UNIVERSITY OF South Carolina

Herpes Simplex Virus (HSV) Vector

General Information

Herpes simplex virus is a member of the Simplexvirus genus and Herpesviridae family. It is an enveloped virus composed of a linear, double-stranded DNA genome. HSV has two major serotypes; HSV type 1 (HSV-1) and HSV type 2 (HSV-2). Recombinant VSV vectors are commonly used to study the mechanisms of viral entry into host cells and vaccine development research. HSV has been used as a viral vector therapy for nervous system disorders due to its natural tropism for neuronal cells. HSV vectors have a wide host range and cell tropism and can infect almost every vertebrate cell type.

Host Range

HSV infects a wide range of vertebrate hosts and a wide variety of cell types.

Incubation Period

Generally, ranges from 1-26 days.

Survival Outside Host

HSV survives for short periods of time outside a host.

Laboratory Hazards

Percutaneous, direct contact (e.g., abraded skin sites), mucous membranes, aerosols, ingestion

Symptoms of Exposure

Common symptoms include painful lesions, itching or burning, and flu-like symptoms (fever, malaise, myalgias, swollen lymph nodes). Exposure to the eyes can result in herpes keratitis.

Lab Acquired Infections (LAIs)

None reported.

Personal Protective Equipment

Disinfection & Inactivation

HSV is sensitive to 1% sodium hypochlorite, 70% ethanol, 0.5% Lysol, and 2% glutaraldehyde. HSV can be inactivated by autoclaving at 121°C for one hour.

Waste Management

Refer to USC's Biological and Infectious Waste Management Plan.

Lab Containment

Biosafety Level 2 (BSL-2) for activities with materials and cultures known or reasonably expected to contain HSV.

Animal Containment

Animal Biosafety Level 2 (ABSL-2) for activities with experimentally infected animals for the full duration of the animal's life. *An N95 respirator is required for procedures done outside a BSC or other containment device. Enrollment in the Respiratory Protection Program is required to wear an N95 respirator.

Medical Surveillance/Treatment

Surveillance: HSV infections are confirmed by virus isolation from lesions. HSV is primarily detected by PCR and serological testing.

Prophylaxis: Consult with a health care provider.

Vaccines: None are currently available for use in humans

Treatment: Antiviral therapy (acyclovir, valacyclovir, and famciclovir)

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 – Herpes simplex virus. Pathogen Regulation Directorate, Public Health Agency of Canada

Rutgers Environmental Health and Safety, "Herpes Simplex Virus Vectors," https://ipo.rutgers.edu/rehs/sop/herpes.

Larry Jameson, "Chapter 187: Herpes Simplex Virus Infections," in Harrison's Principles of Internal Medicine, 20 ed., McGraw-Hill.

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