

PATHOGEN SAFETY DATA SHEET

Measles virus

CHARACTERISTICS	
Morphology	Measles virus is a negative-sense, single stranded RNA virus, which belongs to morbillivirus genus in the Paramyxoviridae family. It consists of a helical nucleocapsid, 100-300 nm in diameter, surrounded by an envelope. The envelope is lined by matrix proteins and carries transmembrane hemagglutinin and fusion glycoproteins which are the virulence factors.
Disease	The Measles virus may cause measles, a systemic infection starting in the respiratory epithelium of the nasopharynx. Measles may lead to severe complication and can cause death.
Zoonosis	None known, but humans may communicate the disease to non-human primates.

HEALTH HAZARDS	
Host Range	Humans, non-human primates.
Modes of Transmission	Measles can be spread by respiratory droplets and by direct contact with secretions from nose and throat of an infected person. Direct contact is the primary mode of transmission, and airborne droplet and indirect contact are less common modes of transmission.
Signs and Symptoms	After an incubation period of 8-12 days, fever (approximately 38.3°C) and malaise develop over 24 hours, followed by cough, coryza (inflammation of the nasal mucous membranes) and conjunctivitis. After 2-3 days of cough, coryza and conjunctivitis, Koplik spots (white and granular lesions in the lateral buccal mucosa) appear. On the fourth day, a macropapular rash appears on the head and neck, behind the ears. The rash then spreads to the rest of the body and persists for 3-5 days before fading. Other symptoms include anorexia and dyspnea.
Infectious Dose	0.2 units by intranasal spray.
Incubation Period	8-12 days

MEDICAL PRECAUTIONS/TREATMENT	
Prophylaxis	Immunization with live virus vaccine can be given up to 72 hours post-exposure to prevent measles in unvaccinated persons. Passive immunization with measles immunoglobulin (0.25 mL/kg, for a maximum of 15 mL) between 72 hours and 6 days following exposure or in persons for which measles vaccine is contraindicated can be given to prevent or decrease the severity of measles.
Vaccines	Trivalent vaccine using live-attenuated virus of measles, mumps and rubella (MMR), but this vaccine requires constant cold for storage and transport, which is a problem in developing countries. The first dose is given in the first year, and the second at the beginning of schooling (4-6 years of age) to allow full coverage. Pregnant women should not take MMR.
Treatment	There is currently no treatment for measles other than supportive care. In cases of malnourishment or vitamin A deficiency, vitamin A may be prescribed to help avoid complications.
Surveillance	Monitor for symptoms, microbiological and serological testing for measles virus or anti-measles antibodies.
MSU Requirements	Report any exposures.

LABORATORY HAZARDS	
Laboratory Acquired Infections (LAIs)	One case.
Sources	MV may be isolated from urine, conjunctiva, nasopharynx, and blood. Cultures, frozen stocks, other samples described in IBC protocol.

SUPPLEMENTAL REFERENCES	
Canadian MSDS:	http://www.phac-aspc.gc.ca/lab-bio/res/psds-ftss/index-eng.php
BMBL	https://www.cdc.gov/labs/BMBL.html
CDC	https://www.cdc.gov/globalhealth/measles/
NIH Guidelines	https://osp.od.nih.gov/wp-content/uploads/NIH_Guidelines.pdf

RISK GROUP & CONTAINMENT REQUIREMENTS	
Risk Group 2	Agents that are associated with human disease which is rarely serious and for which preventive or therapeutic interventions are often available.
BSL2	For all procedures involving suspected or known infectious specimen or cultures.
ABSL2	For all procedures utilizing infected animals.

SPILL PROCEDURES	
Small	Notify others working in the lab. Remove PPE and don new PPE. Cover area of the spill with absorbent material and add fresh 1:10 bleach:water. Allow 20 minutes (or as directed) of contact time. After 20 minutes, cleanup and dispose of materials.
Large	<ul style="list-style-type: none"> Immediately notify all personnel in the lab and clear all personnel from the area. Remove any contaminated PPE/clothing and leave the lab. Secure the area by locking doors, posting signage and guarding the area to keep people out of the space. For assistance, contact MSU's Biosafety Officer (406-994-6733) or Safety and Risk Management (406-994-2711).

EXPOSURE PROCEDURES	
Mucous membrane	Flush eyes, mouth, or nose for 5 minutes at eyewash station.
Other Exposures	Wash area with soap and water for 5 minutes.
Reporting	Immediately report incident to supervisor, complete a First Report of Injury form, and submit to Safety and Risk Management.
Medical Follow-up	During business hours: Bridger Occupational Health 3406 Laramie Drive Weekdays 8am -6pm. Weekends 9am-5pm After business hours: Bozeman Deaconess Hospital Emergency Room 915 Highland Blvd

VIABILITY	
Disinfection	MV is susceptible to povidone iodine, formaldehyde, 1% sodium hypochlorite, 70% ethanol, glutaraldehyde, phenolic disinfectants, peracetic acid, hydrogen peroxide
Inactivation	Heat (30 min at 56°C), acidic pH, and trypsin. Inactivated moist heat (1 hour at 121°C).
Survival Outside Host	Agent may survive less than 2 hours on surfaces or objects. Respiratory droplets can remain infective for at least 1 hour in a close space.

PERSONAL PROTECTIVE EQUIPMENT (PPE)	
Minimum PPE Requirements	Lab coat, disposable gloves, safety glasses, closed toed shoes, long pants
Additional Precautions	Additional PPE may be required depending on lab specific SOPs and IBC Protocol.