

BIOLOGICAL AGENT REFERENCE GUIDE

Adeno-Associated Viral Vectors

BACKGROUND

Adeno-Associated Viruses (AAV) are non-enveloped, single-strand DNA that require a helper virus to replicate, usually wild-type adenovirus or herpesvirus. Without a helper virus, AAV will integrate into the host cell genome and remain dormant until co-infection occurs and triggers reproduction. AAV vector qualities include:

- ❖ Ability to infect a broad range of cells
- ❖ A limited cloning capacity
- ❖ Stable expression in a pH range of 3 to 9 and up to 56°C

HEALTH HAZARDS

Though AAV does not directly cause any human disease, when used as a viral vector it may be associated with insertional mutagenesis, cancer, premature birth, and male infertility.

LABORATORY HAZARDS

AAV is transmitted through direct or indirect contact via aerosol, droplet exposure to the mucous membrane, ingestion, and injection. Laboratory acquired infections are possible through exposure to lab cultures of wild-type AAV or recombinant viruses. In the case of an exposure, seek care as per the Northeastern SOP guidelines: <https://www.northeastern.edu/ehs/wp-content/uploads/2016/11/IBC-Spill-Decon-Emergency-SOP.pdf>.

PERSONAL PROTECTIVE EQUIPMENT

Use disposable gloves, lab coats, and goggles (for protection against splashes) in areas where AAV is handled.

LABORATORY PRACTICES

AAV is classified as a Risk Group 2 (RG2) organism, and as such, Biosafety Level 2 (BSL-2) practices and facilities in accordance with the Institutional Biosafety Committee (IBC) must be used during any AAV activities.

- ❖ All manipulations of AAV that may generate aerosols, including pipetting, infection of cell culture, infection of animals, and harvesting infected cells, must take place in a biological safety cabinet (BSC).
- ❖ Display biohazard signs and labels in areas and on equipment where AAV is used or stored.
- ❖ Aerosol containment devices, like sealed rotors or safety cups, must be used when centrifuging. Rotors, cups, and centrifuge tubes should be opened inside the BSC.

ANIMAL PRACTICES

Animal housing uses ABSL-1 standards. If a helper virus is present, then maintain ABSL-2 standards.

DECONTAMINATION

Alcohol is *not* an effective disinfectant for AAV. Use the following disinfectants to decontaminate against AAV:

- ❖ 1-10% dilution of fresh sodium hypochlorite (bleach) with 30 minutes contact time.
- ❖ Alkaline solutions with pH >9 or 5% phenol
- ❖ Autoclaving for 30 minutes – 1 hour at 121°C under 15 psi of steam pressure.

TRANSPORTATION

All AAV materials must be properly contained in a closed leak-proof container and labeled for transport within the university. For transportation outside of the university, contact the Office of Research Administration and Finance at ORAF@northeastern.edu to negotiate a Material Transfer Agreement.

REFERENCES

Environmental Health and Safety, University of Iowa, "Adeno-Associated Virus and Adeno-Associated Viral Vectors," ehs.research.uiowa.edu/adeno-associated-virus-and-adeno-associated-viral-vectors.

Environmental Health and Safety, Rutgers University. "Adeno-Associated Viral Vectors," 2013. http://rehs.rutgers.edu/pdf_files/AdenoassociatedvirusSOPFinal2013.pdf.

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Acknowledgement and Agreement

The following list of individuals acknowledge that they have read and understood the Biological Agent Reference Guide for Adeno-Associated Viral Vectors. By signing this agreement, they agree that it is their responsibility to uphold these policies set forth in accordance with the Institutional Biosafety Committee (IBC). Any experiments conducted using Adeno-Associated Viral Vectors are done so with an understanding of the hazards and safe work practices aforementioned.

Name	ID #	Signature	Date

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