GENERAL STANDARD OPERATING PROCEDURES
WORKING WITH ADENO-ASSOCIATED VIRUS IN ANIMAL MODELS AT ABSL 1

Introduction

Adeno-Associated Virus (AAV) is a common viral vector used in animal models. For work with animals, researchers generally use a recombinant AAV for vector work. Adeno-associated viruses (AAV) belong to the family Paroviridae. They are non-enveloped, single-stranded DNA viruses that can only replicate in the presence of a helper virus, adenovirus (Ad), herpes virus, or vaccinia. Wild-type AAV may integrate into the host-cell genome (preferentially into human chromosome 19) and remain latent until a helper virus supplies the necessary genes for replication.

AAV-vector characteristics include:

- A limited cloning capacity (~4.5kb).
- Ability to be produced in high titers
- Ability to infect a broad range of cells.
- Long-term (stable) expression from episomal sequences.
- Replication in the presence of wild-type AAV and of a helper virus.

Purpose

This SOP provides safe work practices for researchers and animal care personnel who work with rodents infected with recombinant AAV at ABSL 1 with the following vector requirements:

- Transgene does not express an oncogenic protein or toxin
- rAAV/AAV are not co-infected with a helper virus

Occupational Exposure Hazards

The primary occupational routes of exposure for AAV in animal models include aerosol exposure and accidental injection. While AAV is not associated with human diseases, there is research showing an association AAV in male infertility and infection in human embryos from the wild type virus. It is therefore important that when using AAV in animal models, certain precautions be taken to promote safe handling and use of the virus in animal models. The following safe work practices should be followed to minimize the risk of occupational exposure to AAV in the vivarium.

Safe Work Practices

The list of potential AAV health hazards identified above makes it imperative that PIs conduct thorough risk assessments and prepare protocols which include standard operating procedures (SOPs) identifying appropriate administrative controls, personal protective equipment, work methods, engineering controls, and waste disposal procedures for eliminating or sufficiently reducing exposure potential to all staff involved in the affected research.

1. Administrative Controls
   a. Laboratory specific SOP must be included with the APF application and all animal handlers should be trained on the lab specific requirements in addition to this general SOP.
   b. Principal investigators shall develop and implement SOPs by which laboratory staff will prepare/administer AAV with minimal potential for occupational exposure.
c. All tasks having potential for occupational AAV exposure (administering of injections, etc.) will be conducted by competent staff who have received and documented appropriate training regarding specific AAV related health and safety risks, SOPs, and procedures to be followed in event of an exposure incident.
   a. administering injections appropriately must be included in the training
   b. all employees working with animals must complete the SDSU IACUC training
   c. instruct employees on the proper Emergency Response for needlestick or exposure incidents and document any incidents or injuries using the Incident/Accident form and sending to the Biosafety Officer.
   d. Personnel with active or chronic Adenoviral infections should not work with AAV.

2. Engineering Controls
   a. Syringes used for AAV injections should be safely engineered (self-sheathing syringes, luer-lock syringes, etc.). If engineered sharps injury protective device obstructs the procedure compromising animal care and safety or user safety, engineered sharps injury protective device for the needle would not be required. The assessment and determination that an ESIP cannot be used needs to be indicated in APF or BUA and made available to all researchers and staff involved.
      a. all needles should be disposed of in the approved sharps container immediately following use.
      b. do not recap, bend or manipulate sharps prior to disposal
   b. Animals should be restrained by physical or chemical means prior to administering an injection.
   c. Emergency shower and eyewash station must be available and accessible.

3. Personal Protective Equipment (PPE): Staff involved with any tasks where potential for AAV exposure exists must don all of or a combination of the following PPE:
   a. lab coat
   b. appropriate laboratory attire (covering all skin surfaces)
   c. gloves
   d. safety glasses or goggles
   e. booties

4. Work Methods
   a. Immediately after injection, animals should be housed as follows:
      a. disposable caging
      b. housed on non-ventilated rack
      c. label cage card with “AAV” and date of exposure
   b. For 72 hours, all animal husbandry is the responsibility of the researchers
   c. Transfer of animals into a new cage after 72 hours is the responsibility of the researcher
   d. After 72 hours, the animals should be transferred to regular ventirack cage using the cage changing hood and returned to the vent rack.

5. Waste Disposal
   a. Biohazardous Waste Disposal is the responsibility of the researcher until after the first cage change 72 hours after AAV injection.
   b. Surplus AAV must be disposed of as a biohazardous waste.
   c. Bedding materials and disposable caging generated following administration of AAV for 72 hours, under normal procedures and circumstances, must be disposed of as biohazardous waste. Carcasses contaminated with AAV during the 72 initial hold period must be disposed of as biohazardous waste.
d. All contaminated sharps waste materials must be placed in proper sharps container and disposed of as biohazardous waste.

6. **Spills:**
   
a. Small spills of AAV should be cleaned and deactivated with 10% bleach with 15 minute contact time. After bleach, clean area with soap, water and absorbent paper. Don appropriate PPE during clean-up and collect all waste in as biohazardous waste.

b. For larger spills of AAV, contact EHS at x46778.

**References:**


**Training**

I have reviewed and understand this safety training for this standard operating procedure. I have had my questions answered.

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