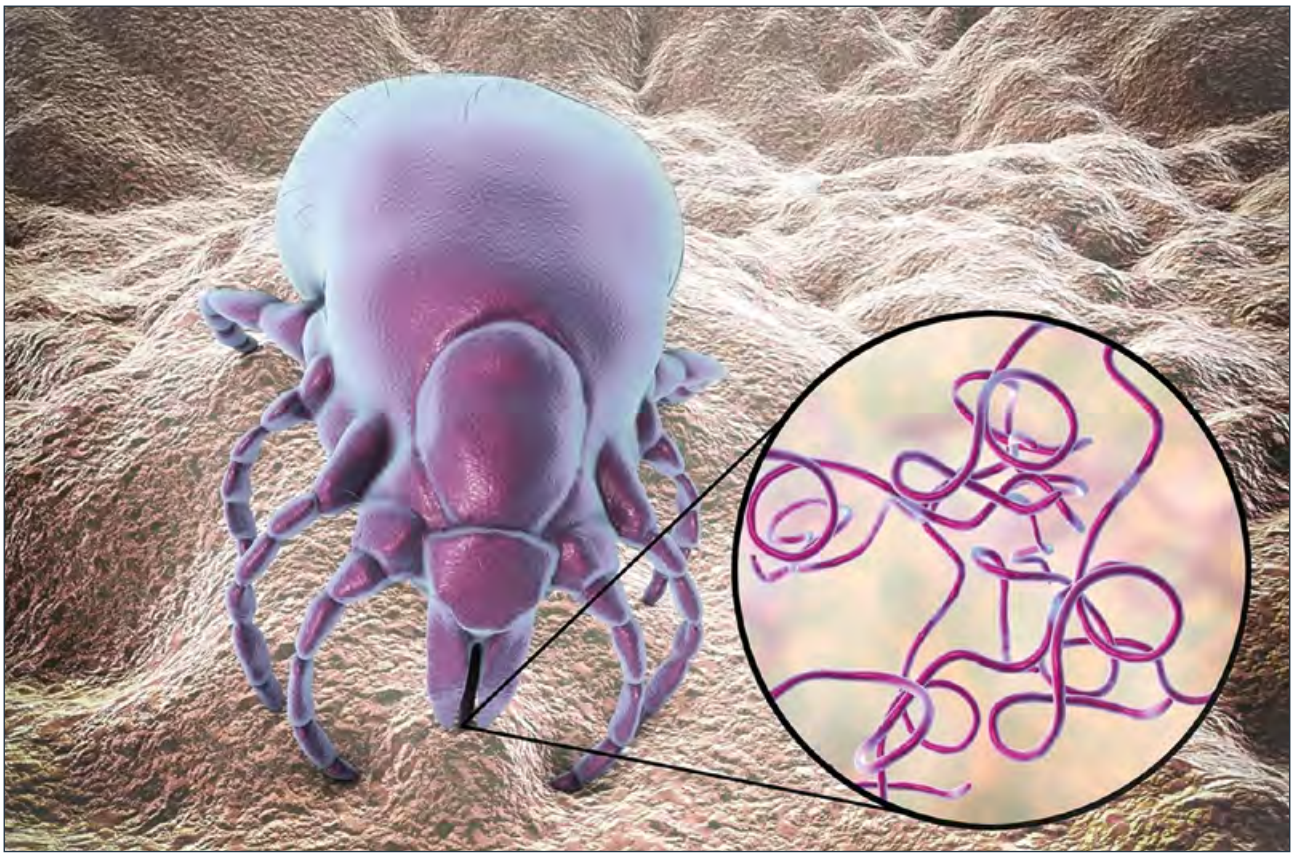
Remember, Lyme disease is a far greater threat than is generally recognized, so even if you don't have Lyme disease be alert and stay informed.

LYME

Diagnosing Lyme Disease

Missing The Mark With Diagnosing Chronic Lyme Disease

Lyme Disease is a clinical diagnosis. The disease is caused by a spiral-shaped bacteria (spirochete) called **Borrelia Burgdorferi.** The Lyme spirochete can cause infection of multiple organs and produce a wide range of symptoms.



Lyme Disease is known as the **"great imitator"** as Lyme disease symptoms have a widespread list of symptoms that mimic many other diseases causing it to be misdiagnosed for fibromyalgia, multiple sclerosis, chronic fatigue syndrome, and various psychiatric illnesses such as depression.

Lyme disease can be difficult to diagnose. Sadly, recent data shows more than 85% of Lyme disease patients were not diagnosed until after four months of illness, and over 70% saw four or more doctors before receiving a diagnosis.

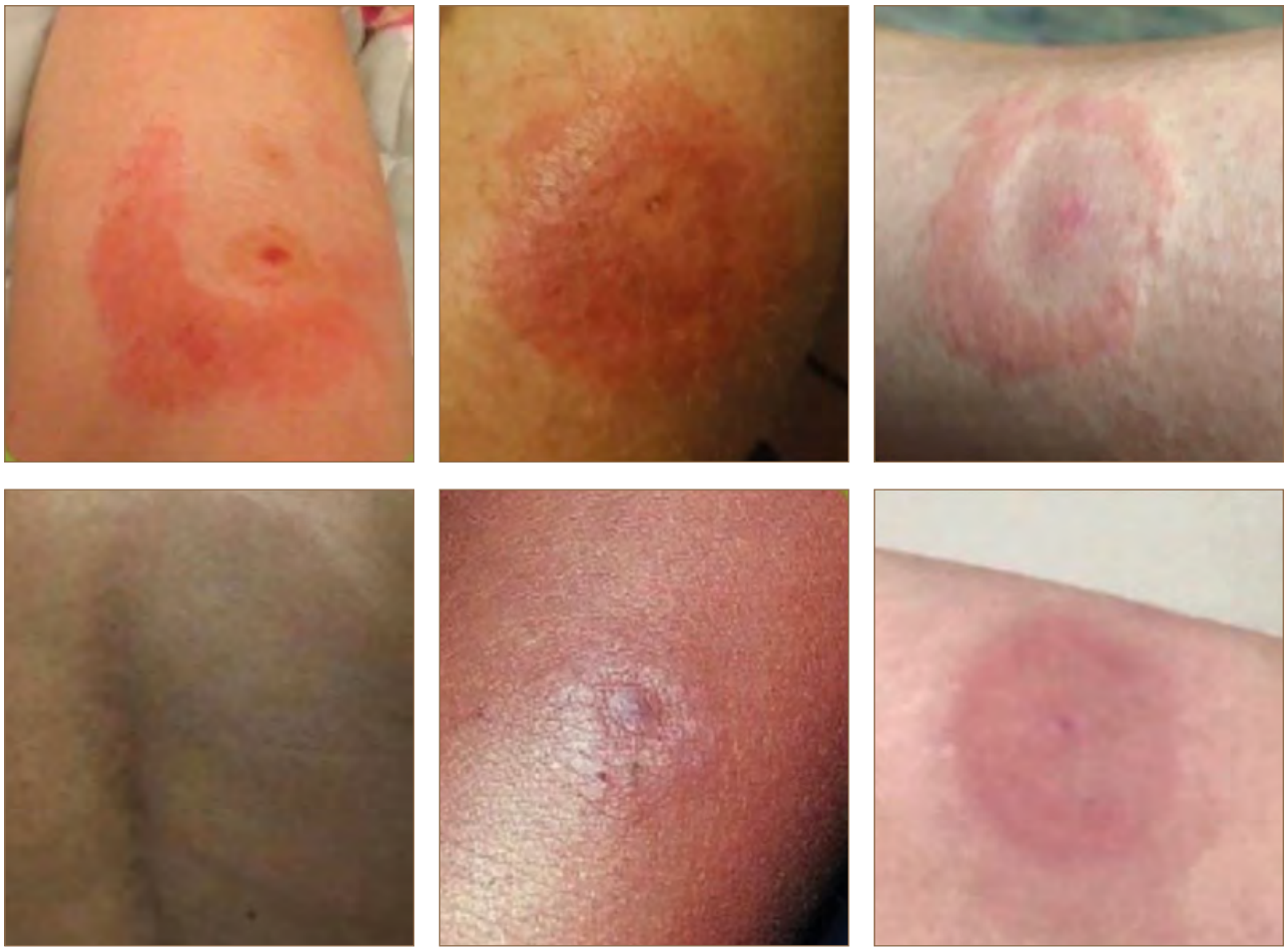
The CDC estimates cases in the United States at more than 476,000 people infected annually while acknowledging that Lyme disease can be difficult to diagnose.

A respected University Medical Center, Drexel University College of Medicine, has proven that standard Lyme Disease testing fails to diagnose 60- to 70 percent of patients who are truly affected with Lyme Disease.

For this reason, nearly all of the Lyme Disease patients at IAH Wellness have been infected for years. Because these patients went undiagnosed for so long, they have become “Chronic Lyme Disease” patients, and a majority are suffering from brain infections and therefore have Neurological Lyme Symptoms.

There are several reasons for this difficulty, including the fact that many people don’t remember a tick bite, EM rash isn’t always present, Lyme symptoms mimic so many other conditions, and current EMA and FDA-approved/CDC-recommended testing fails to accurately diagnose in 60-70% of cases.

Several studies proves what ILADs Physicians Have Been Saying For Years: Standard Lyme Disease Testing Fails Up To 70 Percent Of Time



Erythema migrans (EM) rash

However, when an expanding **EM rash** is present, especially if you're from or have traveled to a Lyme-endemic area, a diagnosis is given without laboratory testing, and treatment is started immediately. In all other suspected cases of Lyme disease, your physician will assess your symptoms, medical history, and any past diagnostic tests and run new laboratory tests.

Lyme Disease is consistently being misdiagnosed as a variety of ailments including but not limited to chronic fatigue syndrome, fibromyalgia, MS, depression, bipolar disorder, Alzheimer's, and ALS.

Lyme disease is a severe condition where that disease can affect multiple areas of the body with symptoms appearing as early as 1 to 2 weeks after being bitten. After being bitten, a telltale sign begins with a red rash or a bulls-eye red ring not necessarily exclusive to the surrounding area of the bite.

Since Lyme infections can vary, and Lyme can manifest over 100 different symptoms with no two people being the same, many physicians do not even consider Lyme disease as the problem.

Even when testing is performed, standard testing misses over 90% of chronic Lyme disease cases. The reason for this is that the conventional methods of testing are designed to test for acute Lyme disease and not chronic Lyme disease.

How is Lyme Disease Diagnosed?

Lyme disease is most often diagnosed and confirmed through blood tests or testing of the cerebrospinal fluid. During a blood test, blood is usually drawn from a vein in the arm and tested for the antibodies a person's body produces in response to the invading Borrelia burgdorferi.

Patients experiencing neurological symptoms may be recommended a spinal tap to test the cerebrospinal fluid. In a spinal tap, fluid is drawn through a lumbar puncture between two vertebrae in the lower spine.

These tests reveal if there are antibodies in the blood or cerebrospinal fluid. They do not check for Borrelia burgdorferi. Although this could mean Lyme disease, it can also be a sign of other autoimmune diseases such as lupus or rheumatoid arthritis.

A positive result on these tests paired with Lyme disease symptoms or the acknowledgment of a tick bite are often keys to a successful diagnosis. Patients who have previously undergone antibiotic treatment for Lyme disease, yet are still experiencing symptoms, are also considered a positive diagnosis, more specifically a condition called post-treatment Lyme disease.

Lyme Disease Symptoms

Known as the “Great Imitator”, Lyme Disease Can Mimic Symptoms of 100+ Conditions

What Are the Symptoms of “Chronic” Lyme Disease?

Vastly misunderstood, Lyme Disease symptoms mimic those of other diseases making it commonly misdiagnosed as something else.

Symptoms of Lyme Disease are extremely severe and debilitating, leaving sufferers **feeling like it has stolen their lives**. The IAH Wellness team of doctors dedicate time and effort to understand and successfully treat Chronic Lyme Disease.

Lyme disease can present a variety of symptoms ranging from a flu-like illness to neurological impairment. A bulls-eye-shaped rash is often a tell-tale sign of Lyme disease, however, some infected people do not develop one at all. In fact, many patients who are diagnosed with Lyme disease do not remember ever being bitten by a tick.

Symptoms of Lyme Disease for those infected often include fever, headache, fatigue, chills, swollen lymph nodes, muscle or joint pain, and other flu-like symptoms. Many suffer notice a bulls-eye-like rash called “erythema migrans,” which is a sign of the bacteria multiplying in the bloodstream.

Graphic visualization of some of the symptoms when infected with Lyme.

If the Lyme Disease infection is left untreated, Lyme patients may experience a wide range of physical and neurological symptoms, including, loss of memory or concentration, depression, speech problems, pain and swelling, cough, facial palsy, muscle loss, and more.

What Happened to the Classic "Bull's-Eye" Rash?

An initial bite from a tick can cause a rash that will appear typically 3 to 30 days for the initial rash but they can reappear as time goes on. While the characteristic "bull's-eye" rash (erythema migrans) is associated with Lyme disease, the rash only appears in an estimated 50% of infected individuals, or it may appear in a different form. If this rash does appear,it can stay for several days or dissipate within a few hours. Seventy percent of all patients who do present with Lyme disease complex never recall such a rash.

What Are the Stages of Lyme Disease?

Lyme disease can be broken down into **3 stages**.

Stage 1 (Detection)
Time Span: Days – Couple of Weeks

Often called the "early localized" stage of Lyme disease, symptoms start a few days to a few weeks after contraction. The symptoms of stage 1 Lyme disease mimic those of the flu making them difficult to link to a bite, especially if the sufferer does not remember being bitten.

- Erythema Migrans or bull's-eye rash
- Severe headaches
- Neck stiffness
- Joint pain
- Muscle pain
- Dizziness
- Shortness of breath
- Nerve pain or numbness
- Tingling pain
- Shooting pain
- Memory loss
- Swelling

Stage 2 (Early Disseminated):
Time Span: Weeks – Months

Stage 2 of Lyme disease can start weeks to months after the Borrelia burgdorferi enters the system. This phase is known as the "early disseminated stage" of Lyme disease and the symptoms often overlap with those of stage 1.

Stage 2 occurs when Lyme disease is not detected immediately or initial antibiotic treatment does not kill the bacteria in its entirety.

In this stage, the Borrelia burgdorferi has started to invade and multiply within the body. The early disseminated stage of Lyme disease symptoms includes:

- Rash
- Fatigue
- Fever
- Chills
- Stiffness
- Facial palsy
- Headaches
- Muscle aches
- Confusion or memory loss
- Pain
- Vertigo
- Nausea
- Cough
- All of the stated in Stage 1

Stage 3 (Late Chronic):
Time Span: Months – Years

Chronic Lyme disease, or stage 3, can affect patients months to years after initial contraction. By this point, the Borrelia burgdorferi has multiplied and infected tissues or organs within the body.

It often creates a **biofilm, or protective barrier**, around itself making it difficult to penetrate and kill. When multiplying, many patients experience little or no symptoms, leading them to believe the bacteria is no longer within their system.

When symptoms reappear, they often mimic that of other illnesses like arthritis, multiple sclerosis, chronic fatigue syndrome, fibromyalgia, depression, insomnia, and other autoimmune disorders. It is important to mention that patients who have received treatment for Lyme disease may still be at risk. Post-treatment Lyme disease (PTLD) may affect up to 50% of people who receive treatment at stage 1. Stage 3 symptoms are severe and debilitating and can include:

- Extreme Fatigue
- Chronic Pain and Soreness
- Depression, Anxiety, Stress
- Cognitive Impairment
- Migraines and Headaches
- Arthritis
- Insomnia
- Bell's Palsy
- Loss of Vision
- Hearing Impairment
- Irregular Heartbeat
- All of the stated in Stage 1 and 2

Lyme Disease Transmission

How is Lyme Disease Transmitted?

Lyme disease is a tick-borne infection most often transmitted by black-legged tick bites and, in recent studies, has also been found in mosquitos which we will talk about in the folliwing chapter.

Lyme Disease Transmission by Ticks

The bite of a tick transmits Lyme disease, and the disease is prevalent across the United States and throughout the world. Ticks know no borders and respect no boundaries.

A patient's country of residence does not accurately reflect his or her Lyme disease risk because people travel, pets travel, and ticks travel. This creates a dynamic situation with many opportunities for exposure to Lyme disease for each individual.

The bite of a black-legged or deer tick most commonly spreads Lyme Disease. These tiny ticks and tick bites are tiny and difficult to see.

As we mentioned above, when it comes to the transmission of Lyme disease, ticks are not necessarily flying bug syringes that suck Borrelia from one organism and then simply inject it into another. The process, of course, is a little more complicated as it is the interactions between two living things, the tick, and Borrelia, that play a crucial role in the transmission of the infection.

While Borrelia resides in the tick's gut, it produces a protein that enables the Borrelia to persist in the tick for long periods. The protein aids its survival until the tick feeds again. Then, when the tick begins to feed again, the spirochete decreases its production of that protein and focuses on producing a new protein, which allows the spirochete to move to the tick's salivary gland where it can then be transmitted to the new host by way of the tick's saliva.

The production and function of the two proteins that the Borrelia spirochete produces in a tick are integral to the Borrelia's survival. Still, it also can enhance and utilize a protein already in the tick that protects not only the tick but the spirochete as well from any attacks by the host's immune system.

Therefore, Borrelia is dependent on the tick's protein, Salp15, to infect the host as a Lyme disease agent. In addition to the Salp15 protein, the Borrelia also needs the extended time that a tick spends feeding, as it often feeds for multiple days at a time. The spirochetes often require such an extended amount of time for those interactions to occur.

Transmitting the Lyme infection from a tick to a person is not necessarily a matter of the tick sucking Borrelia from one person and injecting it into another. Rather, certain relations, processes, and systems inside the tick and Borrelia enable it to persist for a long enough time to become strong enough to be transmitted to a person.

Understanding how the Lyme disease organism, Borrelia, works in a tick is crucial to understanding the controversy over mosquitoes and Lyme disease.

Such concerns have made mainstream disease centers deny that mosquitoes have the capacity to be significant vectors of Lyme disease infections. However, recent studies have provided evidence to combat any such concerns.

Specifically, one study performed by individuals from Goethe-University, Senckenberg Museum of Natural History Gorlitz, and the University of Frankfurt has found that mosquitoes might have the equipment, after all, to enable Borrelia spirochetes the ability to survive for the duration necessary to be viable vectors of Lyme disease. See next chapter.

Variuos studies have also shown that Lyme Spirochetes can be sexually transmitted.

Do Mosquitoes Carry Lyme Disease?

Lyme disease is often associated with ticks, specifically deer ticks. Yet, some researchers have started to suggest that mosquitoes might also be vectors of this disease, stirring controversy within the Lyme disease academic sphere.

Despite evidence that mosquitoes carry Borrelia in their gut and potentially can transmit the infection to humans, many prominent disease centers, such as the Centers for Disease Control and Prevention (CDC), still argue otherwise.

Unlike in ticks, Borrelia's survival in mosquitoes is less well-equipped. Even though Borrelia has been found in mosquito guts and saliva, questions arise regarding its survival capacity without supportive the proteins found in ticks.

Furthermore, mosquitoes feed rapidly, often within minutes, a far cry from the days-long feeding of ticks, thereby limiting the spirochetes' ability to adapt for transmission.

However, recent studies, including one performed by researchers from Goethe-University, Senckenberg Museum of Natural History Gorlitz, and the University of Frankfurt, suggest that mosquitoes might indeed have the necessary equipment to facilitate Borrelia's survival and transmission.

Are Women More Prone To Mosquito Bites?

Do mosquitoes prefer “sugar” to “spice”? The old nursery rhyme suggests females are true, sweeter than men, is it actually true?

If so, and if mosquitoes are a major reservoir for Lyme spirochetes, it might explain why we so many women are being registered with severe Lyme disease, yet they claim never having seen a tick.

To make this debate more interesting, we must mention a University of Florida study that suggests mosquitoes are more attracted to the sweet smell of lactic acid. Thus, patients with higher toxicity levels will attract more mosquitoes, and it is a known fact that females generally suffer far more gut toxity than men.

Furthermore, females have twice the prevalence of toxin-derived Multiple Sclerosis (MS) than men.

The more toxicity one suffers, the more inflammation one suffers, and subsequently, excessive inflammation stimulates an elevation of multiple blood clotting factors (Fibrinogen, Thrombin-Antithrombin III, PAT).

The elevated clotting factors ultimately narrow the capillary lumen and prevent red blood cells from traveling through the microcirculation, thus compromising oxygen delivery. This leaves deep tissue in a state of micro-hypoxia or lack of oxygen, thus leaving body tissue in a slight but chronic anaerobic state. This mild anaerobic state causes excessive production and accumulation of sweet-smelling lactic acid in the body tissue and bloodstream.

The take-home message

The more toxic ⟶ the more inflamed ⟶ the more excessive blood clotting ⟶ the more reduction of capillary blood flow ⟶ the more lactic acidosis build-up ⟶ the “sweeter” you smell to mosquitoes.

This will explain the mechanism for some of you who know well that you are the “mosquito magnet” among your friends and family.

Suppose we accept the stellar research from the University of Frankfurt and acknowledge that mosquitoes bite many more people than ticks. Should we then not surmise that partial causation of the surge of Lyme disease is secondary to the ever-growing scourge of mosquitos?

We must therefore seriously consider these scientific facts and common sense should compel well-funded institutions to immediately begin an attempt to study and ascertain what percentage of mosquitoes are indeed carrying Lyme spirochetes.

Women Who Consider Themselves "Mosquito Magnets" Are Most Susceptible

Let us always think and pontificate, let us not become complacent, assuming we have the answer in totality. We must realize the more we know, the less we know. We cannot blindly accept the limited thinking of many; we should indeed be focused on studying the possibility that mosquitoes are potentially every bit responsible for causing an increased prevalence of Lyme disease in the world today.

We should also surmise that there is a great possibility, certainly remain open-minded, that mosquitoes can more easily transport Bartonella, a much smaller bacterium than the Borrelia spirochete.

These women who suggest "mosquitoes love them" more commonly test positive for Bartonella, which seems to be ubiquitous. The blood smears of these women typically reveal **Bartonella infection**, which correlates with medial **frontal lobe pressure**, **mid-forehead**, and often significant **pressure behind their eyes**. These female patients who readily attract mosquitoes exhibit a specific pattern of under activity in the medial frontal lobe on their PET brain imaging.

This "Bart pattern" we can see on these PET brain scan and the excessive pressure these patients experience in the middle of their forehead and behind their eyes typically goes away once enhanced their mitochondrial function, enhance natural killer cell activity via all-natural IV protocols, which then, after the enhancement of their immune function we provide an efficacious kill with specific antibiotics that are much better for killing Bartonella than they are for Lyme spirochetes.

Let's keep learning together as we encourage you, the patients, to increase awareness and put pressure on politicians to allocate more public funds for the study of mosquitos as a potential and significant reservoir of not only Lyme spirochetes but also what many patients are proving is a Bartonella epidemic..

Lyme Disease Spirochetes

Lyme disease is caused by the spirochete bacterium *Borrelia burgdorferi*.
What is a Spirochete?

A spirochete is a type of bacterium characterized by its unique corkscrew or spiral shape. This shape allows the spirochete to move effectively through various environments, including human tissues. Spirochetes are responsible for causing several diseases, including **syphilis** and, most notably, **Lyme disease**. The term "spirochete" is derived from the Greek words "speira," meaning coil, and "chaite," meaning hair, in other word, "coiled hair".

Characteristics of Spirochetes

Spirochetes are highly adaptable and can change their shape and behavior to survive in different environments. They can also avoid detection by the immune system, allowing them to persist and cause chronic infections in their host. Some of the key characteristics of spirochetes include:

- Corkscrew or spiral shape
- Ability to move through tissues and fluids
- Can evade the host's immune system
- Capable of causing chronic infections

Lyme Disease: A Spirochete Infection

Lyme disease is caused by the spirochete bacterium *Borrelia burgdorferi*. This bacterium is primarily transmitted to humans through the bite of infected black-legged ticks, also known as deer ticks. Lyme disease is often referred to as "The Great Imitator" because its symptoms can mimic those of many other diseases, making it difficult to diagnose and treat.

Transmission of Lyme Disease

The primary way, but not the only way as we have already discussed in the previous chapter, that people become infected with Lyme disease is through the bite of an infected tick. These ticks are typically found in wooded and grassy areas and can be very small – about the size of a poppy seed. Because of their small size and painless bite, many people do not realize they have been bitten and may not seek treatment until symptoms develop.

Lyme disease has been found in every continent except Antarctica and is most prevalent in the United States, particularly on the East Coast, Midwest, and West Coast, and in Europe, particularly in north Spain, France, south Germany and all through the Alp regions towards the eastern Europe.

Symptoms and Diagnosis of Lyme Disease

Lyme disease can affect any organ in the body, including the brain, nervous system, muscles, and joints. Symptoms can vary widely from person to person and may include:

- Fatigue
- Joint and muscle pain
- Headaches
- Fever and chills
- Swollen lymph nodes
- Cognitive difficulties, such as memory problems and difficulty concentrating

Diagnosing Lyme disease can be challenging, as its symptoms often mimic those of other illnesses. In addition, standard laboratory tests for Lyme disease are not always accurate, leading to potential misdiagnoses.

Borrelia Spirochetes

Treatment of Lyme Disease

The treatment of Lyme disease typically involves the use of antibiotics, often in combination with other therapies, to address the various aspects of the infection.

Some of the treatments offered at the IAH Wellness clinic include:

- **Detoxification**: Removing toxins from the body is crucial to treating Lyme disease, as the spirochete bacteria can release harmful substances as they die off. IAH Wellness program focuses on detoxifying the body and supporting the liver and kidneys in their natural detoxification processes.
- **Immune system support**: A robust immune system is essential for fighting off Lyme disease and other infections. IAH Wellness program supports the immune system through targeted therapies, such as IV-therapy, nutritional support, natural supplements, and lifestyle modifications.
- **Hormonal health:** Lyme disease can affect various hormone-producing glands in the body, leading to imbalances that can exacerbate symptoms. IAH Wellness program addresses these imbalances through targeted treatments and therapies.
- **Treatment of co-infections:** In addition to Lyme disease, ticks can transmit other infections, such as Babesia, Bartonella, Anaplasmosis, Ehrlichia, STARI and Borrelia Miyamotoi. These co-infections can make Lyme disease more difficult to treat and may require additional therapies. You can read more about these co-infections in the next chapter.

By combining these various therapies, IAH Wellness aims to provide a comprehensive and personalized treatment plan for each patient, addressing the unique challenges of their Lyme disease journey.

LYME DISEASE CO-INFECTIONS

LYME DISEASE CO-INFECTIONS

In recent years, experts have identified new tick-borne co-infections capable of harming humans.

Lyme Disease Co-Infections

Lyme disease, caused by the bacterium *Borrelia burgdorferi*, is a well-known tick-borne illness transmitted through the bite of a black-legged (I. scapularis) tick.

However, what is less commonly known is that ticks can harbor multiple infectious pathogens, leading to the development of Lyme disease co-infections.

In recent years, health experts have identified several new tick-borne microbes capable of infecting humans.

This chapter article takes a closer look at these Lyme disease co-infections - including Babesia, Bartonella, Anaplasmosis, Ehrlichia, Southern Tick-Associated Rash Illness (STARI), and Borrelia miyamotoi - and delves into their symptoms, diagnosis, and treatment options.

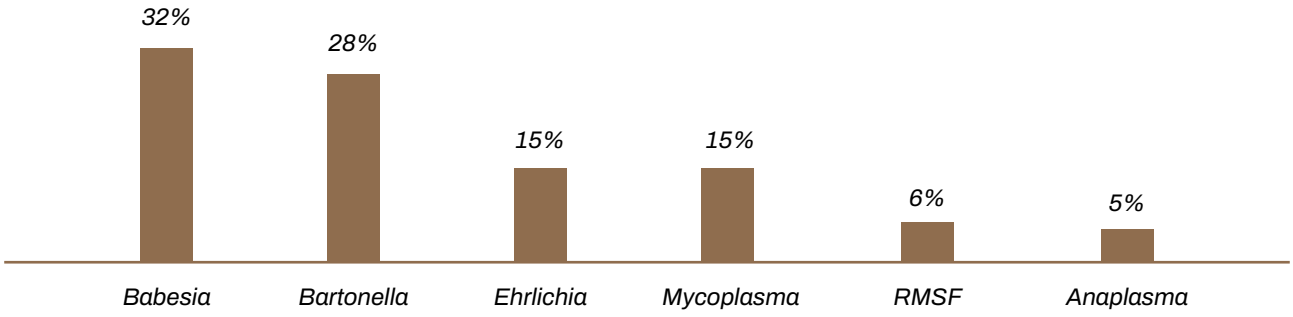
The Emergence of Lyme Disease Co-Infections

Since the discovery of Lyme disease in 1982 by Dr. Will Burgdorfer, researchers have identified numerous other tick-borne diseases that can be transmitted to humans through a tick bite or tainted blood transfusion.

A single tick can transmit multiple pathogens, including bacteria, viruses, and parasites. This has led to a rise in Lyme disease co-infections, with a single individual potentially suffering from multiple tickborne coinfections simultaneously.

Co-infections

The majority of patients with chronic Lime disease report at least one co-infection.
30% report two or more coinfections.



Prevalence of Co-Infections in Ticks

Studies have found that co-infections are not uncommon in ticks. For instance, a study in Suffolk County, Long Island, revealed that more than half (67%) of the ticks collected harbored at least one pathogen.

In Lyme-endemic areas of the United States, co-infection occurs in up to 28% of black-legged ticks. Among infected ticks collected in one study, 45% were co-infected and carried up to five different pathogens.

Lyme Disease with Co-Infections: A Complex Picture

Researchers from Columbia University, Tufts Medical Center, and Yale School of Medicine examined the extent of co-infections in patients diagnosed with Lyme disease. Their findings showed that:

- 40% of Lyme disease patients had concurrent Babesia
- 1 in 3 patients with Babesia had concurrent Anaplasmosis
- Two-thirds of patients with Babesiosis experienced concurrent Lyme disease, and one-third experienced concurrent Anaplasmosis.

These results highlight the complex nature of Lyme disease co-infections and the challenges healthcare professionals face in recognizing, diagnosing, and treating these conditions.

Recognizing and Treating Co-Infections

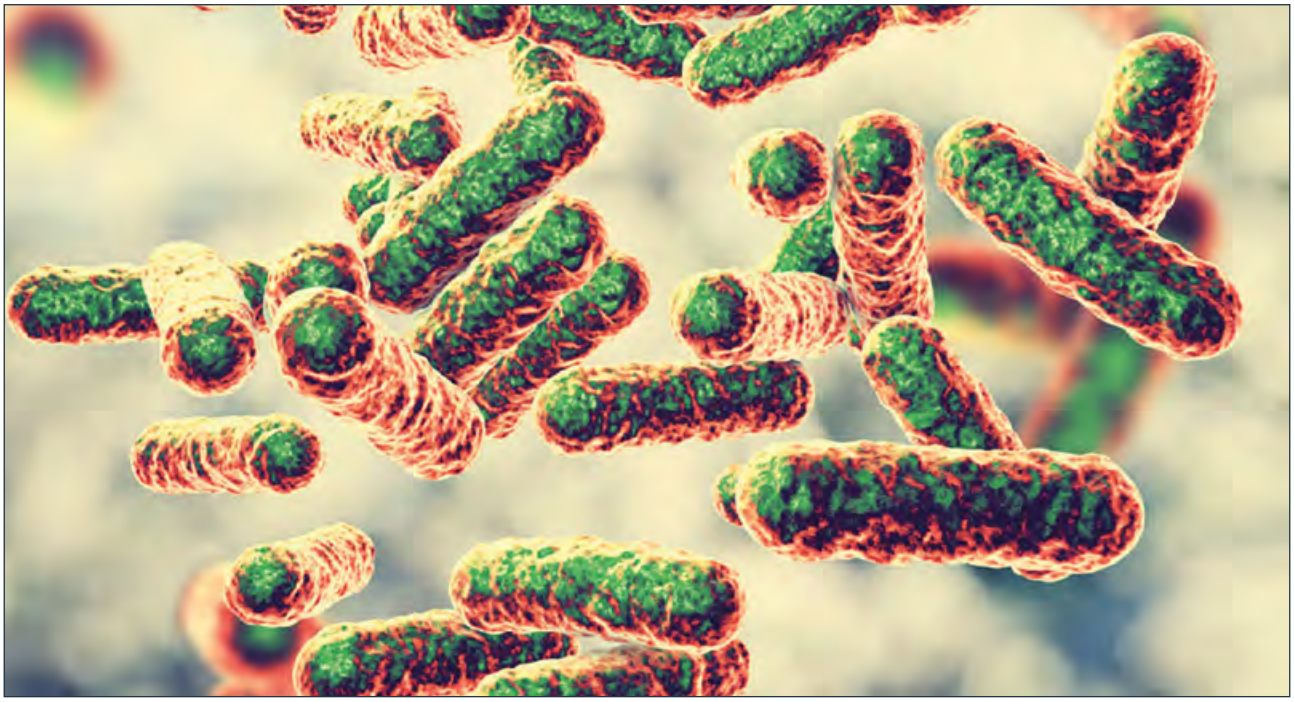
As tick populations continue to grow and expand into new geographic regions, there is increasing concern surrounding the medical community's ability to recognize, diagnose, and treat Lyme disease co-infections. One study found that nearly 1 in 4 black-legged ticks tested had multiple infections, emphasizing the need for a clinical approach that covers all infection possibilities.

Unfortunately, testing for co-infections is often overlooked. In a study of nearly 3 million specimens, only 17% were tested for non-Lyme tick-borne diseases. Accurate diagnosis is crucial since patients may require different treatments depending on the type of co-infection. For example, antibiotics prescribed for Lyme disease may be ineffective in treating parasitic or viral tick-borne diseases such as Babesia.

Most Common Lyme Disease Co-Infections

The most frequently diagnosed tick-borne co-infections include Babesia, Anaplasmosis, Ehrlichia, Bartonella, Southern Tick-Associated Rash Illness (STARI), and Borrelia miyamotoi. The following sections will provide an overview of each co-infection, including their symptoms, diagnosis, and treatment options.

Bartonella



Bartonellosis, the infection caused by the bacteria Bartonella, is possibly a more problematic human infection than Lyme disease. Like Lyme disease, Bartonella can be transmitted to humans through a tick bite. However, Bartonella can also be transmitted to humans by various other vectors. Historically, testing for Bartonellosis has been insensitive. Bartonella causes symptoms similar to Lyme disease but requires different treatment, so it is important to test for it properly. However, the biggest concern Bartonella poses over Lyme disease is most physicians are entirely unaware of this prevalent bacteria.

Cat scratch desease

Cat scratch disease is the most well-known disease caused by “Bartonella henselae”. Cat fleas carrying Bartonella bacteria defecate on cats, and the bacteria will survive in the feces on cats for many days. When cats scratch themselves, the bacteria from the feces get under their claws, then transmitted to humans through a scratch. Bartonella bacteria have been identified in cat saliva and can be transmitted by a cat bite.

Symptoms of Bartonella

Bartonella bacteria are transmitted to humans through a bite from a vector or a cat scratch. In lice, the transmission of Bartonella to humans occurs when lice feces enters a break in the skin when a person scratches their scalp.

Once in the bloodstream, the bacteria attach to the red blood cells. Bartonella possesses specific proteins, enzymes, and genes that allow the bacteria to invade red blood cells. Inside the cell, the bacteria replicate and then are released from cells, where they are transported to organs and tissues that are highly vascularized, such as the heart, liver, spleen, and blood vessels. In Bartonella Quintana, bacteria may be released from red blood cells every five days, causing a cyclical pattern of symptoms.

The severity of infection with Bartonella is determined by the virulence of the bacteria species, the bacterial load, and the health of the infected person's immune system. It is the host's immune response that determines the outcome of the infection.

Bartonella Contributes to Small Vessel Disease

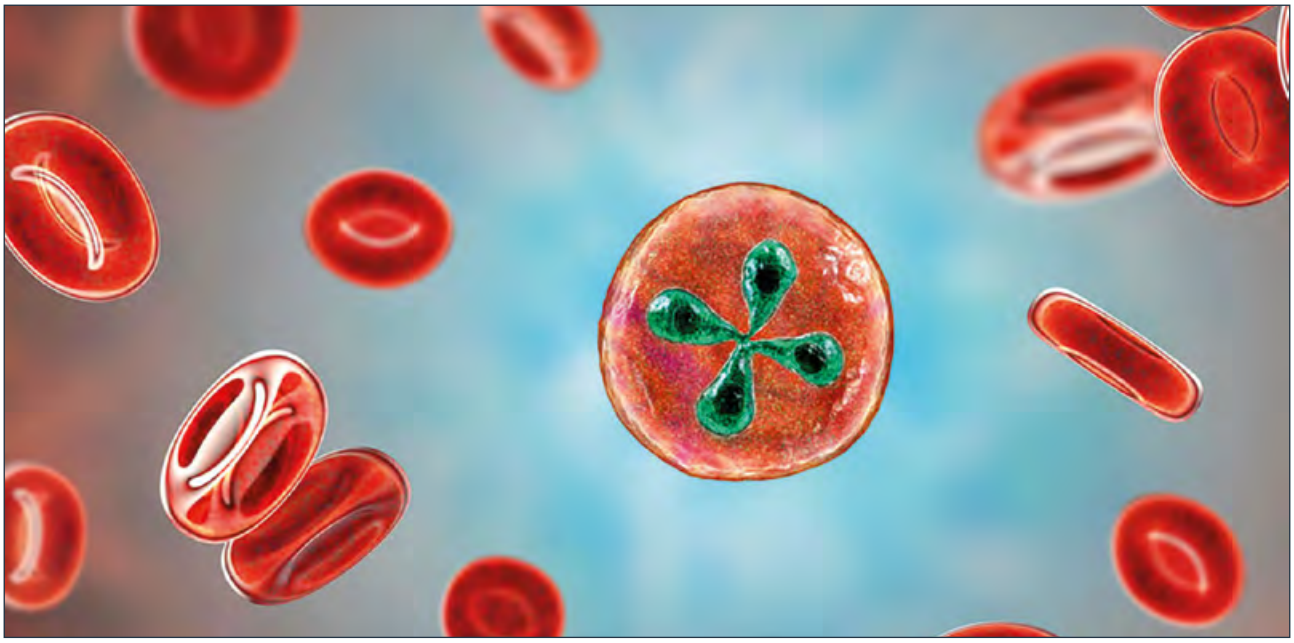
Bartonella prefers the cells that line blood vessels called endothelial cells. Bacteria inside of the vessel wall create inflammation and fibrin deposition, causing narrowing of the vessel where blood flows. Blood vessel constriction reduces blood flow and oxygen delivery to organs and tissues. Decreased oxygen causes tissue damage and leads to loss of function in cells contributing to symptoms. Tissue that receives blood from small vessels like capillaries is most at risk.

The central nervous system – especially the brain – is susceptible to decreased oxygen delivery. The brain's white matter does not have collateral circulation, so neurological symptoms manifest early in infection with Bartonella. Symptoms such as cognitive impairment, disconnection syndrome, poor executive function (decisions, planning), decreased working memory, delayed processing speed, and mood swings are associated with small vessel disease caused by Bartonella.

Symptoms of Bartonella

- **Neurological** – headaches, peripheral neuropathy (numbness, tingling in hands, feet), dysautonomia/POTS, tremors, seizures, vertigo, PANS/PANDAS, OCD, ALS
- **Psychological** – cognitive impairment, decreased processing speed, hallucinations, disconnection/dissociation, Schizophrenia, depression, anxiety, panic attacks, agitation, mood swings
- **Musculoskeletal** – pain in the soles of the feet, arthritis, rheumatoid arthritis, bone pain, joint hypermobility, muscle weakness, muscle twitching
- **Immune** – swollen lymph nodes, frequent sore throats, fevers (especially of unknown origin)
- **Blood** – anemia, low platelets (thrombocytopenia)
- **Visual** – blurred vision, retinitis
- **Skin** – stretch marks (especially horizontal on back and hips)
- **Abdominal** – enlarged liver and spleen (hepatosplenomegaly, pain under the ribcage), liver cysts
- **Cardiovascular** – endocarditis, palpitations
- **General** – fatigue, insomnia, nausea

Babesia



Babesia is a parasite that infects red blood cells. This parasitic infection is primarily transmitted by a tick bite but can also be acquired through a contaminated blood transfusion. There have been rare reports of congenital transmission of Babesiosis.

Symptoms of Babesia

Symptoms of Babesia typically include:

- Headaches
- Fatigue
- Fevers, night sweats
- Shortness of breath, air hunger, cough
- Anxiety, depression, emotional lability
- Nausea, vomiting, low appetite, abdominal pain
- Joint pain, muscle pain
- Vivid dreams
- Enlarged liver and spleen

Babesia and Lyme Disease

Babesia is often present with Lyme disease and can increase the severity of Lyme disease symptoms. Patients co-infected with Lyme disease and Babesia, may experience more severe fatigue, headache, sweats, chills, anorexia, emotional lability, nausea, conjunctivitis, and splenomegaly compared to those with Lyme disease alone. Babesia can also increase

the duration of illness with Lyme disease, with 50% of co-infected patients being symptomatic for three months or longer, compared to only 4% of patients with Lyme disease alone.

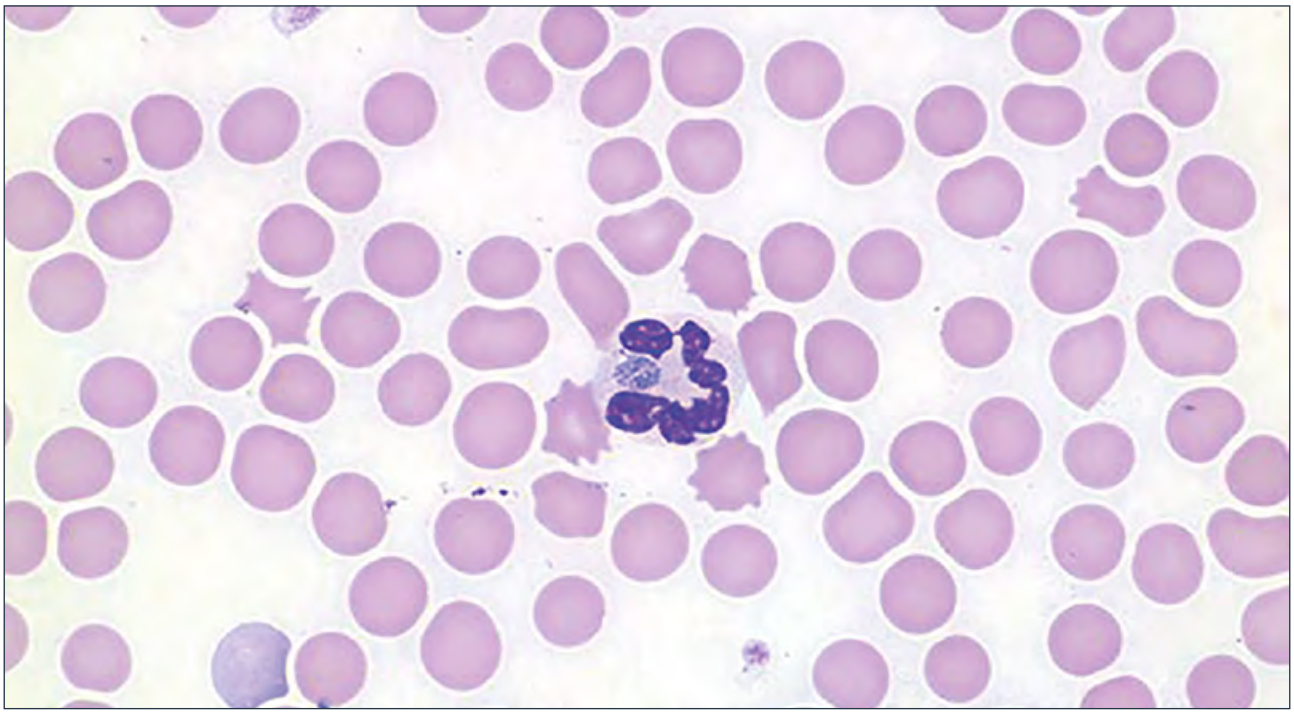
Testing for Babesia

Current testing for Babesia can be unreliable, with the parasite detected microscopically in as few as one-third of patients. Specific amplifiable DNA and IgM antibody tests are more likely to be positive, but the reliability of these tests in practice remains to be determined.

If someone is experiencing chronic fevers, sweats, chills, fatigue, headaches, and shortness of breath, Babesia testing should be performed. General laboratory tests may detect anemia, low platelets, and elevated liver enzymes.

The traditional test performed to diagnose Babesia is looking at a blood smear (commonly a **Giemsa stain**) under a microscope. This test can be useful in the first couple of weeks of infection when Babesia parasite levels are high in the blood. However, as the infection persists, this test is not sensitive.

Anaplasma

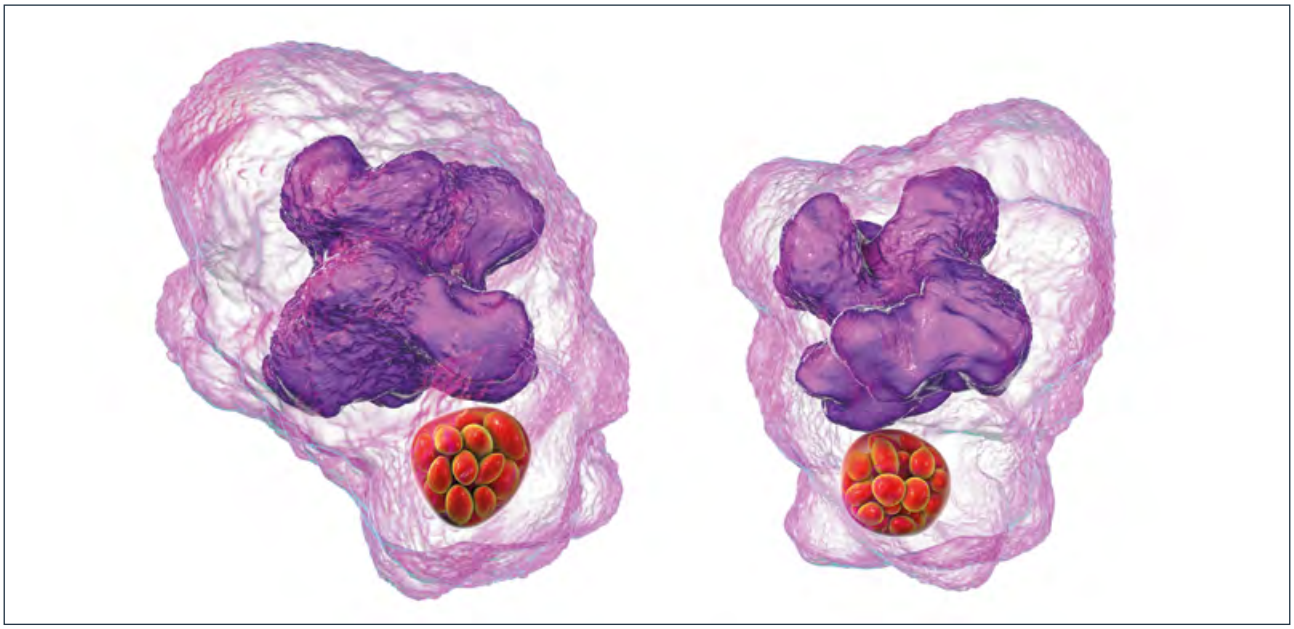


Anaplasmosis, previously known as Human Granulocytic Ehrlichiosis, is caused by the bacteria *Anaplasma phagocytophilum*. It can be difficult to distinguish from Ehrlichiosis, Lyme disease, and other tick-borne illnesses. This emerging infectious disease remains under-recognized in many areas of the United States and Europe.

Symptoms of Anaplasmosis

Symptoms of Anaplasmosis may include headaches, fevers, chills, malaise, and muscle aches. There have been a few reported cases describing pulmonary complications, leading some researchers to recommend including anaplasmosis in the differential diagnosis for atypical respiratory presentations. Although uncommon, there have been patients with anaplasmosis who did not exhibit any symptoms (asymptomatic), making it crucial for clinicians to be aware of potential asymptomatic anaplasmosis following a tick bite.

Ehrlichia



Ehrlichia is a tick-borne bacteria that infects white blood cells, but it has been found in spleen, lymph node, and kidney tissue samples. An infection with Ehrlichia can lead to Ehrlichiosis, which is caused by *Ehrlichia chaffeensis* and *Ehrlichia chagrins*. The bacteria are transmitted by the Lone Star tick (*Amblyomma americanum*) and the black-legged tick (*Ixodes scapularis*).

Symptoms

Signs and symptoms of ehrlichiosis usually begin within 1-2 weeks after the bite of an infected tick. Early signs and symptoms (within the first 5 days of illness) include:

- Severe headache
- Fever and chills
- Muscle aches
- Nausea, vomiting, diarrhea, loss of appetite
- Confusion
- Rash (more common in children)

Late stage symptoms can result from delayed treatment and include:

- Damage to the brain or nervous system (e.g. meningoencephalitis, or inflammation of the brain and surrounding tissue)
- Respiratory failure
- Uncontrolled bleeding
- Organ failure
- Death

Rickettsia

Rickettsia is a similar type of bacteria to both Anaplasma as to Ehrlichia which can cause tick-borne diseases in humans. What makes these thre bacterias different from more common coinfections like Bartonella and Babesia is that they have a greater chance of contributing to severe, life-threatening symptoms.

The diseases resulting from Rickettsia is called rickettsioses. The most common Ricketsial disease is Rocky Mountain spotted fever (RMSF), caused by the bacteria *Rickettsia rickettsii.* It targets small blood vessels in the body, where it has the potential to be deadly. RMSF isn't transmitted by the same tick that carries Lyme disease, but a person with Lyme could also acquire RMSF at some point and vice versa.

Symptoms of RMSF

Infections from Rickettsia bacteria have unique features, and they tend to progress rapidly through the body. The illnesses exist on a spectrum, meaning some people may experience a greater degree of symptoms than others. Generally, symptoms of RMSF shows up in 2-4 days as a rash.

RMSF may be mild or severe but has a high chance of resulting in dangerous vascular complications.

Hallmark symptoms of RMSF include:

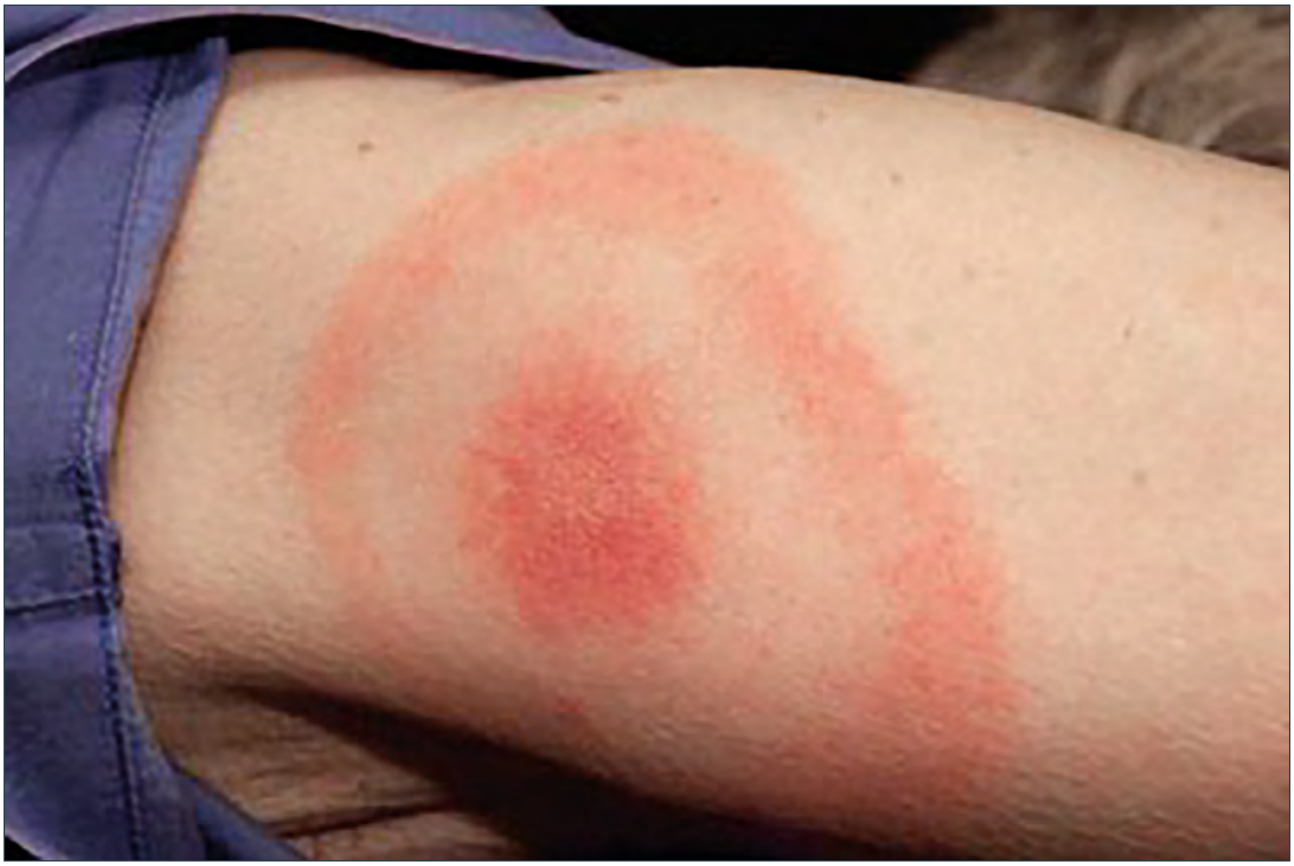
- High fever
- Intense headache
- Chills
- Fatigue
- Muscle aches and pains
- Pink, red, or purple rash on wrists, forearms, ankles, the trunk of the body, and the soles of the feet (A rash is most likely to occur with RMSF, but a similar one can also develop with Ehrlichia.)
- Vasculitis

Other symptoms that can accompany the infections are:

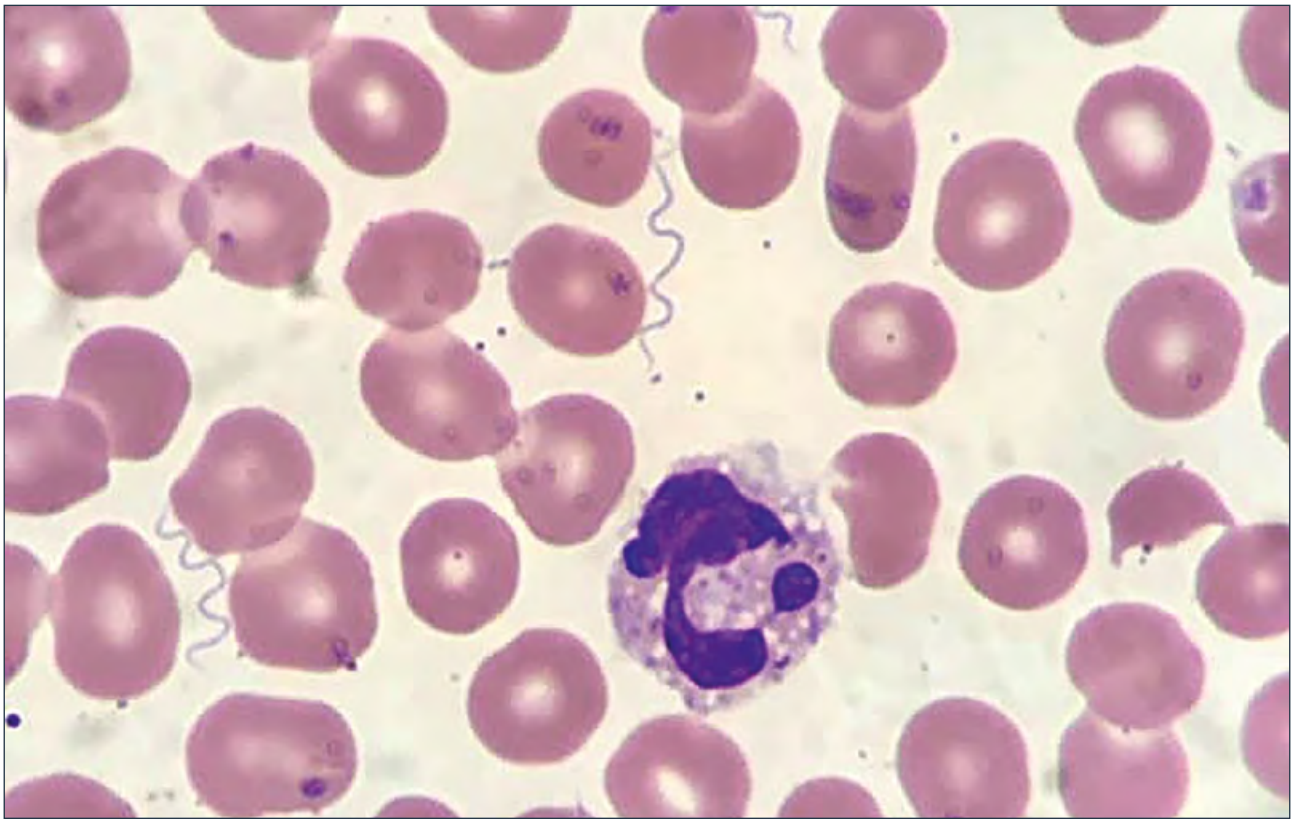
- Flu-like illness
- Joint pain
- Disorientation
- Stomach aches
- Nausea and vomiting
- Weight loss
- Respiratory distress
- Low white blood cell count
- Anemia
- Increased liver enzymes
- Kidney failure

Southern Tick-Associated Rash Illness (STARI)

STARI is an emerging tick-borne illness related to Lyme disease and identified in the south-eastern and south-central United States. It is believed to be transmitted by the Lone Star tick, but this has not been officially confirmed. The hallmark sign of STARI is an EM-like rash similar to that seen in Lyme disease. Symptoms may include fevers, headaches, stiff neck, joint pain, and fatigue. The long-term consequences and treatment of STARI have not been established. However, because STARI resembles early Lyme disease, physicians often treat patients with oral antibiotics.



Borrelia Miyamotoi



Borrelia miyamotoi (BMD) is a spiral-shaped bacteria that causes tick-borne relapsing fevers. It is increasingly being recognized as an agent of a nonspecific febrile illness often misdiagnosed as acute Lyme disease without rash or Ehrlichiosis. BMD is a common infection in areas endemic for Lyme disease.

Symptoms and Prevalence of Borrelia miyamotoi

Symptoms of BMD generally include systemic signs such as headache and fever. Most patients present with fever, fatigue, and headache. Other symptoms may include myalgia, chills, nausea, and arthralgia. BMD is particularly concerning given that the bacterium can be transmitted to a person within the first 24 hours of tick attachment. The prevalence of BMD is unknown, but studies in New England suggest it may be as common as anaplasmosis and babesiosis.

Testing for Borrelia miyamotoi

Diagnostic testing for BMD is limited, with blood smears having poor sensitivity for confirming the disease. The CDC recommends using PCR and antibody-based tests, but the reliability of these tests remains to be determined.

Fibromyalgia and Lyme

Lyme disease and fibromyalgia are closely related and their symptoms often overlap. Lyme is the world's first vector-borne disease and mimics common conditions such as the aforementioned fibromyalgia (FM), chronic fatigue syndrome (myalgic encephalomyelitis), some autoimmune diseases such as rheumatoid arthritis and multiple sclerosis, as well as psychiatric illnesses such as depression and anxiety. Since blood tests to arrive at a diagnosis of Lyme disease have so far proven to be unreliable, it is suspected that a high percentage of those diagnosed with fibromyalgia are cases of Lyme disease. Lyme and tick-borne infections are often one of the underlying causes of the problem.

In medicine, it is essential to get to the root cause of the symptoms. In addition to an infection with Borrelia burgdorferi, the Lyme disease agent that can cause fibromyalgia, it is found that patients often have multifactorial causes of their illness.

Currently, ticks carry multiple bacterial, viral and parasitic infections that can be transmitted simultaneously. Among these is Borrelia Burgdorferi, the agent of Lyme disease. Patients infected with Lyme disease and associated co-infections are much more resistant to standard therapies. This is one of the infections that can cause chronic fatigue and musculoskeletal pain.

The early stages of Lyme disease can be very difficult to diagnose, even with a blood test. In addition to physical examination findings, most physicians rely on environmental factors, such as tick exposure and the patient's medical history. It should not be forgotten that some of the symptoms of fibromyalgia overlap with those of Lyme disease, especially muscle pain and fatigue.

Lyme disease can affect the **hypothalamic-pituitary-adrenal axis** in two ways: through neurotoxins and epigenetic changes. Imbalances in this axis can lead to chronic fatigue syndrome, depression, insomnia and widespread pain, which is related to fibromyalgia. There appears to be a strong link between Lyme disease, its co-infections and fibromyalgia.

Lyme disease involves a multitude of infections that can also include other complications such as **heavy metal and chemical toxicity**. If you really want to atomize Lyme disease and its co-infections, it is ideal to have a combination of **advanced immunotherapy, aggressive natural antiviral, antifungals, IV antibiotics and biodetoxification**. When all of these are provided by the properly trained integrative physician in a personalized treatment plan, these therapies will help bring the patient back to optimal health.

80% of fibromyalgia is Lyme disease.

Most often, 80% of fibromyalgia cases are actually Lyme disease, which is not fibromyalgia as such, but the manifestation of a mosquito or tick bite disease due to borrelia burgdorferi infection. A symptomatic treatment will not solve the problem.

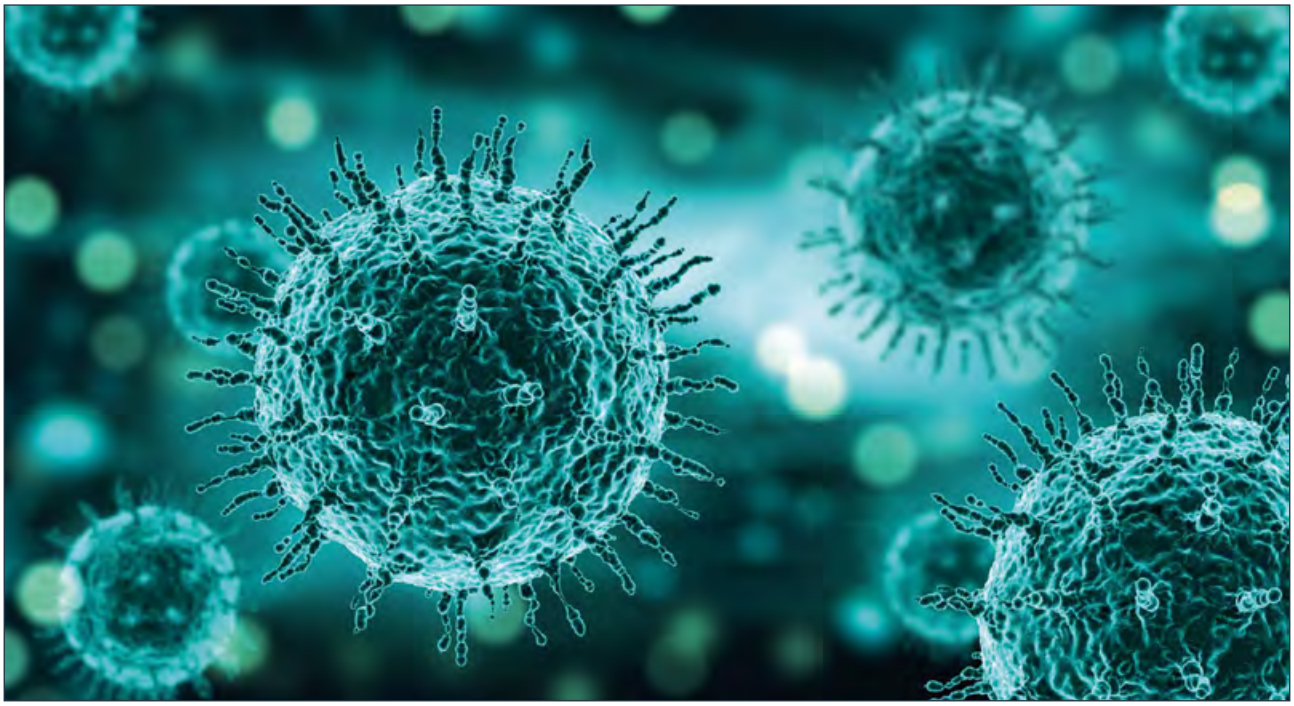
At IAH Wellness we try to discern whether the patient is suffering from Lyme disease, which manifests itself with symptoms similar to what is now known as fibromyalgia and is characterized by very specific pain at the muscle level. The scientific community has localized the points where these pains occur, but has not found the cause of the pains.

The necessary treatment will be the one applied by IAH Wellness for Lyme disease, since apart from specific treatments for pain, it is necessary to look for the cause. When fibromyalgia is compounded by fatigue, we speak of chronic fatigue syndrome, and many of these cases also find their origin in Lyme disease. Our Lyme treatment will be indicated in these cases.

The biggest difficulty is that being an infection, everything that is acidification of the body and tissues, ie, everything that produce anti-inflammatory, will increase or maintain the infection, ie, fibromyalgia or chronic fatigue syndrome will not be cured until they are not treated with an anti-infectious and personalized treatment.

There is undoubtedly a relationship between Lyme disease and fibromyalgia. It is absolutely advisable to rule out the first disease if you have symptoms or even diagnosis of the second. At IAH Wellness we offer the possibility to have this information and to approach an effective treatment against Lyme disease.

What is Epstein-Barr Virus?



Epstein-Barr Virus (EBV) is one of the most common viruses. It's a member of the herpes group of viruses including HSV 1 and 2, Varicella zoster virus (shingles, chicken pox), Cytomegalovirus (CMV) and Pseudorabies virus.

A common factor of these viruses is their stress on the immune system, and their ability to remain dormant in the body for life even after the initial infection.

Epstein Barr Virus Infection

Infection with Epstein Barr is inevitable in humans. Estimates are that 95% or more of the population carry antibodies to the Epstein-Barr virus. Those infected with EBV during adolescence or young adulthood may develop infectious mononucleosis (mono). Although symptoms of mono usually clear up after a couple of months, EBV will remain dormant in the body for the rest of a person's life.

Epstein-Barr virus is normally spread through saliva and other bodily fluids. During pregnancy, the virus can be transmitted to the unborn baby. It can be spread unknowingly by daycare workers, teachers, grandmas, and college students.

Epstein Barr is a key player in autoimmune disease and chronic illness. It is a contagious, highly infectious, opportunistic disease allowed by a weak immune system; it can be contracted from an infected carrier, overuse, and abuse drugs and/or alcohol.

Periodic reactivation of Epstein Barr may occur but usually doesn't cause symptoms or illness in healthy individuals with strong immune function. But, if you're experiencing a vast amount of stress, or you're pregnant, or have a weakened immune system, EBV and other viruses such as cytomegalovirus (CMV) can become problematic. CMV is spread by direct contact of body fluids, such as saliva, blood, urine, semen, vaginal fluids, and breast milk. CMV is the most common virus transmitted from a pregnant woman to her unborn child.

Most people have been exposed to Epstein Barr by age 40. Many people don't realize they have been infected because they never feel sick.

But, in those with compromised immune function, reactivation of a dormant EBV infection tends to create more severe problems such as chronic fatigue syndrome, fibromyalgia, MS, thyroid disorders, mitochondrial damage, Lyme, schizophrenia, pleurisy, development of autoimmune diseases, cancer and increased risk of Hodgkin's disease.

Epstein Barr Virus and Autoimmune Disease

Gut dysbiosis, underlying infections (both viral and bacterial), leaky gut, nutrient deficiencies, food sensitivities, and toxin overload are major factors in autoimmunity.

People with autoimmune conditions have an elevated microbial load, disrupted microbiome, mitochondrial dysfunction from toxin exposures, and nutritional deficiencies. As the pieces to the autoimmune puzzle are identified, the root causes can be addressed systematically by peeling away the layers of the onion and building a strong foundation through diet, nutrition, toxic exposure elimination, lifestyle, and environmental interventions.

A viral protein found in EBV-infected human cells may activate genes associated with an increased risk for autoimmunity. The Epstein Barr Virus attacks the pancreas's beta cells, leading to type 1 diabetes and other autoimmune conditions.

Studies have shown high viral loads of active EBV in a high percentage of patients with a variety of autoimmune diseases, including rheumatoid arthritis, lupus, Sjögren's, type 1 diabetes, autoimmune hepatitis, MS, autoimmune thyroiditis (Hashimoto's and Grave's), inflammatory bowel diseases (Crohn's and ulcerative colitis), and other chronic autoimmune diseases.

A longitudinal study determined that the strongest known risk factor for multiple sclerosis is infection with EBV. Compared with healthy controls, the hazard of developing MS is approximately **15 times higher among individuals infected with EBV** in childhood and about 30 times higher among those infected with EBV in adolescence or later in life.

Recognizing Epstein-Barr Virus Symptoms

While many individuals who contract EBV may not experience any noticeable symptoms, those who do can suffer from a range of health issues. It is essential to be aware of the common Epstein-Barr Virus symptoms to identify and address the infection promptly.

Typical EBV Symptoms

Epstein-Barr Virus symptoms can vary significantly from person to person. However, some of the most common symptoms include:

- Fatigue
- Loss of appetite
- Fever
- Sore throat
- Swollen glands
- Skin rash
- Swollen liver and spleen

It is important to note that EBV symptoms can be more severe in teenagers and adults compared to children. Symptoms usually manifest around four to six weeks after infection and can last anywhere from two to four weeks. In some cases, fatigue may linger for weeks or even months after the initial recovery.

Chronic Active Epstein-Barr Virus (CAEBV)

In rare instances, some individuals may develop chronic active Epstein-Barr Virus infection. This progressive disease begins as a primary EBV infection and results in the overproduction of lymphocytes for more than six months. CAEBV is most likely to affect those with weakened immune systems and can lead to ongoing symptoms, such as:

- Persistent fatigue
- Fever
- Swollen glands
- Liver and spleen enlargement

Although fatigue is a common symptom of CAEBV, no definitive link has been established between EBV and chronic fatigue syndrome.

Understanding Epstein-Barr Virus Causes and Risk Factors

While the primary mode of transmission for EBV is through saliva, it is essential to understand the various ways the virus can spread to better protect oneself from infection.

How EBV Spreads

The Epstein-Barr Virus can be transmitted between individuals through the following means:

- Kissing someone infected with EBV
- Sharing drinks or utensils with an infected person
- Using a toothbrush of an infected individual
- Contact with infected blood or semen during sexual activity
- Blood transfusions
- Organ transplants

Certain factors can increase an individual's risk of contracting EBV and developing mono. These risk factors include:

- Having a weakened or suppressed immune system due to existing health conditions, autoimmune disease, HIV, or taking certain medications
- Being female, as women tend to experience mono more often
- Living in close quarters with many other people, such as college/university dorms or military barracks
- Having a family history of EBV infection
- Being sexually active, particularly with multiple partners
- Living in a tropical country, where EBV appears to spread more easily

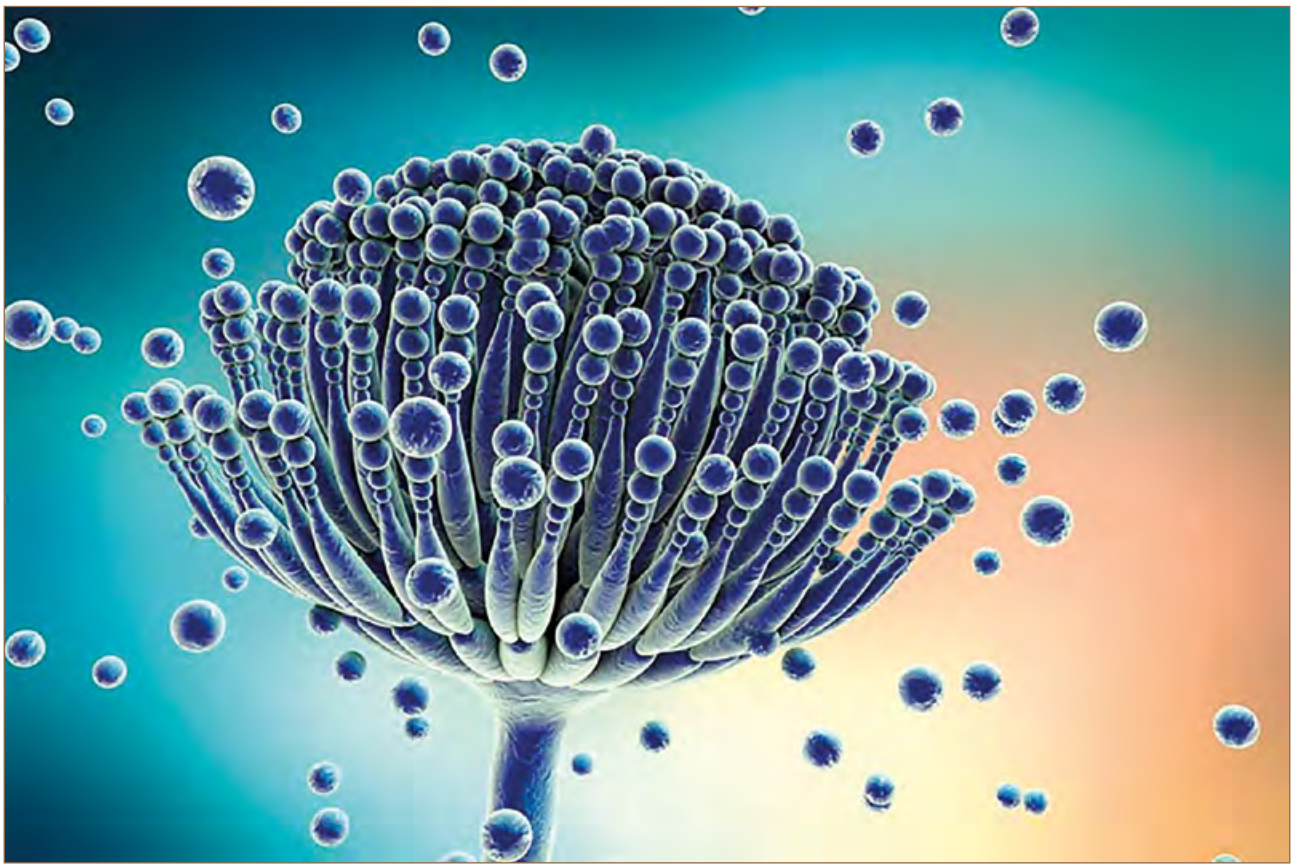
What Are Mycotoxins?

Mycotoxins are substances produced naturally by a type of fungi called molds. Molds are filamentous and grow from fungal spores that settle on any warm, moist surface. If the surface is rich in the organic products of decaying matter, molds grow as saprophytes, but if on the surface of living organisms, as parasites.

Mycotoxins are not parasites but rather chemicals that molds produce after nutrient uptake. Molds produce mycotoxins in quantities unsafe for livestock or human exposure. Contact with mycotoxins may carry the risk of harm (myotoxicity) depending on whether the mycotoxin's toxicity threshold is reached.

Each mycotoxin has its harm threshold defined by pharmacokinetic conditions and factored into public health regulations. The threshold of harm specified for food security differs between humans and livestock.

Mycotoxins enter the body through food or drinks, where they cause acute poisoning, immune suppression, cancer, or damage to organs such as the gut, lungs, kidneys, and liver. Among several diseases, liver cancer has been closely associated with the ingestion of aflatoxin, one of more than five hundred known mycotoxins.



Types of Mycotoxins

Mycotoxins are produced by just over 360 species of mold, mostly belonging to the type of Aspergillus, Fusarium, and Penicillium. Mycotoxin product happens fast, and it does not take long to spread. They have a low molecular weight and are most often thermo-stable in non-aqueous medium, and therefore difficult to degrade. In most cases, they can survive in food even after mold elimination.

There are several hundred types of mycotoxins, but the most harmful ones with toxic effects on our health are Aflatoxins, Ochratoxin A, Patulin, Fumonisins, Zearalenone, and Nivalenol. They appear in the food chain because of the contamination of crops by molds, these toxins can also contaminate human beings by air. Even if they are mostly known for long-term harmful effects, such as immune deficiency or cancer, mycotoxins can also expose to immediate complications such as acute intoxication.

Where are Mycotoxins Found?

According to the World Health Organization, mycotoxins are toxic compounds naturally produced by certain types of molds (fungi). They grow on either on the floor or walls in a humid and confined environment or on some foods. Mold growth can occur before or after harvest, during storage, on or in the food itself, often in a hot, humid and moist environment.

Mycotoxin Testing and Detection

Exposure to mycotoxins is a serious issue that many people do not realize impacts their health until it is too late. If you find mold growth or suspect you may have mycotoxins in your body it is important to get tested and begin treatment as soon as possible. Mycotoxin poisoning and illness looks different in everyone and looks similar to other conditions like chronic fatigue syndrome.

Chart my Lyme

Following chart is a general overview of the symptoms caused by Lyme and the Lyme co-infections. It is not to be used for self-diagnosing. A person infected by Lyme and/or any of the co-infections can suffer both less or more symptoms. We are still learning on a daily basis the depths and secrets of this complex disease and how it affect each individual differently.

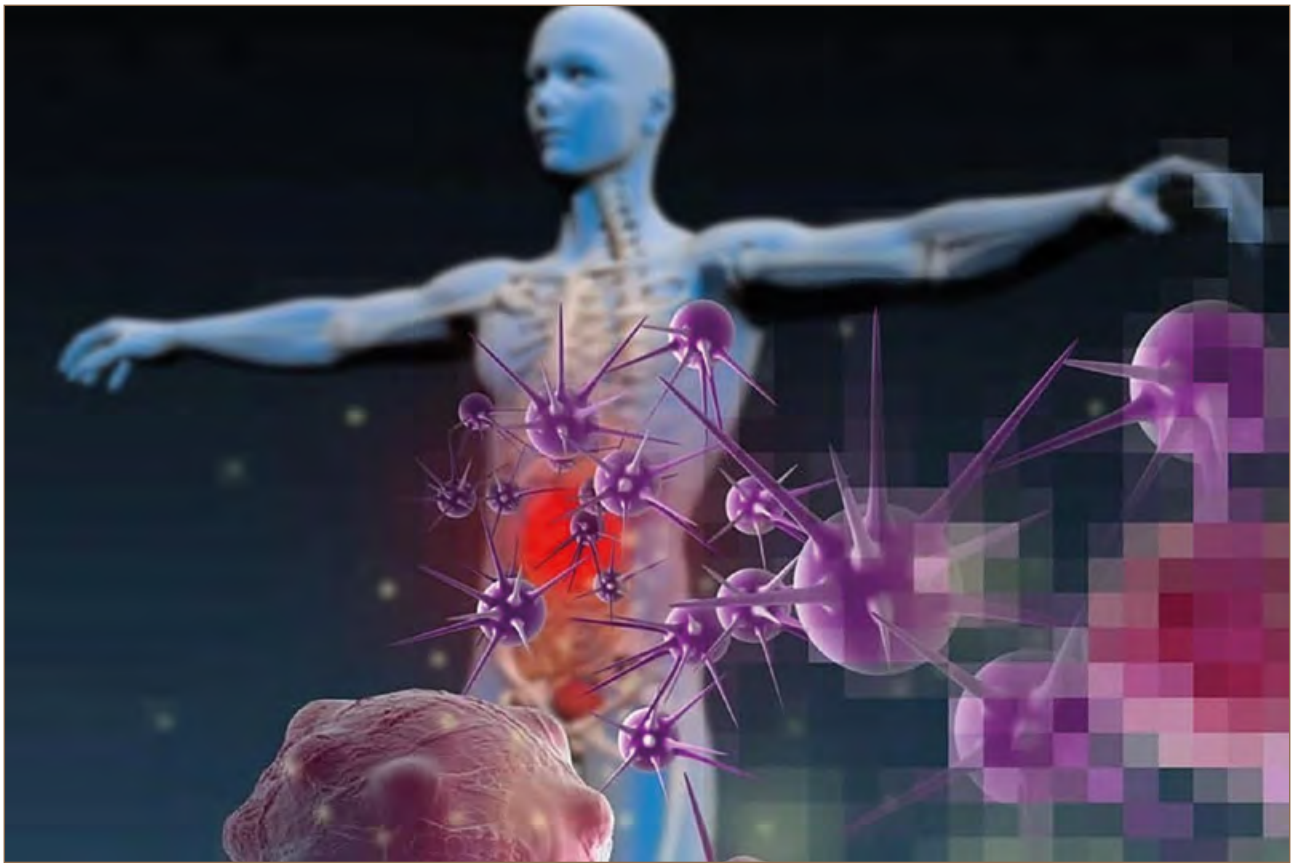
Disease	Borrelia	Bartonella	Babesia	Anaplasmosis	Ehrlichia	BMD	EBV	Mycotoxin	STARI	Rickettsia
Symptoms	*Bacteria*	*Bacteria*	*Parasite*	*Bacteria*	*Bacteria*	*Bacteria*	*Virus*	*Fungi*	*Bacteria*	*Bacteria*
Erythema Migrans	X				X		X		X	X
Severe Headache	X	X	X	X	X	X			X	X
Neck Stifness	X								X	
Joint Pain (Hypermobility)	X	X							X	
Muscle Pain	X			X						
Dizziness	X									
Shortness of Breath	X		X							
Hypoglycemia			X							
Blurred Vision		X								
Nerve Pain / Numbness	X									
Tingling Pain	X	X								
Shooting Pain	X									
Memory Loss	X									
Swelling	X									
Fatigue	X	X	X	X	X	X	X	X	X	X
Fever	X		X	X	X	X	X		X	X
Chills	X			X	X	X				X
Swollen Glands							X			
Stiffness	X									
Facial palsy	X									
Muscle Aches	X			X	X					X
Vertigo	X									
Nausea	X	X		X	X	x				X
Cough	X		X							
Soreness	X			X						X
Depression	X		X							
Anxiety	X		X							
Stress	X									
Cognitive Impairment	X									
Arthritis	X	X								
Arthralgia		X				X				
Insomnia	X	X								
Bell's Palsy	X									
Vision Loss	X	X								

Hearing Impairment	X									
Swollen Lymph Nodes		X								
Stretchmarks		X								
Tingling in Hands/Feet										
POTS		X								
PANS/PANDAS		X								
Panic Attacks										
Sore Throat		X					X			
Hepatosplenomegaly (Pain under ribcage)		X	X	X	X		X			X
Endocarditis		X								
Palpitations		X								
Vomiting				X	X					X
Malaise				X						
Diarrhea					X					
Appetite Loss				X	X		X			X
Encephalitis		X								
Meningoencephalitis					X					
Respiratory Failure				X	X					X
Uncontroled Bleeding					X					
Myalgia		X			X					
SIBO*	X									
Gut Dysbiosis*	X									
Leaky Gut*	X									
Low Stomach Acid*	X									
Candida Overgrowth*	X									
IBS*	X									
Neurotoxity*	X									
Chronic Inflamation	X									
Anemea		X								
Vasculitis										X
Joint Pain				X	X					X
Dissorientation				X	X					X
Stomach Ache				X	X					X
Weight Loss				X	X					X
Low white blood cell count				X	X					X
Anemia				X	X					X
Kidney failure				X	X					X

**Repercussions of prolonged antibiotic use.*

TREATMENTS

IPT (Insulin Potentiated Therapy)



The key element in IPT is the **insulin**.

This autologous hormone is produced in the pancreas and serves to transport nutrients from the blood into the cells. Insulin is thus **the door opener** which renders the cell membranes (the outer mantle of the cells) permeable. If insufficient insulin is present, the supply of nutrients cannot take place, so healthy cells also soon suffer from lack of nutrients, as is the case with diabetes, for example.

Since insulin is the general door opener for cells, it follows that this hormone can be used to introduce not only nutrients, but also other carefully chosen, precisely measured substances, such as medication, into the cells as well.

Insulin Potentiated Therapy exploits the “door opening” function of insulin in the cell membranes, allowing the necessary substances to be introduced into the organism in much lower doses than in conventional therapies.

Insulin Potentiated Therapy for borreliosis and other diseases

IPT is primarily used as a gentle form of chemotherapy to combat cancer.

But IPT can also be of great benefit with other diseases which until now have proven intransigent and difficult to treat.

Borreliosis (also called Lyme borreliosis or by other names in subcategories thereof) is a multisystemic infectious disease which can attack any organ, the human nervous system, the joints and various tissues.

This awkward, often difficult to diagnose disease is transmitted in our latitudes almost exclusively by a type of tick known as the deer tick (in rare cases also by mosquitoes or horseflies). Infections with the disease usually entail other complaints as well, which must be identified. Because only a large number of possible "pathogens" is capable of compromising the individual immune system to the point of outbreak of the disease.

Once borreliosis does break out, the patient experiences many symptoms and complaints, such as chronic headaches, permanent exhaustion, heart disorders and polyneuropathies, even including signs of paralysis.

The standard treatment for borreliosis usually involves antibiotics. But as with classic chemotherapies for treating cancer, conventional antibiotic therapy is administered over the course of months and results in an enormously diverse range of negative side effects, which weaken the patient further. Consequently, the negative effects of conventional therapy often outweigh the desired positive effects.

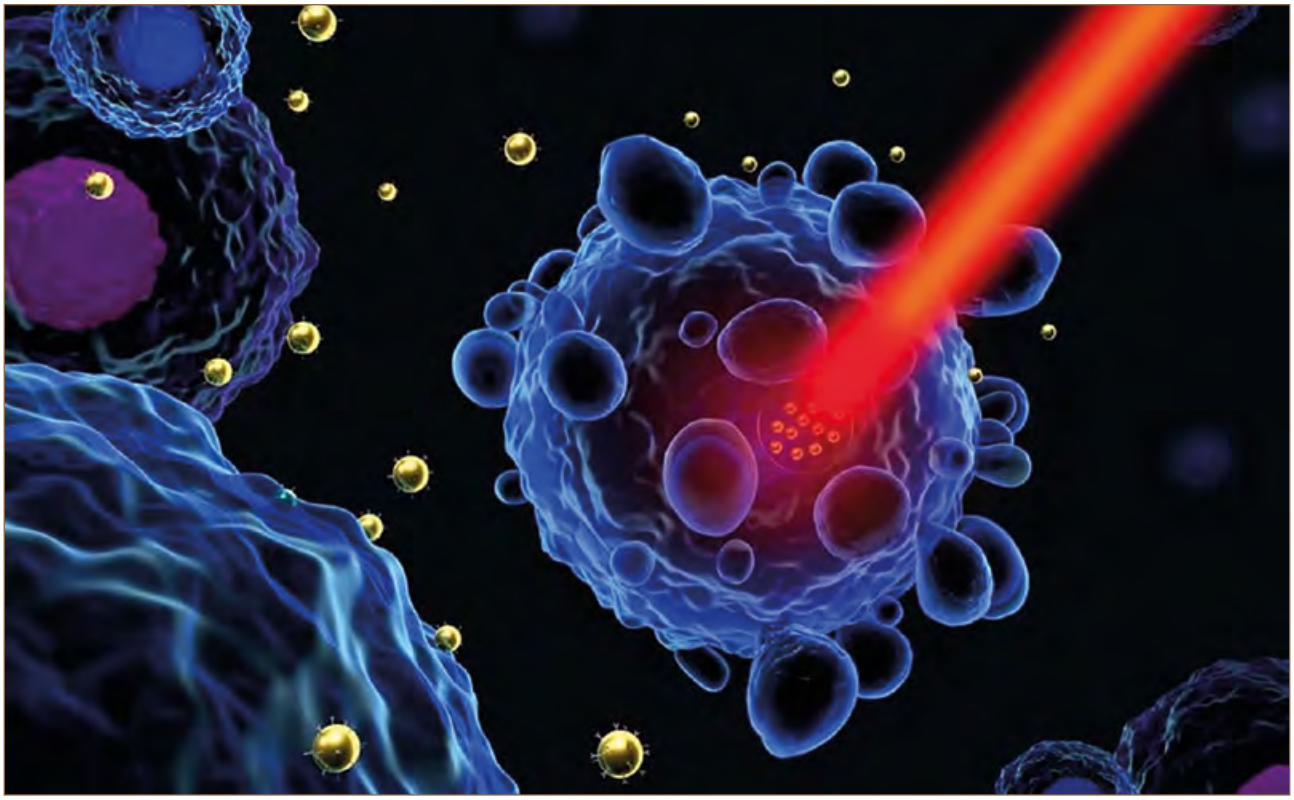
Here too, insulin helps to "smuggle" carefully selected antibiotics into the interior of the cells, so that only a fraction of the conventional doses is required. This is where the Borrelia bacteria "hide", out of reach of conventionally delivered antibiotics.

The same applies to diseases which are caused by a **chronic infection**. These include the diseases of the rheumatoid type, such as c chronic arthroses and arthritises. Many bacteria and viruses are unreachable with the therapeutic procedures known today, so they also cannot be eliminated.

On the other hand, IPT offers a way to locate, target, attack and/or neutralise these pathogens inside the cells, by using insulin as a kind of "Trojan horse".

IAH Wellness has used IPT successfully for a long time. We have undergone careful, thorough training in the application of IPT internationally, and accordingly we possess the necessary experience and certainty to be able to personalise IPT for use with individual patients to the best effect.

Total body hyperthermia in cases of chronic borreliosis



Total body hyperthermia in cases of borreliosis – deadly heat for the Borrelia bacterium.

Treating borreliosis – Total body hyperthermia

According to a study carried out by the Max-Planck Institute, Borreliosis bacteria die off above a temperature of 41.6 °Celsius. Evidence of the thermolability of the bacteria was reported in a Scandinavian study as early as 1996, which also revealed that **all Borrelia strains died off at 41.6 °C.**

We take advantage of this knowledge with total body hyperthermia therapy, in which the patient lies on a bed inside a tent and is exposed to a temperature between 41.6 and 41.8 °C, always under the closest medical supervision. At the same time, this elevated temperature also activates the body's own macrophages (scavenger and killer cells), which can then eliminate the bacteria. This method has to be applied variuos times.

At IAH Wellness, we offer you this method as the cornerstone of a holistic procedure, because we eliminate the neurotoxins produced by the Borrelia bacteria in a special detoxification programme.

Total body hyperthermia is also ideally suitable for combining with **insulin-potentiated therapy (IPT)**.

The benefits of Hydrogen Gas

Hydrogen is a Selective Anti-oxidant: It only neutralizes the most cyto-toxic (cell destroying) free radicals such as the hydroxyl radical (OH), turning it into cellular water. Molecular Hydrogen has no effect on other, required, free radicals, such as Nitric Oxide and Hydrogen Peroxide which are very important to the body and immune system.

Hydrogen is able to freely enter the cells and mitochondria, even reaching the cell nucleus. Hydrogen neutralizes hydroxyl radicals and scavenges peroxynitrite, converting them to water. These free radicals are known for causing arthritis and arthralgia.

No toxic byproduct vs. other anti-oxidants. Water is created as the reaction by-product, with nothing else for the body to eliminate.

To summarize, Molecular Hydrogen is

- Highly Bio-available
- Selective in its action
- No by-products to eliminate
- Helps maintain the body's natural anti-oxidants – the Hydrogen does the work, so the body can concentrate on other battles

Use of Molecular Hydrogen allows greater natural levels of:

- Glutathione
- Superoxide Dismutase (SOD)
- Catalase
- Ghrelin*

Anti-oxidant supplements can perturb redox homeostasis – which is a fancy way of saying you're throwing the body's cellular mechanisms and cycles out of balance. Synthetic "Vitamin C" (Ascorbic Acid) is a chemical that reacts indiscriminately in the body and causes harm, while it is doing some good. Hydrogen **NEVER** causes harm to any cell in the body, as it is selective and only scavenges the most toxic free radicals, leaving the body's important natural balance intact.

Hydrogen up-regulates good cell activity and down-regulates bad cell activity – but never to the point of upsetting cell homeostasis. It also regulates apoptosis (programmed cell death). Hydrogen improves cellular communication.

Hydrogen provides a "cell modulating property" to the body, to help prevent the formation of free radicals in the first place. It "fixes" the cell and stops it from producing further damage.

Hydrogen infused into water makes the water much more hydrating to the human body.

* A word about the hormone **Ghrelin**. Ghrelin has the following attributes:

- Well known to function as an appetite stimulant
- Secretagogue** for Growth Hormone
- Neuroprotective (protects nerves)
- Enhances Cognition
- Favorably impacts vascular health
- Exerts anti-inflammatory activity (useful in autoimmune disorders)
- Is markedly Hepatoprotective (protects the blood)

Ozone Therapy for Lyme

Ozone (O3) is an inorganic molecule that, when consumed by the body, disrupts infections, harmful bacteria, and anything that may cause illness. This can be done through a medical treatment called **Ozone therapy**. Ozone therapy for Lyme disease has provided an alternative treatment.

Ozone therapy helps the body by regulating the oxidative reaction in the blood, thus pushing the immune system to release substances that have a positive impact on the body's overall physiological state.

Ozone therapy uses an ozone generator machine. This machine's task is to make accurate concentrations of ozone gas (less than 5 percent) from pure medical grade oxygen.

This ozone gas concentration is beneficial to the body, particularly to the immune system. For over 50 years, ozone therapy has been used in the medical field to combat various chronic diseases and health conditions such as bacterial/viral infections, cancer, autoimmune conditions, mold toxicity, neurological conditions, chronic fatigue syndrome, and others.

Ozone therapy for Lyme disease has been used since the First World War. It became an important tool in fighting infectious diseases, with excellent and consistent results.

Ozone's administration into the body to fight *Lyme disease* lies in its positive effect on the immune system, blood circulation, and more. It is also helpful in eradicatig bacteria and other related symptoms of tick bites and Lyme disease. Patients experience more symptoms in the late stage of Lyme disease due to the elevation of inflammatory cytokines. At this stage, the treatment of chronic Lyme disease can become much harder as it becomes more difficult to determine whether the infection is already inactive, as the antibodies can remain for months or years after the infection is resolved.

Ozone therapy's role is to reduce the cytokines that are pro-inflammatory and increase those that help reduce the inflammation.

Benefits of Ozone in Lyme Disease Management

Using prescription antibiotics to treat Lyme disease can have negative effects on the immune system. However, these complications can be remedied by Ozone therapy, as it can make the immune system work faster in relieving the symptoms and improving circulation, as well as in protecting the liver.

This positive effect on the immune system is caused by the reinfusion of ozone, which creates a mild biochemical stress that stimulates the liver into producing more glutathione, the main antioxidant that the body uses for detoxification.

Conclusion

There is no question on the effectiveness of Ozone (O3) in disrupting the spread of infections and harmful bacteria in the body.

Through innovations in the medical field, it is now proven that ozone plays a central role in fighting bacterial/viral infections such as Lyme disease, as it enhances the flow of blood in the body, giving the cells the essential supply of oxygen they need to function properly.

It also regulates the cellular antioxidants to protect the cells. Lastly, it strengthens the immune system and shows immunomodulating effects by releasing different cytokines that are helpful in cleaning arteries and veins and in reducing pain and inflammation.

What Is IV Ketamine Therapy?

Ketamine infusion therapy is an innovative method involving using small doses of the anesthetic ketamine as an antidepressant.

In ketamine therapy, the drug is delivered directly into the bloodstream through an IV. This allows the drug to have maximum effect. Ketamine is thought to relieve symptoms of depression by binding with glutamate receptors in the brain. Glutamate is a neurotransmitter that is dysfunctional in patients with depression.

By activating the neurotransmitter receptors and pathways, ketamine has been found in animal studies to promote the regrowth of neurons damaged by prolonged exposure to stress, potentially leading to the remission of depression in the long term.

Although ketamine as an anesthetic holds U.S. Food and Drug Administration (FDA) approval, it is considered an off-label treatment when used for depression and other mental health disorders. This means ketamine is not yet explicitly FDA-approved for the treatment of depression.

Psychiatrists and physicians have permission to prescribe off-label medications at their discretion based on available evidence and the potential benefits to the patient. The American Psychiatric Association released a consensus statement on IV ketamine to treat major depressive disorder.

What is Ketamine?

Ketamine was developed in 1962 by Parke-Davis. It has been used safely as an effective anesthetic since the 70s for various medical purposes for children and adults.

It works primarily as an NMDA receptor antagonist, commonly described as a 'dissociative' anesthetic. Recently, Ketamine IV Therapy has been touted as the most significant breakthrough in treating treatment-resistant depression, anxieity, PTSD, chronic pain, and other mood disorders.

Unlike traditional psychotropic medications, which can take weeks to months to take effect, ketamine infusion works within hours of an infusion. This can be especially useful for severely depressed individuals with suicidal thoughts who suffer from major depressive disorder and other mental illnesses. The immediate relief could be lifesaving.

Benefits of IV Ketamine Therapy

The primary benefit of IV Ketamine Therapy is its rapid onset of action compared to traditional antidepressant medications, which can take weeks or even months to take effect. This fast-acting treatment can be life-changing for patients suffering from severe, treatment-resistant depression.

Rapid Relief of Depression Symptoms

IV Ketamine has been shown to provide rapid relief of depression symptoms, with some patients reporting significant improvement within hours of treatment. This is particularly beneficial for individuals experiencing suicidal thoughts, as the swift alleviation of distressing symptoms can be lifesaving.

Treatment-Resistant Depression

For patients who have not responded to two or more antidepressant medications, IV Ketamine Therapy offers a viable alternative. In many cases, patients who have struggled to find relief through traditional treatments have found success with IV Ketamine.

Anxiety and Depression

In addition to its effectiveness in treating depression, IV Ketamine Therapy has also shown promise in alleviating anxiety symptoms, particularly when combined with depression. This dual-action treatment can provide rapid relief for individuals struggling with both conditions.

IV Ketamine Therapy FAQs

How does IV Ketamine Therapy work?

Although the exact mechanism of action is not fully understood, researchers believe that IV Ketamine Therapy works by repairing damage to the brain caused by long-term stress hormones.

Specifically, ketamine targets NMDA receptors in the brain, increasing the amount of glutamate (a neurotransmitter) in the space between neurons.

This process, known as synaptogenesis, helps create new neural pathways, improving mood, cognition, and thought patterns.

Is IV Ketamine Therapy addictive?

When administered in controlled medical settings, IV Ketamine Therapy is generally considered non-addictive. However, it is essential to note that ketamine does have addictive properties similar to opioids when used recreationally or in high doses. Patients with a history of substance abuse should discuss this risk with their healthcare provider before beginning IV Ketamine Therapy.

ANTIBIOTICS AND THE GUT

ANTIBIOTICS AND THE GUT

Antibiotics and Lyme

The role of antibiotics in Lyme Disease treatment is undeniable, yet, its implementation demands judiciousness.

One aspect that sets Lyme Disease apart from many other bacterial infections is its ability to evade antibiotics through the **formation of biofilms**.

This characteristic, coupled with the repercussions of prolonged antibiotic use such as gut dysbiosis, results in a complex interplay of physiological complications, including neurological disorders and **leaky gut syndrome**.

Through expercience and research, it has been demostrated that there is a place for the use of IV antibiotics in chronic Lyme patients once the body's immune function and natural killer power has been optimized.

Antibiotics are essential in fighting bacterial infections; however, prolonged and aggressive antibiotic therapy can have unintended consequences on our health, particularly in the context of gut toxicity. Chronic Lyme disease patients, for instance, often become more debilitated after months of antibiotic treatment as their immune systems become suppressed. Minimal, targeted use of antibiotics can also reduce the risks of side effects and antibiotic resistance and help prevent further gut dysbiosis and antibiotic-induced gut toxicity.

The Complexity of Antibiotics in Lyme Disease

Lyme disease, a bacterial infection that stands apart due to its biofilm-forming capability, poses unique challenges for antibiotic therapy. This ability allows the disease-causing bacterium to evade antibiotics, leading to a multifaceted interplay of physiological complications, such as neurological disorders and leaky gut syndrome. Prolonged antibiotic treatment, especially in chronic Lyme disease, can lead to immune suppression, further complicating the patient's health trajectory.

The Optimal Use of Antibiotics in Lyme Disease Treatment

Antibiotics, while crucial in Lyme Disease treatment, must be used with careful consideration. Chronic Lyme disease patients often witness a deterioration in their health following months of antibiotics, mainly due to gut toxity.

According to numerous research studies, there is a role for the usage of IV antibiotics in chronic Lyme patients, but only once the body's immune function and natural killer capacity have been optimized. This strategic approach minimizes side effects and antibiotic resistance risks while preventing further gut dysbiosis and antibiotic-induced gut toxicity.

The Intersection of Antibiotics and Gut Health

The role of antibiotics in Lyme disease treatment is undeniable, yet their prolonged use can lead to unintended consequences. Among these is the impact on gut health. Approximately 70% of our immune system resides in the intestinal lining, which can be severely damaged by extended antibiotic therapy. This damage disrupts the balance of intestinal microorganisms, leading to a condition known as 'intestinal dysbiosis'.

The Repercussions of Antibiotic-Induced Dysbiosis

Extended antibiotic use disrupts the population of beneficial intestinal bacteria, notably **Lactobacillus**, which aids in maintaining an acidic environment. This acidic pH acts as a natural defense mechanism against pathogenic overgrowth. Unfortunately, prolonged antibiotic use shifts the intestinal pH towards alkalinity, encouraging the growth of harmful pathogens. This imbalance can lead to damage to the intestinal lining, including the destruction of Peyer's patches, a key site for antibody production.

From Nutritional Deficiency to Leaky Gut: Unraveling Antibiotic-Induced Gut Toxicity

Chronic antibiotic use can trigger severe malnutrition by damaging the intestinal lining, affecting the production of natural killer cells, essential immune system components. As a result, the risk of severe Leaky Gut Syndrome is heightened in Lyme disease patients.

Immune System Resource Misallocation in Leaky Gut Syndrome

In severe cases of Leaky Gut Syndrome, the immune system may divert resources to combat undigested food particles that "leak" into the bloodstream through the damaged intestinal lining. Under normal circumstances, these particles are too large to cross from the gut into the bloodstream.

Gut-to-Brain Toxicity Migration

Once these patients develop antibiotic-induced gut toxicity, mycotoxins, and bacterial endotoxins can migrate from the gut to the brain. These toxins, being fatty in structure, can infiltrate the fattiest organ in the body, **the brain**, contributing to the cumulative level of neurotoxicity in Lyme patients.

Migrating from the gut to the brain, mycotoxins and bacterial endotoxins can deposit in the brain, inflaming the myelin sheath of neurons and changing the electromagnetic field around the neuron. This shift can suppress the brain's electrical activity, disrupting immune function and creating an imbalance of neurotransmittors.

Neurological Impacts of Antibiotic-Induced Gut Toxicity

It has also been further identified as abnormalities through brain scans of Lyme patients, illuminating the profound neurological footprint of this disease. A noteworthy revelation from this work is that alterations in brain chemistry instigated by prolonged antibiotic use can induce excessive electrical activity in two specific brain regions.

The heightened electrical activity in these regions profoundly affects patients' mental health. Severe overactivity in these areas can manifest as depression and a specific type of anxiety characterized by constant worry.

Furthermore, the research indicates that when Chronic Lyme disease patients experience hyperactivity in the deep limbic center, an array of distressing psychological symptoms can emerge. These symptoms can include depression, moodiness, pervasive negativity, irritability, feelings of hopelessness, excessive guilt, and social anxiety. Moreover, an overactive deep limbic center can also increase the propensity of patients to take offense more easily.

The adverse psychological impacts extend to Chronic Lyme disease patients exhibiting an overactive anterior cingulate. These patients may display enhanced argumentativeness, heightened stubbornness, a hyper-focus on negativity, and the development of an obsessive-compulsive worry pattern.

In essence, these research underscores the critical interplay between neurological alterations, specifically in the deep limbic center and anterior cingulate, and the psychological well-being of Chronic Lyme disease patients. These insights highlight the necessity of an integrated approach to Lyme disease treatment, considering the physical and psychological aspects of this complex disease.

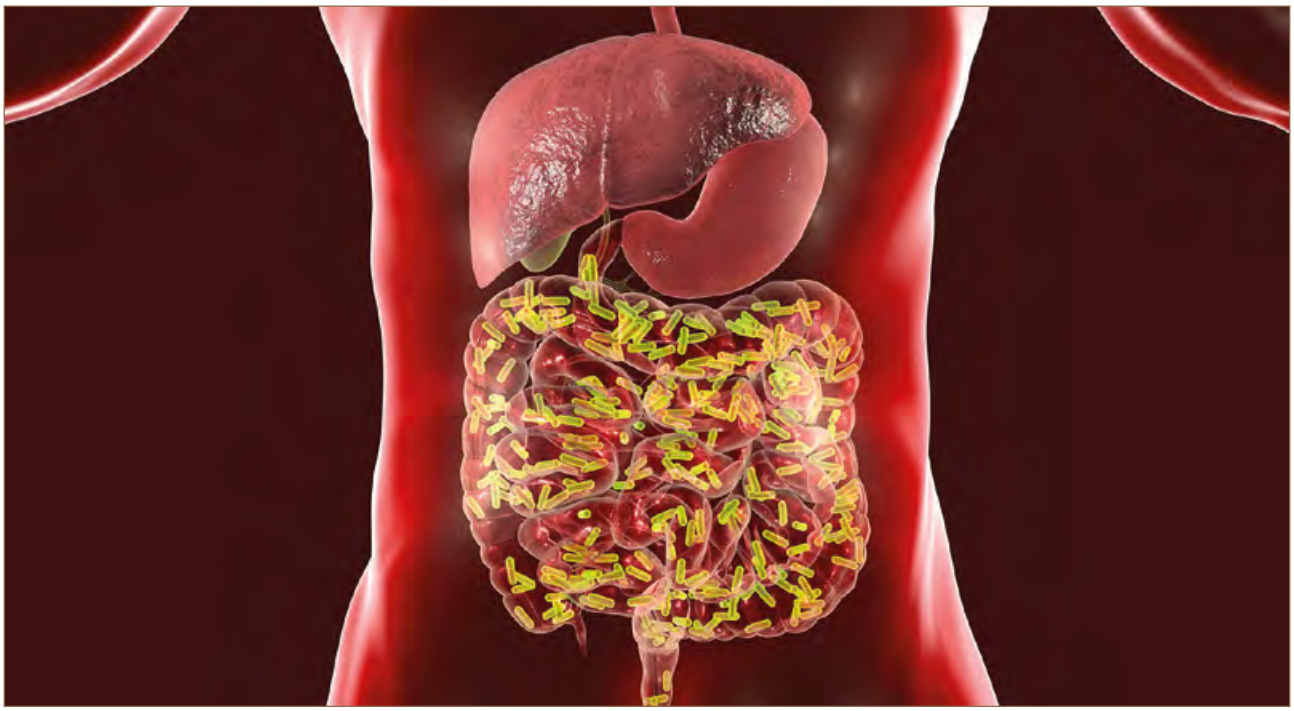
Systematic Impacts of Antibiotic-Induced Gut Toxicity

Prolonged antibiotic use in Lyme Disease leads to gut toxicity and biofilm-associated antibiotic resistance and contributes to neurological complications.

One of the severe consequences of intestinal dysbiosis and the resulting gut damage is the development of **Leaky Gut Syndrome**. In this condition, the damaged intestinal lining allows undigested food particles, typically too large to cross into the bloodstream, to “leak” into the circulatory system.

This leakage prompts an immune response, leading to inflammation and potentially contributing to various chronic diseases. In patients with Lyme Disease, Leaky Gut Syndrome can cause the already compromised immune system to divert its resources to attack these foreign particles, thereby further weakening the body’s defenses against Lyme spirochetes.

Antibiotics & Gut Toxicity



Balancing Antibiotics and Gut Health

The cornerstone of Lyme disease treatment is antibiotics. However, their prolonged usage can wreak havoc on the intestinal lining, the hub of approximately 70% of our immune system. This damage gives rise to a condition known as 'intestinal dysbiosis,' an imbalance in intestinal microorganisms.

Long-term antibiotic treatment wipes out beneficial intestinal bacteria, including **Lactobacillus**, a key bacterium that maintains an acidic intestinal pH through lactic acid production. This acidic environment checks the overgrowth of pathogenic entities.

Regrettably, after extended antibiotic administration, the intestinal pH shifts towards alkalinity, promoting the overgrowth of harmful yeast and bacteria such as Klebsiella, Proteus, and Enterobacteriaceae.

The resultant Candida, Mycotoxins, and bacterial endotoxins can devastate the intestinal lining, eradicating the Peyer's patches, a binding antibody production site in our intestinal lining.

From Nutritional Deprivation to Leaky Gut: The Pitfalls of Antibiotic-Induced Gut Toxicity

The destruction of the intestinal lining frequently triggers severe malnutrition. This malnourished state detrimentally affects the production of natural killer cells, a type of lymphocyte

reliant on certain essential amino acids. In the face of extensive antibiotic-induced damage to the intestinal lining, Lyme disease patients face a heightened risk of severe Leaky Gut Syndrome.

As **Leaky Gut Syndrome** intensifies, the immune system diverts resources to combat undigested food particles that "leak" into the bloodstream through the damaged intestinal lining. Usually, these particles are too large to traverse from the gut into the bloodstream.

Neurological Implications of Antibiotics

Research has established a link between abnormal brain chemistry patterns and Lyme bio-marker CD 57 levels, in addition to abnormalities observed in the brain scans of Lyme patients. These investigations revealed that antibiotic-induced alterations in brain chemistry instigate excessive electrical activity in two distinct brain regions.

When these brain regions become severely overactive, patients develop depression and a "worry-worry" type of anxiety. When Chronic Lyme disease patients develop an overactive deep limbic center, they suffer from depression, moodiness, negativity, irritability, hopelessness, excessive guilt, and social anxiety and become more easily offended.

When Chronic Lyme Disease patients develop an overactive anterior cingulate, they become more argumentative, more stubborn, and hyper-focused on the negative, and they establish obsessive-compulsive worry.

Antibiotic-Induced Gut Toxicity Causes Increased Brain Toxicity

After Chronic Lyme disease, patients develop antibiotic-induced gut toxicity, mycotoxins, and bacterial endotoxins migrate from the gut to the brain. These toxins are lipophilic and fatty in structure, so they are drawn to other fatty tissues on a molecular level. After migrating away from the gut, they deposit in the fattiest organ, our brain, which is 60 percent fat.

These neurotoxins inflame the brain's white matter, the insulation on brain neurons called **myelin**, adding to the cumulative level of neurotoxicity, which is already significant from an accumulation of toxins in Lyme & Mold Toxicity patients.

Antibiotic-induced neurotoxicity causes further suppression of the immune system by "shutting down" the electrical current in the brain. This is problematic because the brain's electrical activity stimulates cytokine activity. Cytokines are the chemical messengers that activate our natural killer cells.

When neurotoxins inflame the myelin sheath of brain neurons, they change the electromagnetic field surrounding the neuron, slowing the speed of the electrical impulse. By this mechanism, neurotoxins essentially suppress the brain's electrical activity. In a healthy brain, the electrical current rapidly jumps over the myelin on brain neurons.

However, when the myelin sheath becomes infiltrated with fatty neurotoxins from the gut and toxins from the Lyme disease spirochete, it fails to modulate immune function effectively.

Destruction of the Intestinal Lining

One of the primary reasons behind antibiotic-induced gut toxicity is the destruction of the intestinal lining, where 70 percent of our immune system is located. Prolonged antibiotic therapy kills our good intestinal bacteria, such as Lactobacillus, which produces lactic acid and helps maintain an acidic pH in our intestines to prevent the overgrowth of foreign invaders.

Malnutrition and Leaky Gut Syndrome

The destruction of the intestinal lining also leads to severe malnutrition. Essential amino acids, responsible for producing natural killer cells, become scarce, leading to a weakened immune system.

Eventually, Lyme disease patients may develop severe Leaky Gut Syndrome, causing the immune system to waste resources attacking undigested food particles that “leak” across the damaged intestinal lining into the bloodstream.

The Prudent Application of Antibiotics in Tickborne Disease

Antibiotics are unquestionably pivotal in Lyme Disease treatment. Nevertheless, their deployment calls for cautious deliberation. The capacity of Lyme Disease to dodge antibiotics by forming biofilms differentiates it from many other bacterial infections. Together with the adverse effects of prolonged antibiotic use, such as gut dysbiosis, a complex cascade of physiological complications materializes, including neurological and leaky gut syndrome.

At IAH Wellness we advocate a role for the usage of IV antibiotics in chronic Lyme patients, contingent upon the optimization of the patient’s immune function and natural killer capacity. This minimalist, targeted approach to antibiotic use minimizes the risks of side effects and antibiotic resistance and is a preventive measure against further gut dysbiosis and antibiotic-induced gut toxicity.

Antibiotic therapy can render a more “desired kill” of Borrelia spirochetes and expedite patient recovery when combined with a robust immune system. Conversely, withholding antibiotic therapy in Neurological Lyme Disease patients constitutes a significant misjudgment.

Leaky Gut Syndrome

Leaky Gut Syndrome causes chronic inflammation in the gut and throughout the body.
What is Leaky Gut Syndrome?

The lining of our intestines is made up of a wall of cells held tightly together. This wall, also known as a **mucosal barrier**, measures 9m in length and allows for optimal absorption of nutrients during the digestive process. The barrier is also important because it prevents substances, such as partially digested food, bacteria, and toxins, from passing (or permeating) out of the small intestine into the bloodstream.

When the junctures between cells of the mucosal barrier weaken, intestinal permeability increases. This is known as a 'leaky gut.'

Fluids, electrolytes, and small food particles can normally pass through the mucosal lining. However, when a **"Leaky Gut"** develops, toxins, pathogens, and large food particles can also permeate the gut barrier. The body then recognizes these substances as foreign invaders, triggering an inflammatory immune response.

What is Intestinal Permeability?

The digestive system consists of organs that break down and absorb nutrients in the body. Thanks to the intestinal walls, they also protect the body from harmful substances.

Gut permeability describes a carefully regulated function in the gastrointestinal tract that facilitates the absorption of nutrients, water, and electrolytes and acts as a barrier against the movement of toxins and other harmful substances—like foreign antigens and microorganisms—from the intestine into the bloodstream.

Gut permeability is a normal function in a healthy human body. But when there is an increase in permeability, there will be **hyper-permeability** in the gut—this becomes a health issue.

Although increased gut permeability is not typically diagnosed, many tests can measure the health of a human gut. These tests include gastrointestinal testing (GI testing), the zonulin test (measuring the amount of zonulin in the gut), and a urine test called the lactulose mannitol test.

Some gut permeability is normal, but increases in gut permeability levels can cause many health problems. Once you recognize the symptoms, be sure to consult with an integrative health practitioner so that you can take steps to get your gut back to normal levels of permeability.

What is Zonulin?

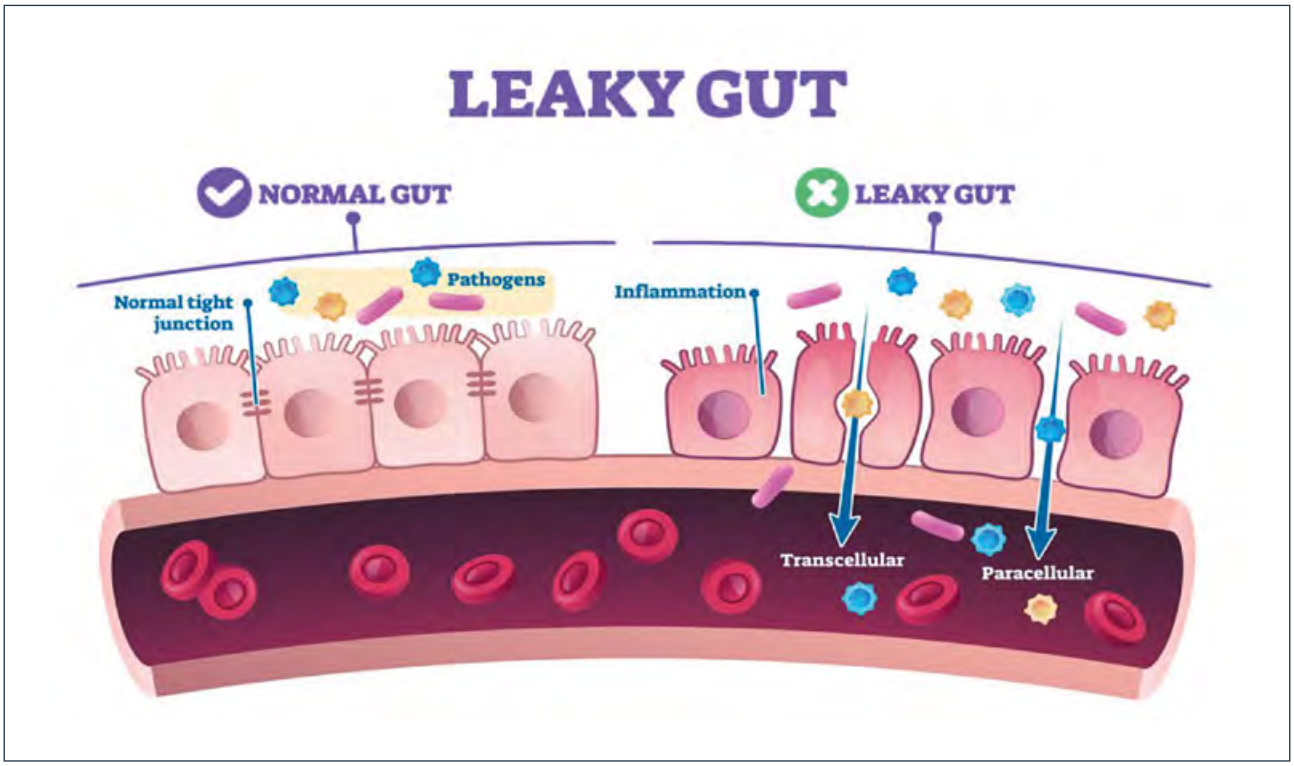
Zonulin is a protein molecule synthesized in intestinal and liver cells that helps regulate tight junctions in your intestinal wall. When it connects to specific receptors on the cell surface, the tight junctions open up and therefore increase your intestinal permeability. This can be caused, e.g., by exposure to certain types of bacteria, such as Borrelia, or mycotoxins, such as trichothecene.

Zonulin is one of three ways the FIT test can diagnose a leaky gut and find a sensitivity to Candida and multiple Food Sensitivities. It is estimated that between 50 and 100 percent of food intolerance sufferers have increased intestinal permeability.

Exposure to foreign antigens and cell components can cause immunological reactions and dysregulations. High Zonulin values can typically be observed in cases of Diabetes Type 1, autoimmune diseases, celiac disease, multiple sclerosis, rheumatoid arthritis, and other chronic diseases.

Increased intestinal permeability can be caused by food allergies and sensitivities, stress, infestions, and low stomach acid, among other causes. Elevated levels of Zonulin are associated with Celiac Disease, Autoimmune disease, Multiple Sclerosis, and other chronic illnesses.

A healthy gut has healthy cell junctions and good nutrient absorption. In a leaky gut, however, the Villi are damaged, there is poor absorption, and the cell junctions are loose. This means bacteria and unwanted items can pass through the gut, as seen in the image.



Gut Toxicity Induced by Antibiotics & Lipophilic Mycotoxins & Industrial Toxins

Since the advent of penicillin during World War II, we have poisoned our food supply with antibiotics. Antibiotics that were intended for medical treatment have unwisely been used for agricultural purposes – poultry, dairy, and stockyard beef production. Because of antibiotic-laden foods, most people in the industrialized world suffer from an imbalance of the good bacteria that live in our guts or Gastrointestinal Dysbiosis.

This imbalance causes **Candidad overgrowth**. Candida, a type of yeast, naturally exists in our bodies but can be problematic when it overpopulates the digestive system. During Gastrointestinal Dysbiosis there is no limit to how much Candida can grow and spread. This excessive yeast can cause serious damage to vital organs and tissues, including the brain.

Understanding Leaky Gut Syndrome

Patients develop leaky gut syndrome when Gastrointestinal Dysbiosis begins to cause erosion to the gut lining.

A leaky intestinal lining will further distort the delicate biochemical balance of the brain. Homeostasis, or balance, between the immune system, the hormonal system, and the nervous system begins in and is critically dependent on a healthy intestine.

Leaky Gut Syndrome causes chronic inflammation in the gut and throughout the body. It has been linked to various conditions and symptoms such as chronic fatigue syndrome, Celiac Disease, Irritable Bowel Syndrome, Crohn's Disease, Rheumatoid Arthritis, Autism, Multiple Sclerosis, Lupus, and more.

Healing a Leaky Gut

Dysbiosis – How to restore gut ecology to achieve balance

Dysbiosis is a familiar concept for most of us. However, we may still be inclined to think about pathogens as the villains, and us as the victims, tempting us to embark on a journey of "eradication". But is this a holistic approach? Does that approach encourage a robust and resilient gut ecosystem? There are cases where pathogens are perilous and eradication is required, but more often than not, we are talking about a state of dysbiosis, created by a disruption to gut ecology. Assessing the whole person by considering all the complex contributing factors and restoring that ecology offers a wider and likely more effective approach to addressing dysbiosis.

What is dysbiosis?

Dysbiosis is a state of an imbalance in the gut microbiome, characterised by a proliferation of pathobionts and pathogens, accompanied by compromised levels of beneficial bacteria. Symptoms of dysbiosis include bloating, disrupted bowel movements, abdominal pain, anomalous joint pains, brain fog, food sensitivity, allergies, and inflammation. Some other seemingly unrelated symptoms can also be linked with dysbiosis e.g., headaches, palpitations, insomnia, exertional fatigue, photophobia, and dizziness.

Dysbiosis has been directly linked with a number of disorders including **IBS, IBD, SIBO**, fatigue, and **autoimmune conditions**. Dysbiosis caused by an infection or antibiotic use, often results in infectious diarrhoea (also known as gastroenteritis). In all cases, the state of dysbiosis leaves the gut much more vulnerable to external pathogens (as found in contaminated food, for example), easily overwhelming the immune responses and leading to symptoms of varying severity, from diarrhoea to sepsis.

Your gut houses over **100 trillion microorganisms**, known as the **gut microbiome.** Your gut microbiome regulates a wide range of functions in your body, including how well you digest and absorb nutrients, Your microbiome even affects your emotions. It should come as little surprise, then, that your gut is critical to your overall health.

It is estimated that more than 70% of your immune function lies in your gut.

Because your gut comes in contact with everything you eat, it's exposed to **more antigens –** substances that can cause an immune response – than your systemic immune system is. But your immune system **doesn't react to everything.** And that's thanks to your gut barrier, otherwise known as the intestinal lining.

The Gut Barrier

Your intestinal barrier consists of multiple elements, including:

- **The lumen**, where gastric acid and bile degrade pathogens and antigens
- **The mucus layer**, which protects the intestinal epithelial cells from interacting with bacteria
- **A single layer of epithelial** cells known as enterocytes, stitched together by various proteins like tight junctions that limit the entry of pathogens and toxins
- **The lamina propria**, another layer beyond the epithelium that provides defense

If your gut is a castle, your gut barrier is the **castle gate.** Guarding the gate are protein complexes called **tight junctions** that open and close the gate upon learning the identities of the visitors. Under optimal circumstances, the guards keep out anyone they deem an intruder. But if the castle gate has holes or the guards are injured, intruders would be able to enter the castle and wreak havoc.

When your gut lining is exposed to continuous assault from toxins, medications, and other factors, "gaps" or "holes" can form. Weakened tight junctions have a harder time being selective, giving **bacteria, undigested food, and toxins unrestricted access to your bloodstream.** Once they enter your bloodstream, they can travel throughout your body.

And because your immune system can detect that these substances are unwanted, it triggers an immune response. **Without relief from the toxins, chronic inflammation results**.

Types of Dysbiosis

The most common **pathogenic bacteria** associated with dysbiosis include Yersinia, Salmonella, pathogenic forms of E. coli, Fusobacterium nucleatum, Proteus mirabilis, Citrobacter, Salmonella, and Clostridium difficile.

Small Intestinal Bacterial Overgrowth (SIBO) is the presence of an abnormally high number and/or abnormal type of microorganisms in the small intestine. This includes Streptococci, Escherichia coli and Klebsiella, which are usually found in the large intestine. The symptoms of SIBO include diarrhoea, flatulence, and upper abdominal pain and distension. Prolonged SIBO may interfere with digestion and absorption of food, increasing the risk of vitamin and mineral deficiencies. It may even lead to damage and hyperpermeability of the gut lining. SIBO is also associated with a number of conditions such as IBS, acne rosacea and diabetes.

SIBO is an increasingly popular diagnosis these days, however the testing methods used often result in either false-positives or false-negatives, and arguably, can narrow our view. Unfortunately, in the past, there's been an exaggerated focus on the overgrowth of microorganisms and an overreliance on antimicrobial supplements, antibiotics, and a low FODMAP diet. However, whilst SIBO can very much be a problem for a person, it is merely a marker, an end result, accompanied by wider digestive dysfunction such as low stomach acid secretion, slow motility, colonic dysbiosis, or decreased secretion of digestive enzymes.

Candida albicans is an opportunistic yeast, which, if allowed to proliferate, can contribute to a range of issues, from IBS-symptoms to brain fog and mental health issues. Whilst we know high sugar diet contributes to Candida overgrowth and especially **Candida Albicans**, we now acknowledge that adopting a strict low sugar and yeast diet is not the sole and best answer to the problem. Most individuals have some amount of Candida growing in their gut, but the numbers are kept in check by a robust immune system.Compromised immunity can lead to Candida evolving into the more aggressive mycelial form, hijacking nutrient supplies, and establishing more dominance over the beneficial microbiota.

Parasitic infections are another major cause of dysbiosis, driven by consumption of contaminated food and water (including undercooked meat and fish, or leafy vegetables), travelling to developing tropical countries, poor hygiene, and regular exposure to small children, animals, and hospitals. Commonly identified parasites include Blastocystis hominis, Dientameoba fragilis, Cryptosporidium, Giardia, Entamoeba histolytica, and Schistosoma (water-borne flatworms or blood flukes).The symptomatology significantly overlaps with other types of dysbiosis (e.g., fatigue, bloating, brain fog), but abdominal pain, acute or chronic diarrhea, and anal itching are particularly diagnostic of parasitic infections. Skin rashes, such as urticaria (hives), weight loss or difficulty gaining weight, and food sensitivities can also be experienced. However, not all parasites are bad, as is the case with the Blastocystis hominis which has been associated with a reduced risk of GI disease. There are in fact many different genotypes of this parasite, some pathogenic and some not, so appropriate testing is required to ensure that we're not treating something that may in fact be a healthy resident of the microbiome.

What Causes Leaky Gut Syndrome?

So far, researchers and doctors have been unable to pinpoint a direct cause of leaky gut. But we do know that several factors play a role, including:

- **Bacterial overgrowth or imbalance (dysbiosis):** When the microbial population in your gut is balanced, your body functions the way it's supposed to. But when you don't have enough – or when you have too many – of certain microbes your health can unravel.
- **Food sensitivities:** Consuming food you may be sensitive to can cause your immune system to react constantly, resulting in a chronic inflammatory state.
- **Food additives:** Research studies have found that food additives like sugar, carrageenan, and emulsifiers can disturb the balance of the gut microbiome, leading to inflammation.
- **Antibiotics:** Antibiotics are major disruptors of your gut microbiome. While they're necessary in some cases, many antibiotics don't go after only the harmful bacteria – *they can eliminate the good ones, too.* For this reason, inappropriate use of antibiotics can lead to the growth of antibiotic-resistant bacteria and long-term (maybe permanent) loss of some bacterial species. Antibiotics can also lead to yeast overgrowth, which can influence your gut permeability.
- **Proton pump inhibitors (PPIs):** This class of medications reduces the production of stomach acid. Examples of PPIs include Prevacid, Prilosec, and Nexium. Long-term use of PPIs has been associated with an increased risk of intestinal infections, most notably by a bacterial species called *Clostridium difficile*. The imbalance of your gut microbiome caused by PPIs may lead to certain gastrointestinal disorders.
- **Stress:** When you experience stress, your body shunts blood and energy away from your digestive system to your muscles and brain so that they can respond to the threat. In other words, the digestion process is paused. This means toxins and pathogens can stay in your gut, triggering inflammation in your gut lining. Research studies have shown that stress can affect the composition of your gut microbiome and influence which microbes thrive independent of your diet.
- **Non-steroidal anti-inflammatory drugs (NSAIDs):** A considerable amount of evidence shows that NSAIDs, often used for pain or fever relief, cause gastrointestinal or heart complications. In your gut, NSAIDs can cause bleeding, inflammation, or ulcerations. Results from research studies show NSAIDs can affect the composition and function of your gut microbiome.
- **Alcohol consumption:** Excessive alcohol consumption can reduce the number and diversity in your gut microbiome, increasing the gut lining permeability. Some studies suggest that alcohol can promote bacterial overgrowth. Alcohol can also reduce the production of stomach acid, which in turn affects your stomach's ability to neutralize pathogens.

Healing your leaky gut is more than taking a probiotic supplement or drinking kombucha and kefir. ***Too much bacteria in your gut can also be problematic***, leading to SIBO. Gut healing also does not equate to going gluten-free. **Many gluten-free products are heavily processed foods, which can cause inflammation.**

So *how* do you start to heal a leaky gut?

As discussed above, stress can increase your gut inflammation and promote dysbiosis. If your body is under chronic stress, ***it can't focus on healing*.** Instead, it's diverting all its energy and focus to simply surviving, further impairing digestion.

Therapeutic Diets and Antimicrobial Agents

In cases of multiple and severe chronic issues, stubborn or pathogenic infections, or where approaches to support digestion & microbiome have not resulted in significant improvements, you may resort to using a more targeted approach; specific diets (e.g. Specific Carbohydrate or low FODMAP diets), or antimicrobial supplements. However, in most cases, these should be utilised short-term, and always alongside interventions that positively modulate the gut ecology.

When opting for antimicrobial botanicals, using a combination of ingredients may be more effective than single ingredients, and may reduce the likelihood of the microbes developing resistance. Botanicals such as **clove**, **thyme**, **oregano**, and **barbery bark** have broad anti-bacterial, anti-fungal, and anti-parasitic properties, and also inhibit biofilm formation. Natural antimicrobials can also confer protection when travelling abroad, and they can be paired up with probiotics for increased efficacy. Freeze-dried oils, for example oregano oil, offer far more potency, but can also reduce irritation to the mucous membranes and promote absorption for systemic support, therefore helpful for respiratory, or other infections. The table below lists some of the most versatile and effective antimicrobial botanicals.

Natural Antimicrobials

All of the below have a range of antimicrobial properties against a lot of common pathogens including Salmonella, Staphylococcus aureus, Candida species, Escherichia coli, Clostridium difficile, Proteus mirabilis, Bacillus cereus, Entamoeba hartmanni, Endolimax nana, Blastocystis hominis, Listeria, Campylobacter jejuni, Klebsiella pneumoniae, Fusobacterium nucleatum, H. pylori, Toxoplasma gondii, Schistosoma spp. etc.

Oregano	Contains carvacrol which is antifungal, antibacterial and antiparasitic. Reduces biofilm formation
Golden Seal	Goldenseal is an excellent digestive aid since it is very bitter, which stimulates the appetite, aids digestion and encourages bile secretion. It has antimicrobial activity against certain pathogens that cause bacterial diarrhea, including *E. coli* and *V. cholera*
Clove	Contains eugenol and tannins which have broad-spectrum activity against pathogenic yeasts and bacteria. Reduces production of mycotoxins.
Garlic	Antiviral, antibacterial, and antifungal. Garlic does not exert a negative effect on beneficial probiotic bacteria.
Cinnamon	Both cinnamaldehyde and cinnamon oil vapours have potent antifungal and antibacterial properties.
Caprylic Acid	Particularly good for fungal infection. Also, mildly anti-inflammatory. Naturally found in coconut oil and dairy products.
Grapeseed	Contains antimicrobial and antioxidant compounds such as resveratrol, tannins and polyphenols.
Olive Leaf	A source of polyphenols such as oleuropein and hydroxytyrosol that have antiviral, antibacterial, anti-inflammatory, and heart-supporting properties.
Barberry Bark	Contains a range of plant chemicals, including berberine which is antimicrobial including parasites, and also supports immunity, cholesterol balance, and blood sugar regulation.
Thyme	Contains thymol which has potent antibacterial activity and is also useful to support respiratory tract infections (inc. influenza). Reduces biofilm formation.
Wormwood	Components a- & b- thujone, artemisinins, and a-santonin provide antimicrobial effects. Really good for parasites. Chamazulene provides antioxidant and anti-inflammatory effects.
Grapefruit	The antimicrobial activity is down to the active ingredients D-Limonene, flavonoids and phenolic compounds.

Conclusion

Our gut ecology is more than a simple black and white canvas. It is an ever-evolving environment, continuously being affected by other systems whilst affecting them at the same time. In essence, there's much that we don't know about the specifics of the gut ecosystem, and, while we should always be interested in specific details and mechanisms, we must also zoom out and consider the interconnections between all these systems. A healthy gut is a happy gut, and without the restoration of this fortress, we are always keeping the castle gate open for any tempted intruder.

The Lyme Guide

GAIN KNOWLEDGE, EMBRACE HEALTH

IAH WELLNESS