

Biological Agent Reference Sheet (BARS)

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BIOLOGICAL AGENT REFERENCE SHEET

Middle East Respiratory Syndrome Coronavirus (MERS-CoV)

CHARACTERISTICS	
Morphology	Enveloped, positive-sense, single-stranded RNA virus from the Coronaviridae family, in lineage C of the genus Beta-coronavirus.
Growth Conditions	Cell culture (Vero cells and LLC-MK2 cells)
HEALTH HAZARDS	
Host Range	Humans, bats and dromedary camels with camels serving as the intermediate reservoir. Virus may have originated from bats and later transmitted to camels.
Modes of Transmission	It is a zoonotic virus and dromedary camels are considered the primary source of human infection. Human-to-human transmission infections are very limited in the general population and have mainly occurred among close contacts and in health care settings.
Signs and Symptoms	Ranging from asymptomatic infection to acute upper respiratory illness, and rapidly progressive pneumonitis, respiratory failure, septic shock and multi-organ failure resulting in death. Early symptoms have included high fever (>100.4°F [>38.0°C]), headache, chills, myalgia, nausea/vomiting, and diarrhea.
Infectious Dose	Unknown.
Incubation Period	Ranges from 2 to 14 days (median 5 days).
MEDICAL PRECAUTIONS / TREATMENT	
Vaccines / Prophylaxis	None available.
Diagnosis & Treatment	Real-Time Reverse Transcriptase (RT)-PCR for use with upper and lower respiratory specimens. No specific treatment is available. Medical care is supportive.
Surveillance	Monitor for symptoms and confirm by serological or molecular tests.
Emory Requirements	Report all incidents/exposures.
LABORATORY HAZARDS	
Laboratory Acquired Infections (LAIs)	No data available.
Sources	No data available.
SUPPLEMENTAL REFERENCES	
CDC	http://www.cdc.gov/coronavirus/mers/index.html
Government of Canada	https://www.canada.ca/en/public-health/services/laboratory-biosafety-biosecurity/pathogen-safety-data-sheets-risk-assessment/middle-east-respiratory-syndrome-coronavirus.html#a9
European CDC	https://www.ecdc.europa.eu/en/middle-east-respiratory-syndrome-coronavirus-mers-cov-situation-update
World Health Organization (WHO)	http://www.who.int/emergencies/mers-cov/en/

CONTAINMENT		
ABSL2/BSL2	Pathologic examination and processing of formalin-fixed or otherwise inactivated tissues; molecular analysis of extracted nucleic acid preparations.	
ABSL3/BSL3	Work with MERS-CoV and other associated infectious materials should be conducted in biocontainment level 3, including all procedures involving infected animals.	
SPILL PROCEDURES		
Small	Notify others working in the lab. Allow aerosols to settle. Don appropriate PPE. Contain the spill by covering with paper towels or damming to prevent spread. Apply an appropriate disinfectant, working from the perimeter towards the center. Allow 30 minutes of contact time before disposal and cleanup of spill materials.	
Large	Contain the spill, notify and evacuate others in the area, then contact Emory’s Biosafety Officer (404-357-1821) or the EHSO Spill Response Team (404-727-2888).	
EXPOSURE PROCEDURES		
Mucous membrane	Flush eyes, mouth, or nose for 15 minutes at an eyewash station.	
Other Exposures	Wash area with soap and water for 15 minutes.	
Seek Medical Attention	7:30 am - 4:00 pm (OHS): 404-686-8587	Emory National Primate Research Center (ENPRC/EPC): Contact EPC Safety Office office: 404-727-8012 cell: 470-966-8003
Occupational Health Services (OHS)	OHS After Hours: Advanced Practice Provider (APP) On Call 404-686-5500, PIC# 50464	
Reporting	Immediately report incidents to supervisor. Accidents/Exposures must be reported in H.O.M.E. via HR Self-Service portal. Emory HR website > Self-Service > Workplace Health > Report	
VIABILITY		
Disinfection	0.1% sodium hypochlorite and organochlorine, 10% Iodophor, 2% glutaraldehyde, 70% ethanol	
Inactivation	Sensitive to heat, lipid solvents, non-ionic detergents and oxidizing agents.	
Survival Outside Host	Remains viable at 48 hours at 20 °C and 40% relative humidity, comparable to an indoor environment on plastic and metal surfaces. In unpasteurized camel milk, MERS-CoV remains infectious beyond 72 hours after introduction to the milk.	
PERSONAL PROTECTIVE EQUIPMENT (PPE)		
Minimum PPE Requirements	At minimum, personnel are required to wear lab coat plus fluid resistant gown, double gloves, eye protection with side shields, closed-toe shoes with shoe covers, long pants/skirt, and N95 respirator. Additional PPE may be required depending on lab specific or facility specific SOPs.	
Additional Precautions	Due to the mode of exposure, respirator is required when working with MERS-CoV. Fit testing, medical evaluation, and training is required annually per Emory’s Respiratory Protection Program.	