



BACULOVIRUS and BACULOVIRAL VECTORS

Baculovirus is a lytic virus, primarily pathogenic for insects. Baculovirus vector systems are often used to obtain a high level of expression of a desired protein in insect cells (Sf9 cells). In the natural environment, wild-type baculovirus can pose a threat to certain insect species; however, commonly used baculovirus based vectors have been modified to reduce the pathogenicity to insects.

Potential Health Hazards

Generally, non-genetically modified wild type baculoviruses are not capable of replicating in vertebrate cells and thus do not pose any inherent hazards to laboratory workers. However, more recent studies with the use of mammalian specific promoters have achieved expression of foreign genes in a wide variety of mammalian cell lines and primary cell cultures.

Modes of Transmission

Transmission of baculovirus is through direct contact with the infective virus/vector. Baculovirus is highly sensitive to human complement and, therefore, should an exposure occur, rapid inactivation of the virus is anticipated.

The budded form of the virus routinely used in research is noninfectious for the insect host, decreasing the risk of recombinant viral release into the environment.

Laboratory Acquired Infections

None reported.

Host Range

Baculovirus is mainly infective for insect cells; however, as noted above, some recombinant baculoviral vectors can infect mammalian cells.

Survival

Polyhedrin negative baculovirus expression system is susceptible to desiccation and UV light; survival time is limited to hours.

Wild-type and AcNPV baculovirus with normal polyhedron genes can survive for days or weeks in the environment.

Laboratory Practices

Biosafety Level 1 practices and facilities are appropriate for activities involving baculovirus/viral vectors in insect cells, as determined by the Institutional Biosafety Committee.

- Procedures are performed to minimize the creation of splashes or aerosols
- Persons wash hand after they handle viable material, after removing gloves, and prior to leaving the laboratory.
- Work surfaces are decontaminated at least once a day and after and spill of viable material.

Biosafety Level 2 practices and facilities must be used for activities involving modified baculoviral vectors in mammalian cell lines, as determined by the Institutional Biosafety Committee.

- Biohazard signs and labels must be displayed in areas and on equipment where baculovirus is used and stored. This includes, but is not limited to, laboratory entrance doors, biological safety cabinets, incubators, refrigerators, and freezers.
- Use a biological safety cabinet (BSC) (a.k.a. tissue culture hood) for manipulations that can generate aerosols, such as pipetting, harvesting, infecting cells, filling tubes/containers, and opening sealed centrifuge canisters.
- Use aerosol containment devices when centrifuging. These include sealed canisters that fit in the centrifuge bucket, covers for the centrifuge bucket, heat sealed tubes, or seal centrifuge rotors. Rotors should be removed and opened inside a BSC. Centrifuge tubes should be filled and opened in a BSC.
- Vacuum lines must be protected with liquid disinfectant and micron filters.

Personal Protective Equipment

Personal protective equipment (PPE) includes, but is not limited to:

- Disposable gloves (nitrile, latex, etc.)
- Lab coat when working in the area. Remove when leaving laboratory.
- Safety glasses/goggles for eye protection. These do not have to be worn if working appropriately inside a biosafety cabinet.

Precautions When Using Animals

The use of insect cells does not fall under the responsibilities of the Institutional Animal Care and Use Committee (IACUC). However, if work with animals will be proposed, requests are made to the IACUC. ABSL1 housing and handling is observed when using

baculoviral vectors *in vivo*. Carcasses must be disposed in the regulated medical waste stream. See the IACUC webpage for more information:

<http://www.ohsu.edu/xd/research/about/integrity/iacuc/index.cfm>

Recombinant Baculoviral Research

Protocols involving recombinant baculoviral vectors must be approved by the Institutional Biosafety Committee (IBC); complete a Recombinant DNA Research Questionnaire. Available at:

<http://www.ohsu.edu/xd/about/services/integrity/policies/policy-detail.cfm?policyid=291376>

Employee Exposure

Eye Exposure – Rinse eyes in an eyewash for at least 15 minutes.

Skin Exposure – Rinse skin with soap and water.

Accidental Needlestick Injury – Scrub contaminated skin with soap and water.

Report Incidents – Report actual or suspected exposure incidents to your supervisor and Biosafety Officer.

- Immunizations and Prophylaxis – none available.
- Incubation Period – no symptoms apparent.

Spill and Disposal Procedures

Spills involving baculovirus at BSL1 can be absorbed with paper towels and then saturated with 70% ethanol or 1% bleach. Allow an inactivation time of 10 minutes before disposing in waste.

Refer to the OHSU BSL2 Template Manual spill response cue cards for spills involving baculovirus at BSL2.

Disinfectants

- 70% Ethanol
- Sodium hypochlorite (1-10% dilution of fresh bleach). If using bleach within a biosafety cabinet, always follow up with a 70% ethanol rinse.

Decontamination

Autoclave cultures for 30 minutes at 121°C, 15 psi. Disinfect work surfaces using a disinfectant listed above.

Transport Requirements

Materials must be appropriately contained, sealed, and labeled for transport within OHSU. Shipping infectious substances, diagnostic specimens, and/or dry ice off-campus

requires training and certification. Individuals must take the Dangerous Goods Shipping Training available on Big Brain.

The use of baculovirus and baculoviral vectors may be subject to shipping regulations through the Animal and Plant Health Inspection Services (APHIS). Please consult the Biosafety Officer (503-494-0655) for any regulations that must be met if you are shipping baculovirus/baculoviral vectors.

Questions/Concerns? Contact the Biosafety Officer at 503-494-0655 (Central Campus) or 503-690-5312 (West Campus).