Viral Vector Containment Guidelines

This document provides general biosafety containment recommendations for viral vectors commonly used in research labs at U-M. The containment levels listed below are applicable to standard situations, but additional biosafety precautions may be required depending on the nature of the vector, the transgene insert, and the procedures being performed.

Note that the Institutional Biosafety Committee (IBC) recommends working with viral vectors in a biosafety cabinet and testing your vector stocks for replication competent virus (RCV).

Viral Vector	Risk Group	Biosafety level	Notes
Adenovirus (human*)	2	BSL2	This virus can remain infective for weeks on lab surfaces, so decontamination is extremely important. *It may be possible to work with non-human adenoviruses at BSL1.
Retrovirus, ecotropic (non-human, such as MLV, MMLV)	1	BSL1	Ecotropic non-human retrovirus vectors may be worked with at BSL1 containment because they are not infectious to lab personnel.
Retrovirus, amphitropic (or VSV-G pseudotyped)	2	BSL2	Because these vectors may be infectious to lab personnel and because the virus integrates into the host's genome, there is the potential for insertional mutagenesis in exposed workers.
Lentivirus , 3rd generation (3 or 4 vector system)	2	BSL2	3rd generation HIV-based vectors are RG2, downgraded from the original RG3 status. Because this virus integrates into the host's genome, there is the potential for insertional mutagenesis in exposed workers.
HSV (Herpes simplex virus)	2	BSL2	The possibility of vector transmission via direct contact with epithelial or mucosal surfaces is a concern due to the percentage of the population exposed to wild type HSV, and this increases the risk of recombination that may lead to replication-competent virus.

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Adeno-associated Virus (AAV)	1/2	BSL1/BSL2	Work with AAV vectors is generally appropriate for BSL1 containment unless an adenovirus helper is used or if the work involves growth control genes or genes that encode toxins. (In these latter cases BSL2 containment is required.)
Baculovirus	1/2	BSL1/BSL2	Work with baculovirus vectors is generally appropriate for BSL1 containment, unless the BacMam vector is being used. (BacMam can infect and transduce mammalian cells, so BSL2 containment is required.)