Working with HIV Materials in the Research Laboratory

Overview

Weill Cornell Medicine (WCM) policy establishes that every laboratory working with the Human Immunodeficiency Virus (HIV), or with blood or other biological materials from subjects with known or suspected HIV infection must adhere to the safety standards and procedures published by the Centers for Disease Control and Prevention (CDC), the National Institutes of Health (NIH), the Department of Health and Human Services (HHS),and the Department of Labor Occupational Safety and Health Administration (OSHA).

This outline aims to assist Principal Investigators in the planning and instruction of laboratory-based employees and students. It does not replace publications by the institutions referenced above, the contents of which every person working with HIV or with biological samples possibly contaminated with HIV should be fully cognizant.

Applicability

This update applies to all personnel working with HIV cultures, blood, or other potentially infectious materials known or suspected to contain HIV.

Responsibilities

Environmental Health and Safety (EHS) assists laboratory personnel to ensure compliance with institutional, CDC, NIH, and OSHA standards concerning work with materials which are known or suspected to be infected with HIV. The Biosafety Officer monitors laboratories working with such materials for compliance at periodic intervals.

Principal Investigators must develop and implement compliant procedures and training to confirm that all staff in their laboratory are aware of the relevant CDC, NIH, and OSHA standards and procedures outlined here.

Laboratory Personnel must track samples known or suspected to be infected with HIV in the laboratory, follow procedures established by their Principal Investigator, and take all required training. Laboratory staff also needs to inform their Principal Investigator of any new samples in this category in use or storage.

Procedure

GENERAL SAFETY CONSIDERATIONS

The Human Immunodeficiency Virus (HIV) is known to be the cause of the acquired immunodeficiency syndrome (AIDS) and various AIDS-related disease states. While HIV transmission does not occur through casual contact with infected individuals, the virus can be transmitted through blood or other biological materials from infected persons.

The common pathways for transmission of HIV are via sexual contact involving the exchange of biological fluids, and the sharing of hypodermic needles by intravenous drug users. Cases of transmission of HIV to laboratory workers and health care providers have been documented. These have usually involved accidental puncture wounds with contaminated needles or direct skin and/or mucous membrane exposure to blood. Because of the severity of HIV infection, it is essential that all persons working with materials known or suspected to be contaminated with HIV be fully aware of the risks involved and adhere to appropriate safety procedures.

Laboratory personnel should avoid direct contact of skin and mucous membranes with blood, blood products, excretions, secretions, tissues or other biological materials from persons known or suspected to be infected with HIV. Extreme care should also be taken to avoid accidental wounds from needles and to avoid contact of open skin lesions.

Strict adherence to standard microbiological practices must be followed when working with any human blood or other biological samples that have not been subjected to effective inactivation protocols.

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LABORATORY CONTAINMENT AND PRACTICES

1. **Follow the WCM Research Biosafety Plan for working with pathogenic materials.** Know the laboratory plan for managing an accidental spill of pathogenic materials. Always keep appropriate spill response materials available in the lab.
2. **Never mouth pipettes. Avoid hand-to-mouth or hand-to-eye contact in the laboratory.** Never eat, drink, apply cosmetics or lip balm, handle contact lenses, or take medication in the laboratory.
3. **Gloves must be worn for all procedures which might result in direct contact with potentially infectious specimens, and *be removed immediately upon leaving the work area.***
4. Dedicated lab coats, gowns, or uniforms are to be worn while working with any potentially infectious materials. ***These garments must not be worn outside the laboratory work area***. When working with concentrated viral preparations, disposable garments must be worn and disposed of appropriately immediately at the end of a work session. The use of Tyvek sleeves are recommended additional PPE.
5. All manipulation of potentially infectious materials should be performed carefully to minimize the creation of aerosols. **All procedures involving the manipulation of infectious materials that may generate an aerosol must be conducted within a Biological Safety Cabinet (BSC) or another physical containment device.** Face shields and masks are required for procedures involving a splash hazard.
6. Class II biological safety cabinets and other primary containment devices (e.g., centrifuge safety cups) must be used for handling all biological materials derived from persons known or suspected to be infected with HIV.
7. **Laboratory doors shall be kept closed when work involving infectious or potentially infectious agents is in progress.** Access to the laboratory must be restricted to authorized personnel. Doors to all laboratories handling infectious agents and materials shall display a Health and Safety Door Sign, available from EHS upon request.
8. Laboratory work surfaces must be decontaminated with an appropriate EPA-approved disinfectant following any spill of potentially infectious materials, as well after daily work activities.
9. **EHS must be notified immediately of any spills outside containment, accidents, or exposures; as established in the WCM Bloodborne Pathogens Exposure Control Plan.**
10. **All laboratory waste shall be decontaminated by a method known to destroy bloodborne pathogens effectively, such as autoclaving.** All waste should be labeled with its contents and an indication as to whether the material has been decontaminated.
11. **Hand washing is essential after removing gloves and other personal protective equipment, after handling potentially infectious agents, and prior to exiting the laboratory.**
12. Needles and syringes or other sharp instruments should be restricted in laboratories where infectious agents are handled. If sharps must be used, consider using safety-sharp devices or substitute with plastic when available. **Never recap a used needle.** Dispose of syringe-needle assemblies in properly labeled, puncture resistant, autoclavable sharps containers.
13. The use of disinfectant traps and inline filters on vacuum lines to protect vacuum lines from potential contamination is required. Please refer to the Tissue Culture Waste Guide for additional information.
14. When transporting infectious materials to another laboratory, always use leak-proof, sealed, and properly packed receptacles for primary and secondary containment. Avoid contaminating the outside of the container, and confirm the lid tightly closed. Decontaminate the outside of the container before transporting.
15. A laboratory-specific HIV Standard Operating Procedure must be prepared and adopted as policy in the lab. EHS is available to provide an HIV SOP template or to review proposals as requested.

EXPERIMENTAL ANIMAL STUDIES

Animals inoculated with potentially infectious materials as part of an experimental study must be maintained in approved animal facilities. The staff of the Research Animal Resource Center (RARC) must be informed in advance of any studies with HIV or with biological samples from subjects known or suspected to be infected with HIV, which involve the use of experimental animals.

INSPECTION OF LABORATORIES AND LABORATORY PERSONNEL

EHS

The EHS Biosafety Office will monitor all laboratories regularly to ensure that appropriate practices, containment procedures, and staff training are carried out.

Laboratories

Laboratories working with HIV or with biological materials from persons known or suspected to be infected with HIV must be inspected by the Biosafety Office (EHS) to certify that the laboratory meets the physical containment levels specified in the relevant CDC-NIH guidelines and summarized above.

Laboratory Personnel

All personnel who intend to work with HIV or with blood or other biological samples from persons known or suspected to be infected with HIV must receive training in appropriate microbiological techniques and laboratory safety procedures. When new personnel are assigned to a project involving samples known or suspected to be contaminated with HIV, the Principal Investigator in charge of the laboratory will confirm that all appropriate training is provided.

Exposure Response Procedure

WCM employees must receive immediate care for needlesticks and bodily fluid exposures. Enforcement of the treatment and reporting procedures allows documentation of exposures and initiation of preventative measures.

All puncture wounds and other exposures to blood and body fluids must be reported immediately to Workforce Health and Safety at (212) 746-4370 so that the exposure can be documented and appropriate preventive measures initiated. Each case will be assessed and counseling and the medical provider and exposed individual will discuss the nature of the exposure in the context of the CDC guidelines for post-exposure prophylaxis (PEP) for HIV (https://www.cdc.gov/hiv/risk/pep/index.html)

The decision whether to accept or decline PEP is then made by the exposed individual.

Since prompt treatment increases the likelihood of maximum therapy benefit, the following policy has been established:

- For exposures Monday through Friday (8:30 a.m. to 4:30 p.m.), the employee will report to Workforce Health and Safety.
- For exposures occurring during nights, weekends, or holidays, the employee will report to the NYP Emergency Department for immediate treatment and, if appropriate, early prophylaxis.
- Follow-up treatment for all exposures will be provided by Workforce Health and Safety.

References

- EHS Program Manual 3.2 - Research Biosafety
- EHS Update - Tissue Culture Waste Guide
- Research Biosafety, Health and Human Services (HHS) Publication No. (CDC) 21-1112 December 2009 (5th edition, revised December 2009): Biosafety in Microbiological and Biomedical Laboratories: Section VIII-E: Viral Agents: "Agent Summary Statement for Retroviruses, including Human and Simian Immunodeficiency Viruses (HIV and SIV)"
- OSHA Regulations (Standards - 29 CFR) - Occupational Safety and Health Standards, Standard Number: 1910.1030, Bloodborne pathogens, Appendix: A