MAYO CLINIC LABORATORIES

Test Definition: ROGM

Measles (Rubeola) Virus Antibody, IgM and IgG, Serum

Overview

Useful For

Diagnosing measles virus infection

Determination of immune status of individuals to the measles virus using IgG antibody testing

Documentation of previous infection with measles virus in an individual without a previous record of immunization to measles virus

Profile Information

Test Id	Reporting Name	Available Separately	Always Performed
ROM	Measles (Rubeola) Ab, IgM, S	Yes	Yes
ROPG	Measles (Rubeola) Ab, IgG, S	Yes	Yes

Method Name

ROM: Immunofluorescence Assay (IFA)
ROPG: Multiplex Flow Immunoassay (MFI)

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: 1 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

0.6 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

The measles virus is a member of the Paramyxoviridae family of viruses, which include parainfluenza virus serotypes 1-4, mumps, respiratory syncytial virus (RSV), and metapneumovirus. The measles virus is one of the most highly contagious infectious diseases among unvaccinated individuals and is transmitted through direct contact with aerosolized droplets or other respiratory secretions from infected individuals. Measles has an incubation period of approximately 8 to 12 days, which is followed by a prodromal phase of high fever, cough, coryza, conjunctivitis, and malaise. Koplik spots may also be apparent on the buccal mucosa and can last for 12 to 72 hours.(1,2) Following this phase, a maculopapular, erythematous rash develops beginning behind the ears and on the forehead and spreads centrifugally to involve the trunk and extremities.

Immunocompromised individuals, pregnant women, and those with nutritional deficiencies, are particularly at risk for serious complications following measles infection, which include pneumonia and central nervous system involvement.(1,3)

Following implementation of the national measles vaccination program in 1963, the incidence of measles infection has fallen to below 0.5 cases per 1,000,000 population and the virus is no longer considered endemic in the United States.(4) Measles outbreaks continue to occur in the United States however, due to exposure of nonimmune individuals or those with waning immunity to infected travelers. The measles outbreak in 2011 throughout Western Europe emphasizes the persistence of the virus in the worldwide population and the continued need for national vaccination programs.(5)

The diagnosis of measles infection is often based on clinical presentation alone. The presence of IgM-class antibodies suggests recent infection but should not be used alone to diagnose measles infection. Screening for IgG-class antibodies to measles virus aids in identifying nonimmune individuals.

Reference Values

IMMUNOGLOBULIN M
Negative
Reference values apply to all ages.

IMMUNOGLOBULIN G
Vaccinated: Positive (> or =1.1 AI)
Unvaccinated: Negative (< or =0.8 AI)
Reference values apply to all ages.

Interpretation

This assay tests for both IgM and IgG-class antibodies. The presence of IgM-class antibodies, with or without the presence of IgG-class antibodies, to measles virus may support a clinical diagnosis of recent/acute phase infection with the virus. IgM results alone should not be used to diagnose measles virus infection.

The absence of IgM-class antibodies suggests lack of an acute phase infection with measles virus. However, serology may be negative for IgM-class antibodies in early disease, and results should be interpreted in the context of clinical findings.

Testing for IgM-class antibodies to measles should be limited to patients with clinically compatible disease.

The presence of detectable IgG-class antibodies, in the absence of IgM-class antibodies, indicates prior exposure to the measles virus through infection or immunization. These individuals are considered immune to measles infection.

The absence of detectable IgG-class antibodies suggests the lack of a specific immune response to immunization or no prior exposure to the measles virus. These individuals are considered nonimmune to measles virus infection.

Cautions

A serum specimen collected during the acute phase of infection or soon after vaccination may yield negative for IgM- or IgG-class antibodies.

Rare heterotypic IgM responses to measles virus have been reported in patients with rubella virus, chronic active hepatitis, systemic lupus, and infectious mononucleosis.(6)

IgG-class antibodies to measles virus may be present in serum specimens from individuals who have received blood products within the past several months but have not been immunized or have experienced past infection with this virus.

Supportive Data

Immunoglobulin G:
To evaluate the accuracy of the BioPlex Measles IgG multiplex flow immunoassay (MFI), 500 prospective serum samples

were analyzed in a blinded fashion by the Diamedix Measles IgG enzyme immunoassay (EIA) and the BioPlex Measles IgG assay. Samples with discordant results after initial testing were repeated by both assays during the same freeze/thaw cycle. Further discrepancies were evaluated by the SeraQuest Measles IgG EIA. The results are summarized in the table below:

Table.

BioPlex measles IgG	**Diamedix measles IgG EIA**		
	Positive	**Negative**	**Equivocal**
Positive	420	1(a)	0
Negative	10(b)	27	17
Equivocal	14	0	11

(a) This sample tested negative by the SeraQuest Measles IgG EIA
(b) All 10 samples tested positive by the SeraQuest Measles IgG EIA
Sensitivity: 94.6% (420/444); 95% CI: 92.1%-96.4%
Specificity: 96.4% (27/28); 95% CI: 80.8%-100.0%
Overall Percent Agreement: 91.6% (458/500); 95% CI: 88.8%-93.8%

Clinical Reference

1. Perry RT, Halsey NA. The clinical significance of measles-a review. J Infect Dis. 2004;189 Supp 1:S4-S16. doi:10.1086/377712
2. Babbott FL, Gordon JE. Modern measles. Am J Med Sci. 1954 Sep;228(3):334-361
3. Liebert UG: Measles virus infections of the central nervous system. Intervirology. 1997;40:176-184. doi:10.1159/000150544
4. Centers for Disease Control and Prevention (CDC): Measles-United States, 1999. MMWR Morb Mortal Wkly Rep. 2000;49(25):557-560
5. Centers for Disease Control and Prevention (CDC): Increased transmission and outbreaks of Measles-European region. MMWR Morb Mortal Wkly Rep. 2011;60(47):1605-1610
6. Cremer NE, Devlin VL, Riggs JL, Hagens SJ. Anomalous antibody responses in viral infection: specific stimulation or polyclonal activation? J Clin Microbiol. 1984;20:468-472
7. Theel ES, Sorenson M, Rahman C, Granger D, Vaughn A, Breeher L. Performance characteristics of a multiplex flow immunoassay for detection of IgG-Class antibodies to measles, mumps, rubella, and Varicella-Zoster viruses in presumptively immune health care workers. J Clin Microbiol. 2020;58(4):e00136-20. doi:10.1128 /JCM.00136-20
8. National Center for Immunization and Respiratory Diseases, Division of Viral Diseases; Centers for Disease Control and Prevention (CDC). Measles (Rubeola). CDC; Updated July 15, 2024. Accessed December 16, 2024. Available at www.cdc.gov/measles/hcp/index.html

Performance

Method Description

Immunoglobulin M:
The presence of IgM-class antibody to measles is determined by an indirect immunofluorescence assay. After removal of

IgG by specific immunoglobulin antibody, the serum is incubated with measles antigen, which is adhered to a glass microscope slide. Antibodies, if present, will bind to the antigen forming stable antigen-antibody complexes. If no antibodies are present, the complexes will not be formed, and the serum components will be washed away. Fluorescein-labeled antihuman-IgM antibody is added to the reaction side and binds to IgM antibodies if present. This results in a positive reaction of bright apple-green fluorescence when viewed with a fluorescence microscope.(Package insert: Measles Virus Antigen Substrate Slide. AESKU.BION; 11/2024)

Immunoglobin G:
The BioPlex 2200 Measles IgG assay uses multiplex flow immunoassay technology. Briefly, serum samples are mixed and incubated at 37 degrees C with sample diluent and dyed beads coated with measles antigen. After a wash cycle, antihuman-IgG antibody conjugated to phycoerythrin (PE) is added to the mixture and incubated at 37 degrees C. Excess conjugate is removed in another wash cycle and the beads are resuspended in wash buffer. The bead mixture then passes through a detector that identifies the bead based on dye fluorescence and determines the amount of antibody captured by the antigen based on the fluorescence of the attached PE. Raw data is calculated in relative fluorescence intensity.

Three additional dyed beads, an internal standard bead, a serum verification bead, and a reagent blank bead, are present in each reaction mixture to verify detector response, the addition of serum to the reaction vessel and the absence of significant nonspecific binding in serum.(Package insert: BioPlex 2200 System MMRV IgG. Bio-Rad Laboratories; 02/2019)

PDF Report
No

Day(s) Performed
Monday through Friday

Report Available
Same day/1 to 3 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 Definition: ROGM

Measles (Rubeola) Virus Antibody, IgM and IgG, Serum

Test Classification

This test has been cleared, approved, or is exempt by the US Food and Drug Administration and is used per manufacturer's instructions. Performance characteristics were verified by Mayo Clinic in a manner consistent with CLIA requirements.

CPT Code Information

86765 x2

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
ROGM	Measles (Rubeola) Ab, IgM and IgG,S	90253-6

Result ID	Test Result Name	Result LOINC® Value
80979	Measles (Rubeola) Ab, IgM, S	35276-5
ROG	Measles (Rubeola) Ab, IgG, S	35275-7
DEXG3	Measles IgG Antibody Index	5244-9