**Biological Agent Reference Sheet (BARS)**

**Agent: Venezuelan Equine Encephalitis Virus**

### Agent Characteristics

<table>
<thead>
<tr>
<th>Risk Group (RG)</th>
<th>Description</th>
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<tbody>
<tr>
<td>☒ RG-3</td>
<td>Associated with serious or lethal human disease; preventive or therapeutic interventions may be available</td>
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</table>

**Agent Type**: Virus

**Description**: Venezuelan equine encephalitis virus (VEEV) is a single-stranded, enveloped, message-sense RNA virus that is enzootic to South American countries such as Venezuela, Colombia and Peru. Recently, however, there have been emerging outbreaks in southern United States. VEEV is spread between host species primarily via mosquito vectors and could be mechanically transmitted through smaller arthropods such as lice and mites. Healthy adults may develop flu-like symptoms such as high fever and headaches; people with weakened immune systems can develop encephalitis which may result in death. There are some vaccines for both equines and humans but have limited functionality. There is only supportive therapy for infection with VEEV.

### Health Hazards

#### Signs and Symptoms
- ☒ Flu-like symptoms (i.e. fever, headache, dehydration, weight loss, lethargy)
- ☐ Cutaneous symptoms (i.e. skin lesions, rash)
- ☒ Gastrointestinal symptoms (i.e. loss of appetite, nausea, vomiting, diarrhea)
- ☒ Respiratory symptoms (i.e. coughing, sneezing)
- ☒ Neurological symptoms (i.e. loss of sensation, ataxia)
- ☒ Musculoskeletal symptoms (i.e. joint and muscle pain)
- ☒ Lymphoreticular symptoms (i.e. enlarged internal organs or lymph nodes)
- ☒ Reproductive Health concerns (i.e. abortion, fetal abnormalities) – request a Reproductive Health Consultation

#### Immunizations
- ☒ Available
- ☐ Not Available

#### Prophylaxis
- ☒ Avoid and protect against mosquito bites.

**Agent Viability**

| Disinfection | ☒ 1:10 Bleach Dilution  ☒ 70% Ethanol |

### Laboratory Hazards

- **High energy-creating activities (centrifugation, sonication, high pressure systems, vortexing, tube cap popping)**
- **Handling of sharps (needles, scalpels, microtome blades, broken glass, etc.)**
- **Splash/droplet-creating activities (shaking incubators, liquid culturing, mechanical pipetting)**
- **Equipment contamination**
- **Exposed skin/uncovered wounds**

### Laboratory Acquired Infection History

Several laboratory-acquired cases of the VEE virus have been reported. As of 2006, a total of 186 cases and 2 deaths were documented. Most of these incidents were related to exposure of aerosols near infected equines.

### Laboratory Handling Guidelines

#### Laboratory Biosafety Level (BSL)
- ☒ BSL-3

#### Attenuated Strain Alternatives
- None known.

#### Training
- ☒ EHS Laboratory Safety Training (CULearn #2555)
- ☒ EHS Bloodborne Pathogens Training (CULearn #1074)
- ☒ Lab-specific protocol training
- ✒ CULearn BARS Course #2277.67

#### Lab Engineering Controls
- ☒ Benchtop
- ☒ Biosafety Cabinet
- ☒ Chemical Fume Hood
- ☒ Centrifuge lids or safety cups; samples are loaded/unloaded inside the BSC
- ☒ Use of safety-engineered sharps
- ☒ Other:
- ✒ Eye protection
- ✒ Single gloves
- ✒ Additional gloves, required
- ✒ Snap-front lab coat with cinch cuffs
- ✒ Disposable solid front gown
- ✒ Additional mucous membrane protection
- ✒ Disposable outer sleeves
- ✒ Other: Respiratory protection

#### Waste Management
- ☒ Regulated Medical Waste (RMW)

#### Shipping Guidance
- Refer to EHS Biological Materials Shipping

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**Animal Vivarium Guidance**

### Animal Housing Biosafety Level (ABSL)
- ☒ ABSL-1
- ☒ ABSL-2
- ☒ ABSL-3

#### Animal Biosecurity
- ☒ Experimental animals are housed separately
- ☒ Information not available

#### Perform Inoculations
- ☒ Benchtop
- ☒ Biosafety Cabinet

#### Change Cages
- ☒ Benchtop
- ☒ Biosafety Cabinet
## Exposure and Spill Procedures

### Mucous Membranes
- Flush eyes, mouth or nose for 15 minutes at eyewash station. See: responding to exposures.

### Other Exposures
- Wash with soap and water for 15 minutes (open wounds, sores, etc.) and a minimum of 20 seconds of soap and water for areas with intact skin. See: responding to exposures.

### Small Spills
- Notify others working in the lab. Evacuate area and allow 30 minutes for aerosols to settle. Don appropriate PPE. Cover area of the spill with paper towels and apply disinfectant, working from the perimeter toward the center. Allow 30 minutes of contact time before disposal and cleanup of spill materials. See: spill cleanup.

### Large Spills
- Request assistance from the EHS Spill Team by calling CUPD dispatch. Call 911 from a campus phone or 607-255-1111 from a mobile phone.

### Incident Reporting
- Immediately report the incident to supervisor and complete the EHS online injury/illness report as soon as possible.

## Medical Follow Up

<table>
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<tr>
<th>During Business Hours</th>
<th>After Hours Care</th>
<th>Emergencies:</th>
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<tbody>
<tr>
<td>Cornell Health 607-255-5155 (24-hour phone consultation line)</td>
<td>Cornell Health Services 24-hour phone consultation line or local urgent care as listed on above webpage.</td>
<td>Call 911 from a campus phone or 607-255-1111 from a mobile phone.</td>
</tr>
</tbody>
</table>

## Biosafety Level 3 Containment Requirements Summary

### Personal Hygiene
- Remove PPE before leaving the lab – avoid wearing PPE in public spaces.
- Wash hands frequently with soap and water after removing gloves, handling potentially hazardous samples, leaving lab, etc.
- Change gloves frequently while working, and before removing samples from the biosafety cabinet to minimize potential contamination of equipment and surfaces within the lab.
- Individuals must be trained by the BSL-3 team and demonstrate proficiency in the proper PPE donning, doffing and decontamination.
- If respiratory protection is required, enroll in the University’s respiratory protection program, participate in a medical evaluation by Occupational Medicine, and receive further training by EH&S.

### Standard Microbiological Practices
- In addition to standard BSL1&2 practices:
  - Biohazard signs and labels on equipment.
  - Use a biological safety cabinet (BSC), such as a Class II Type A2, for manipulations that can generate infectious aerosols.
  - Use aerosol containing devices for high energy activities which may cause splashing and generate infectious aerosols. For example, centrifugation of agents which may generate infectious aerosols will use gasketed rotors or buckets. Rotors or buckets will be removed and opened inside a BSC. Centrifuge tubes will be filled and opened in a BSC.
  - Vacuum lines are protected with liquid disinfectant-filled traps and 0.45-micron filters.
  - Decontaminate work surfaces after completion of work and after any spill or splash of potentially infectious material with appropriate disinfectant.
  - Decontaminate all cultures, stocks and other potentially infectious materials before disposal within laboratory. Examples of decontamination instruments include autoclave, incineration, chemical disinfection, etc.
  - Chemically disinfect all surfaces and equipment.
  - Potentially infectious materials are placed in durable, leak proof, labeled primary containers during collection, handling, processing, and secondary containers during storage, or transport within a facility.
  - Implementation of an effective pest management program to prevent transport of agent through an animal or arthropod agent.

### Special Practices
- In addition to special BSL1&2 practices:
  - All persons entering the laboratory are advised of the potential hazards and meet specific entry/exit requirements.
  - The laboratory supervisor ensures that lab personnel demonstrate proficiency in standard and special microbiological practices before working with such agents.
  - Laboratory personnel must be provided medical surveillance and offered appropriate immunizations for present agents in the laboratory.
  - Animals and plants not associated with the work being performed must not be permitted in the laboratory.
  - All procedures involving the manipulation of infectious materials must be contained within a BSC; no work with open vessels is conducted on the bench.
  - Equipment is decontaminated before repair, maintenance, or removal from the laboratory.

## Regulated Medical Waste Guidance

### Regulated Medical Waste (RMW)
- Soft waste:
  - All materials that come into contact with this agent must be placed in a biohazard waste bag.
  - If working in a BSC, have a biohazard waste bag inside the BSC for waste collection.
  - All equipment, tubes, and waste bags that are brought out of the biosafety cabinet are wiped with appropriate disinfectant.

### Sharps waste:
- Place in leak proof sharps container labeled with the biohazard symbol. If working in a BSC, place a sharps container in the BSC.

### Liquid waste:
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- Add EHS-approved disinfectant to appropriate concentration, hold for contact time specified per manufacturer’s guidelines, and then gently pour down the drain.

### Special Considerations

<table>
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<tr>
<th>Experiment-Specific Requirements</th>
<th>See lab protocols for additional information, any deviations from this BARS, and for lab-specific expectations.</th>
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### References


*Cornell EHS would like to thank Emory University for the use of their Biological Agent Reference Sheet (BARS) format and some content.*