MAYO CLINIC LABORATORIES

Test Definition: DENGM

Dengue Virus Antibody, IgG and IgM, Serum

Overview

Useful For

Aiding in the diagnosis of dengue virus infection

Profile Information

Test Id	Reporting Name	Available Separately	Always Performed
DENG	Dengue Virus Ab, IgG, S	No	Yes
DENM	Dengue Virus Ab, IgM, S	No	Yes
DNABI	Dengue Ab Interpretation	No	Yes

Testing Algorithm

For information see:

-Mosquito-borne Disease Laboratory Testing

-Assessment for Dengue Virus Infection

Special Instructions

- Mosquito-borne Disease Laboratory Testing
- Assessment for Dengue Virus Infection

Highlights

Detection of antibodies to dengue virus is suggestive of recent exposure and/or infection with dengue virus.

This test should be used for diagnostic purposes only.

Method Name

Enzyme-Linked Immunosorbent Assay (ELISA)

NY State Available

Yes

Specimen

Specimen Type

Serum

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 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
Heat-inactivated specimen	Reject

Specimen Stability Information

Specimen Type	Temperature	Time	Special Container
Serum	Refrigerated (preferred)	14 days	
	Frozen	14 days	

Clinical & Interpretive

Clinical Information

Dengue virus (DV) is a globally distributed flavivirus with 4 distinct serotypes (DV-1, -2, -3, -4). It is primarily transmitted by the *Aedes aegypti* mosquito, which is found throughout the tropical and subtropical regions of over 100 countries. DV poses a significant worldwide public health threat with approximately 2.5 to 3 billion people residing in DV endemic areas, among whom 100 to 200 million individuals will be infected, and approximately 30,000 patients will succumb to the disease, annually.

Following dengue infection, the incubation period varies from 3 to 7 days, and while some infections remain asymptomatic, the majority of individuals will develop classic dengue fever. Symptomatic patients become acutely febrile and present with severe musculoskeletal pain, headache, retro-orbital pain, and a transient macular rash, most often observed in children. Fever defervescence signals disease resolution in most individuals. However, children and young adults remain at increased risk for progression to dengue hemorrhagic fever and dengue shock syndrome, particularly during repeat infection with a new DV serotype.

Detection of dengue-specific IgM and IgG-class antibodies remains the most commonly utilized diagnostic method.

Seroconversion occurs approximately 3 to 7 days following exposure, and therefore, testing of acute and convalescent sera may be necessary to make the diagnosis. As an adjunct to serologic testing, identification of early DV infection may be made by detection of the DV nonstructural protein 1 (NS1) antigen. NS1 antigenemia is detectable within 24 hours of infection and up to 9 days following symptom onset. The DV NS1 antigen can be detected by ordering DNSAG / Dengue Virus NS1 Antigen, Serum.

Reference Values

Dengue virus antibody, IgG: Negative
Dengue virus antibody, IgM: Negative
Reference values apply to all ages.

Interpretation

The presence of IgG-class antibodies to dengue virus (DV) is consistent with exposure to this virus sometime in the past. By 3 weeks following exposure, nearly all immunocompetent individuals should have developed IgG antibodies to DV.

The presence of IgM-class antibodies to DV is consistent with acute-phase infection.

IgM antibodies become detectable 3 to 7 days following infection and may remain detectable for up to 6 months or longer following disease resolution.

The absence of IgM-class antibodies to DV is consistent with lack of infection. However, specimens collected too soon following exposure may be negative for IgM antibodies to DV. If DV remains suspected, a second specimen collected approximately 10 to 12 days following exposure should be tested.

Cautions

Test results should be used in conjunction with clinical evaluation, including exposure history and clinical presentation.

False-positive results, particularly with the dengue virus IgG enzyme-linked immunosorbent assay, may occur in persons infected with other flaviviruses, including Zika virus, West Nile virus, and St. Louis encephalitis virus. Obtaining a detailed exposure history and additional laboratory testing may be necessary to determine the infecting virus.

Positive test results may not be valid in persons who have received blood transfusions or other blood products within the last several months.

The significance of a negative result in an immunosuppressed patient is unclear.

Supportive Data

A total of 200 prospective serum samples submitted for dengue virus (DV) IgM and IgG testing by the Focus Diagnostics DV IgM and IgG enzyme immunoassays (EIA) were also tested by the InBios IgM and IgG DV assays. The results were compared and the data summarized in Tables 1 and 2.

Table 1. Comparison of the InBios and Focus (Quest) Diagnostics DV IgM EIA

InBios DV IgM EIA	**Focus (Quest) Diagnostics DV IgM EIA**	
	Positive	Negative
Positive	14	0

Negative	1	184
Equivocal	1	0

Sensitivity: 87.5% (14/16); 95% CI: 62.7%-97.7%
Specificity: 100% (184/184); 95% CI: 97. 5%-100%
Agreement: 99% (198/200); 95% CI: 96.1%-99.9%

Table 2. Comparison of the InBios and Focus (Quest) Diagnostics DV IgG EIA

InBios DV IgG EIA	**Focus (Quest) Diagnostics DV IgG EIA**	
	Positive	Negative
Positive	34	0
Negative	0	164
Equivocal	2	0

Sensitivity: 94.4% (34/36); 95% CI: 80.9%-99.4%
Specificity: 100% (164/164); 95% CI: 97.2%-100%
Agreement: 99% (198/200); 95% CI: 96.1%-99.9%

An additional 42 serum samples positive for IgG-class antibodies to West Nile virus (n=24), St. Louis encephalitis virus (n=9), and California (LaCrosse) virus (n=9) were also tested by the InBios DV IgG EIA and the data are summarized below in Table 3.

Table 3. Cross-reactivity of the InBios DV IgG EIA with antibodies to West Nile virus, St. Louis encephalitis virus, and California (LaCrosse) virus

InBios DV IgG EIA	West Nile virus IgG positive	St. Louis encephalitis virus positive	California (LaCrosse) virus positive
Positive	18	7	1
Negative	2	0	8
Equivocal	4	2	0

Note that the InBios DV IgG EIA shows significant cross-reactivity with antibodies to West Nile virus and St. Louis encephalitis virus.

Clinical Reference

1. Centers for Disease Control and Prevention (CDC). Clinical Testing Guidance for Dengue. Updated August 26, 2024. Accessed December 11, 2024, Available at www.cdc.gov/dengue/hcp/diagnosis-testing/index.html
2. Dengue: Guidelines for Diagnosis, Treatment, Prevention and Control. Geneva: World Health Organization; 2009
3. Khan MB, Yang ZS, Lin CY, et al. Dengue overview: An updated systemic review. J Infect Public Health. 2023;16(10):1625-1642. doi:10.1016/j.jiph.2023.08.001

Performance

Method Description

Dengue virus IgM:
In this enzyme-linked immunosorbent assay (ELISA), samples and controls are diluted in sample dilution buffer and incubated in microtiter wells coated with antihuman IgM antibodies. This incubation is followed by incubation with dengue-derived recombinant antigens (DENRA) and normal cell antigen separately. After incubation and washing, the wells are treated with a DEN-specific monoclonal antibody labeled with horseradish peroxidase (HRP). After a second incubation and washing step, the wells are incubated with tetramethylbenzidine (TMB) substrate. Acid stop is added, and absorbance at 450 nm is read. The ratio of absorbencies of the DENRA and the control antigen wells determines whether the result is positive or negative.(Package insert: InBiOS DENV Detect IgM CAPTURE ELISA. InBios International, Inc; Revision 10/2019)

Dengue virus IgG:
In this enzyme-linked immunosorbent assay, controls and diluted samples are incubated in microtiter wells coated with monoclonal antibody bound to dengue-derived recombinant antigens (DENRA). After incubation and washing, wells are treated with IgG antibody labeled with horseradish peroxidase. After a second incubation and washing, wells are incubated with tetramethylbenzidine substrate. Acid stop is added, and absorbance at 450 nm is measured. The ratio of the absorbencies of the DENRA and the control wells determines whether a result is positive or negative.(Package insert: InBiOS DENV Detect IgG ELISA. InBios International, Inc; Revision 05/01/2018)

PDF Report

No

Day(s) Performed

Tuesday

Report Available

Same day/1 to 7 days

Specimen Retention Time

14 days

Performing Laboratory Location

Mayo Clinic Laboratories - Rochester Superior Drive

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 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

IgM-86790
IgG-86790

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
DENGM	Dengue Virus Ab, IgG and IgM, S	87546-8

Result ID	Test Result Name	Result LOINC® Value
DENG	Dengue Virus Ab, IgG, S	29661-6
DENM	Dengue Virus Ab, IgM, S	29663-2
DNABI	Dengue Ab Interpretation	69048-7