MONTANA STATE UNIVERSITY | Office of Research Compliance

PATHOGEN SAFETY DATA SHEET

Orthobunyaviruses

CHARACTERISTICS	
Morphology	Orthobunyaviruses (over 170 species, including Batai virus, Ngari virus, Inkoo virus, Jamestown Canyon virus, Tahyna virus, Keystone virus, Bunyamwera virus) are a genus of single-stranded, tri-segmented negative-sense RNA viruses that belong to the family Peribunyaviridiae. Orthobunyaviruses are endemic to many areas of the world, including Africa, Europe, Asia, and North America. All viruses are of zoonotic origin and are transmitted primarily by contact with infected mosquitoes.
Disease	Batai virus; Bunyamwera virus (Bunyamwera fever); Inkoo virus; Jamestown Canyon virus; Keystone virus; Oropouche virus; Tahyna virus
Zoonosis	Yes. The only documented transmission of orthobunyaviruses have been through zoonotic means (mosquito bites, tick bites, Culicoid flies).

HEALTH HAZARDS	
Host Range	Mosquitoes. Humans are accidental hosts. Other mammals, including hares, rabbits, hedgehogs, rodents, and seals may serve as accidental or amplifying hosts.
Modes of Transmission	Transmission is primarily through mosquito bites. Disease has not been documented to show transmission from human to human. If working in an endemic area or near mosquitoes that may be infected with Orthobunyaviruses, be sure to minimize skin exposure and use personal protectants containing N, N-diethyl-meta-toluamide (DEET).
Signs and Symptoms	Most cases report sudden onset of fever, stiff neck, lethargy, headache, nausea, vomiting. Symptoms usually end within 7 days. Mosquitoes begin to become infectious approximately 1-2 weeks after ingestion of the virus (extrinsic incubation period). High viremia is essential for neuroinvasion.
Infectious Dose	Unknown.
Incubation Period	The incubation period is approximately 3 to 7 days.

MEDICAL PRECAUTIONS/TREATMENT	
Prophylaxis	None.
Vaccines	None.
Treatment	There is no proven antiviral treatment for orthobunyavirus infections. Ribavirin treatment has been studied in humans, though was not proven to reduce either viral load or mortality. Management is mainly supportive. If severe enough, blood product transfusion may be necessary. Data is insufficient regarding the use of steroids, intravenous immunoglobulin, or plasma exchange. However, some advocate the use of IVIG from patients endemic to the area of infection, as there is a higher probability of antibodies against the virus.
Surveillance	Diagnosis relies primarily on serologic methods, as the virus is generally absent from blood or secretions during CNS disease. Hemagluttinin inhibition testing is sensitive for these viruses, though neutralization and RT-PCR with nucleotide genome sequencing are needed to confirm the diagnosis. ELISA may also be used, but has not been widely studied.
MSU Requirements	Report any exposures.

LABORATORY HAZARDS	
Laboratory Acquired Infections (LAIs)	Unknown.
Sources	Cultures, frozen stocks, other samples described in IBC protocol.

SUPPLEMENTAL REFERENCES	
Canadian MSDS:	n/a
BMBL	https://www.cdc.gov/labs/BMBL.html
CDC	n/a
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	• 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	1:10 dilution of bleach; 70% Ethanol
Inactivation	Treatment with lipid solvents or nonionic detergents removes the viral envelope and results in loss of infectivity for arthropods and mammals. Inactivated moist heat (1 hour at 121°C).
Survival Outside Host	Unknown.

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.