MAYO CLINIC LABORATORIES

Test Definition: CHIKV

Chikungunya IgM and IgG, Antibody, Serum

Overview

Useful For

Aiding in the diagnosis of recent infection with Chikungunya virus in patients with recent travel to endemic areas and a compatible clinical syndrome

Profile Information

Test Id	Reporting Name	Available Separately	Always Performed
CHIKM	Chikungunya IgM, Ab, S	No	Yes
CHIKG	Chikungunya IgG, Ab, S	No	Yes
CHIKI	Chikungunya Interpretation	No	Yes

Testing Algorithm

For more information see Mosquito-borne Disease Laboratory Testing.

Special Instructions

- Mosquito-borne Disease Laboratory Testing

Highlights

This test may be used as an aid to diagnose recent or past infection with Chikungunya virus (ChikV) in patients with recent travel to endemic regions and a compatible clinical syndrome.

IgM and IgG antibodies to ChikV are typically detectable 3 to 4 days and 6 to 7 days following onset of symptoms, respectively.

IgM antibodies to ChikV typically remain detectable for 3 to 4 months after infection, whereas IgG antibodies to ChikV remain detectable for years.

Method Name

CHIKM, CHIKG: Enzyme-Linked Immunosorbent Assay (ELISA)
CHIKI: Technical Interpretation

NY State Available

Yes

Specimen

Specimen Type

Serum

Ordering Guidance

Testing a patient in a convalescent period is recommended because specimens collected too early following infection may be negative for antibodies to Chikungunya virus.

Specimen Required

Supplies: Sarstedt Aliquot Tube, 5 mL (T914)
Collection Container/Tube:
Preferred: Serum gel
Acceptable: Red top
Submission Container/Tube: Plastic vial
Specimen Volume: 0.5 mL
Collection Instructions: Centrifuge and aliquot serum into a plastic vial.

Forms

If not ordering electronically, complete, print, and send Infectious Disease Serology Test Request (T916) with the specimen.

Specimen Minimum Volume

0.4 mL

Reject Due To

Gross hemolysis	Reject
Gross lipemia	Reject
Gross icterus	Reject

Specimen Stability Information

Specimen Type	Temperature	Time	Special Container
Serum	Refrigerated (preferred)	30 days	
	Frozen	30 days	

Clinical & Interpretive

Clinical Information

Chikungunya virus (ChikV) is a single-stranded RNA alphavirus and a member of the Togaviridae family of viruses. The name Chikungunya is derived from the language of the Makonde ethnic groups in southeast Africa and means "that which bends" or "stooped walk." This is in reference to the hunched-over appearance of infected individuals due to the characteristically painful and incapacitating arthralgia caused by the virus. ChikV is endemic throughout Africa, India, and, more recently, the Caribbean islands. In 2014, the first case of autochthonous, or local transmission, in the United States occurred in Florida.

Humans are the primary reservoir for ChikV and *Aedes* species mosquitos are the primary vectors for transmission. Unlike other mosquito-borne viruses, such as West Nile virus and Dengue, the majority of individuals who are exposed

to ChikV become symptomatic, with the most severe manifestations observed at the extremes of age and in those with suppressed immunity. Once exposed to ChikV, individuals develop lasting immunity and protection from reinfection.

Prior to development of symptoms, the incubation period ranges, on average, from 3 to 7 days. Infected patients typically present with sudden-onset high fever, incapacitating joint pain, and often a maculopapular rash lasting anywhere from 3 to 10 days. Notably, symptom relapse can occur in some individuals 2 to 3 months following resolution of initial symptoms. Currently, there are no licensed vaccines and treatment is strictly supportive care.

Reference Values

IgM: Negative
IgG: Negative
Reference values apply to all ages.

Interpretation

IgM and IgG Negative:
-No serologic evidence of exposure to Chikungunya virus. Repeat testing on a new specimen collected in 5 to 10 days is recommended if clinical suspicion persists.

IgM and IgG Positive:
-IgM and IgG antibodies to Chikungunya virus detected, suggesting recent or past infection. IgM antibodies to Chikungunya virus may remain detectable for 3 to 4 months post-infection.

IgM Positive, IgG Negative:
-IgM antibodies to Chikungunya virus detected, suggesting recent infection. Repeat testing in 5 to 10 days is recommended to demonstrate anti-Chikungunya virus IgG seroconversion to confirm current infection.

IgM Negative, IgG Positive:
-IgG antibodies to Chikungunya virus detected, suggesting past infection.

IgM and/or IgG Borderline:
-Repeat testing in 10 to 14 days is recommended.

Cautions

Specimens collected too early following infection may be negative for antibodies to Chikungunya virus.

Chikungunya and Dengue viruses currently co-circulate in endemic areas and infections can present similarly in symptomatic patients. It is therefore recommended to evaluate at-risk patients for infection with both viruses.

Supportive Data

Accuracy:
IgM Antibodies to Chikungunya Virus:
Originally 87 serum samples tested by the Focus Diagnostics Inc. anti-Chikungunya virus IgM immunofluorescence assay (IFA) were also evaluated by the EuroImmun anti-Chikungunya virus IgM enzyme-linked immunofluorescence assay (ELISA) and the results are indicated in Table 1.

Table 1. Comparison of the EuroImmun ChikV IgM ELISA and the Focus Diagnostics ChikV IgM IFA

		Focus Diagnostics ChikV IgM IFA	
		Positive	Negative
EuroImmun ChikV IgM EIA	Positive	43	0
	Negative	3	41
	Borderline	0	0

Positive Agreement: 93.5 (43/46); 95% CI: 81.9%-98.4%
Negative Agreement: 100% (41/41); 95% CI: 89.8%-100%
Overall Agreement: 96.6% (84/87); 95% CI: 89.9%-99.2%

IgG Antibodies to Chikungunya Virus:
Originally 101 serum samples tested by the Focus Diagnostics Inc. anti-Chikungunya virus IgG IFA were also evaluated by the EuroImmun anti-Chikungunya virus IgG ELISA and the results are indicated in Table 2.

Table 2. Comparison of the EuroImmun ChikV IgG ELISA and the Focus Diagnostics ChikV IgG IFA

		Focus Diagnostics ChikV IgG IFA	
		Positive	Negative
EuroImmun ChikV IgG EIA	Positive	39	2
	Negative	7*	50
	Borderline	0	3

*All 7 samples were positive by both the Focus and EuroImmun IgM assays. Also, 4 of 7 samples had low titers (< or =1:20) by the IFA assay.
Positive Agreement: 84.8 (39/46); 95% CI: 71.5%-92.7%
Negative Agreement: 90.9% (50/55); 95% CI: 80.0%-96.5%
Overall Agreement: 88.1% (89/101); 95% CI: 80.2%-93.2%

Reference Range:
Of serum samples collected from normal donors, 74/75 (98.7%) and 90/90 (100%) were negative by the EuroImmun anti-Chikungunya virus IgG and IgM assays, respectively.

Analytical Specificity:
1. Sixty serum samples previously characterized as positive for IgG-class antibodies to West Nile virus (n=29), Dengue virus (n=15), St. Louis encephalitis virus (n=8), California encephalitis virus (n=6), and Western equine encephalitis virus (n=2) were analyzed by the EuroImmun anti-Chikungunya virus IgG assay. One sample, positive for IgG antibodies to Dengue virus was also positive by the Chikungunya IgG assay, giving an overall specificity of 98.3% (59/60).

2. Thirty-three serum samples previously characterized as positive for IgM-class antibodies to West Nile virus (n=8), Dengue virus (n=11), St. Louis encephalitis virus (n=6), California encephalitis virus (n=6), and Western equine encephalitis virus (n=2), were analyzed by the EuroImmun anti-Chikungunya virus IgM assay. Two samples, positive for IgM antibodies to Dengue virus were also positive by the Chikungunya IgM assay, giving an overall specificity of 93.9% (31/33).

Note: Dengue and Chikungunya virus cocirculate in endemic areas and are transmitted by the same mosquito genera, so the 3 specimens with antibodies to both viruses may indicate coinfection or past exposure to both viruses.

Clinical Reference

Lwande OW, Obanda V, Bucht G, et al. Global emergence of Alphaviruses that cause arthritis in humans. Infect Ecol Epidemiol. 2015;5:29853. doi:10.3402/iee.v5.29853

Performance

Method Description

For both the Chikungunya virus IgM and IgG assays, polystyrene microwells are coated with recombinant Chikungunya antigen. Diluted serum samples and controls are incubated in the wells to allow anti-Chikungunya antibodies (if present in the sample) to react with the antigen. Nonspecific reactants are removed by washing. Next, peroxidase-conjugated antihuman antibody is added to the wells and will react with human antibodies bound to the antigen. Excess conjugate is removed by washing. Enzyme substrate and chromogen are added, and the color is allowed to develop. After adding the Stop Reagent, the resultant color change is quantified by a spectrophotometric reading of optical density (OD). Sample OD readings are compared with reference cut-off OD readings to determine the qualitative results.(Package inserts: Anti-Chikungunya virus ELISA IgG. , Euroimmun Ag; v. 12/20/2018; Anti-Chikungunya virus ELISA. IgM Euroimmun Ag;12/20/2018)

PDF Report

No

Day(s) Performed

Bimonthly on the second and fourth Wednesday; fifth Wednesday when applicable

Report Available

Same day/1 to 14 days

Specimen Retention Time

14 days

Performing Laboratory Location

Rochester

Fees & Codes

Fees

- Authorized users can sign in to Test Prices for detailed fee information.
- Clients without access to Test Prices can contact Customer Service 24 hours a day, seven days a week.
- Prospective clients should contact their account representative. For assistance, contact Customer Service.

Test Definition: CHIKV

Chikungunya IgM and IgG, Antibody, Serum

Test Classification

This test was developed and its performance characteristics determined by Mayo Clinic in a manner consistent with CLIA requirements. It has not been cleared or approved by the US Food and Drug Administration.

CPT Code Information

86790 x2

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
CHIKV	Chikungunya IgM and IgG, Ab, S	93976-9

Result ID	Test Result Name	Result LOINC® Value
CHIKI	Chikungunya Interpretation	69048-7
CHIKG	Chikungunya IgG, Ab, S	88630-9
CHIKM	Chikungunya IgM, Ab, S	88629-1