Environmental Health & Safety
UNIVERSITY OF COLORADO **BOULDER**

Post Exposure Plan for Lentiviral Vectors

Background Information:

Lentiviruses are a genus of retroviruses that can infect both dividing and non-dividing cells. The best-known lentivirus is the Human Immunodeficiency Virus (HIV), which is where most lentiviral vectors are derived from for use in research. To make this safer to work with, researchers use altered forms of the virus that are replication incompetent viral vectors with genes necessary for replication removed from the genome (e.g., "3rd" and "4th generation" viruses).

Although safeguards are used when making lentiviral vectors, there are still exposure hazards when working with these. One being, the transgene itself may be hazardous (e.g., an oncogene). Another issue is insertional mutagenesis, which can cause gene misregulation in the host genome. A more unlikely possibility is for the replication incompetent virus to become competent. The lentivirus would be more likely to convert to a replication competent virus if the host was infected with wild type HIV, which could supply the genes previously removed. Researchers working with lentiviral vectors are encouraged to complete the "Lentivirus Training" on BioRaft/SciShield.

Laboratory-acquired infections are presumed to occur via exposure to splashes, aerosolized materials or contaminated sharps containing virus particles.

Primary hazards in the laboratory:

Creation of splashes or aerosols, exposure to mucous membranes or open wounds, and exposure to contaminated sharps.

Acceptable disinfectants:

Lentiviral vectors are susceptible to 70% ethanol and 1% sodium hypochlorite.

Exposure controls and personal protection:

Lentivirus is a Risk Group 2 organism. Biosafety Level-2 (BSL-2) practices, containment equipment, and facilities are required when working with materials known or suspected of containing this agent.

Personal protective equipment such as lab coats and gloves should be worn when handling infected or potentially infected materials. Eye protection must be used when there is a known or potential risk of generating aerosols or a splash-risk.

Procedures that may generate aerosols or splashes must be conducted in a certified biosafety cabinet, if possible.

Personnel should wash their hands frequently while working in and before leaving the laboratory. Personal items including waters bottles, cell phones, car keys, etc., should be stored in such a way as to avoid contamination and should be accessed only when the laboratory exercise is completed, lab coats and gloves are removed, and hands are washed.

The Principal Investigator (PI), or their designee, must ensure that all personnel are adequately trained in safe laboratory practices, universal precautions, and proper surface and equipment disinfection before initiating any work with this agent. The PI must also ensure that all personnel are aware of the time sensitive nature of post-exposure medical treatment.

At risk populations:

HIV positive individuals are at highest risk because of the potential for the "wild type" HIV to supply the viral attributes necessary to produce replication-competent viruses, propagating the transgene in the infected person.

Immediate Action by Route of Exposure:

Needlestick, Animal Bite, Laceration: Wash area thoroughly with soap and running water. Rinse the area under cool water for several minutes. Do not apply disinfectant to the skin.
Mucous membranes (Eyes, nose, mouth): Flush the eyes for 10-15 minutes if eyes have been exposed to splash or spray containing virus. Rinse out mouth without swallowing after any exposure.
Inhalation: If contaminated materials are aerosolized and potentially inhaled, rinse mouth twice and spit. Do not swallow.

After washing, *immediately* proceed to Foothills Hospital Emergency Department (4747 Arapahoe Ave., Boulder) for medical consultation. Emergency medical providers should be told that you have had an exposure to a variant of HIV. Ideally, post exposure prophylaxis (PEP) should be initiated within hours of exposure if you decide to receive it. After 72 hours of exposure, PEP may be less effective.

After First Aid – Treatment and Reporting:

University of Colorado Boulder: Procedures for Work-Related Injuries or Illness, Including Animal Bites, Severe Allergic Symptoms, and Sharps Exposures.

It is the policy of the University of Colorado Boulder that all incidents that result in an injury or severe illness to faculty, staff or students be appropriately documented and reported. If a work-related incident, accident, injury or illness occurs:

a) Medical Treatment

a. **In case of life or limb-threatening emergency call 911** or go immediately to the nearest emergent or urgent care facility. Immediately administer appropriate first aid, including thoroughly washing any wounds or exposed areas with soap and water, if at all possible.
b. **If you are an employee of the University and you need non-emergency care** for a work-related illness or injury that has occurred during regular weekday working hours, you must be treated at one of the UCB Designated Medical Providers (DMPs: shown below). **Boulder Community Foothills Hospital Emergency Department has the ability to rapidly test for work-related infectious disease or potential biological exposures; all other DMPs may not have this rapid capability.** Testing can be done on the exposed personnel; it may be difficult to test any source patient or sample at the DMP.
c. **After hours or while traveling**, go to the nearest urgent or emergent care facility.
d. **Sharps injuries** that include exposure to human blood, body fluids, tissues, tissue culture cells are considered to be injuries with a potential for transmitting bloodborne pathogens. Prompt evaluation and treatment is necessary for these injuries (go to Boulder Community Foothills Hospital Emergency Department).

b) Reporting

a. Report the work-related injury or illness to your supervisor immediately. You or your supervisor should notify the Biosafety Officer at 303-492-2817 or at Cher.Masini@colorado.edu.
b. You must file a worker's compensation injury report form **within 4 days of the work-related injury** / exposure or illness onset. Report the incident on the URM website and use the on-line reporting form.
c. Sharps injuries must be reported on the URM's needle stick exposure report form.
d. All injury reporting forms can be found at the URM's website at: https://www.cu.edu/risk/file-claim

c) Eligibility (who is eligible to be seen by UCB Designated Medical Providers?)

a. All UCB employees, paid UCB staff, graduate students receiving a traineeship or stipend administered by UCB, undergraduate work-study students and paid undergraduate student assistants are eligible to be seen by CU DMPs. If you are an employee and you visit your regular primary care provider for a work-related injury and your visit is coded as a work-related injury, your primary insurance may not cover the cost of your visit or treatment with your primary care provider.

Some individuals are not covered by UCB Worker's Compensation: All visiting or resident scholars who do not receive payment via UCB (e.g., Howard Hughes Medical Institute Fellows) must follow the work-related exposure / illness or injury protocol outlined by their parent institution or outside funding source. Contract or consulting employees are also not covered by UCB Worker's Compensation; they need to follow the work-related exposure / illness or injury protocols established by their parent institution or consult with their personal health

care provider. Volunteers, contract employees and students not paid by UCB are **not** covered by UCB Worker's Compensation and should be seen by their personal health care provider. If you are a student with a Wardenburg Health care plan, post-exposure lab tests are available and covered.

d) Payment and questions:

a. All employee bills from medical providers must be sent to University Risk Management:

University Risk Management (https://www.cu.edu/risk/file-claim)
1800 Grant Street, Ste 700
Denver, CO 80203
Fax: 303-860-5680

b. For further questions, contact URM at: 303-860-5682 or 888-812-9601