PATIENT

NAME: **TEST2 PATIENT** GENDER: **Male**
DATE OF BIRTH: **01/22/2003** AGE: **19**

, SAN CARLOS, CA- 94070.

ACCESSION ID: **2203230004**
SPECIMEN COLLECTION TIME: **03-22-2022 09:50**
SPECIMEN RECEIVED TIME: **03-23-2022 03:50**
FINAL REPORT TIME: **03-23-2022 09:51**
FASTING: **FASTING**

PROVIDER

PRACTICE NAME: **Vibrant IT4 Practice**
PROVIDER NAME: **Demo Client, DDD (999994)**
ADDRESS: **TEST STREET, TEST CITY, KY- 42437.**

Your **Vibrant Wellness TickBorne panel** results are enclosed. These results are intended to aid in the diagnosis of tickborne diseases by 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. The Vibrant Immunochip test is a semiquantitative assay that detects IgG and IgM antibodies in human serum. The PCR Test is a real-time PCR Assay designed for qualitative detection of infectious group- specific DNA in clinical samples.

Interpretation of Report: The test results of antibody levels to the individual antigens are calculated by comparing the average intensity of the individual antibody to that of a reference population and cut-off chosen for each protein. Reference ranges have been established using a well characterized set of more than 300 serum samples and antibodies to specific bacteria tested. The results are displayed as In Control (<= 10.0), Moderate (10.1 ~ 20.0), or High (>= 20.1) for each antigen tested. The PCR panel reports results as Detected or Not Detected.For each species tested Interpretation for the results is obtained by using all the antigens tested and provided below the panel results. As with all testing, results should be interpreted in light of a patient's history, physical examination, and/or results of other diagnostic testing

The Test Summary page at the start of the report shows the antigens for which positivity was seen in the patient serum across IgG and IgM respectively, the additional column labelled PCR shows the results of the nucleic acid testing as well. While the summary report provides a quick snapshot of the complete test, providers are encouraged to review the complete detailed report for more description on the analytes themselves.

Test interpretation for Borrelia burgdorferi based on multiple bands is reported according to the CDC/IDSA criteria as well as Alternate criteria established by running clinical samples. By CDC criteria Lyme IgM is reported positive if VlsE1 or C6 peptide or WCS (Whole cell sonicate) is positive and two of the following three antigens are positive: 23-25kDa, 39kDa and 41kDa. In the alternate criteria IgM is reported positive if VlsE1 or C6 peptide or WCS (Whole cell sonicate) is borderline or positive and any two of the following antigens are borderline or positive: 23-25kDa, 31kDa, 34kDa, 39kDa, 41kDa and 83-93kDa. This interpretation is based on internal validation studies.

Similarly, by CDC criteria Lyme IgG is reported positive if VlsE1 or C6 peptide or WCS (Whole cell sonicate) is positive and any five of the following ten antigens are positive: 18kDa, 23-25kDa, 28kDa, 30kDa, 39kDa, 41kDa, 45kDa, 58kDa, 66kDa and 83-93kDa. In the alternate criteria IgG is reported positive if VlsE1 or C6 peptide or WCS is borderline or positive and two of the following antigens are borderline or positive: 18kDa, 23-25kDa, 28kDa, 30kDa, 31kDa, 34kDa, 39kDa, 41kDa, 45kDa, 58kDa, 66kDa and 83-93kDa. The alternate criteria are based on internal validation studies.

The Vibrant Wellness platform provides tools for you to track and analyze your general wellness profile. Testing for the TickBorne Diseases panel is performed by Vibrant America, a CLIA certified lab CLIA#:05D2078809 and Vibrant Genomics LLC, 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. 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 accept 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 physician for medication, treatment, or lifestyle management. This product is not intended to diagnose, treat, or cure any disease.

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Tick Borne Summary

Panel Name	Organism	Positive Serology		PCR
		IGG	IGM	
Lyme disease	Borrelia burgdorferi	VlsE1,p28,p30,p34 (OspB),p39 (BmpA),p45,p58,297 strain WCS		
	Borrelia mayonii	Borrelia mayonii		
	Borrelia afzelii	BmpA		
	Borrelia garinii	DbpA		
Bartonella infection	Bartonella henselae	26 kDa,SucB	SucB	POSITIVE
Cytomegalovirus	Cytomegalovirus	GlyB,p52		

Serology Reference Range

In control	Moderate	High
<= 10.0	10.1 ~ 20.0	>= 20.1

PCR reference range

Detected or Not Detected

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PATIENT	TEST2	MALE	2003-01-22	2203230004	03-22-2022 09:50

Lyme disease - Borrelia burgdorferi

Borreliella burgdorferi is one of the pathogens of the Borreliella 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, arrythmia, arthritis, arthralgia, meningitis, neuropathies, and facial nerve palsy depending on the stage of infection.

Test Name	IgG		IgM	
	Current	Previous (02/23/2022)	Current	Previous (02/23/2022)
Borrelia burgdorferi VlsE1	20.0	1.0	5.0	20.0
Borrelia burgdorferi C6 peptide	6.0	1.0	6.0	2.0
Borrelia burgdorferi p18 (DbpB)	5.0	1.0	8.0	8.0
Borrelia burgdorferi p23-25 (OspC)	3.0	9.0	7.0	30.0
Borrelia burgdorferi p28	30.0	1.0	4.0	5.0
Borrelia burgdorferi p30	20.0	1.0	3.0	3.0
Borrelia burgdorferi p31 (OspA)	5.0	8.0	6.0	2.0
Borrelia burgdorferi p34 (OspB)	30.0	8.0	8.0	8.0
Borrelia burgdorferi p39 (BmpA)	20.0	5.0	6.0	20.0
Borrelia burgdorferi p41	2.0	<0.1	7.0	30.0
Borrelia burgdorferi p45	20.0	4.0	2.0	9.0
Borrelia burgdorferi p58	30.0	6.0	6.0	6.0
Borrelia burgdorferi p66	4.0	8.0	4.0	5.0
Borrelia burgdorferi p83-93	3.0	8.0	8.0	2.0
Borrelia burgdorferi B31 strain WCS	9.0	7.0	7.0	1.0
Borrelia burgdorferi 297 strain WCS	30.0	4.0	6.0	5.0

Test Name	IgG		IgM	
	Current	Previous (02/23/2022)	Current	Previous (02/23/2022)
CDC/IDSA Lyme Criteria	NEGATIVE	NEGATIVE	NEGATIVE	NEGATIVE
Alternative Lyme Criteria	POSITIVE	NEGATIVE	NEGATIVE	POSITIVE

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Comments

Variable major protein like sequence E1 protein (VlsE1) is a borrelial surface protein which is the most sensitive protein for IgG antibody detection in all stages of Lyme disease. It is particularly valuable for diagnosis of Lyme disease during early manifestations (EM and acute neuroborreliosis).

The protein B. burgdorferi p28, also known as Oms28, is considered to play an important role in host-pathogen interaction of Lyme disease. First it was classified as an integral membrane protein, but investigation of the secondary structure suggests that it is a periplasmic protein associated with the outer membrane.

Immunofluorescence studies showed that antibodies against the outer surface protein p30 are recognized in Lyme borreliosis patients. P30 expression could be detected in representatives of all 3 subspecies of B. burgdorferi sensu lato, but not in all of the tested strains. We conclude that P30 is a putative substrate-binding protein of B. burgdorferi and is immunologically recognized in human and murine Lyme borreliosis.

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.

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.

B. burgdorferi p45 localizes to the outer membrane of B. burgdorferi. It has shown significant diagnostic value for Lyme disease while its function is still under investigation.

B. burgdorferi p58's functional domain is predicted to be in periplasmic oligopeptide-binding proteins, suggesting a role in the transport of solutes across the cytoplasmic membrane. It has shown significant diagnostic value for Lyme disease while its function is still under investigation.

Lyme disease - Borrelia mayonii

Borrelia mayonii is a recently found bacteria that has been shown to cause Lyme disease in North America. It has been reported primarily in the Upper Midwest region of the United States. B. mayonii has been found in blacklegged ticks collected in northwestern Wisconsin and Minnesota. The blacklegged tick can also transmit B. burgdorferi (the bacteria that causes almost all Lyme disease infections in the United States), and the germs that cause anaplasmosis, babesiosis, and Powassan virus disease.

Test Name	IgG		IgM	
	Current	Previous (02/23/2022)	Current	Previous (02/23/2022)
Borrelia mayonii	30.0	20.0	10.0	<0.1

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.

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Test Name	IgG		IgM	
	Current	Previous (02/23/2022)	Current	Previous (02/23/2022)
Borrelia afzelii BmpA	30.0	2.0	8.0	3.0
Borrelia afzelii DbpA	1.0	6.0	7.0	9.0
Borrelia afzelii OspA	5.0	7.0	9.0	10.0
Borrelia afzelii OspC	1.0	8.0	1.0	7.0
Borrelia afzelii p100	10.0	1.0	7.0	5.0

Lyme disease - 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.

Test Name	IgG		IgM	
	Current	Previous (02/23/2022)	Current	Previous (02/23/2022)
Borrelia garinii DbpA	20.0	7.0	<0.1	6.0
Borrelia garinii OspC	<0.1	10.0	10.0	6.0

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.

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Test Name	IgG		IgM	
	Current	Previous (02/23/2022)	Current	Previous (02/23/2022)
Borrelia bavariensis DbpA	<0.1	10.0	2.0	9.0
Borrelia bavariensis p58	10.0	6.0	7.0	<0.1
Borrelia bavariensis VlsE1	10.0	8.0	8.0	8.0

Lyme disease - Borrelia spielmanii

Borreliella spielmanii is a gram-negative bacterium belonging to the pathogens of the B. burgdorferi sensu lato complex causing Lyme disease. B. spielmani has an exceptionally narrow host specificity for a particular reservoir and differentiates it from all other Lyme disease. B. spielmani was detected in ticks feeding on garden and hazel dormice, in questing ticks, and in patients in France, Germany, The Netherlands, and the Czech Republic. It is one of the several species that have been less frequently isolated from symptomatic patients.

Test Name	IgG		IgM	
	Current	Previous (02/23/2022)	Current	Previous (02/23/2022)
Borrelia spielmanii DbpA	8.0	5.0	3.0	6.0
Borrelia spielmanii OspC	2.0	<0.1	9.0	3.0

Lyme disease PCR

Test Name	Current Result	Previous Result (02/23/2022)
Borrelia burgdorferi	NOT DETECTED	NOT DETECTED
Borrelia mayonii	NOT DETECTED	NOT DETECTED
Borrelia afzelii	NOT DETECTED	NOT DETECTED
Borrelia garinii	NOT DETECTED	NOT DETECTED
Borrelia bavariensis	NOT DETECTED	NOT DETECTED
Borrelia spielmanii	NOT DETECTED	NOT DETECTED

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Tick Borne Relapsing Fever (TBRF) - Borrelia hermsii

Borrelia hermsii is the primary cause of tick-borne relapsing fever in western North America. It is a rodent-associated spirochete transmitted by the fast-feeding soft tick Ornithodoros hermsii. B. hermsii undergoes multiphasic antigenic variation through gene conversion of a unique expression site on a linear plasmid by an archived variable antigen gene.

Test Name	IgG		IgM	
	Current	Previous (02/23/2022)	Current	Previous (02/23/2022)
Borrelia hermsii	8.0	9.0	7.0	3.0

Tick Borne Relapsing Fever (TBRF) - Borrelia turicatae

Borrelia turicatae is the primary cause of tick-borne relapsing fever in southwestern United States. It is transmitted by the vector, Ornithodoros turicata, an extremely fast feeder among ticks, making it difficult to track transmission. O. turicata can be found in caves and ground squirrel or prairie dog burrows in the Plains regions of the Southwest. The epidemiological evidence for B. turicatae causing human infections is strong. Along with fever, patients may experience an incredible range of nonspecific symptoms. The clinical features of relapsing fever may include recurring febrile episodes, chills, nausea, headache, muscle and joint aches, vomiting, lethargy, thrombocytopenia, etc.

Test Name	IgG		IgM	
	Current	Previous (02/23/2022)	Current	Previous (02/23/2022)
Borrelia turicatae	1.0	1.0	2.0	2.0

TBRF PCR

Test Name	Current Result	Previous Result (02/23/2022)
Borrelia hermsii	NOT DETECTED	NOT DETECTED
Borrelia turicatae	NOT DETECTED	NOT DETECTED
Borrelia lonestari	NOT DETECTED	NOT DETECTED

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Borrelia miyamotoi disease

Borrelia miyamotoi is a type of spiral-shaped bacteria that is closely related to the bacteria that cause tickborne relapsing fever (TBRF). It is more distantly related to the bacteria that cause Lyme disease. First identified in 1995 in ticks from Japan, B. miyamotoi has since been detected in two types of North American ticks, the blacklegged or “deer” tick (Ixodes scapularis) and the Western blacklegged tick (Ixodes pacificus). These ticks are already known to spread the germs that cause several diseases, including Lyme disease and anaplasmosis. Clinical manifestations are fever, chills, and headache. Other common symptoms included body and joint pain and fatigue. Fewer than 1 in 10 patients would develop a rash.

Test Name	IgG		IgM	
	Current	Previous (02/23/2022)	Current	Previous (02/23/2022)
Borrelia miyamotoi	9.0	2.0	6.0	2.0

Borrelia miyamotoi PCR

Test Name	Current Result	Previous Result (02/23/2022)
Borrelia miyamotoi	NOT DETECTED	NOT DETECTED

Other Borrelia species

Test Name	IgG		IgM	
	Current	Previous (02/23/2022)	Current	Previous (02/23/2022)
Borrelia andersonii	<0.1	1.0	<0.1	1.0
Borrelia maritima	<0.1	1.0	<0.1	1.0
Borrelia californiensis	<0.1	1.0	<0.1	1.0
Borrelia bissettiae	<0.1	1.0	<0.1	1.0
Borrelia lusitaniae	<0.1	1.0	<0.1	1.0
Borrelia valaisiana	<0.1	1.0	<0.1	1.0
Borrelia yangtzensis	<0.1	1.0	<0.1	1.0
Borrelia turcica	<0.1	1.0	<0.1	1.0

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Other Borrelia species PCR

Test Name	Current Result	Previous Result (02/23/2022)
Borrelia andersonii	NOT DETECTED	NOT DETECTED
Borrelia maritima	NOT DETECTED	NOT DETECTED
Borrelia californiensis	NOT DETECTED	NOT DETECTED
Borrelia bissettiae	NOT DETECTED	NOT DETECTED
Borrelia lusitaniae	NOT DETECTED	NOT DETECTED
Borrelia valaisiana	NOT DETECTED	NOT DETECTED
Borrelia yangtzensis	NOT DETECTED	NOT DETECTED
Borrelia turcica	NOT DETECTED	NOT DETECTED

Babesiosis - Babesia microti

Babesia microti, the primary agent of human babesiosis in the United States. The B. microti life cycle involves two hosts, which includes a rodent, primarily the white-footed mouse, Peromyscus leucopus, and a tick in the genus, Ixodes, the same tick species that vectors Lyme disease. Cases of babesiosis caused by B. microti occur in southern New England and the northern Midwest. Early clinical manifestations are intermittent fevers accompanied by fatigue and malaise, headache, chills, and myalgias. Nausea, vomiting, reduced appetite, and depression can also occur. Coinfection with Lyme disease or anaplasmosis may complicate the clinical presentation and predispose the patient to more severe disease.

Test Name	IgG		IgM	
	Current	Previous (02/23/2022)	Current	Previous (02/23/2022)
Babesia microti IRA	3.0	5.0	1.0	9.0
Babesia microti p32	5.0	9.0	3.0	3.0
Babesia microti p41	1.0	5.0	3.0	9.0
Babesia microti WCS	7.0	7.0	1.0	8.0

Babesiosis - Babesia duncani

Babesia duncani is an etiological agent of Babesiosis in the United States and Canada, primarily identified on the West Coast. Babesiosis is a malaria-like illness wherein erythrocytes are infected and damaged by the protozoan parasite. Most infections are probably asymptomatic, as indicated by serologic surveys. Manifestations of disease include fever, chills, sweating, myalgias, fatigue, hepatosplenomegaly, and hemolytic anemia. Symptoms typically occur after an incubation period of 1 to 4 weeks and can last several weeks. The disease is more severe in patients who are immunosuppressed, splenectomized, and/or elderly.

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Test Name	IgG		IgM	
	Current	Previous (02/23/2022)	Current	Previous (02/23/2022)
Babesia duncani	1.0	5.0	1.0	2.0

Babesiosis PCR

Test Name	Current Result	Previous Result (02/23/2022)
Babesia microti	NOT DETECTED	NOT DETECTED
Babesia duncani	NOT DETECTED	NOT DETECTED

Bartonella infection - Bartonella henselae

Bartonella henselaeis, a member of the genus Bartonella, is a proteobacterium that is the causative agent of Bartonellosis, including Cat Scratch Disease (CSD) and Bacillary Angiomatosis (BA). Most bartonellosis is transmitted to humans by companion animals (dogs and cats), typically through a bite or scratch. B. henselae infection can appear up to ten days after exposure to the microbe. Symptoms start with a papule at the site the microbe enters, followed by lymphadenopathy, usually in the axillary node. Half of patients also get aches, nausea, abdominal pain, and malaise.

Test Name	IgG		IgM	
	Current	Previous (02/23/2022)	Current	Previous (02/23/2022)
Bartonella henselae 17 kDa	10.0	8.0	10.0	20.0
Bartonella henselae 26 kDa	20.0	4.0	10.0	20.0
Bartonella henselae SucB	20.0	1.0	20.0	20.0

Comments

Dihydrolipoamide-succinyltransferase (SucB), an enzyme of the alpha-ketoglutarate dehydrogenase complex, has been shown to be an immunogenic protein during infections by Brucella melitensis, Coxiella burnetii and Bartonella vinsonii.

The p26 protein is an immunodominant antigen that is expressed during infection in cats as a preprotein and is subsequently cleaved to form mature P26. It has been recognized as an immunoreactive protein by the humoral immune system during infection with B. henselae.

Bartonella infection - Bartonella elizabethae

Bartonella elizabethae, a member of the genus Bartonella, is a proteobacterium that is the causative agent of Bartonellosis. A human case of valvular endocarditis led to the discovery of this particular bartonella species. It is important to note that based on available literature this is not as common as bartonella henselae. Bartonella elizabethae is primarily associated with rats and mice and is a known human pathogen. Symptoms range from mild fever to endocarditis in extreme cases.

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Test Name	IgG		IgM	
	Current	Previous (02/23/2022)	Current	Previous (02/23/2022)
Bartonella elizabethae	5.0	1.0	1.0	8.0

Bartonella infection - Bartonella vinsonii

Bartonella vinsonii, a member of the genus Bartonella, is a proteobacterium that is the causative agent of Bartonellosis. The pathogen has been isolated in immunocompetent patients with endocarditis, arthritis, neurological disease and neoplasia . From animal studies it appears that Bartonella henselae is well adapted to felines or cats while Bartonella vinsonii is well adapted to canines or dogs though each species can infect both.

Test Name	IgG		IgM	
	Current	Previous (02/23/2022)	Current	Previous (02/23/2022)
Bartonella vinsonii	9.0	6.0	4.0	3.0

Bartonella infection - Bartonella quintana

Bartonella quintana, a member of the genus Bartonella, is a proteobacterium that is the causative agent of trench fever. The infection was first documented in soldiers during World War I, but has now been seen Europe, Asia, and North Africa. It is mainly transmitted via the human body louse while tickborne transmission is not clearly established.

Test Name	IgG		IgM	
	Current	Previous (02/23/2022)	Current	Previous (02/23/2022)
Bartonella quintana	3.0	1.0	8.0	3.0

Bartonella PCR

Test Name	Current Result	Previous Result (02/23/2022)
Bartonella henselae	DETECTED	NOT DETECTED
Bartonella elizabethae	NOT DETECTED	NOT DETECTED
Bartonella vinsonii	NOT DETECTED	DETECTED
Bartonella quintana	NOT DETECTED	NOT DETECTED

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PATIENT	TEST2	MALE	2003-01-22	2203230004	03-22-2022 09:50

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.

Test Name	IgG		IgM	
	Current	Previous (02/23/2022)	Current	Previous (02/23/2022)
Anaplasma phagocytophilum Msp5	7.0	7.0	<0.1	3.0
Anaplasma phagocytophilum Msp2 (p44)	9.0	7.0	6.0	8.0
Anaplasma phagocytophilum OmpA	10.0	1.0	5.0	6.0

HGA PCR

Test Name	Current Result	Previous Result (02/23/2022)
Anaplasma phagocytophilum	NOT DETECTED	NOT DETECTED

Human Monocytic Ehrlichiosis (HME) - Ehrlichia chaffeensis

Ehrlichia chaffeensis may cause Human Monocytic Ehrlichiosis (HME), an infection transmitted to humans by the bite of the lone star tick Amblyomma americanum. Unlike Lyme disease, ehrlichiosis is considered an acute infection without chronic long-term consequences. Clinical manifestations of HME can range from mild to life-threatening depending on the patient's age and general health and often includes fever, severe headaches, malaise, muscle pains, and chills. A rash may appear in some HME cases but is usually not associated with the site of the tick bite. Ehrlichiosis may produce severe symptoms requiring immediate antibiotic treatment for elderly patients and others with compromised immune systems.

Test Name	IgG		IgM	
	Current	Previous (02/23/2022)	Current	Previous (02/23/2022)
Ehrlichia chaffeensis	4.0	10.0	5.0	6.0

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PATIENT	TEST2	MALE	2003-01-22	2203230004	03-22-2022 09:50

HME PCR

Test Name	Current Result	Previous Result (02/23/2022)
Ehrlichia chaffeensis	NOT DETECTED	NOT DETECTED

Rickettsial disease - Rickettsia typhi

Rickettsia typhi is the etiological agent of murine typhus. R. typhi is transmitted primarily by the rat flea, Xenopsylla cheopis. Lice and mites can be potential vectors and rodents, shrews, opossums, cats can be reservoir. The clinical manifestations of murine typhus are usually less severe than those of epidemic typhus and includes persistent headache, a high-grade fever, and a cutaneous rash predominating on the trunk. Murine typhus usually takes a prolonged incubation period and the characteristic rash is occasionally absent. An antibody response is usually detected only after 10 days from the onset of systemic symptoms, and antibody titers reach a peak after 3 to 4 weeks or later if an antibiotic therapy has been administered.

Test Name	IgG		IgM	
	Current	Previous (02/23/2022)	Current	Previous (02/23/2022)
Rickettsia typhi OmpB	6.0	5.0	9.0	3.0
Rickettsia typhi Surface antigen	7.0	3.0	3.0	8.0

Rickettsial disease PCR

Test Name	Current Result	Previous Result (02/23/2022)
Rickettsia typhi	NOT DETECTED	NOT DETECTED
Rickettsia rickettsii	DETECTED	NOT DETECTED

Powassan Virus

Powassan virus (POWV) is a Flavivirus transmitted by ticks. Powassan virus disease is extremely rare. Most cases in the United States occur in the northeast and Great Lakes regions from late spring through mid-fall when ticks are most active. It can cause encephalitis, an infection of the brain in extreme cases. The transmission of Powassan virus can happen as soon as 15 minutes after the bite of a tick unlike some of the other tickborne pathogens. Common symptoms that have been documented include headaches, lack of coordination, fever, vomiting, muscle weakness, memory problems, and seizures.

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Test Name	IgG		IgM	
	Current	Previous (02/23/2022)	Current	Previous (02/23/2022)
Powassan Virus	6.0	3.0	2.0	2.0

Powassan Virus PCR

Test Name	Current Result	Previous Result (02/23/2022)
Powassan virus	NOT DETECTED	NOT DETECTED

Tickborne Encephalitis Virus

Tickborne Encephalitis Virus is a flavivirus and a prominent pathogenic agent in Europe and Asia, that is known to affect the central nervous system. According to the CDC the incubation period is generally 7 to 14 days. Symptoms associated with this disease include headache, nausea, vomiting, muscle aches and fever.

Test Name	IgG		IgM	
	Current	Previous (02/23/2022)	Current	Previous (02/23/2022)
Tickborne Encephalitis Virus	2.0	4.0	1.0	2.0

Tickborne Encephalitis Virus PCR

Test Name	Current Result	Previous Result (02/23/2022)
Tickborne encephalitis virus	DETECTED	NOT DETECTED

West Nile Virus

West Nile Virus is an infectious agent commonly spread by mosquito bites. Most people infected with WNV do not feel sick. About 1 in 5 people who are infected develop a fever and other symptoms. About 1 out of 150 infected people develop a serious, sometimes fatal, illness.

LAST NAME	FIRST NAME	GENDER	DATE OF BIRTH	ACCESSION ID	DATE OF SERVICE
PATIENT	TEST2	MALE	2003-01-22	2203230004	03-22-2022 09:50

Test Name	IgG		IgM	
	Current	Previous (02/23/2022)	Current	Previous (02/23/2022)
West Nile Virus	5.0	7.0	10.0	1.0

West Nile Virus PCR

Test Name	Current Result	Previous Result (02/23/2022)
West Nile Virus	NOT DETECTED	NOT DETECTED

Chlamydophila pneumoniae

Chlamydia pneumoniae may cause respiratory tract infections, such as pneumonia (lung infection), by damaging the lining of the respiratory tract. C. pneumoniae is commonly spread by coughing or sneezing, which creates small respiratory droplets that contain the bacteria. People can also get sick if they touch something with droplets from a sick person on it and then touch their mouth or nose. The incubation period of C. pneumoniae infection is around 21 days, and such symptoms as cough and malaise show a gradual onset yet may persist for several weeks or months despite appropriate antibiotic therapy. North American guidelines recommend the antimicrobial treatment of patients with acute C. pneumoniae respiratory infection.

Test Name	IgG		IgM	
	Current	Previous (02/23/2022)	Current	Previous (02/23/2022)
Chlamydophila pneumoniae	2.0	10.0	5.0	3.0

Chlamydophila pneumoniae PCR

Test Name	Current Result	Previous Result (02/23/2022)
Chlamydophila pneumoniae	NOT DETECTED	NOT DETECTED

Coxsackie Virus

Coxsackie virus is an enterovirus that can be transmitted during a tick's bite. Enteroviruses are very small viruses in the intestinals and the stool. There are 2 main groups of coxsackie viruses: type A and type B. Coxsackie viruses can result in all sorts of symptoms varying from only a fever to sore throat, diarhea, vomitting, rash, muscle pains, liver inflammation and inflammation of the heart sack. Coxsackie viral infections can be fatal for babies and children for causing meningitis, blood poisoning or pneumonia. Coxsackie virus is also the causing agent for hand foot and mouth disease. One of the clinical pictures caused by the virus is called Bornoholm disease. In this syndrome the pleura is infected (pleuritis) which results in severe chest pains that can come in seizures.

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PATIENT	TEST2	MALE	2003-01-22	2203230004	03-22-2022 09:50

Test Name	IgG		IgM	
	Current	Previous (02/23/2022)	Current	Previous (02/23/2022)
Coxsackie Virus	2.0	2.0	9.0	3.0

Coxsackie Virus PCR

Test Name	Current Result	Previous Result (02/23/2022)
Coxsackie Virus	NOT DETECTED	NOT DETECTED

Mycoplasma pneumoniae

Co-infection with Mycoplasma spp. (Mycoplasma fermentans, Mycoplasma hominis, Mycoplasma pneumoniae or Mycoplasma penetrans) can be present in a subset of Lyme disease patients. Mycoplasma is a ubiquitous intracellular pleomorphic gram-negative bacterium. They are naturally resistant to antibiotics that target cell wall synthesis such as beta-lactam antibiotics due to the lack of a cell wall around their cell membranes. Mycoplasma spp. are believed to be the smallest bacterial cells and they can survive without oxygen. Mycoplasmal infections not only complicates the diagnosis and treatment of Lyme disease, but also independently cause many of the signs and symptoms. Mycoplasma spp. are only rarely found in the blood and can be found at intracellular locations in various tissues.

Test Name	IgG		IgM	
	Current	Previous (02/23/2022)	Current	Previous (02/23/2022)
Mycoplasma pneumoniae	7.0	9.0	7.0	8.0

Mycoplasma pneumoniae PCR

Test Name	Current Result	Previous Result (02/23/2022)
Mycoplasma pneumoniae	NOT DETECTED	NOT DETECTED

Cytomegalovirus

Cytomegalovirus is a common virus that infects people of all ages. Around 80% of adults in the United States are infected with virus. This virus has the ability to remain alive yet dormant for the life of the human host, but it can become active when the immune system is weakened , .

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PATIENT	TEST2	MALE	2003-01-22	2203230004	03-22-2022 09:50

Test Name	IgG		IgM	
	Current	Previous (02/23/2022)	Current	Previous (02/23/2022)
Cytomegalovirus EIA Antigen	3.0	6.0	10.0	1.0
Cytomegalovirus GlyB	20.0	20.0	6.0	8.0
Cytomegalovirus p150	4.0	9.0	9.0	<0.1
Cytomegalovirus p28	5.0	8.0	6.0	6.0
Cytomegalovirus p52	30.0	20.0	10.0	2.0
Cytomegalovirus p65	<0.1	1.0	<0.1	1.0
Cytomegalovirus p38	<0.1	1.0	<0.1	1.0

Epstein Barr Virus

The Epstein–Barr virus, also called human herpesvirus 4 (HHV-4), is one of the causes of infectious mononucleosis (glandular fever). It is a double-stranded, enveloped, linear DNA virus. Lyme disease and infectious mononucleosis are common illnesses that share similar clinical presentations and hence its useful to test together.

Test Name	IgG		IgM	
	Current	Previous (02/23/2022)	Current	Previous (02/23/2022)
Epstein Barr Virus EA Antigen	3.0	1.0	1.0	5.0
Epstein Barr Virus EBNA1	8.0	8.0	7.0	2.0
Epstein Barr Virus VCA gp125	6.0	4.0	2.0	4.0
Epstein Barr Virus p18	2.0	8.0	2.0	5.0
Epstein Barr Virus p23	1.0	1.0	5.0	7.0

Parvovirus B19

Lyme disease and Parvovirus B19 infections produce arthritis, rashes, and a systemic illness that may be thought to represent a chronic rheumatic disease . Cases of co infections have also been reported in literature. Additionally, it has been shown to be a good candidate for differential diagnosis in cases of arthopathy where Lyme disease has been suspected .

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Test Name	IgG		IgM	
	Current	Previous (02/23/2022)	Current	Previous (02/23/2022)
Parvovirus B19 VLP VP2	9.0	1.0	6.0	7.0
Parvovirus B19 VLP VP1/Vp2 Co Capsid	2.0	10.0	7.0	6.0

Parvovirus B19 PCR

Test Name	Current Result	Previous Result (02/23/2022)
Parvovirus B19	NOT DETECTED	NOT DETECTED

Toxoplasma gondii

Toxoplasma gondii is a protozoan parasite that infects most species of warm-blooded animals, including humans, and causes the disease toxoplasmosis. Tick based transmission has been increasingly considered and evidence indicates that T. gondii could be a potentially unrecognized tick-borne pathogen spreading toxoplasmosis . The parasite forms cysts that can affect almost any part of the body often your brain and muscle tissue of different organs, including the heart. The immune system keeps the parasites in check in an inactive state however, if it is weakened by disease or certain medications, the infection can be reactivated, leading to serious complications.

Test Name	IgG		IgM	
	Current	Previous (02/23/2022)	Current	Previous (02/23/2022)
Toxoplasma gondii Crude Extract	2.0	2.0	2.0	2.0
Toxoplasma gondii MIC3	7.0	7.0	1.0	6.0
Toxoplasma gondii p24	3.0	4.0	1.0	9.0
Toxoplasma gondii p29	10.0	1.0	7.0	7.0
Toxoplasma gondii p30	6.0	<0.1	1.0	9.0

Toxoplasma gondii PCR

Test Name	Current Result	Previous Result (02/23/2022)
Toxoplasma gondii	NOT DETECTED	NOT DETECTED

LAST NAME	FIRST NAME	GENDER	DATE OF BIRTH	ACCESSION ID	DATE OF SERVICE
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Herpes simplex virus 1

Herpes simplex virus 1 is a member of the herpesvirus family that can infect humans. It mostly produces cold sores and is ubiquitous and contagious. As a neutrophic and neuroinvasive virus, HSV-1 persists in the body in its latent form and is hiding from the immune system in the cell bodies of neurons. Seropositivity to HSV-1 antibodies have been reported with increased risk for alzheimer's disease . Disseminated Lyme Disease has been shown to be presenting with nonsexual acute genital ulcers and Lyme disease should be considered in women presenting with acute-onset genital ulcers

Test Name	IgG		IgM	
	Current	Previous (02/23/2022)	Current	Previous (02/23/2022)
HSV-1	6.0	5.0	8.0	6.0

Herpes simplex virus 2

Herpes simplex virus 2 is a member of the herpesvirus family that can infect humans. It is the primary cause of genital herpes. HSV2 can persist in the body in its latent form. Recent primary HSV-2 infection should be considered as a cause of cross-reacting IgM-class anti-B. burgdorferi antibody .

Test Name	IgG		IgM	
	Current	Previous (02/23/2022)	Current	Previous (02/23/2022)
HSV-2	3.0	9.0	7.0	<0.1

Human herpesvirus 6

Human herpesvirus 6 is a herpes family virus that can stay in your body for life usually in a dormant state. Most commonly it can affect people who have a compromised immune system. Research has linked HHV-6 with various neurological conditions. It has also been an important candidate in the chronic fatigue syndrome population

Test Name	IgG		IgM	
	Current	Previous (02/23/2022)	Current	Previous (02/23/2022)
HHV-6	6.0	5.0	3.0	8.0

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LAST NAME	FIRST NAME	GENDER	DATE OF BIRTH	ACCESSION ID	DATE OF SERVICE
PATIENT	TEST2	MALE	2003-01-22	2203230004	03-22-2022 09:50

Human herpesvirus 7

Human herpesvirus 7 is a herpes family virus that can stay in your body for life usually in a dormant state.It is ubiquitous worldwide and nearly 70% of all children will be exposed to the virus by the age of 4. DNA of the virus has been found in the CD4+ T cells of healthy adults which is indicative of the latency .

Test Name	IgG		IgM	
	Current	Previous (02/23/2022)	Current	Previous (02/23/2022)
HHV-7	1.0	9.0	3.0	10.0

Streptococcal A

Antibodies to Streptococcal A are indicative of current or recent strep infection. In PANDAS (Pediatric Autoimmune Neuropsychiatric Disorders Associated with Streptococcal Infections) researchers suggest that antibodies produced to the infection may lead to the PANDAS symptoms. Strep bacteria are very ancient organisms that survive in the human host by hiding from the immune system as long as possible. They hide themselves by putting molecules on their cell wall so that they look nearly identical to molecules found on the child's heart, joints, skin, and brain tissues. This hiding is called "molecular mimicry" and allows the strep bacteria to evade detection for a long time. However, the molecules on the strep bacteria are eventually recognized as foreign to the body and the child's immune system reacts to the molecules by producing antibodies. Because of the molecular mimicry by the bacteria, the immune system reacts not only to the strep molecules but also to the human host molecules that were mimicked; antibodies "attack" the mimicked molecules in the child's own tissues. These antibodies that react to both the molecules on the strep bacteria and to similar molecules found on other parts of the body are an example of "cross-reactive" antibodies. Studies at the National Institute of Mental Health (NIMH) and elsewhere have shown that some cross-reactive antibodies target the brain—causing OCD, tics, and the other neuropsychiatric symptoms of PANDAS.

Test Name	IgG		IgM	
	Current	Previous (02/23/2022)	Current	Previous (02/23/2022)
Streptococcal A	<0.1	1.0	<0.1	1.0

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Vibrant Tickborne panel does not demonstrate absolute positive and negative predictive values for any condition. The test results should be considered as one component of the physician's clinical assessment of the individual. Clinical history and current symptoms of the individual must also be considered by the healthcare provider prior to any interventions.

Tickborne testing is performed at Vibrant America, a CLIA certified laboratory and utilizes ISO-13485 developed technology. Vibrant America has 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 antibody due to circumstances beyond Vibrant's control. Vibrant may re-test a sample in order 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.

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