

## **Biological Agent Reference Sheet (BARS)**

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## BIOLOGICAL AGENT REFERENCE SHEET

### *Lentivirus and Lentiviral Vectors*

CHARACTERISTICS	
<i>Morphology</i>	Family: <i>Retroviridae</i> ; Genus: <i>Lentiviridae</i> . The <i>Lentiviridae</i> genus includes the primate Human Immunodeficiency Virus (HIV) types 1-2 and the non-human primate Simian Immunodeficiency Virus (SIV). HIV-derived vectors are highly efficient vehicles for in vivo gene delivery. Lentiviruses are approx. 120nm in diameter, enveloped, and contain a nucleocapsid containing two copies of single-stranded positive-sense RNA. <i>Cis</i> and <i>trans</i> -acting factors of the lentivirus are on separate plasmids depending on the Viral Vector generation. Third generation systems are currently the safest to use because the virus production is split across four plasmids.
<i>Growth Conditions</i>	Packaging cells: 293T cells Lentiviral vectors infect dividing and non-dividing cells.

HEALTH HAZARDS	
<i>Host Range</i>	If the HIV envelop is replaced with Vesiculo-Stomatitis Virus (VSV)-G then a broad host-range can be achieved.
<i>Modes of Transmission</i>	Direct exposure to infected bodily fluids, sexual contact, splash or percutaneous injection.
<i>Signs and Symptoms</i>	Fever, fatigue, weight loss, immunological and neurological disease. Insertional mutagenesis is the major risk after exposure to retroviral vectors.
<i>Infectious Dose</i>	Unknown
<i>Incubation Period</i>	1-6 months

MEDICAL PRECAUTIONS / TREATMENT	
<i>Prophylaxis</i>	Post exposure prophylaxis for occupational exposure with HIV-based viral vectors includes the use of anti-retroviral drugs.
<i>Vaccines</i>	None available.
<i>Treatment</i>	Anti-retroviral therapy when indicated.
<i>Surveillance</i>	Serological monitoring; Western blot test advised for confirmation.
<i>Emory Requirements</i>	Report all incidents. All work including retroviral vectors must be reviewed by the IBC.

LABORATORY HAZARDS	
<i>Laboratory Acquired Infections (LAIs)</i>	Six reported lab infections (splash or puncture wounds)
<i>Sources</i>	Direct contact with skin and mucous membranes, parenteral inoculation and ingestion.

SUPPLEMENTAL REFERENCES	
<i>Canadian MSDS</i>	<a href="http://www.phac-aspc.gc.ca/lab-bio/res/psds-ftss/hiv-vih-eng.php">http://www.phac-aspc.gc.ca/lab-bio/res/psds-ftss/hiv-vih-eng.php</a>
<i>BMBL: 5<sup>th</sup> Edition</i>	<a href="http://www.cdc.gov/biosafety/publications/bmb15/BMBL5_sect_VIII_e.pdf">http://www.cdc.gov/biosafety/publications/bmb15/BMBL5_sect_VIII_e.pdf</a>
<i>NIH</i>	<a href="http://osp.od.nih.gov/sites/default/files/resources/Lenti_Containment_Guidance.pdf">http://osp.od.nih.gov/sites/default/files/resources/Lenti_Containment_Guidance.pdf</a>
<i>University of Cincinnati</i>	<a href="http://researchcompliance.uc.edu/training/lentiviral-vectors/story_content/external_files/LV%20online%20(March%202014b).pdf">http://researchcompliance.uc.edu/training/lentiviral-vectors/story_content/external_files/LV%20online%20(March%202014b).pdf</a>

CONTAINMENT	
<i>BLSL/ABSL2</i>	Containment Level 2 facilities, equipment, and operational practices. <b>No open-bench work</b> should be performed with retroviral vectors. All work should be performed inside a Biosafety Cabinet. Use of needle-safe sharps is encouraged. Centrifuge rotors must have a lid, samples should be loaded/unloaded inside the BSC and the centrifuge should be decontaminated with appropriate disinfectant after use. If the vector is replication incompetent, animals infected with retroviral vectors will remain at ABSL-2 for 72h, then moved to ABSL1. If the vector is replication competent, animals will be housed at ABSL2 for the length of the experiment.

SPILL PROCEDURES	
<i>Small</i>	Notify others working in the lab. Allow aerosols to settle. Don appropriate PPE. Cover area of the spill with paper towels and apply an EPA registered disinfectant, working from the perimeter towards the center. Allow 30 minutes of contact time before disposal and cleanup of spill materials.
<i>Large</i>	For assistance, contact Emory's Biosafety Officer (404-727-8863), the EHSO Office (404-727-5922), or the Spill Response 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 in PeopleSoft.	
<i>Medical Follow-up</i>	<b>7am-4pm (OIM):</b> EUH (404-686-7941) EUHM (404-686-7106) WW (404-728-6431) <b>Needle Stick (OIM):</b> EUH (404-686-8587) EUHM (404-686-2352)	<b>After Hours:</b> OIM NP On Call 404-686-5500 PIC# 50464 <b>Yerkes:</b> Maureen Thompson Office (404-727-8012) Cell (404-275-0963)

VIABILITY	
<i>Disinfection</i>	10% freshly prepared bleach solution or 70% ethanol.
<i>Inactivation</i>	Heat at 56°C for 30+ minutes.
<i>Survival Outside Host</i>	90-99% reduction in several hours.

PERSONAL PROTECTIVE EQUIPMENT (PPE)	
<i>Minimum PPE Requirements</i>	At minimum, personnel are required to don gloves, closed toed shoes, lab coat, and appropriate face and eye protection prior to working with <i>Lentivirus</i> . Additional PPE may be required depending on lab specific SOPs.
<i>Additional Precautions</i>	Use respiratory protection if work will be performed outside the biosafety cabinet. Additional precautions should be considered with work involving animals or large scale activities.