

Biological Agent Reference Sheet (BARS)

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BIOLOGICAL AGENT REFERENCE SHEET

Powassan Virus (POWV)

CHARACTERISTICS	
<i>Morphology</i>	Powassan virus (POWV) belongs to the family <i>Flaviviridae</i> . It is 40-50 nm in diameter, enveloped and single stranded RNA. There are two lineages of POWV in the United States, lineage 1 POWV appears to be associated with <i>Ixodes cookei</i> or <i>Ix. marxi</i> . Lineage 2 POWV is sometimes called deer tick virus and is associated with <i>Ix. scapularis</i> ticks. Both lineages have been linked to human disease (zoonosis). POWV is phylogenetically related to the Tick-Borne Encephalitis Virus (TBEV), which is common in Europe. POWV and TBEV are members of the Tick-Borne encephalitis complex of viruses.
<i>Growth Conditions</i>	POWV can be propagated in tick cells <i>in vitro</i> .

HEALTH HAZARDS	
<i>Host Range</i>	Humans, woodchuck, snowshoe hare, coyotes, foxes, raccoons and skunks, domesticated cats and dogs
<i>Modes of Transmission</i>	POWV is transmitted through the bite of an infected tick. POWV is not transmitted directly from person to person. POWV is maintained in a cycle between ticks and small -medium sized rodents. Vectors include: <i>Ix. cookei</i> , <i>Ix. marxi</i> , <i>Ix. spinipalpus</i> .
<i>Signs and Symptoms</i>	Most individuals infected with POW will not develop symptoms. POWV causes encephalitis and meningitis. Symptoms are non-specific and flu-like, they include fever, headache, vomiting, weakness, confusion, loss of coordination, speech difficulties, stiff neck, and seizures. About half of the survivors have permanent neurological symptoms. Approx. 10% of POWV encephalitis are fatal.
<i>Infectious Dose</i>	Unknown
<i>Incubation Period</i>	1 week to 1 month

MEDICAL PRECAUTIONS / TREATMENT	
<i>Prophylaxis</i>	None available
<i>Vaccines</i>	None available
<i>Diagnosis & Treatment</i>	A combination of signs and symptoms and laboratory tests of blood or spinal fluid to detect virus-specific IgM and neutralizing antibodies. There is no specific treatment to cure the disease caused by POWV. Severe illness caused by this virus may include hospitalization, respiratory support and intravenous fluids. Antibiotics are ineffective.
<i>Surveillance</i>	Monitor for symptoms
<i>Emory Requirements</i>	Report all incidents using PeopleSoft

LABORATORY HAZARDS	
<i>Laboratory Acquired Infections</i>	Infection with TBEV has been reported in a laboratory worker, most probably acquired by aerosol.
<i>Sources</i>	Blood, CSF and exudates, direct contact with broken skin, exposure to aerosols of infectious solutions and animal bedding, parenteral inoculation.

SUPPLEMENTAL REFERENCES	
<i>CDC</i>	https://www.cdc.gov/powassan/index.html https://www.cdc.gov/biosafety/publications/bmb15/
<i>Coppe Laboratories</i>	http://www.coppelabs.com/wp-content/uploads/Coppe-Powassan-Guide-InPg-July_2016.pdf
<i>Public health Agency of Canada</i>	http://www.phac-aspc.gc.ca/lab-bio/res/psds-ftss/msds121e-eng.php
<i>PubMed</i>	https://www.ncbi.nlm.nih.gov/pubmed/15566827

CONTAINMENT	
<i>BSL3/ABSL3</i>	Work with POWV should be conducted in biocontainment level 3, following BSL3 practices and using appropriate containment equipment. Approval from the IBC/RHSC is required to work with POWV. HEPA filtration on lab exhaust is not required.

SPILL PROCEDURES	
<i>Small</i>	Notify others working in the lab. Allow aerosols to settle. Don appropriate PPE. An EPA-registered disinfectant should be used to remove contaminating matter from surfaces (e.g., of bench tops and equipment). All decontamination litter and other disposable materials should be autoclaved.
<i>Large</i>	For assistance, contact Emory's Biosafety Officer (404-727-8863), or the EHSO Spill Team (404-727-2888)

EXPOSURE PROCEDURES		
<i>Mucous membrane</i>	Flush eyes, mouth or nose for 15 minutes at eyewash station.	
<i>Other Exposures</i>	Wash area with soap and water for 15 minutes.	
<i>Reporting</i>	Immediately report incident to supervisor, complete an employee incident report using PeopleSoft.	
<i>Medical Follow-up</i>	7am-4pm (OIM): EUH (404-686-7941) EUHM (404-686-7106) WW (404-728-6431)	After Hours: OIM NP On Call 404-686-5500 PIC# 50464 Yerkes: Maureen Thompson Office (404-727-8012) Cell (404-275-0963)
	Needle Stick (OIM): EUH (404-686-8587) EUHM (404-686-2352)	

VIABILITY	
<i>Disinfection</i>	Susceptible to 1% sodium hypochlorite, 2% glutaraldehyde, formaldehyde and 70% ethanol
<i>Inactivation</i>	Inactivated by heat (60°C for 30 minutes), UV and gamma irradiation.
<i>Survival Outside Host</i>	Does not survive outside the host

PERSONAL PROTECTIVE EQUIPMENT (PPE)	
<i>Minimum PPE Requirements</i>	At minimum, personnel are required to don two pairs of gloves, closed toed shoes, lab coat, and appropriate face and eye protection prior to working with POWV-infected samples. Additional PPE may be required depending on lab specific SOPs.
<i>Additional Precautions</i>	All procedures that may produce aerosols, or involve high concentrations or large volumes should be done in a BSC.