### Agent Characteristics

<table>
<thead>
<tr>
<th>Risk Group (RG)</th>
<th>Agent Type</th>
<th>Description</th>
<th>Host Range</th>
<th>Infectious Dose</th>
<th>Incubation Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>RG-2</td>
<td>Viral Vector</td>
<td>Lentiviruses are medium-sized (120 nm), enveloped viruses composed of a nucleocapsid containing two copies of single-stranded positive-sense RNA. Lentivirus is a genus of slow viruses (lente-, Latin for &quot;slow&quot;) of the Retroviridae family, characterized by a long incubation period. The viruses are species-specific in host range and several have been recognized as pathogens of domestic animals, non-human primates and humans.</td>
<td>The host range is dependent upon the viral envelope glycoproteins and structural proteins involved in integration. Possible hosts include human, murine, feline, bovine, and avian. The Vesicular Stomatitis Virus glycoprotein G (VSV-G), which allows gene transfer to a broad array of cell types and species, is frequently used for pseudotyping of lentiviral vectors. Though advantageous for research purposes, this poses an increased risk of infection in case of exposure to VSV-G-pseudotyped lentiviral vectors for lab workers, since these vectors will be able to target a larger range of cells.</td>
<td>n/a</td>
<td>Unknown</td>
</tr>
</tbody>
</table>

### 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)
- 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)
- Other:

**Immunizations**

- Not Available

**Prophylaxis**

Post exposure prophylaxis for occupational exposure with HIV-based viral vectors may include the use of antiretroviral drugs.

### Laboratory Hazards

- Handling of sharps (needles, scalpels, microtome blades, broken glass, etc.)
- Splash/droplet-creating activities (shaking incubators, liquid culturing, mechanical pipetting)
- Exposed skin/uncovered wounds

### Laboratory Handling Guidelines

#### Laboratory Biosafety Level (BSL)

<table>
<thead>
<tr>
<th>BSL-2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Note: 3rd generation and higher lentiviral vectors are usually pseudotyped with a human tropic envelope, such as the VSV-G envelope. In this case, BSL2 containment is implemented since these viruses now have the capability of transducing human cells.</td>
</tr>
</tbody>
</table>

#### Attenuated Strain Alternatives

- n/a

#### Training

- EHS Laboratory Safety Training (CULearn #2555)
- EHS Bloodborne Pathogens Training (CULearn #1070)
- Lab-specific protocol training
- BARS CULearn #2277.47

#### Lab Engineering Controls

- Biosafety Cabinet (for aerosol containment)
- Centrifuge lids or safety cups; samples are loaded/unloaded inside the BSC
- Use of safety-engineered sharps

#### Personal Protective Equipment (PPE)

- Eye protection - For activities conducted outside of a biosafety cabinet (e.g. stereotactic injection), the use of mucosal membrane protection devices is of extreme importance.
- Single gloves
- Snap-front lab coat with cinch cuffs

#### Waste Management

- Regulated Medical Waste (RMW)

#### Shipping Guidance

- Refer to EHS Biological Materials Shipping

### Animal Vivarium Guidance

- ABLS-1
- ABLS-2

#### Animal Housing

- Experimental animals are housed separately

#### Perform Inoculations & Cage Changes

- Biosafety Cabinet

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1 Final Biosafety Level designation will be assigned upon a case-by-case review by the Institutional Biosafety Committee.

2 Recommended in addition to closed toed shoes and long pants

3 BSL containment practices and waste management requirements are provided on the next page.
**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>
<thead>
<tr>
<th>During Business Hours</th>
<th>After Hours Care:</th>
<th>Emergencies:</th>
</tr>
</thead>
<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 2 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 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.

**Standard Microbiological Practices**
- In addition to standard BSL1 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 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.
  - **Sharps handling** and safety practices are implemented.
  - Decontaminate work surfaces after completion of work and after any spill or splash of potentially infectious material with appropriate disinfectant.
  - 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.
  - Windows in BSL-2 labs remain closed.

**Special 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 equipment are routinely decontaminated, as well as, after spills, splashes or other potential contamination.
- Spills involving infectious materials are contained, decontaminated, and cleaned up by staff properly trained and equipped to work with infectious material.
- Equipment is decontaminated before repair, maintenance, or removal from the laboratory.

**Regulated Medical Waste (RMW)**

### Online RMW Pickup Request
- Soft waste:
  - All materials that come into contact with this agent is 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.
  - Place smaller red bag waste from BSC into larger red bag outside the BSC for transport.

### 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:
- 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

#### Experiment-Specific Requirements
- See lab protocols for additional information, any deviations from this BARS, and for lab-specific expectations.

### References

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