The University of Vermont
Risk Management & Safety
Biosafety Office

BIOHAZARDOUS AGENT REFERENCE DOCUMENT

Hantavirus

The Biohazardous Agent Reference Document (BARD) is a general guidance resource that reviews and summarizes the nature of a pathogen or biotoxin, and offers safety requirements for work with the agent in the laboratory. The BARD may replace the formal SOPs used in conjunction with some IBC registrations.

The BARD is provided as an additional guidance tool, and is not a substitute for a risk assessment, biosafety training, lab-specific training, or a formal IBC master protocol registration. This document should be readily available in the laboratory, and it is the responsibility of the Laboratory Supervisor or Principal Investigator to ensure that all personnel have read, understood, and signed the document. The BARD is for informational purposes only, and is not intended to be a substitute for professional medical advice, diagnosis, or treatment. Please consult a health care provider for any medical questions or concerns.

INSTRUCTIONS

1. **Review the information contained in this document.**
2. **Add any necessary information that is specific to your work in the laboratory (such as strain-specific information). Please be sure that the track changes function is turned on to indicate any changes that you make.**
3. **Instruct all personnel to review the BARD and sign the last page, indicating that they have read and understood the information.**
4. **Submit the BARD along with your IBC master protocol registration, amendment, or continuing review.**

Principal Investigator: _____ IBC Registration #: _____

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CHARACTERISTICS	
Morphology	Family of zoonotic, enveloped viruses, belonging to the family Bunyaviridae
Strain Specific Characteristics	Sin Nombre: HPS, 50% mortality Seoul: HFRS (moderate) Andes: HPS (renal variant) Puumala: HFRS (mild) Hantaan: HFRS (severe), 5 – 15% mortality

HEALTH HAZARDS	
Host Range	Humans, voles, mice, rats
Modes of Transmission	Inhalation of aerosolized rodent urine, saliva, respiratory secretions, particles of feces, dust, or other contaminated matter. Rodent bites or other cutaneous injury, ingestion of contaminated food or water, mucous membrane contact.
Signs and Symptoms	**Hemorrhagic fever with renal syndrome (HFRS)**: high fever, chills, headaches, blurred vision, malaise, anorexia; followed by abdominal or lumbar pain, gastrointestinal upset, facial flushing, petechiae, erythematous rash, lasting 3 – 7 days. May also exhibit sudden hypotension, shock, hemorrhagic manifestations. Progresses to increased blood pressure, significantly decreased urinary output, severe hemorrhage. **Hantavirus pulmonary syndrome (HPS):** fever, muscle pain, malaise, headache, dizziness, abdominal pain, gastrointestinal upset, lasting 3 – 6 days. Followed by rapid progression of non-cardiogenic pulmonary edema, hypoxemia, cough, pleural effusion, gastrointestinal upset, rapid breathing, rapid heart rate, myocardial depression, cardiogenic shock. Hypotension and decreased urinary output may also occur.
Infectious Dose	Unknown
Incubation Period	2 – 4 weeks (range from a few days to 2 months) for HFRS, 14 – 17 days for HPS

MEDICAL PRECAUTIONS / TREATMENT	
Prophylaxis	None available
Vaccines	None available
Treatment	Supportive treatment. Ribavirin improves outcome of HFRS, but not investigated for HPS.
Surveillance	Monitor for symptoms and test using serology or RT-PCR
UVM IBC Requirements	Report any exposures or signs and symptoms to your supervisor.
Additional Medical Precautions	

LABORATORY HAZARDS	
Laboratory Acquired Infections	226 reported cases for lab-acquired infection with Hantaan virus
Sources	Blood, urine, cerebrospinal fluid, respiratory secretions, feces, & tissues from infected humans and animals, and laboratory cultures.

CONTAINMENT REQUIREMENTS	
BSL - 2+	
BSL - 3	All work involving infectious or potentially infectious materials or cultures (RG3)
ABSL - 2	
ABSL - 3	Work with infected animals (RG3)
Aerosol generating activities	Centrifugation, homogenizing, vortexing or stirring, changing of animal cages, animal surgeries, cell sorting, pipetting, pouring liquids, sonicating, loading syringes
Primary containment device (BSC)	Use for all activities with infectious material, loading or unloading of centrifuge rotors, any other procedures which may generate aerosols

EXPOSURE PROCEDURES	
Mucous membranes	Flush eyes, mouth or nose for 15 minutes at eyewash station.
Other exposures	Wash area with soap and water for 15 minutes
Medical Follow-Up	Contact UVMMC Infectious Disease Dept. directly at **(802) 847-2700** for immediate assistance
Reporting	Report all exposures or near misses to: 1. Your immediate Supervisor 2. The UVM Biosafety Officer at **(802) 777-9471** and Risk Management at **6-3242** 3. Risk Management and Safety; https://www.uvm.edu/riskmanagement/incident-claim-reporting-procedures

PERSONAL PROTECTIVE EQUIPMENT (PPE)	
Minimum PPE Requirements	Double nitrile gloves, shoe covers, full coverage protective clothing, solid-front gown with tight-fitting wrists, appropriate eye/face protection, respiratory protection. Wash hands after removing all PPE. Medical clearance, fit testing and training is required annually per UVM's Respiratory Protection Program: https://www.uvm.edu/riskmanagement/personal-protective-equipment
Additional Precautions (Risk assessment dependent)	Sharps use strictly limited. Non-intact skin should be allowed to scab over before entering the laboratory, and should then be covered with waterproof dressings. Remove hand jewelry before donning gloves.

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VIABILITY	
Disinfection	Susceptible to 1% sodium hypochlorite, 1-5% chlorine dioxide, 1-5% parachlorometaxylenol, 1-5% peracetic acid, absolute methanol, or Virkon with 10-minute contact time. 70% ethanol with a 30-minute contact time.
Inactivation	Inactivated by heat above 56°C (15 minutes for cell culture, 2 hours for dried virus)
Survival Outside Host	Capable of surviving 12 – 15 days in contaminated animal bedding, 5 – 11 days at room temperature in cell culture media, and 18 – 96 days at 4°C in cell culture media

SPILL CLEAN UP PROCEDURES	
Small Spill	Notify others working in the lab. Allow aerosols to settle. Don appropriate PPE. Cover area of the spill with paper towels and apply approved disinfectant, working from the perimeter towards the center. Allow 30 minutes of contact time before clean up and disposal. Dispose in double biowaste bags and biobox.
Large Spill	**Inside of a lab:** Call UVM Service Operations at 656-2560 and press option 1 to speak to a dispatcher. Ask them to page Risk Management and Safety. **Outside of a lab:** Pull the nearest fire alarm and evacuate the building. Wait out front of the building for emergency responders to arrive.

REFERENCES	
Canadian PSDS	https://www.canada.ca/en/public-health/services/laboratory-biosafety-biosecurity/pathogen-safety-data-sheets-risk-assessment/hantavirus.html
BMBL	https://www.cdc.gov/biosafety/publications/bmbl5/
CDC Guidelines	https://www.cdc.gov/hantavirus/technical/hanta/virology.html
Journal of Medical Microbiology	http://www.microbiologyresearch.org/docserver/fulltext/jmm/49/7/mjm4907.587.pdf?expires=1502118814&id=id&accname=sgid026657&checksum=F78506A43028517CEDB28BDF1E3E8885

STUDENT / EMPLOYEE NAME	SIGNATURE	DATE

Biosafety Review:

_____ _____

Jeff LaBossiere, Biological Safety Officer — Date

Principal Investigator: _____ IBC Registration #: _____