

# 2303100134 - TICKBORNE DISEASES 1.0 DEMO

FINAL REPORT

Accession ID: 2303100134

Name: 2303100134 - TICKBORNE DISEASES 1.0 DEMO  
Date of Birth: 01-01-1111  
Gender: Male  
Age: 01  
Height:  
Weight: 188 lbs  
Fasting: FASTING

Telephone: 000-000-0000  
Street Address:  
Email:

## Provider Information

Practice Name: DEMO CLIENT, MD  
Provider Name: DEMO CLIENT, MD  
Phlebotomist: 0  
Telephone: 000-000-0000  
Address: 3521 Leonard Ct, Santa Clara, CA 95054

## Report Information

Current Result Previous Result In Control Moderate Risk

## Specimen Information

Sample Type	Collection Time	Received Time	Report	Final Report Date
Serum	2023-03-21 00:00 (PDT)	2023-03-23 15:19 (PDT)	Tickborne Diseases 1.0 - P2	2023-03-30 15:42 (PDT)
EDTA	2023-03-21 00:00 (PDT)	2023-03-23 15:19 (PDT)	Tickborne Diseases 1.0 - P2	2023-03-30 15:42 (PDT)



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## INTRODUCTION

Vibrant Wellness is pleased to present Tickborne panel to help you make healthy lifestyle, dietary and treatment choices and aid in the diagnosis of tickborne diseases in consultation with your healthcare provider. The Vibrant Tickborne Diseases panel tests for IgG and IgM antibodies for Borreliosis/Lyme disease as well as co-infection(s) and opportunistic infections with other tick-borne illnesses along with detection of DNA of the species causing these infections.

### Methodology:

The Vibrant Tickborne ImmunoChip test is a semiquantitative assay that detects IgG and IgM antibodies in human serum/DBS for the tickborne microorganisms with multiplexed chemiluminescence immunoassay (CLIA) methodology. The Tickborne PCR Test is a real-time PCR Assay based on probe-based qPCR and RT-qPCR designed for qualitative detection of infectious group-specific DNA in clinical samples.

### Interpretation of Report:

The Tickborne Summary provides concise information on all organisms with representing the list of antigens with positive serology antibody titers that are outside the normal reference range and/or any detected results of the PCR testing for all analytes tested. Reference ranges have been established using a cohort of 2000 apparently healthy individuals. While the summary table provides a quick snapshot of the analytes tested, providers are encouraged to review the comments provided following the summary for a detailed description of the analytes and the tickborne interpretation guideline available in the portal.

This is followed by a complete list of all analytes tested including PCR results IgG and IgM titers for all organisms. For antibody results, the classification of Green denotes a results that is within the normal reference range, the classification of Yellow denotes a result that is moderately elevated titer with respect to the reference range and the classification of Red denotes a result that is elevated with respect to the normal reference range. Additionally, the previous value (if available) is also indicated to help check for improvements every time the test is ordered. The PCR panel reports results as Detected or Not Detected. As with all testing, results should be interpreted considering a patient's history, physical examination, and/or results of other diagnostic testing.

The Vibrant Wellness platform provides tools for you to track and analyze your general wellness profile. Testing for the Tickborne panel is performed by Vibrant America, a CLIA certified lab CLIA#:05D2078809 and Vibrant Genomics, a CLIA certified lab CLIA#: 05D2098445. Vibrant Wellness provides and makes available this report and any related services pursuant to the Terms of Use Agreement (the "Terms") on its website at [www.vibrant-wellness.com](http://www.vibrant-wellness.com). By accessing, browsing, or otherwise using the report or website or any services, you acknowledge that you have read, understood, and agree to be bound by these terms. If you do not agree to these terms, you shall not access, browse, or use the report or website. The statements in this report have not been evaluated by the Food and Drug Administration and are only meant to be lifestyle choices for potential risk mitigation. Please consult your healthcare provider for medication, treatment, diet, exercise, or lifestyle management as appropriate. This product is not intended to diagnose, treat, or cure any disease or condition. Vibrant Wellness does not provide clinical consultations for Lyme Disease treatments.

### Please note:

It is important that you discuss any modifications to your diet, exercise, and nutritional supplementation with your healthcare provider before making any changes

# Tickborne Diseases 1.0 - Summary

Panel Name	Organism	Positive Serology		PCR
		IgG	IgM	
Lyme disease	Borrelia burgdorferi	C6 peptide, p34 (OspB), p39 (BmpA), p41, p83-93		
	Borrelia afzelii	OspA		
	Borrelia garinii	DbpA		
	Borrelia bavariensis	VlsE1		
Other Borrelia species	Other Borrelia species	Borrelia turcica		
Human granulocytic anaplasmosis (HGA)	Anaplasma phagocytophilum	Msp2 (p44)		

## Tickborne Diseases 1.0

### Lyme disease

#### **Borrelia burgdorferi**

*Borrelia burgdorferi* is one of the pathogens of the *Borrelia burgdorferi* sensu lato complex causing Lyme disease. Lyme disease is a zoonotic, vector-borne disease transmitted by the Ixodes tick. Clinical presentation of Lyme disease is known for the characteristic bull's-eye rash (also known as erythema migrans) but can also include myocarditis, cardiomyopathy, arrhythmia, arthritis, arthralgia, meningitis, neuropathies, and facial nerve palsy depending on the stage of infection.

#### **Comment**

**C6 peptide** - C6 peptide refers to the sixth invariant region (C6) of the variable major protein-like sequence-expressed (VlsE) lipoprotein of *B. burgdorferi* may be more sensitive in patients with erythema migrans.

**p34 (OspB)** - Outer surface protein B (OspB) is one of the major proteins in the outer membrane of this *B. burgdorferi*. OspB was found to be critical for *B. burgdorferi* adherence and survival within Ixodes ticks.

**p39 (BmpA)** - *B. burgdorferi* basic membrane protein A (BmpA) localizes to the bacterium's outer membrane. BmpA and its three paralogous proteins, BmpB, BmpC, and BmpD, all bind to laminin in the host's extracellular matrix.

**p41** - *B. burgdorferi* p41 is a flagellar filament 41kD core protein of *B. burgdorferi*. Flagellin is a protein found in the hollow cylinder forming the filament in bacterial flagellum. Its structure is helical, which is important for its function. Studies comparing aflagellate *borrelia* to flagellated indicate that the flagella have a role in the invasion of human tissue.

**p83-93** - *B. burgdorferi* p83-93, also known as p100, is an important immunodominant protein. Comparison of the p83 molecule with sequences from protein databases showed similarities with characteristics of eukaryotic cell structures, therefore p83 is predicted to be involved in the immune escape mechanism of the pathogenic agent of Lyme disease.

#### **Borrelia afzelii**

*Borrelia afzelii* is a species of *Borrelia*, a bacterium that can infect various species of vertebrates and invertebrates. *B. afzelii* and *B. garinii* are the primary causes of Lyme disease in Europe and Asia. Coinfection by this *Borrelia* species with one or more pathogens can occur, carried by the vector, which appears to be in most cases the tick. In Europe the related genospecies *Borrelia afzelii* is associated with both EM and acrodermatitis chronica atrophicans (ACA), and several European studies have found compelling evidence for *B. afzelii* infection in patients with morphea.

#### **Borrelia garinii**

*Borrelia garinii* is a type of spirochete that can cause Lyme disease. *Borrelia garinii* has only been found in ticks in Eurasia. *B. garinii* and species similar to it have been found in hard ticks such as *Ixodes ricinus*, *Ixodes scapularis*, *Ixodes pacificus*, and *Ixodes persulcatus*. These ticks feed on all sorts of mammals, birds, and reptiles. Between one to three weeks after an infected tick bite, most people end up developing a reaction that causes a flat red rash. Common clinical manifestations include a low-grade fever, fatigue, stiff neck, arthritis, and lymphadenopathy. Neurological manifestations are more common with *B. garinii*, while arthritis occurs mostly in cases dealing with *B. burgdorferi*. In a study of a coinfection of *B. burgdorferi* and *B. garinii* on Lyme Borreliosis, the researchers concluded that the coinfection resulted in a more severe form of Lyme disease.

#### **Borrelia bavariensis**

*Borrelia bavariensis*, found in Europe and Asia, is a spirochete belonging to the *Borrelia* group and utilizes rodents as reservoir hosts. Europe *B. bavariensis* strains were frequently associated with Neuroborreliosis. *B. bavariensis* strains were frequently included into the species *B. garinii* in epidemiological and clinical studies in Asia; therefore, their overall medical significance is at present difficult to judge. It is also possible that *B. bavariensis* is divided into an Asian and European subpopulation.

Tickborne Diseases 1.0

Other Borrelia species

Other Borrelia species

The 'Other Borrelia species' encompass a group of spiral-shaped bacteria related to those causing Lyme disease and relapsing fever. These species, including *Borrelia andersonii*, *Borrelia maritima*, *Borrelia californiensis*, *Borrelia bissettiae*, *Borrelia lusitaniae*, *Borrelia valaisiana*, *Borrelia yangtzensis*, and *Borrelia turcica*, are lesser-known compared to *Borrelia burgdorferi*, the primary Lyme disease pathogen, but still pose significant health concerns globally. Typically transmitted by ticks, infections by these *Borrelia* species can result in a range of symptoms, including fever, headache, joint pain, and fatigue. Due to the diversity and non-specific nature of these symptoms, diagnosing infections from these pathogens can be challenging. Recent studies indicate that some of these other *Borrelia* species may be linked to health issues that are not yet fully recognized. Therefore, further research into these species is crucial for public health and disease prevention.

Human granulocytic anaplasmosis (HGA)

Anaplasma phagocytophilum

*Anaplasma phagocytophilum* causes human granulocytic anaplasmosis (HGA). These bacteria are spread to people by tick bites primarily from the blacklegged tick (*Ixodes scapularis*) and the western blacklegged tick (*Ixodes pacificus*). It also causes anaplasmosis in sheep and cattle, also known as tick-borne fever and pasture fever. During the last stage of the infection, a group of small bacteria can be observed within the neutrophils in the blood. Clinical manifestations are fever, headache, leucopenia, thrombocytopenia, and mild injury to the liver.

Comment

**Msp2 (p44)** - *Anaplasma phagocytophilum* MSP2(p44) is the bacterium's major surface protein, encoded by a paralogous gene family and has been implicated in a variety of pathobiological processes, including antigenic variation, host adaptation, adhesion, porin activity, and structural integrity.

# Tickborne Diseases 1.0

PCR					
Lyme disease PCR			Lyme disease PCR		
	Current	Previous		Current	Previous
Borrelia burgdorferi	NOT DETECTED		Borrelia afzelii	NOT DETECTED	
Borrelia garinii	NOT DETECTED		Borrelia bavariensis	NOT DETECTED	
Borrelia spielmanii	NOT DETECTED		Borrelia mayonii	NOT DETECTED	
TBRF PCR			TBRF PCR		
	Current	Previous		Current	Previous
Borrelia hermsii	NOT DETECTED		Borrelia turicatae	NOT DETECTED	
Borrelia lonestari	NOT DETECTED				
Borrelia miyamotoi PCR					
	Current	Previous			
Borrelia miyamotoi	NOT DETECTED				
Other Borrelia species PCR			Other Borrelia species PCR		
	Current	Previous		Current	Previous
Borrelia andersonii	NOT DETECTED		Borrelia maritima	NOT DETECTED	
Borrelia californiensis	NOT DETECTED		Borrelia bissettiae	NOT DETECTED	
Borrelia lusitaniae	NOT DETECTED		Borrelia valaisiana	NOT DETECTED	
Borrelia yangtzensis	NOT DETECTED		Borrelia turcica	NOT DETECTED	
Babesiosis PCR			Babesiosis PCR		
	Current	Previous		Current	Previous
Babesia microti	NOT DETECTED		Babesia duncani	NOT DETECTED	
Bartonella PCR			Bartonella PCR		
	Current	Previous		Current	Previous
Bartonella henselae	NOT DETECTED		Bartonella elizabethae	NOT DETECTED	
Bartonella vinsonii	NOT DETECTED		Bartonella quintana	NOT DETECTED	
HGA PCR			HME PCR		
	Current	Previous		Current	Previous
Anaplasma phagocytophilum	NOT DETECTED		Ehrlichia chaffeensis	NOT DETECTED	

Lyme disease				Reference Range:  In Control: ≤10  Moderate: 10.1-20  Risk: >20		
Borrelia burgdorferi	IgG	Current	IgM	IgG	Previous	IgM
Borrelia burgdorferi VlsE1	8.2		2.6			

# Tickborne Diseases 1.0

## Lyme disease

Reference Range:  In Control: ≤10  Moderate: 10.1-20  Risk: >20

<i>Borrelia burgdorferi</i>	IgG	Current	IgM	IgG	Previous	IgM
<i>Borrelia burgdorferi</i> C6 peptide	13.4		4.1			
<i>Borrelia burgdorferi</i> p18 (DbpB)	3.0		3.3			
<i>Borrelia burgdorferi</i> p23-25 (OspC)	8.5		3.0			
<i>Borrelia burgdorferi</i> p28	5.2		3.6			
<i>Borrelia burgdorferi</i> p30	9.1		3.7			
<i>Borrelia burgdorferi</i> p31 (OspA)	2.9		2.5			
<i>Borrelia burgdorferi</i> p34 (OspB)	13.2		2.9			
<i>Borrelia burgdorferi</i> p39 (BmpA)	17.6		3.3			
<i>Borrelia burgdorferi</i> p41	11.6		3.9			
<i>Borrelia burgdorferi</i> p45	4.8		3.7			
<i>Borrelia burgdorferi</i> p58	4.2		3.0			
<i>Borrelia burgdorferi</i> p66	4.9		2.8			
<i>Borrelia burgdorferi</i> p83-93	11.9		1.5			
<i>Borrelia burgdorferi</i> crude extract B31	2.9		3.1			
<i>Borrelia burgdorferi</i> 297 strain WCS	3.4		2.9			
<i>Borrelia mayonii</i>	IgG	Current	IgM	IgG	Previous	IgM
<i>Borrelia mayonii</i>	3.2		1.7			
<i>Borrelia afzelii</i>	IgG	Current	IgM	IgG	Previous	IgM
<i>Borrelia afzelii</i> BmpA	5.2		2.1			
<i>Borrelia afzelii</i> DbpA	5.0		2.8			
<i>Borrelia afzelii</i> OspA	13.5		2.4			
<i>Borrelia afzelii</i> OspC	9.8		2.1			
<i>Borrelia afzelii</i> p100	4.4		2.7			

# Tickborne Diseases 1.0

## Lyme disease

Reference Range: In Control: ≤10 Moderate: 10.1-20 Risk: >20

Borrelia garinii	IgG	Current	IgM	IgG	Previous	IgM
Borrelia garinii DbpA	14.1		1.7			
Borrelia garinii OspC	2.4		1.4			
Borrelia bavariensis	IgG	Current	IgM	IgG	Previous	IgM
Borrelia bavariensis DbpA	4.8		2.0			
Borrelia bavariensis p58	3.8		2.8			
Borrelia bavariensis VlsE1	13.8		2.4			
Borrelia spielmanii	IgG	Current	IgM	IgG	Previous	IgM
Borrelia spielmanii DbpA	3.0		1.5			
Borrelia spielmanii OspC	7.5		1.5			

## Tick Borne Relapsing Fever (TBRF)

Reference Range: In Control: ≤10 Moderate: 10.1-20 Risk: >20

Borrelia hermsii	IgG	Current	IgM	IgG	Previous	IgM
Borrelia hermsii	3.1		1.8			
Borrelia turicatae	IgG	Current	IgM	IgG	Previous	IgM
Borrelia turicatae	6.5		3.0			

## Borrelia miyamotoi disease

Reference Range: In Control: ≤10 Moderate: 10.1-20 Risk: >20

Test Name	IgG	Current	IgM	IgG	Previous	IgM
Borrelia miyamotoi	9.4		3.4			

## Other Borrelia species

Reference Range: In Control: ≤10 Moderate: 10.1-20 Risk: >20

Test Name	IgG	Current	IgM	IgG	Previous	IgM
Borrelia andersonii	7.5		3.1			
Borrelia maritima	4.3		1.8			
Borrelia californiensis	4.4		2.5			
Borrelia bissettiae	3.8		2.1			



# Tickborne Diseases 1.0

## Other Borrelia species

Reference Range: In Control: ≤10 Moderate: 10.1-20 Risk: >20

Test Name	IgG	Current	IgM	IgG	Previous	IgM
Borrelia lusitaniae	5.5		2.4			
Borrelia valaisiana	4.2		2.0			
Borrelia yangtzensis	6.5		2.5			
Borrelia turcica	14.2		1.7			

## Babesiosis

Reference Range: In Control: ≤10 Moderate: 10.1-20 Risk: >20

Babesia microti	IgG	Current	IgM	IgG	Previous	IgM
Babesia microti IRA	4.4		1.9			
Babesia microti p32	8.9		2.9			
Babesia microti p41	3.9		1.7			
Babesia microti WCS	3.2		1.5			
Babesia duncani	IgG	Current	IgM	IgG	Previous	IgM
Babesia duncani	3.6		1.6			

## Bartonella infection

Reference Range: In Control: ≤10 Moderate: 10.1-20 Risk: >20

Bartonella henselae	IgG	Current	IgM	IgG	Previous	IgM
Bartonella henselae 17 kDa	4.3		2.2			
Bartonella henselae 26 kDa	5.0		1.8			
Bartonella henselae SucB	5.9		1.8			
Bartonella elizabethae	IgG	Current	IgM	IgG	Previous	IgM
Bartonella elizabethae	6.8		2.1			
Bartonella vinsonii	IgG	Current	IgM	IgG	Previous	IgM
Bartonella vinsonii	7.3		1.9			
Bartonella quintana	IgG	Current	IgM	IgG	Previous	IgM
Bartonella quintana	6.6		2.3			

# Tickborne Diseases 1.0

Human granulocytic anaplasmosis (HGA)				Reference Range: <span>In Control: ≤10</span> <span>Moderate: 10.1-20</span> <span>Risk: &gt;20</span>		
Anaplasma phagocytophilum	IgG	Current	IgM	IgG	Previous	IgM
Anaplasma phagocytophilum Msp5	4.0		2.5			
Anaplasma phagocytophilum Msp2 (p44)	19.8		3.0			
Anaplasma phagocytophilum OmpA	3.6		2.1			

Human Monocytic Ehrlichiosis (HME)				Reference Range: <span>In Control: ≤10</span> <span>Moderate: 10.1-20</span> <span>Risk: &gt;20</span>		
Ehrlichia chaffeensis	IgG	Current	IgM	IgG	Previous	IgM
Ehrlichia chaffeensis	7.1		2.6			

## Risk and Limitations

This test has been developed and its performance characteristics determined by Vibrant America LLC., a CLIA certified lab and Vibrant Genomics, a CLIA certified lab. These assays have not been cleared or approved by the U.S. Food and Drug Administration. Vibrant Wellness provides additional contextual information on these tests and provides the report in a more descriptive fashion.

Clinical history and current symptoms of the individual must be considered by the healthcare provider prior to any interventions. Test results should be used as one component of a healthcare provider's clinical assessment.

Vibrant Tickborne panel testing is performed at Vibrant America, a CLIA and CAP certified laboratory utilizing ISO-13485 developed technology and Vibrant Genomics, a CLIA certified laboratory. Vibrant America and Vibrant Genomics have effective procedures in place to protect against technical and operational problems. However, such problems may still occur. Examples include failure to obtain the result for a specific test due to circumstances beyond Vibrant's control. Vibrant may re-test a sample to obtain these results but upon re-testing the results may still not be obtained. As with all medical laboratory testing, there is a small chance that the laboratory could report incorrect results. A tested individual may wish to pursue further testing to verify any results.

It should be realized that there are possible sources of error like any lab testing which include sample misidentification, trace contamination of PCR reactions, technical errors and rare genetic variants that may interfere with analysis.

Some individuals may feel anxious about getting their test health results. If the potential user feels very anxious, such user should speak to his or her doctor or other health care professional prior to collection of a sample for testing. Users should consult with their doctor or other health care professional if they have any questions or concerns about the results of their test or their current state of health. Users of the test are also encouraged to discuss their test results with a genetic counselor, board-certified clinical molecular geneticist, or equivalent health care professional.

The information in this report is intended for educational purposes only. While every attempt has been made to provide current and accurate information, neither the author nor the publisher can be held accountable for any errors or omissions. Tested individuals may find their experience is not consistent with Vibrant's selected peer reviewed scientific research findings of relative improvement for study groups. The science in this area is still developing and many personal health factors affect diet and health. Since subjects in the scientific studies referenced in this report may have had personal health and other factors different from those of tested individuals, results from these studies may not be representative of the results experienced by tested individuals. Further, some recommendations may or may not be attainable, depending on the tested individual's physical ability or other personal health factors. A limitation of this testing is that many of these scientific studies may have been performed in selected populations only. The interpretations and recommendations are done in the context of these studies, but the results may or may not be relevant to tested individuals of different or mixed ethnicities.

Vibrant Wellness makes no claims as to the diagnostic or therapeutic use of its tests or other informational materials. Vibrant Wellness reports and other information do not constitute medical advice and are not a substitute for professional medical advice. Please consult your healthcare practitioner for questions regarding test results, or before beginning any course of medication, supplementation, or dietary changes.