COLUMBIA UNIVERSITY
ENVIRONMENTAL HEALTH AND SAFETY

Post Exposure PRINT&GO Sheet

Lentiviral Vector post-exposure prophylaxis guidance	**Created: 4/07/2016** **Revised: 1/7/2025** https://research.columbia.edu/sites/default/files/content/EHS/Homepage/LentivirusPostExposureProphylaxisPrintAndGo.pdf

What are print and go sheets?
Following an occupational exposure to the agent identified above, this information sheet identifies the immediate "first aid" actions that should be taken. A medical evaluation should be sought immediately following the exposure. The guidance sheet provides information that medical personnel can reference but does not provide individualized medical care or treatment. This sheet should be printed and taken to the medical provider. Also, display your Columbia University ID card while visiting the medical provider.

Organism and Exposure:
Lentiviruses are a genus of the retrovirus family and include; HIV, SIV, SHIV and FIV among others. The wild type HIV backbone has been modified for research and therapeutic applications such that it can be used as a carrier vehicle; called a lentiviral vector, to efficiently introduce genetic material (transgenes) into both dividing and non-dividing target cell genomes. 3rd and 4th generation lentiviral vectors **typically used today** are considered to be replication incompetent. Replacement of the wild HIV envelope gene with vesicular stomatitis virus glycoprotein (VSV-G) gene broaden the cell types that can be infected (wild HIV targets CD4 cells) and the modes of transmission beyond percutaneous and mucocutaneous modes to also include potential aerosol risks. Hazards of a lentiviral vector include the effects of the expressed transgene such as an oncogene, or toxin being introduced into the target cell by the vector. The onetime introduction of a gene can introduce potential problems which are hard to gauge and may be long term. In addition, for replication incompetent lentiviral vectors, while the virus does not replicate, the transgene is integrated into the host genome. The transgene may also insert in a genetically sensitive area and induce mutational changes. This is called **insertional risk.**

Post-exposure Medical Surveillance:
Employees from CUIMC, Morningside and Manhattanville campuses go to the Workforce Health and Safety (WHS) clinic located at Harkness Pavilion 1 South 176 Fort Washington Ave (212-305-7590) if exposure occurs during the hours the clinic is in operation (see below). CUIMC students go to Student Health Services at 60 Haven Avenue (212-305-3400). Morningside students go to Columbia Health in the John Jay Building (212-854-7426). For after-hours exposure, go to the New York Presbyterian Hospital or Mount Sinai St. Luke's Hospital (212-523-3335) Emergency Room (ER). Give this sheet to the physician so they understand that you may have just been exposed to a lentiviral vector, and this is a medical emergency.

1. **Verify that first aid was performed** – Ensure skin was washed with soap and water for 5 minutes and mucus membranes or eyes with plain water for 5 minutes. Confirm that the area of injury is not squeezed and chemicals like bleach are not used as they are not known to be beneficial and may break down the barrier function of the skin.
2. **Document and understand the exposure** – This means the type of lentiviral vector (e.g. HIV backbone), generation, replication incompetent or competent, transgenes of concern like oncogenes, good gene knockdown or knockout genes, or toxins carried by the vector. Confirm what type of animal, cells or tissues are being used as these may present separate hazards; including ordinary bloodborne pathogens (human cells or tissues), zoonoses, chemicals or drug exposures. Note that not all cells and tissues are screened for bloodborne pathogens prior to use in research, and macaque cells and tissues may harbor macacine herpes virus 1 (herpes B virus). Confirm if exposure was mucocutaneous, percutaneous, or aerosol and how large the exposure was as well as when it occurred along with viral vector titer. Determine the nature of the research, contacting the principal investigator (PI) if needed with the exposed individuals' permission, to fully understand the potential hazards.

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3. **Testing and Follow-up**

a. Testing for lentiviral vector exposure is generally not helpful. HIV testing may be worthwhile as if someone has undiagnosed HIV, the PEP regimen could produce HIV resistance, and there is some potential risk for wild HIV recombination with the lentiviral vector. The post exposure visit documents the exposure and so the extent of documentation if something arises down the road may be quite important.

b. Baseline and follow-up labs are indicated for those started on medications and depend upon the medications but generally include CBC and diff, BUN/creatinine and AST + ALT.

4. **Medication**

a. **Replication incompetent lentiviral vector exposures** – There are no studies of the benefits or risks of post exposure prophylaxis for insertional risks. There are no national, published guidelines or consensus on this although a group of national experts has just been funded to develop protocols in this area. Experts advising the Columbia IBC and other institutions advise ASAP evaluation, within 2 hour or less and **the sooner the better**, and certainly by 12-24 hours, post exposure prophylaxis should be started to prevent insertional risks particularly with a lentiviral vector carrying hazardous transgenes. After 72 hours there is no likely benefit. Exposure to cells or animal tissues that have been transduced with a lentiviral vector presents minimal risk and there is no likely benefit to post exposure prophylaxis, especially if the transduction occurred more than 72 hours prior.

Recommended regimen: 2 drugs ; Dolutegravir (Tivicay) 50 mg BID with or without Tenofovir (Viread) 300 mg once daily x 7 days) or Dolutegravir + Emtricitabine x 7 days can be used as alternative drugs (some institutions use 7 days) may be used in the event of a worrisome transgene. This is off label use. Protease inhibitors (like Kaletra) have no effect on transduction or integration of the lentiviral vector and therefore are not used for insertional hazards.

b. **Replication competent lentiviral vector** should be treated just like a wild type HIV BBP exposure so use the normal HIV exposure protocol for this; such as Dolutegravir and Truvada for 28 days:

Be sure to know the drug side effect profiles and any drug-drug interactions, following labs which typically include BMP and LFT at baseline and follow up while on treatment. A common example is the issue of renal toxicity and renal insufficiency dosing with Tenofivir in Truvada or as a single agent in Viread.

Next steps:

If evaluated at the ER, follow up with respective campus provider next business day. Notify supervisor of incident. Complete an Accident Report Form there. By law, any exposures to recombinant DNA (which includes lentiviral vector) must be reported to the NIH, by notifying EH&S.

References:

This document is adapted from "Risks Associated with Lentiviral Vector Exposures and Prevention Strategies – R. Schlimgen, J. Howard, D. Wooley, M. Thompson, L.R. Baden, O.O. Yang, D.C. Christiani, G. Mostoslavsky, D.V. Diamond, E. Gilman Duane, K. Byers, T. Winters, J.A. Gelfand, G. Fujimoto, T.W. Hudson, J.M. Vyas." – *J. Occ. Env. Med. 58 (12), 1159-66, Dec 2016.*

Contact information:

CUIMC Office of Workforce Health and Safety - (212) 305-7590. Mon. - Fri. 7:30 am - 4:00 pm. *Environmental Health & Safety (EH&S)* - Ask for a Biosafety Officer. Mon. - Fri: 9 am - 5 pm. Medical Center - (212) 305-6780. *Public Safety* can contact a Biosafety Officer after business hours. Medical Center - (212) 305-7979. Morningside - (212) 854-5555. Manhattanville - (212) 853-3333. *ICM Veterinarian On Call* - (917) 232-5319.