

Tel-Aviv University –Safety Unit

Standard Operating Procedure for Working with Human immunodeficiency virus (HIV)

1. Health hazards	<p>HIV, acquired immune deficiency syndrome, AIDS, is a member of the Retroviridae family, genus Lentivirus. HIV is an icosahedral, enveloped virus, of approximately 100 to 110 nm in diameter, and has a single-stranded, linear, positive-sense RNA genome. HIV has two recognized strains: HIV-1 and HIV-2. Upon entry into the host cell, retroviral RNA is converted to DNA by a virally encoded reverse transcriptase enzyme, the DNA transcript is integrated into the host's chromosomal DNA.</p> <p>HIV can infect many cell types, mainly lymphocytes, but also macrophages, and microglia in the brain, and other neurological cells, resulting in profound asthenia, dementia and damage to the peripheral nervous system. Due to immunodeficiency, patients succumb to various fungi, parasites, bacteria, and/or viruses and are prone to certain tumors.</p> <p>Host Range: Humans.</p> <p>Zoonosis: None, although current evidence suggests that HIV-1 and HIV-2 entered into the human population through multiple zoonotic infections from simian immunodeficiency virus-infected non-human primates.</p> <p>Mode of Transmission: HIV is transmitted either by exposure of the virus to oral, rectal, or vaginal mucosa during sexual activity; by intravascular inoculation through transfusion of contaminated blood products; by using contaminated equipment during injection drug use; or from mother to infant during pregnancy, delivery or breastfeeding.</p>
2. Biosafety consideration	<p>All procedures/activities with infectious material should be conducted in a biological safety cabinet (BSC) and in a BSL-2+ laboratory.</p> <p>The use of needles, syringes, and other sharp objects should be strictly limited.</p> <p>Additional work involving large-scale activities is conducted in a BSL-3 laboratory.</p> <p>Centrifugation of infected materials must be carried out in closed containers placed in sealed safety cups, or in rotors that are unloaded in a biological safety cabinet. The use of needles, syringes, and other sharp objects should be strictly limited. Workers with open wounds, cuts, scratches, and grazes should be covered with waterproof dressings..</p>
3. Training	<p>Work with Human immunodeficiency virus (HIV) should be carried out by trained personnel and a competent scientist must direct all personnel.</p>
4. Personal Protective Equipment (PPE)	<p>Gloves (consider double gloving), eyes safety goggles and lab coat (Solid-front gowns with tight-fitting wrists).</p> <p>N-99 respirator mask covering the mouth and nose.</p>

	Appropriate PPE should also be used for lower arms such as sleeve covers or securing gloves over the sleeves of laboratory coat.
5. General Precautions	<p>Survival Outside Host: HIV can remain viable in blood in syringes at room temperature for 42 days, and in blood and cerebrospinal fluid from autopsies for up to 11 days. Although drying in the environment is known to cause a rapid reduction in HIV concentration, under experimental conditions, Cell-free HIV dried onto a glass coverslip in 10% serum can survive for longer than 7 days, depending on the initial titer.</p>
6. Environmental / Ventilation Controls	Work should be conducted in BSL-2+ facility, in a class II type A1 or A2 biological cabinet.
7. Exposure risks	<p>Blood, semen, vaginal secretions, cerebrospinal fluid, synovial fluid, peritoneal fluid, pleural fluid, pericardial fluid, amniotic fluid, other specimens containing visible blood, breast milk, unscreened or inadequately treated blood products, and infected human tissues, can contained the HIV.</p> <p>Faces, nasal secretions, sputum, sweat, vomitus, saliva, tears, and urine, are not considered potentially infectious unless they are visibly bloody.</p> <p>Primary Hazards are needle stick, contaminated sharp objects, and/or direct contact of non-intact skin or mucous membranes with HIV-infected specimens/tissues.</p> <p>Extreme care must be taken to avoid spilling and/or splashing infected materials. HIV should be presumed to be in/on all equipment and devices coming in direct contact with infected materials.</p> <p>Combination of goggles and respirator provided adequate protection (mucosal and respiratory).</p>
8. Decontamination	<p>Susceptibility to Disinfectants: HIV is susceptible to fresh 2% glutaraldehyde, 2% Jodopax (detergent and iodine), hypochlorite, iodine, phenolic, and to a lesser extent 70% ethanol, NaOH and isopropanol.</p> <p>Physical Inactivation: HIV is inactivated at pH higher or lower than the optimal level of 7.1.</p> <p>A temperature of 60° C for 30 minutes will likely inactivate HIV; however, higher temperatures and incubations may be required depending on the initial titer of the virus.</p> <p>HIV is also inactivated by ultraviolet (UV) light; however, the level of the inactivation is heavily influenced by the proximity of the UV source to the sample and the concentration of protein in the sample environment. HIV is easily inactivated in a cell free medium; however, in cell associated samples and blood samples complete inactivation requires much longer exposures to the UV source.</p>

<p>9. Spill and Accident Procedures</p>	<ol style="list-style-type: none"> 1. Evacuate area, remove contaminated PPE and allow agents to settle for a minimum of 30 minutes. Initiate spill response procedure. 2. Cover the spill with absorbent material. Starting at the edges and work towards the center. 3. Carefully pour disinfectant over the absorbed spill, again starting at the edges. Saturate the area with disinfectant. 4. Allow sufficient contact period to inactivate the material in the spill. Non-viscous spills require 15-20 minutes: viscous spills require 30 minutes. 5. Use paper towels to wipe up the spill, working from the edge to center. Use tongs or forceps to pick up broken plastics, glass or other sharps that could puncture gloves 6. Discard absorbent material in Chemical waste bags. 7. Clean the spill area with fresh paper towels soaked in disinfectant. Thoroughly wet the spill area, allow disinfecting for 15-20 minutes longer, and wiping with towels. 8. Discard all cleanup materials (soaked with disinfectant) in Chemical bag/ container, and any contaminated PPE (pay special attention to gloves and shoe covers) in a biohazard bag. Close and secure the bags. 9. Place bag in a second biohazard bag, secure and disinfect by autoclaving. <p>Exposure:</p> <ol style="list-style-type: none"> 1. In case of skin contact or injection with Human immunodeficiency virus (HIV), wash the affected area with soap and water for at least 15 minutes. Consult with Employee Health Center. 2. For eye exposure, flush with water for at least 15 minutes. Consult with employee Health Center. Report incident to supervisor. Supervisor reports the accident/injury to the Biosafety Unit.
<p>10. Waste Disposal</p>	<p>Autoclave all waste (1 hour at 121°C/250°F, 15psi of steam pressure).</p>
<p>I hereby confirm that I have read the SOP (Standard Operating Procedure) for Working with Human immunodeficiency virus (HIV), and agree to follow these procedures.</p>	
<p>Name:</p>	<p>Title:</p>
<p>Signature:</p>	<p>Date:</p>

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