Carnegie Mellon University Environmental Health & Safety FIRE | LAB | WORK	**Environmental Health and Safety** **Containment Changes for Research Involving Lentiviral Vectors**
Date of Issuance:	**Revision Date:** 3/8/2024
Revision Number: 2	**Prepared by:** EHS

1. Introduction

Currently, the Carnegie Mellon University Institutional Biosafety Committee mandates that BSL-2+ containment must be used for all research involving HIV-1 based lentiviral vectors. This level of containment may not only be overly conservative, but may also be difficult to achieve due to animal housing constraints, research constraints, and general facility constraints.

2. Scope

Recently, the NIH's Research Advisory Committee developed recommendations for the use of Lentiviral Vectors in Research. In order to become harmonized with the NIH and specifically the NIH's Guidelines for Research Involving Recombinant DNA molecules, it the Carnegie Mellon University Institutional Biosafety Committee has adopted these guidelines. These guidelines will only concern HIV-1 based lentiviral vectors; other vectors will be considered on a case-by-case basis.

3. Requirements

When assessing the risk associated with HIV-1 based lentiviral vectors, the following must be considered:

a. Vector design
b. Nature of transgene(s) used
c. Scale of vector generation
d. Nature and type of the hosts used
e. Nature of animal manipulations

4. Vector Design

Those vectors which are packaged on two or fewer plasmids as well as those vectors that express viral genes are higher risk materials from a biosafety standpoint. Conversely, those vectors which are packaged from multiple plasmids and which viral genes have been deleted are lower risk materials from a biosafety standpoint.

5. Nature of Transgene(s) Used

Transgene(s) that are oncogenic or potentially oncogenic are higher risk materials from a biosafety standpoint. Conversely, transgene(s) which are not oncogenic or have the potential to be oncogenic are lower risk materials from a biosafety standpoint.

6. Scale of Vector Generation

Large scale vector generation is a higher risk activity from a biosafety standpoint. Conversely laboratory scale vector generation, is lower risk activity from a biosafety standpoint.

7. Nature and Type of Hosts/Targets Used

The use of permissive hosts/targets or the use of animals engrafted with human cells constitutes a higher risk from a biosafety standpoint. Conversely, the use of non-permissive hosts constitutes a lower risk from a biosafety standpoint.

8. Nature of Animal Manipulations

Injecting vectors into animals or other use of sharps is a higher risk activity from a biosafety standpoint. Conversely animal housing and husbandry activities are lower risk activities from a biosafety standpoint.

In nature of these considerations, the following recommendations should be considered:

a. BSL-2+ containment must be used when using a HIV-1 system if the experiment meets any of the following conditions:
   i. The HIV-1 system Is packaged from two or less plasmids o Transgene(s) are used that are oncogenic or potentially oncogenic o Vectors are produced above laboratory scale levels
   ii. Hosts are used which are permissive to HIV-1

b. BSL-2 containment may be used if none of the above conditions exist in experiments using HIV-1 based vectors. In addition, animals can be housed under BSL-1 containment 1-7 days after injection with HIV-1 based vectors.

9. Revisions

Date	Documented Changes	Initials
5/19/2021	Updated format and Accessibility Update	MAS
3/8/2024	Reviewed and no updates necessary	AL