MAYO CLINIC LABORATORIES

Test Definition: MUMPR

Mumps Virus, Molecular Detection, PCR, Buccal

Overview

Useful For
Rapid qualitative detection of mumps virus using buccal swab specimens

Method Name
Real-Time Polymerase Chain Reaction (PCR)

NY State Available
Yes

Specimen

Specimen Type
Swab

Ordering Guidance
Polymerase chain reaction testing (this test) is recommended as the first-line test if a patient has symptoms of mumps (ie, fever, swollen salivary/parotid glands).

If serology has been performed and IgM-class antibodies against mumps are detected (MMPGM / Mumps Virus Antibody, IgM and IgG, Serum), this test should be ordered to confirm mumps infection.

Shipping Instructions
Specimens should be transported as soon as possible.

Specimen Required
Specimen Type: Buccal Swab
Supplies: Culturette (BBL Culture Swab) (T092)
Container/Tube: Sterile container with transport media
Specimen Volume: Entire collection
Collection Instructions:
1. Collect specimen by swabbing back and forth over mucosal surface around buccal cavity (the space near the upper rear molars between the cheek and the teeth) to maximize recovery of cells.
2. Swab must be placed into viral transport media (eg, M4-RT, M4, M5, Barthels FlexTrans Media or Jiangsu Transport Media)

Specimen Minimum Volume
0.3 mL

Reject Due To

Throat swab, E-swab, calcium alginate-tipped swab, wood swab, dry swab, or transport swab containing gel or charcoal additive	Reject

Specimen Stability Information

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

Clinical & Interpretive

Clinical Information

The mumps virus is a single-stranded, negative-sense RNA *paramyxovirus* belonging to the *Rubulavirus* family. Symptoms of infection include painful swollen salivary glands (parotitis), fever, headache, muscle aches, weakness, and fatigue. Complications may include pancreatitis, orchitis, encephalitis, meningitis, or hearing loss. Oftentimes, mumps is diagnosed based on the characteristic swollen salivary glands. The mumps virus is spread person-to-person through contact with infected respiratory droplets or saliva. It can also be transmitted by direct contact with contaminated fomites. Laboratory diagnosis of mumps cases can be through serologic detection of mumps-specific IgM antibodies, molecular detection of mumps virus RNA, or viral culture. The use of real-time polymerase chain reaction assays can provide more rapid laboratory confirmation of mumps shortly after symptom onset compared to serologic testing and provides a shorter turnaround time than viral culture. Buccal swabs are the preferred specimen type for the detection of mumps virus, but urine may also be collected for viral detection.

Reference Values

Negative

Interpretation

A positive result indicates the presence of mumps virus RNA in the specimen.

Cautions

A negative test does not rule-out infection with mumps virus. Therefore, the results should be used in conjunction with clinical findings and serologic test results to make an accurate diagnosis. The potential for false-negative results exists due to improper sample collection or viral variants.

Supportive Data

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

Accuracy:
Accuracy studies were performed by testing negative and positive (near the limit of detection) urine and buccal swab samples. Both urine and buccal swabs yielded 100% positive agreement and 100% negative agreement with expected results.

Analytical Sensitivity/Limit of Detection:
The lower limit of detection of this assay is 1.25 genome copies/mcL for urine and buccal swabs.

Precision:
Inter-assay and intra-assay precisions were 100%.

Specificity:
No sequences were identified that would result in cross-reactivity with the assay by in silico analysis. No cross-reactivity was detected in experiments testing a panel of nucleic acid extracts from more than 50 bacterial, fungal, and viral organisms causing similar disease or commonly found in urine or buccal swabs.

Reportable Range:
This is a qualitative assay, and the results are reported as either negative or positive for the mumps virus target.

Clinical Reference

1. Grennan D: Mumps. JAMA. 2019;322(10):1022
2. National Center for Immunization and Respiratory Diseases (NCIRD), Division of Viral Diseases: Mumps For Healthcare Providers. CDC; Updated March 08, 2021. Accessed September 13, 2022. Available at www.cdc.gov/mumps/hcp.html
3. Su SB, Chang HL, Chen AK: Current status of mumps virus infection: Epidemiology, pathogenesis, and vaccine. Int J Environ Res Public Health. 2020;17(5):1686

Performance

Method Description

The mumps virus laboratory-developed real-time polymerase chain reaction (RT-PCR) assay is designed for the qualitative detect of mumps virus RNA from urine and buccal swabs of patients with suspected infection. Mumps virus RNA in clinical specimens is first extracted using the NucliSENS easyMag/EMAG (bioMérieux) instruments according to manufacturer instructions. As a component of extraction, a lysis buffer is first added to clinical specimens in a class II biosafety cabinet (BSC). At this step, any mumps virus that may be present in the sample is inactivated, rendering it non-infectious. Following the addition of lysis buffer, specimens are safe to remove from the BSC and placed onto an instrument for automated extraction. A sample input of 200 mcL will be extracted with an elution volume of 50 mcL

This assay employs a reverse transcription reaction to convert RNA to complementary DNA (cDNA). Oligonucleotide forward and reverse primers specific to the matrix protein (M) gene region of the mumps virus amplify the target

sequence. A TaqMan probe labeled with the fluorophore FAM and specific to the target region of mumps virus RNA bind to amplified mumps RNA virus product. Ribonuclease P (RNase P) is used as an internal control. Oligonucleotide forward and reverse primers specific to the p30 subunit of RNase P amplify the internal control target sequence. A TaqMan probe labeled with fluorophore Cy5 and specific to RNase P bind to the amplified RNase P product. The dye-labeled TaqMan probes allow for the detection of the target and internal control in the corresponding channel of the Roche LightCycler 480 II (LC480) instrument. Detection of the target M gene region indicates the presence of mumps virus RNA in the specimen. The clinical validity of RT-PCR for the detection of mumps virus RNA in urine and buccal swabs as well as the highly conserved nature of the mumps M gene target is documented in peer-reviewed literature.(Unpublished Mayo method)

PDF Report
No

Day(s) Performed
Monday through Friday

Report Available
1 to 3 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.

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
MUMPR	Mumps Virus PCR, Buccal	47532-7

Test Definition: MUMPR

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Result ID	Test Result Name	Result LOINC® Value
617823	Mumps Virus PCR, Buccal	47532-7