Background Information

Herpes Simplex Virus is an incurable enveloped double-stranded DNA virus. There are two distinct types of the virus; HSV-1 causes infections that mainly localize to the oral region while HSV-2 causes infections that mainly localize to the anogenital region. Both viruses can infect either region.

Most adults (~70% in developed countries) are infected with the HSV-1. The virus initially infects epithelial cells of the oral mucosa. Visible blisters and inflammation may appear at the sites of viral entry, but asymptomatic infections are also common. The virus then typically spreads to the ganglia of trigeminal nerve cells, where it can persist in a latent form. The virus can reactivate, replicate in the nerve cells, and spread back to the location of the initial infection. The frequency and severity of reactivations will vary from person to person.

The infectious dose is unknown and lab acquired infections have not been reported. But, infections in healthcare workers have been documented. When people come into contact with areas already infected with HSV, either on their own bodies or on someone else’s body, they can develop lesions known as “herpetic whitlow”. The typical place for a herpetic whitlow to form is on the finger. Usually there is a break in the skin, especially a torn cuticle at the base of the fingernail, which allows the virus to enter the finger tissue and initiate infection. Prior to the use of protective gloves for all patients (“universal precautions”), this was a common infection of dentists, dental hygienists, physicians, and nurses. Thus, although lab-acquired infections have not been described, exposure of a laboratorian to infectious virions could cause a similar, localized infection in the exposed area.

Neonatal herpes, although uncommon, is a severe disease with a very high morbidity and mortality rate. Infants who survive the infection may have neurological complications. Neonatal herpes occurs most commonly when the virus is transmitted perinatally during passage through the birth canal. However, transmission may also occur in utero or postnatally. The greatest risk of transmission to the baby occurs when an initial maternal infection is contracted in the third trimester.

Reporting Exposure Incidents: Report all exposures to the Principal Investigator or lab supervisor and seek immediate medical evaluation. If help is needed with injuries or clean up, members of the University should contact the Police at 6-6911 and members of the Medical Center should contact Security at 6-5100. Whenever there is an accident involving HSV-1, the Biosafety Officer must be notified.

Pre-exposure Health Screening:
Prior to beginning work with or around HSV-1, the PI or an Employee Health Professional will inform each person of the risks s/he takes and of the symptoms s/he may experience following exposure. Persons with impaired cell-mediated immune response (organ transplant recipients, individuals with AIDS) are at increased risk of severe disease. All laboratory personnel and particularly women of child-bearing age can receive information regarding immunocompetence and conditions that may predispose them to infection from the Occupational Health Program. Individuals having these conditions are encouraged to self-identify to the institution’s healthcare provider for appropriate counseling and guidance.

Before an Exposure Incident Occurs:
No vaccine against HSV-1 is available. Several vaccine candidates are in different stages of development and most are for the prevention of HSV-2.
After an Exposure Incident Occurs: Immediate Action by Route of Exposure

*Mucous Membranes (eye(s), nose, mouth):* If contaminated material is splashed or sprayed, immediately flush the eyes, nose and nasal cavities with running water for at least 15 minutes. Rinse mouth out several times with clean water and do not swallow.

*Non-intact Skin Exposure (Laceration/Wound):* Immediately go to the sink and thoroughly wash the skin with water and soap for at least 15 minutes. Do not apply bleach, alcohol or other disinfectant to the skin.

*Splash Affecting Garments:* Spray with 10% bleach for minor spills and splashes. For large spills, remove garments that may have become contaminated and place them in an autoclavable bag if the clothing will survive autoclaving. If not, place in container of solid biological waste.

**After an exposure incident occurs: medical evaluation and follow-up:**

Following immediate post exposure actions, contact both your PI and the Biosafety Officer immediately.

For eye splashes, Boston workers should report immediately to the Tufts Medical Center ER where antivirals may be offered, and ophthalmologic evaluation will occur. In Grafton, the worker or Tufts police call the ERCC and go to the UMASS-Worcester ED. In Medford, the Tufts police assist with access to immediate care.

For skin exposures, contact Tuft MC Employee Health Clinic (Boston), TCSVM Occupational Medical Clinic (Grafton) or the Mt. Auburn Occupational Health Services (Medford) and arrange for medical evaluation, diagnosis and treatment if needed. It is important to inform the healthcare provider that you use HSV so that any subsequent sores are not manipulated, as this can spread the virus.

**Signs and Symptoms:**

After initial exposure, the incubation period generally ranges from 1-7 days during which the virus is delivered to the peripheral neuron cell bodies. A person may experience pain, throbbing, redness and tenderness prior to the appearance of a blister. New lesions may appear after 19 or more days when the virus is no longer latent but replicates and travels to the skin.

Mucous membrane exposure may result in gingivostomatitis presenting as vesicular and ulcerative painful lesions involving the buccal mucosa, tongue, gums, and pharynx. Ulcers heal without scarring within 2-3 weeks. Recurrent infections have generally milder symptoms and clinical course. Recurrent lesions due to HSV-1 reactivation occur mainly on a specific area of the lip are called “cold sores”. The lesions heal in approximately 8-10 days.

Non-intact skin exposure may result in Herpetic whitlow on the nail or finger area. Herpetic whitlow is a self-limited disease.

Splashes to the eye may result in ulceration of conjunctiva and cornea. HSV infection may cause other ocular diseases, including blepharitis/dermatitis, conjunctivitis, and dendritic epithelial keratitis.

**Post-exposure:**
The healthcare provider will determine the course of treatment.

If an employee develops signs and symptoms associated with HSV-1 in the absence of an exposure incident, the PI and Biosafety Officer shall be notified. Due to the ubiquitous nature of the virus, virus typing will need to be performed before the infection can be considered laboratory-acquired.