Adenovirus/Adenoviral Vectors:
Standard Operating Procedures

Containment Level
Generally, Adenovirus is classified as a biosafety level 2 organism. Adenoviral vectors may be regulated at varying biosafety levels, depending on the nature of the inserted genes and its replication competence.

Approvals
Experiments using Adenovirus require local IBC approvals before initiation of experiments.

Laboratory Practices
1. No work with Adenovirus is permitted on the open bench.
2. A certified Class II biosafety cabinet must be used for all manipulations including (but not limited to):
   1. Pipetting
   2. Harvesting infected cells for RNA
   3. Loading and opening containers
3. Centrifugation must be performed in closed containers and using sealed rotors or safety cups.
4. All vacuum lines must be fitted with a HEPA filter in-line hydrophobic filter

Precautions
1. Adenovirus is a pathogen of respiratory and gastrointestinal mucous and eye membranes, and does not have to be replication-competent to cause corneal and conjunctival damage. Face protection (goggles/face shield) must be worn when working with the agent/vector.
2. The replication-defective virus may be complemented in vivo thereby causing the vector to become replication competent.
3. Adenovirus (unlike HIV) is quite stable. After having been extracted with ether, and/or chloroform, it can still be infective.
4. Signs and labels must be placed to indicate each area where Adenovirus is used or stored (including biosafety cabinets, incubators, refrigerators, laboratory entrance doors, etc.)

Personal Protective Equipment
1. Gloves
2. Animal-handling gown when introducing vector into animals or performing necropsies. Lab coats are adequate for tissue culture manipulations.
3. Goggles (not to be confused with safety glasses)
4. N-95 Respirator, (not to be confused with a dust mask) to be used with concentrated titers and highly aerosolizing procedures outside of the Biological Safety Cabinet. For further information, contact EH&S before using an N95 respirator.

Instructions in the Event of Employee Exposure

1. EYE EXPOSURE FROM SPLASH OR AEROSOLS
   Rinse a minimum of 15 minutes in eye wash or flush area with water and report the incident to your supervisor and Occupational Medicine immediately after flush. Refer to the Laboratory Safety flip chart posted in the lab for after-hours exposure.

2. NEEDLESTICK AND/OR SHARPS EXPOSURE
   Contaminated skin should be scrubbed for ~20 minutes using a 10% povidone solution (Betadine) and copious amounts of water. Report the incident to your supervisor and EH&S immediately after scrub. Seek medical attention from Occupational Medicine. Refer to Laboratory Safety flip chart posted in the lab for after-hours exposure.

Decontamination
1. The most effective germicide (with a minimum 15 min. contact time) is a 10% Sodium hypochlorite (bleach) solution
2. Autoclaving for 1 hour at 121°C or 250°F (15 lbs psi of steam pressure)
Animal Practices

Work under the assumption that animals may shed the recombinant adenovirus, and take appropriate precautions as described in this section.

1. When animals are infected with Adenovirus/Adenoviral vectors, an Animal BSL-2 area must be approved and used for the procedure. Concurrent approvals are needed from the Institutional Biosafety Committee (IBC) and the Institutional Animal Care and Use Committee (IACUC).

2. Infected animals may excrete Adenovirus (especially in the first 72 hours after infection). Precautions must be taken to create aerosols when emptying animal waste material and when washing down cages, or cleaning the room with pressure hoses. Surfaces that may be contaminated must be decontaminated, ASAP, with an appropriate disinfectant such as 10% bleach.

3. Animals treated with the replication-deficient recombinant adenovirus should be housed in micro-isolator cages in an ABSL2 room. The cages must be labeled with Biohazard labels indicating the agent, and should only be opened in a Class II BSC.

4. Use a Class II laminar flow hood when moving animals from dirty to clean cages.

5. All bedding, waste and animals should be treated as if they are contaminated with recombinant Adenovirus.

6. Dead animals should be placed in clear bags, labeled with biohazard stickers (indicate the date, PI name, and protocol number), and discarded in carcass cooler. Other waste needs to be decontaminated, by autoclaving, prior to disposal.

7. Special training must be given to all animal husbandry personnel on Adenovirus, the hazards associated with the work, required practices and procedures and proper handling of bedding, cage washing, and all other husbandry materials associated with the experiment.

8. All necropsy must be performed in a necropsy room using Animal BSL-2 plus Adenovirus precautionary practices and procedures.

9. Information pertaining to the safe work practices of Adenoviral vectors and animal research must be stated in the approved Animal Subject Review Form (ASRF).

Adapted From: UMDNJ Adenoviral Vector SOP
http://www.umdnj.edu/cohssweb/publications/AdenovirusSOP.pdf
CDC-BMBL, 5th ed. 2009
http://www.cdc.gov/biosafety/publications/bmbl5/

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