



Rabies Virus Vector

General Information

The rabies virus is a member of the Lyssavirus genus and Rhabdoviridae family. It is an enveloped single-stranded RNA virus that is bullet shaped (approximately 75 nm in diameter by 180 nm in length). Replication-deficient rabies vectors can be useful tools for the investigation of neuronal trafficking or targeted expression in neurons.

Host Range

Wide host range including humans and other mammals.

Incubation Period

20–90 days, but in rare cases as short as a few days or over a year

Survival Outside Host

Does not survive well outside its host (in dried blood and secretions).

Laboratory Hazards

Percutaneous (animal bites and needlesticks), direct contact, mucous membranes, aerosols

Symptoms of Exposure

Initial symptoms include fever, headache, malaise, and upper respiratory and gastrointestinal tract disorders. Progressive symptoms include cerebral dysfunction, anxiety, confusion, agitation, delirium, hallucinations, hydrophobia, and insomnia.

Lab Acquired Infections (LAIs)

At least 2 cases have been reported and are suspected to have occurred by aerosol exposure.

Personal Protective Equipment



Lab Coat



Gloves



Closed-toed Shoes



Eye Protection

Disinfection & Inactivation

10% bleach, 70% ethanol, phenol, formalin, and some detergents. It can be inactivated by ultraviolet light and does not tolerate pH below 3 or above 11.

Waste Management

Refer to [USC's Biological and Infectious Waste Management Plan](#).

Lab Containment

[Biosafety Level 2 \(BSL-2\)](#) is appropriate for most activities with materials and cultures known or reasonably expected to contain rabies virus vectors.

Animal Containment

[Animal Biosafety Level 2 \(ABSL-2\)](#) is appropriate for most for activities with experimentally infected animals.

Medical Surveillance/Treatment

Surveillance: presence of virus can be detected by immunoassays, PCR, and antigen testing from biopsies

Prophylaxis: rabies vaccine; People with a higher risk for rabies exposure, such as those who work with potentially infected animals, are recommended to receive the vaccine. Post-exposure prophylaxis is based on the type of exposure and consists of a regimen of one dose of immune globulin and four doses of the rabies vaccine over a 14-day period.

Vaccines: Imovax Rabies or RabAvert

Treatment: Cleanse wounds with soap and water; irrigate wounds with a virucidal like a povidone-iodine solution (Betadine). Seek medical attention.

Spill Procedures

See [USC Biological Spill Procedures](#)

Exposure Procedures

See [USC Protocol for Post Exposure Evaluation and Follow-up](#). Use of sharps should be strictly limited. All procedures with the potential for creating aerosols and droplets should be performed in a biosafety cabinet.

References

Public Health Agency of Canada (2011) Pathogen Safety Data Sheets: Infectious Substances – Rabies virus. Pathogen Regulation Directorate, Public Health Agency of Canada

"Rabies Virus Fact Sheet," Stanford University, <https://ehs.stanford.edu/reference/rabies-virus-fact-sheet>.

"Harrison's Principles of Internal Medicine," in Chapter 203: Rabies and Other Rhabdovirus Infections, 20th, Ed., McGraw Hill

Center for Disease Control and Prevention, "Rabies," Center for Disease Control and Prevention, <https://www.cdc.gov/rabies/about.html>.