MAYO CLINIC LABORATORIES

Test Definition: DENGC

Dengue Virus, Molecular Detection, PCR, Spinal Fluid

Overview

Useful For

Aiding in the diagnosis of central nervous system infection caused by dengue virus

Testing Algorithm

For more 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 dengue virus nucleic acid in cerebrospinal fluid (CSF) is suggestive of recent exposure or acute central nervous system infection with dengue virus.

The presence of dengue virus nucleic acid in CSF or serum can be used as a marker for acute-phase infection.

Patients with a history of symptoms for more than 1 week may be negative by molecular tests (ie, real-time polymerase chain reaction) and may require serologic testing to confirm the diagnosis of dengue virus infection.

Method Name

Real-Time Reverse Transcription Polymerase Chain Reaction (RT-PCR)

NY State Available

Yes

Specimen

Specimen Type

CSF

Ordering Guidance

The presence of dengue virus nucleic acid in cerebrospinal fluid or serum overlaps with the presence of dengue virus nonstructural protein 1 (*NS1*) antigen (DNSAG / Dengue Virus NS1 Antigen, Serum). Patients with a history of symptoms for more than 1 week may be negative by molecular tests (ie, real-time polymerase chain reaction) and may require serologic testing (DENVP / Dengue Virus Antibody/Antigen Panel, Serum) to confirm the diagnosis of dengue virus infection.

Specimen Required

Collection Container/Tube:
Preferred: Vial number 2
Acceptable: Any vial number
Submission Container/Tube: Sterile screw cap vial
Specimen Volume: 0.5 mL
Collection Instructions: Do not centrifuge or heat inactivate.

Forms

If not ordering electronically, complete, print, and send a Microbiology Test Request (T244)with the specimen.

Specimen Minimum Volume

0.3 mL

Reject Due To

Heat-inactivated specimen	Reject

Specimen Stability Information

Specimen Type	Temperature	Time	Special Container
CSF	Refrigerated (preferred)	7 days	
	Frozen	7 days	

Clinical & Interpretive

Clinical Information

Dengue virus (DV) is a globally distributed flavivirus with 4 distinct serotypes (DV-1, -2, -3, -4) 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. While some individuals remain asymptomatic, the majority 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 DV nucleic acid in cerebrospinal fluid (CSF) is a marker for central nervous system infection caused by this

virus. Importantly, the period of time that the virus can be detected in serum and CSF is brief and, therefore, molecular testing should be performed within the first week following onset of symptoms. After this time, serologic testing is the preferred method for diagnosis of DV infection.

Reference Values

Negative
Reference values apply to all ages.

Interpretation

Positive:
The detection of dengue virus nucleic acid in cerebrospinal fluid (CSF) is consistent with acute-phase infection of the central nervous system.
Dengue virus nucleic acid may be detectable during the first 1 to 7 days following the onset of symptoms.

Negative:
The absence of dengue nucleic acid in CSF is consistent with the lack of acute-phase infection.
Dengue virus nucleic acid may not be detected if the CSF specimen is collected immediately following dengue virus infection (<24-48 hours) and is rarely detectable following 7 days of symptoms.

Cautions

Results should be used in conjunction with clinical presentation and exposure history.

Negative dengue virus (DV) polymerase chain reaction results may occur if the specimen was collected more than 7 days following symptom onset. Serologic testing for the presence of IgM and IgG antibodies to DV is recommended in such cases.

Supportive Data

Assay Inclusivity:
The Altona RealStar Dengue virus reverse transcription polymerase chain reaction (RT-PCR) assay was tested using control strains of each of the 4 dengue serotypes and was able to detect serotypes 1, 2, 3 and 4.

Accuracy:
A commercial panel (SeraCare) of known positive samples for dengue virus serotypes 1, 2, 3, and 4 was tested. Each member of the panel was tested in triplicate, and all replicates were positive by the Altona RealStar Dengue assay.

Thirty analyte-negative CSF samples were spiked (1:10 dilution) with plasma samples collected in South America during an outbreak of dengue virus and determined to be positive for the virus. Of the 30 spiked CSF samples, 29 (97%) were positive by the Altona RealStar Dengue RT-PCR assay.

Limit of Detection:
The limit of detection in CSF was determined to be the following:

Dengue serotype 1: 1.4 genomic targets/mcL (700 genomic targets/mL)
Dengue serotype 2: 2 genomic targets/mcL (1000 genomic targets/mL)
Dengue serotype 3: 1.6 genomic targets/mcL (800 genomic targets/mL)

Dengue serotype 4: 1.3 genomic targets/mcL (650 genomic targets/mL)

Reference Range (Analytical Specificity):
Twenty CSF samples collected for non-infectious diseases testing (eg, chemistry) were analyzed by the Altona RealStar Dengue RT-PCR assay, and all 20 were negative.

A cross-reactivity panel of bacteria (n=12), viruses (n=15), and parasites (n=2) was tested, and all were negative by the Altona Dengue RT-PCR assay.

Clinical Reference

1. Bhatt S, Gething PW, Brady OJ, et al. The global distribution and burden of dengue. Nature. 2013;496(7446):504-507
2. Dengue--an infectious disease of staggering proportions. Lancet. 2013;381(9884):2136
3. Rigau-Perez JG, Clark GG, Gubler DJ, Reiter P, Sanders EJ, Vorndam AV. Dengue and dengue haemorrhagic fever. Lancet. 1998;352(9132):971-977
4. Tang KF, Ooi EE. Diagnosis of dengue: an update. Expert Rev Anti Infect Ther. 2012;10(8):895-907
5. Guzman MG, Kouri G. Dengue diagnosis, advances and challenges. Int J Infect Dis. 2004;8(2):69-80

Performance

Method Description

The Altona Real Star DENV is a qualitative, reverse transcription-polymerase chain reaction (RT-PCR) assay targeting the 3' untranslated region polyprotein gene. The assay includes a heterologous amplification system (internal control: IC) to identify possible RT-PCR inhibition and to confirm the integrity of the reagents of the kit. Specimens are run on the LightCycler 480 following nucleic acid extraction using the NucliSENS EasyMag (BioMerieux). Real-time RT-PCR technology utilizes a reverse-transcriptase reaction to convert RNA into complementary DNA, PCR for the amplification of specific target sequences, and target specific probes for the detection of the amplified DNA. The probes are labelled with fluorescent reporter and quencher dyes. Probes specific for DENV RNA are labelled with the fluorophore FAM. The probe specific for the IC is labeled with the fluorophore JOE. Using probes linked to distinguishable dyes enables the parallel detection of DENV specific RNA and the IC in corresponding detector channels of the real-time PCR instrument.(Package insert: RealStar Dengue RT-PCR Kit 2.0. Altona Diagnostics; 01/2017)

PDF Report

No

Day(s) Performed

Monday, Wednesday, Friday

Report Available

Same day/1 to 5 days

Specimen Retention Time

7 days

Test Definition: DENGC

Dengue Virus, Molecular Detection, PCR, Spinal Fluid

Performing Laboratory Location

Mayo Clinic Laboratories - Rochester Main Campus

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

87798

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
DENGC	Dengue Virus, PCR, CSF	77958-7

Result ID	Test Result Name	Result LOINC® Value
606371	Dengue Virus, PCR, CSF	77958-7