



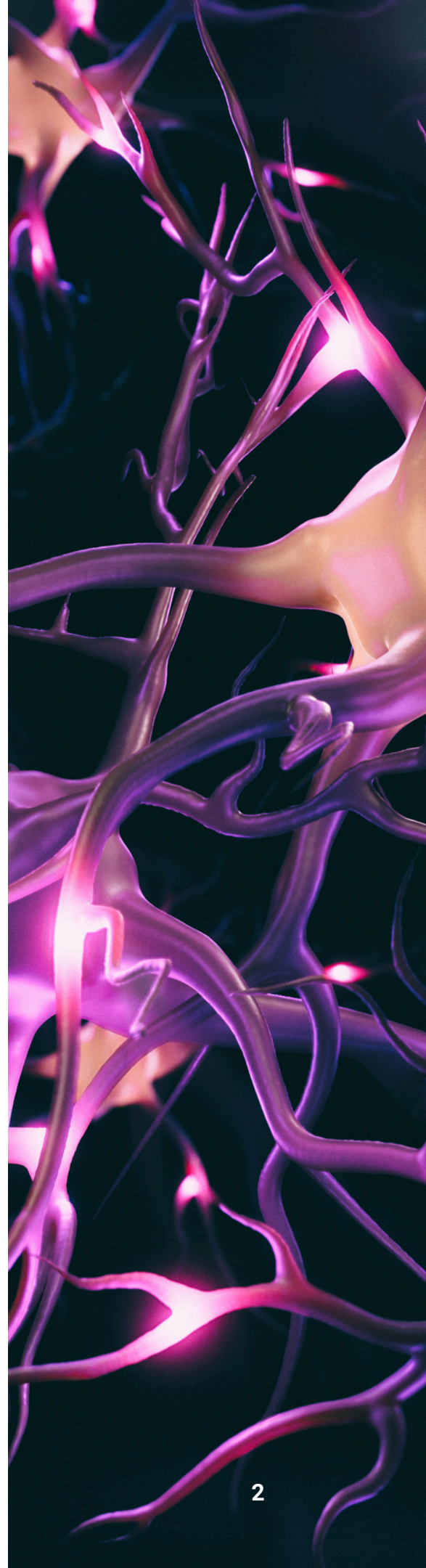
Chronic Lyme Disease & Neurological Symptoms: What You Need to Know

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Lyme disease is the most common vector-borne illness in the US, caused by the bacterium *Borrelia burgdorferi* and transmitted via tick bites.

Lyme disease can cause various symptoms, including fever, joint pain, and loss of appetite, but is generally treatable with antibiotics if caught early.

However, if it's not treated properly or caught on time, the infection can evade the initial antibiotic treatments and disseminate to various parts of the body—thus transitioning into chronic Lyme disease.

This chronic state is not only more difficult to treat but also more debilitating due to its persistence and multifaceted symptoms.

Among the most severe and disruptive of these symptoms are the neurological symptoms.

These symptoms not only reflect the direct impact of the infection on the nervous system but also represent the body's continued inflammatory response to the enduring presence of Lyme bacteria.

This blog discusses the pathology of chronic Lyme, the mechanisms involved in its impact on the central nervous system, and advanced diagnostic tools to manage this complex condition effectively.

Understanding Chronic Lyme Disease

Chronic Lyme disease, often called Post-Treatment Lyme Disease Syndrome (PTLDS), is characterized by the persistence of symptoms such as fatigue, pain, or joint and muscle aches long after the initial treatment of the acute infection.

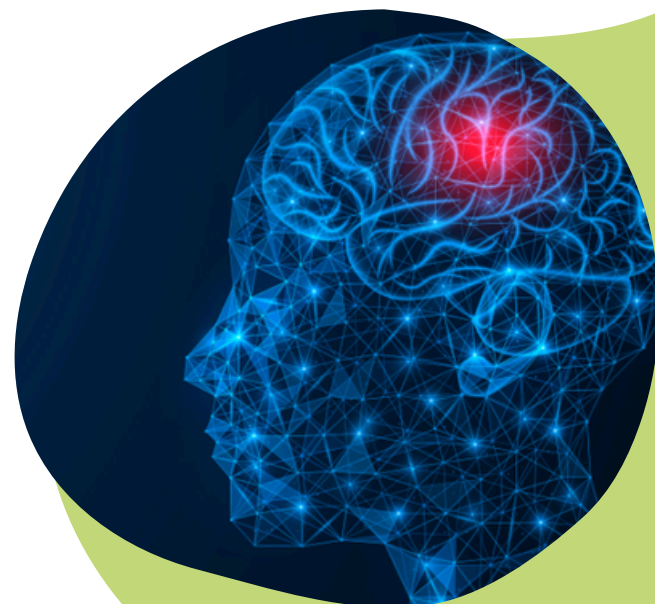
Unlike acute Lyme disease, which is typically resolved with a course of antibiotics, chronic Lyme disease continues to significantly impair quality of life, even when no active infection is detected.

Patients may experience pain, neurocognitive symptoms, or fatigue, emerging during or within several months after antibiotic treatment of the infection. This can last for months or even years.

These patients may have severe pain around their joints (tender points), headache, brain fog, sleep disorders, and incapacitating fatigue, which can significantly impact quality of life.

It's estimated that as many as **36% of those diagnosed and treated early** for Lyme disease still experience symptoms post-treatment.

The reasons why some individuals recover entirely while others develop chronic symptoms remain a significant area of research, and understanding these patterns is crucial for developing targeted interventions.

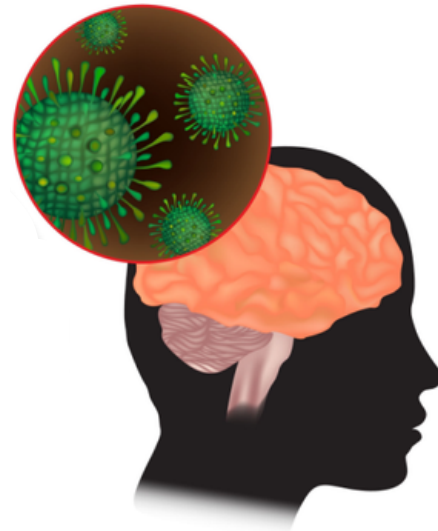




Posttreatment Lyme disease syndromes: distinct pathogenesis caused by maladaptive host responses



Severity of chronic Lyme disease compared to other chronic conditions: a quality of life survey



Pathogenesis of Chronic Lyme

The pathogenesis of chronic Lyme disease involves complex interactions between the infecting organism, *Borrelia burgdorferi*, and the host's immune system.

The tickborne bacteria is a potent antigen— once it enters the human body, it can undergo changes in gene expression to adapt to its new environment.

Initially, when a tick carrying *Borrelia* bites a human, the bacterium enters the skin and can spread to different parts of the body through the bloodstream.

During its journey, *Borrelia burgdorferi* has several mechanisms to evade the immune system, including altering its surface proteins, which confounds immune detection and response.¹

As the bacteria disseminate, they can sequester in remote areas of the body, like the joints, heart, and nervous system.

This ability to hide from the immune system, combined with its antigenic variation, allows the bacteria to persist long-term, potentially causing chronic symptoms.

This can lead to disabling post-treatment syndromes that persist even after the bacterial infection is treated.

These mechanisms suggest why Lyme symptoms can continue even after the bacteria are no longer detectable in the body.

The immune system continues to react to the bacteria's hidden presence, leading to inflammation and the array of symptoms associated with chronic Lyme disease.

Neurological Manifestations of Chronic Lyme Disease

After an initial infection, *Borrelia burgdorferi* can invade the central nervous system, crossing the blood-brain barrier.

This invasion triggers an inflammatory response, which can result in neuroinflammation and a variety of neurological symptoms.

The bacteria can wreak havoc on the nervous system either through inflammatory processes or direct nerve damage.

The resulting symptoms and conditions can severely impact quality of life. Additionally, their chronic nature and subsequent activation of the HPA axis can contribute to psychological distress, further exacerbating the situation.



Overview of Neurological Symptoms and Their Pathology

Chronic Lyme disease can manifest a range of neurological symptoms that significantly affect daily functioning and quality of life.

Common neurological symptoms associated with chronic Lyme include:

- **Cranial Neuritis:** Also known as facial nerve palsy, occurs when people experience weakness or paralysis on one or both sides of their face. This condition affects the facial muscles, making it difficult to control them, and is induced by damage to the facial nerve.
- **Meningitis:** A condition that can occur when Lyme disease affects the coverings around the brain and spinal cord. The most common symptom of this condition is a headache. Additionally, patients might become unusually sensitive to light and sound.
- **Radiculoneuritis:** Inflammation along the spinal nerve roots and the nerves branching from them, causing pain, weakness, numbness, and tingling in the affected areas.

Lyme Disease Diagnostic Challenges

Tickborne infections like Lyme can be difficult to diagnose due to:

- A lack of awareness about tick populations
- Inadequate testing
- Symptoms that mimic other conditions
- These factors can lead to misdiagnosis and further health complications.

The diagnostic tests currently available for tickborne diseases are severely limited in their ability to provide accurate results and can't detect multiple pathogens at once.

Recent research reveals that the standard two-tier testing recommended by the CDC can lead to false positive/negative results.

ELISA and Western blot tests can miss up to 60% of well-defined Lyme disease cases.

Thus, although catching Lyme disease early is critical, it can be difficult using current methods.



**Neurologic Complications
of Lyme Disease**

Advanced Diagnostic Strategies

The Vibrant Tickborne Disease Panel resolves this issue, detecting a broad range of antibodies and exposure to multiple pathogens simultaneously.

Vibrant's Tickborne panel provides protein microarray antigen and PCR detection of Lyme disease, TBRF, and co-infections with tickborne diseases like Anaplasma, Babesia, Bartonella, Ehrlichia, and Rickettsia species.

The panel's dual approach—testing for antibodies (indirect) and DNA (direct) — provides the most comprehensive Lyme and co-infection detection.

Vibrant's Tickborne Diseases panel uses a first-of-its-kind customizable multiplex protein microarray and chemiluminescence detection to test antibody reactions to pathogens.

With protein microarray technology, you can access the full scope of antigen reactions rather than relying on only a limited number.

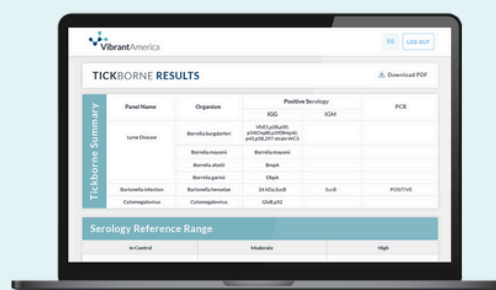
This allows for more comprehensive and accurate Lyme disease testing.



Vibrant's Tickborne Diseases Test



An ultra-high-density protein microarray for high throughput single-tier serological detection of Lyme disease



Tickborne Summary	Panel Name	Organism	Positive Serology		PCR
			IGG	IGM	
			VitE 1 p28, p30, p34 (OspB), p39 (BmpA), p45 (p58, 297 strain WCS)		
	Lyme Disease	Borrelia burgdorferi			
		Borrelia mayonii	Borrelia mayonii		
Borrelia afzelii		BmpA			
Borrelia garinii		DtgA			
Bartonella infection	Bartonella henselae	26 kDa, SucB	SucB	POSITIVE	
	Cytomegalovirus	Cytomegalovirus	GlyB, p52		

Importance of Early & Accurate Diagnosis

In managing Lyme disease, particularly when facing the threat of its progression to chronic stages with neurological complications, the importance of early and accurate diagnosis cannot be overstated.

Preventing Severe Neurological Complications

The neurological complications associated with chronic Lyme disease, such as cognitive impairments, facial palsy, and nerve damage, can profoundly impact quality of life.

These conditions often develop when the initial infection is either undetected or inadequately treated. Early diagnosis and appropriate treatment can halt the progression of the disease, significantly reducing the risk of these serious long-term effects.

Additionally, an accurate diagnosis helps tailor the right treatment approach as early as possible. This is crucial because the standard treatment for early Lyme disease—typically antibiotics—is most effective before the bacteria disseminate throughout the body and establish themselves in hard-to-reach areas like the central nervous system.

Once Lyme disease progresses to more advanced stages, it becomes more difficult to treat, and symptoms can become entrenched and significantly harder to manage.

Enhancing Treatment Outcomes

Early diagnosis not only prevents the disease from advancing but also enhances overall treatment outcomes. Patients diagnosed and treated early for Lyme disease generally have quicker and more complete recoveries.

In contrast, those with delayed treatment may experience persistent symptoms that can lead to chronic Lyme disease, requiring more complex and prolonged management strategies.

Moreover, an early and precise diagnosis minimizes the unnecessary use of broad-spectrum antibiotics, reducing the risk of antibiotic resistance and preserving these medications for when they are truly needed.

Chronic Lyme, The Nervous System, and Longevity

Chronic Lyme disease illustrates infectious diseases' profound impact on long-term health and well-being, emphasizing the need for early intervention and sustained health strategies.

By using advanced diagnostic tools like the Tickborne Diseases Test, you can prevent the progression of acute Lyme disease, stop chronic Lyme in its tracks, and enhance health and longevity.

References

1. Coburn J, Garcia B, Hu LT, Jewett MW, Kraiczy P, Norris SJ, Skare J. Lyme disease pathogenesis. Curr Issues Mol Biol. 2021;42:473-518. doi:10.21775/cimb.042.473.
2. <https://blog.vibrant-wellness.com/research-spotlight-protein-microarray-for-comprehensive-tickborne-testing>

Be a Healthcare Pioneer

Enhance patient care with state-of-the-art functional lab testing for accurate diagnoses and targeted treatment plans.

Get Started



Regulatory Statement:

The general wellness test intended uses relate to sustaining or offering general improvement to functions associated with a general state of health while making reference to diseases or conditions. This test has been laboratory developed and its performance characteristics determined by Vibrant America LLC and Vibrant Genomics, a CLIA-certified and CAP-accredited laboratory performing the test. The lab tests referenced have not been cleared or approved by the U.S. Food and Drug Administration (FDA). Although FDA does not currently clear or approve laboratory-developed tests in the U.S., certification of the laboratory is required under CLIA to ensure the quality and validity of the tests.