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MAYO CLINIC LABORATORIES

Test Definition: VZVPV

Varicella-Zoster Virus, Molecular Detection, PCR, Varies

Overview

Useful For

Rapid (qualitative) detection of varicella-zoster virus DNA in clinical specimens for laboratory diagnosis of disease due to this virus

This test **should not be used** to screen asymptomatic patients.

Method Name

Real-Time Polymerase Chain Reaction (PCR)/DNA Probe Hybridization

NY State Available

Yes

Specimen

Specimen Type

Varies

Necessary Information

1. Specimen source is required.

2. Source information must include main anatomical site of collection.

Specimen Required

Submit only 1 of the following specimens:

Specimen Type: Spinal fluid
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.

Supplies: Sarstedt Aliquot Tube, 5 mL (T914)
Specimen Type: Body fluid
Sources: Pleural, peritoneal, ascites, pericardial, amniotic, or ocular
Container/Tube: Sterile container
Specimen Volume: 0.5 mL
Collection Instructions: Do not centrifuge.

Specimen Type: Swab
Sources: Miscellaneous; dermal, eye, nasal, throat, or genital
Supplies:
-Culturette (BBL Culture Swab) (T092)
-BD E-Swab (T853)
-M4-RT (T605)
Container/Tube: Multimicrobe media (M4-RT, M4, M5, Bartels, or Jiangsu) and E-Swab or Culturette
Collection Instructions: Place swab back into multimicrobe media.

Specimen Type: Respiratory
Sources: Bronchial washing, bronchoalveolar lavage, nasopharyngeal aspirate or washing, sputum, or tracheal aspirate
Container/Tube: Sterile container
Specimen Volume: 1.5 mL

Specimen Type: Fresh tissue
Supplies: M4-RT (T605)
Container/Tube:
Preferred: Multimicrobe media (M4-RT, M4, M5, Bartels, or Jiangsu)
Acceptable: Sterile container with 1 to 2 mL of sterile saline
Specimen Volume: Entire collection
Collection Instructions: Submit only fresh tissue. Fixed tissue is **not** acceptable.

Forms

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

Specimen Minimum Volume

Ocular Fluid and Spinal Fluid: 0.3 mL
Body Fluid (pleural, peritoneal, ascites, and pericardial): See Specimen Required
Respiratory Specimens: 1 mL
Tissue: 2 x 2 mm biopsy

Reject Due To

Calcium alginate-tipped swab Wood swab Transport swab containing gel Formalin-fixed and/or paraffin-embedded tissues	Reject

Heat-inactivated specimen Dry/flocked E-Swab	

Specimen Stability Information

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

Clinical & Interpretive

Clinical Information

Varicella-zoster virus (VZV) causes both varicella (chickenpox) and herpes zoster (shingles). VZV produces a generalized vesicular rash on the dermis (chickenpox) in normal children, usually before 10 years of age. After primary infection with VZV, the virus persists in latent form and may emerge clinically (usually in adults 50 years of age and older) to cause a unilateral vesicular eruption, generally in a dermatomal distribution (shingles).

Reference Values

Negative

Reference values apply to all ages.

Interpretation

Detection of varicella-zoster virus (VZV) DNA in clinical specimens supports the clinical diagnosis of infection due to this virus.

VZV DNA is not detected in cerebrospinal fluid from patients without central nervous system disease caused by this virus.

This LightCycler polymerase chain reaction assay does not yield positive results with other herpesvirus gene targets (herpes simplex virus, cytomegalovirus, Epstein-Barr virus).

Cautions

A negative result does not exclude the possibility of varicella-zoster virus (VZV) infection.

The reference range is typically "negative" for this assay. This assay is only to be used for patients with a clinical history and symptoms consistent with VZV infection and must be interpreted in the context of the clinical picture.

Supportive Data

The following validation data supports the use of this assay for clinical testing.

Accuracy/Diagnostic Sensitivity and Specificity:
LightCycler polymerase chain reaction (PCR) (primers, directed to varicella-zoster virus [VZV], gene 29) was compared with shell vial cell cultures for the detection of VZV from 253 dermal specimens. Twenty-three specimens (9.1%) were positive for VZV by LightCycler PCR and the shell vial cell culture assay. An additional 21 specimens exclusively yielded VZV DNA. These discrepant specimens were resolved as true-positive results by confirmation of results by PCR using primers directed to another gene of VZV. Importantly, there were no instances in which VZV was recovered by the shell vial assay and not detected by LightCycler PCR (specificity, 100%). Of 100 cerebrospinal fluid specimens tested by both conventional PCR and LightCycler PCR, VZV DNA was detected in 49 specimens by both methods; 1 specimen was positive only by the conventional PCR assay. Fifty specimens were found to be negative for VZV DNA by both techniques.

Supplemental Data (Spiking Studies):
To supplement the above data, 30 negative specimens each various specimen type were spiked with VZV plasmid at the limit of detection (10-20 targets/microliter). The spiked specimens were run in a blinded fashion along with approximately 30 negative (non-spiked) specimens each of various specimen types; 90% to 100% of the spiked specimens were positive and 100% of the non-spiked specimens were negative.

Analytical Sensitivity/Limit of Detection:
The limit of detection of this assay is 10 to 20 DNA target copies per microliter in specimen matrix.

Analytical Specificity:
No PCR signal was obtained from extracts of 27 bacterial, viral, and fungal isolates that could be found as normal flora in sites normally tested for this organism or that could cause similar symptoms.

Precision:
Interassay precision was 100%, and intraassay precision was 97%.

Reportable Range:
This test is a qualitative assay, and results are reported as negative or positive for targeted VZV DNA.

Clinical Reference

1. Cinque P, Bossolasco S, Vago L, et al. Varicella-zoster virus (VZV) DNA in cerebrospinal fluid of patients infected with human immunodeficiency virus: VZV disease of the central nervous system or subclinical reactivation of VZV infection? Clin Infect Dis. 1997;25(3):634-639
2. Brown M, Scarborough M, Brink N, Manji H, Miller R. Varicella zoster virus-associated neurological disease in HIV-infected patients. Int J STD AIDS. 2001;12(2):79-83
3. Studahl M, Hagberg L, Rekabdar E, Bergstrom T. Herpesvirus DNA detection in cerebrospinal fluid: differences in clinical presentation between alpha-, beta-, and gamma-herpesviruses. Scand J Infect Dis. 2000;32(3):237-248
4. Iten A, Chatelard P, Vuadens P, et al. Impact of cerebrospinal fluid PCR on the management of HIV-infected patients with varicella-zoster virus infection of the central nervous system. J Neurovirol. 1999;5(2):172-180
5. Sauerbrei A. Varicella-zoster virus infections - antiviral therapy and diagnosis. GMS Infect Dis. 2016;4:Doc01. doi:10.3205/id000019
6. Sauerbrei A. Diagnosis, antiviral therapy, and prophylaxis of varicella-zoster virus infections. Eur J Clin Microbiol Infect Dis. 2016;35(5):723-734. doi:10.1007/s10096-016-2605-0

Performance

Method Description

Viral nucleic acid is extracted by the MagNA Pure automated instrument (Roche Applied Science) from clinical specimens. Primers directed to target DNA (ss DNA binding proteins: gene 29) produce a 202-base pair amplicon. The LightCycler instrument amplifies and monitors by fluorescence the development of target nucleic acid sequences after the annealing step during PCR cycling. This is an automated PCR system that can rapidly detect (30-40 minutes) amplicon development though stringent air-controlled temperature cycling in capillary cuvettes. The detection of amplified products is based on the fluorescence resonance energy transfer hybridization probe with a donor fluorophore, fluorescein, on the 3' end is excited by an external light source and emits light that is absorbed by a second hybridization probe with an acceptor fluorophore, LC-Red 640, at the 5' end. The acceptor fluorophore then emits a light of a different wavelength that can be measured with a signal that is proportional to the amount of specific PCR product. Melting curve analysis is performed following PCR amplification. Starting at 45 degrees C, the temperature in the thermal chamber is slowly raised to 80 degrees C, and the fluorescence is measured at frequent intervals. Analysis of the PCR amplification and probe melting curves is accomplished through the use of LightCycler software.(Dhiman N, Wright PA, Espy MJ, Schneider SK, Smith TF, Pritt BS. Concurrent detection of herpes simplex and varicella-zoster viruses by polymerase chain reaction from the same anatomic location. Diagn Microbiol Infect Dis. 2011;70(4):538-540. doi:10.1016/j.diagmicrobio.2011.03.014; Espy MJ, Teo R, Ross TK, Scien KA, Wold AD, Smith TF. Diagnosis of varicella-zoster virus infections in the clinical laboratory by LightCycler PCR. J Clin Microbiol. 2000;38[9]:3187-3189)

PDF Report

No

Day(s) Performed

Monday through Sunday

Report Available

Same day/1 to 4 days

Specimen Retention Time

1 week

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.

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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
VZVPV	Varicella-Zoster Virus, PCR, Varies	94584-0

Result ID	Test Result Name	Result LOINC® Value
VZVS	Specimen Source	31208-2
618332	Varicella-Zoster Virus PCR	94584-0