Syracuse University

Biosafety Standard Operating Procedures

[Your Name]

[Your Title]

[Syracuse University, Department Name]

[Building Name, Room Number]

[Preparation Date]

SIGNATURE and ACKNOWLEDGEMENT PAGE

Authorization [*This section is based upon your specific laboratory setup*]

All members of the [*Principal Investigator's*] Lab who have signed the list below are approved for entry into Room [*XXXX*] while work with infectious biological agents is in progress.

Anyone (including any workers not in the P.I.'s Lab) who uses Room [*XXXX*] lab must sign below.

Acknowledgement

We, the undersigned, understand that [*the agents used in Room XXXX*] handled in Room [*XXXX*] of [*Building Name*] are infectious to humans. Furthermore, we have read and understood this manual and agree to comply with its mandates.

Name	Signature	Date	Agent Vaccination* Yes/No/ Declined/NA?

*Agent vaccination in table should be specified, as appropriate to potential exposure in laboratory: HBV, Vaccinia, Influenza, etc.

PURPOSE

This document provides a comprehensive source for all matters covering the use of *[infectious agent]* handled in this laboratory [*Room Address of Principal Investigator*]. Specifically, it describes the procedures to be used to insure a safe working environment while working with infectious agents. This manual will be reviewed annually by the Principal Investigator for changes or corrections to ensure that it is accurate.

[The information in the following two sections is an example of the type of specific description of your operations and activities that you should include in your manual. You should discuss detailed procedures and the actual precautions to be taken by those who actually work with the agents found in your laboratory.]

GENERAL PROCEDURES

[This section requires short description {in lay terminology} of work to be performed and agents which are to be used (as shown in the following example):

Hazards under Routine Use [insert a brief summary of the hazards]

Hazards as result of Spill or other accident [insert a brief summary of the hazards]

Procedures involving the use of infectious agent [insert a step by step procedure for this work]

DESCRIPTION OF LABORATORIES

[Provide a summary of required project equipment and a floor plan showing its location]. Laboratory(ies) is/are located on the [xxx floor] of [Building Name] on the Syracuse University Campus .

NOTE: PLEASE EDIT THE FOLLOWING PROCEDURES TO FIT YOUR LAB OPERATIONS. YOU ARE REQUIRED TO EXPLAIN IN THE BODY OF THIS DOCUMENT WHY A PARTICULAR REQUIREMENT DOES NOT APPLY TO THE WORK YOU ARE DOING.

GENERAL LAB RULES

1. Work with infectious agents will be performed in *[Building Name, Room XXXX]*. All work will be conducted in accordance with the Syracuse University Microbiological Safety Program using Biological Safety Level 2 practices and procedures.

2. Access to laboratory will be restricted when work is in progress and a biohazard sign will be posted on the entrance to the lab.

3. Designated use areas (equipment, storage and work areas) in which the organism will be used shall be labeled with a biohazard sticker.

4. Use a class II biosafety cabinet for work with large volumes and high concentrations

5. NO eating, drinking, smoking, handling contact lenses, or applying cosmetics in [*Room XXXX* or *Room YYYY*] at any time.

6. Mouth pipetting is prohibited; mechanical pipetting devices are to be used at all times.

7. All procedures are performed carefully to minimize the creation of splashes or aerosols.

8. Wash hands
   - after handling biohazardous materials,
   - after removing gloves, and
   - before leaving the laboratory.

9. Razor blades, scalpels, and hypodermic needles ("sharps") should be used only when absolutely needed in [*Room XXXX*].

10. Work surfaces are decontaminated at least once a day and after any spill of biological material [*specify the appropriate disinfectant*].

11. All cultures, stocks, and other biologically contaminated wastes are to be treated and disposed of Regulated Medical Waste.

12. Plasticware should be substituted for glassware whenever possible.

13. All high risk operations should be conducted with two knowledgeable individuals present. Each must be familiar with the applicable procedures, maintain visual contact with the other, and be ready to assist in the event of an accident.

CONTAINMENT REQUIREMENTS

1. A Class II Biological Safety Cabinet shall be used for all procedures that will generate aerosols or droplets and for all infected cell-culture manipulations.

2. Before containers are removed from the Biosafety Cabinet, the exterior of the closed primary container should be decontaminated and placed in a clean secondary container. Materials should be transported only in leak/spill-proof secondary containers.

3. All centrifugation shall be done using centrifuge safety buckets or sealed centrifuge tubes in sealed rotors. If a small centrifuge is used and centrifuge safety cups are not available, the centrifuge should be operated in the biological safety cabinet. Each person operating a centrifuge should be trained on proper operating procedures. Keep a log book detailing operation records for centrifuges and rotors to assist in determining service requirements.

4. Contaminated and potentially contaminated protective clothing and equipment should be decontaminated using methods known to be effective against the infectious agent before removal from the laboratory for disposal, cleaning or repair. If decontamination is not possible or practical, materials (e.g., used gloves) should be disposed of as regulated medical waste.

5. Vacuum lines. When vacuum lines are used with systems infectious agents, they should be protected with a HEPA filter to prevent entry into the lines.

PROPER USE OF BIOLOGICAL SAFETY CABINETS

1. To assure sterility inside cabinet and establish proper air flow for containment, the blower should be turned on at least ten minutes before infectious materials are to be put in the biosafety cabinet.

2. Biosafety cabinets must be tested and certified by an approved contractor at the time of installation, any time the cabinet is moved, and at least anually. Check the certification sticker on the front of the unit to verify your biosafety cabinet's condition. Contact EHO if the last certification is more than 1 year old.

3. Wipe inner surfaces (especially the pan) with a solution of [*the disinfectant chosen as effective for the agent you are using*] and allow to dry. Always keep a bottle of disinfectant in the cabinet for decontaminating, or in case of a spill.

NEVER place anything over the front or rear grille of a biosafety cabinet.

4. Disrupting the air flow into the front grill allows contaminated air from inside the cabinet to blow into the lab or directly at the person sitting at the cabinet! It also allows non-sterile air from the room to blow into the biosafety cabinet over your experiments!

5. Materials should be placed in the cabinet so as not to block air flow into the rear grille. Leave a few inches for air to flow around things. Any disruption of the air flow in the cabinet decreases its effectiveness.

Remember: **"A biosafety cabinet is only as safe as the person using it."**

6. Before manipulating infectious materials, try to make sure that you have everything you need in the cabinet. The fewer times you pull your hands out of the cabinet, the less disruption of the air flow.

7. Work should be performed on the center of the work surface of the cabinet whenever possible. Work outward progressing from clean to dirty (contaminated). However, infectious agents should not be placed directly adjacent to or directly on the intake grills.

8. After manipulating infectious agents, make sure all are in tightly closed containers before removing them. Wipe down the surface of all equipment used in manipulations (pipettors, etc.) with disinfectant before removing from the cabinet. All waste and disposable items should be left in the cabinet until properly decontaminated or contained.

9. After the cabinet has been emptied, wipe exposed surfaces including the front grille and splash area with disinfectant. Allow the blower to run for a minimum of ten minutes to purge any aerosols from inside the cabinet before shutting off the blower.

NOTE: Class IIA biosafety cabinets recirculate about 70% of the air inside themselves and exhaust the remainder to the lab. Any use of volatile solvents should be kept to a minimum or done elsewhere. Dangerously high levels of volatile fumes can accumulate inside the cabinet and pose a threat of fire or explosion.

DECONTAMINATION

1. Surface Decontamination: Any equipment used in conjunction with infectious material must be decontaminated by wiping with [*the disinfectant chosen as effective for the agent you are using*] at least once daily.

2. Autoclaving: All solid, contaminated waste shall be placed in an autoclave bag and autoclaved. All autoclaved biological waste shall be placed in EHO supplied Regulated Medical Waste containers. All autoclaved waste shall be identified as biologically deactivated and labeled as such. **No contaminated biological material shall ever be disposed of in the regular trash.**

3. Decontamination of liquid Waste: This should be done by adding [*the disinfectant chosen as effective for the agent you are using*] to the liquid waste in the biosafety cabinet. Mix well and allow to stand for thirty minutes before being poured into the drain. **Liquid poured to drain must be between the pH range of 5.5 and 10.5.**

4. Reusable Items: Reusable items shall be immersed or filled with [*the disinfectant chosen as effective for the agent you are using*] and allowed to stand for thirty minutes before being rinsed and allowed to air dry.

PERSONAL PROTECTIVE EQUIPMENT

1. When using an biological safety cabinet, protective clothing, including gloves and a disposable long-sleeved body covering (gown, laboratory coat, smock, coverall, or similar garment) should be worn so that hands and arms are completely covered.

2. Eye protection should be worn if an open-fronted containment system is used.

3. Other protective equipment may be required, depending on the characteristics of the agent and the containment system. For example, use additional respiratory protection if aerosols may be generated and it is not possible to use containment equipment or other engineering controls.

4. Latex gloves must be worn at all times and changed between tasks and if potentially contaminated.

MANAGEMENT OF SPILLS

SMALL BIOHAZARDOUS SPILL (*Including blood or body fluids*)

a. Cover spill with paper towels
b. Flood spill with appropriate disinfectant (1:10 dilution of bleach), using care not to cause spatter. Add disinfectant slowly to outer margin and allow it to flow in.
c. Allow disinfectant to act for 20-30 minutes before cleaning up with more paper towels and fresh disinfectant.
d. Discard materials (paper towels, gloves, and other wastes from clean up) into plastic bag and seal. Contact EHO for disposal.

LARGE BIOHAZARDOUS SPILL *(Outside a biological safety cabinet)*

a. Leave the room immediately, and close the door.

b. Notify others in the area not to enter the contaminated room. Call the EHO and Safety for assistance. Post a warning sign to prevent entry.

c. Remove and put your contaminated garments into a container for autoclaving and thoroughly wash your hands and face.

d. The Biosafety Officer or EHO staff in cooperation with departmental staff will conduct the spill cleanup as follows:

e. Wait 30 minutes to allow dissipation of spill-created aerosols by the room ventilation.

f. Wear appropriate coveralls, gloves, booties, and respiratory protection.

g. Pour an appropriate solution (1:10 dilution of household bleach or other) around the spill and allow it to flow into the spill. Paper towels soaked with the disinfectant may be used to cover the area. To minimize aerosol generation, avoid pouring the disinfectant directly on the spill.

h. Let stand 20 minutes to allow an adequate contact time.

i. Using an autoclavable dustpan and squeegee, and forceps for sharp materials, transfer all contaminated materials (paper towels, glass, liquid, gloves, etc.) into an autoclave bag lined deep autoclave pan. Cover the pan with a suitable cover and autoclave according to standard directions. Decontaminated material will be checked and disposed of through the EHO.

j. The dust pan, squeegee, and forceps should be placed in an autoclave bag and autoclaved according to standard directions. Contact of reusable items with non-autoclavable plastic bags should be avoided- separation of the plastic after autoclaving can be very difficult.

k. Wash and mop adjacent area and spill area with appropriate disinfectant-detergent solution.

l. Remove and discard protective clothing with other waste material. Shower with germicidal soap.

BIOHAZARDOUS SPILL INSIDE A BIOLOGICAL SAFETY CABINET

When a spill occurs inside a BSC, the cabinet should continue to operate during the cleanup to prevent escape of contaminants. Chemical decontamination procedures should be initiated at once. Be careful with paper towels which can be sucked into the blower fan or HEPA filters. Cleanup will require appropriate personal protective equipment, including respiratory protection, so the EHO should be called for assistance.

a. Spray or wipe walls, work surfaces, and equipment with an appropriate disinfectant detergent, (e.g., 1:10 dilution of household bleach with 0.7% soap). A disinfectant detergent has the advantage of detergent activity, which is important because extraneous organic substances frequently interfere with disinfectant activity. The operator should wear appropriate protective equipment.

b. Flood the top work surface tray, and if a Class II cabinet, the drain pan below the work surface, with a disinfectant and allow to stand for 20-30 minutes.

c. Remove excess disinfectant from the tray by wiping with a sponge or cloth soaked in a disinfectant. For Class II cabinets, drain the tray into the cabinet drain pan, lift out tray and removable exhaust grillwork, and wipe off top and bottom (underside) surfaces with a sponge soaked in a disinfectant. Then replace the grillwork and drain disinfectant from the drain pan into an appropriate disposal container, collect all protective equipment, gloves, sponges, etc, and consult the EHO for autoclaving and or disposal procedures.

All spills of any nature must be described in your laboratory notebook. The description must include:

- the type of spill
- the time and date it happened
- the time and date it was cleaned up
- the time and date you autoclaved the waste from the spill.

All major spills must be reported to [*the Principal Investigator*]. A major spill is one in which:

- hazardous materials contact skin, eyes, etc.

- a break in the skin occurs
- the spill splashes over an area larger than one foot in diameter
- the extent of the spill is undetermined
- or the spill involves an aerosol.

EMERGENCY PHONE NUMBERS AND PROCEDURES

Emergency Phone Numbers

SU Department of Public Safety	315-443-2224
Principal Investigator's Home Phone	[ ]
Syracuse University Health Services	315-443-9006
Environmental Health Office (EHO)	315-443-4132
Biosafety Officer	315-443-2447

EMERGENCY PROCEDURES

In the event of a biohazard emergency, a spill of human blood or material, release of infectious material and/or rDNA that presents a potential for or has already caused:

- A personal injury,
- An exposure (contact with eyes, mouth, inhalation, non-intact skin, or puncture) to a biological material of known or unknown health risk, or
- Any situation immediately dangerous to life, health, or property.

Please proceed as follows:

1) **Communicate:** Immediately notify all personnel in the affected area of the spill or release and evacuate all personnel from the affected area.

2) **Call:** Call the Department of Public Safety (DPS) at **315-443-2224** from a safe location that is unaffected by the spill. DPS will dispatch appropriate response personnel.
   Be prepared to provide DPS with the following information:
   - Your name, phone number, and safe location from which you are calling.
   - The nature of the incident.
   - The location of the incident (building, floor, room number).
   - The name or type of substance (if known).
   - The quantity of substance (estimate).
   - The hazards (if known).
   - Any known injuries.

3) **Stay Safe**: Individuals exposed to or contaminated by a biohazardous/infectious material must leave the immediate spill area and stay in the safe location to meet emergency responders.

4) **Decontaminate:** Individuals contaminated by infectious material must immediately follow the appropriate response actions indicated below:
    - Carefully remove any contaminated personal protective equipment (PPE) and/or clothing. When removing PPE/clothing make sure to turn the contaminated PPE/clothing inward to contain the contaminated areas.
    - Wash hands well with soap and water.
    - Treat any wound sites with antiseptic soap and warm water for 15 minutes.
    - If a splash to the face has occurred, flush eyes in eyewash for 15 minutes.

5) **Medical Follow-up:** Injured or exposed individuals will be offered transport to a local Hospital Emergency Room for a post-exposure evaluation. Requests for medical transport are made by contacting **DPS at 315-443-2224**. Seeking immediate medical attention is key in reducing the risk of infection.

Non-Emergency Spills

If a spill occurs that does not result in and injury or exposure, please refer to your laboratory specific spill clean-up procedures, and/or reference the general Biohazard spill procedure online at: http://ehss.syr.edu/laboratory-safety/biosafety/319-2/section-3-0-laboratory-practices/#310_Spill_Response_Procedures

Documenting Incidents

All lab personnel must report any incident or near miss the lab supervisor. The supervisor must complete an online Incident Report Form, documenting the route of exposure and the circumstances under which the incident occurred. The online Lab Incident Report form is found at the following link: http://ehss.syr.edu/laboratory-safety/laboratory-safety/laboratory-incident-reporting/

It should be emphasized that incidents that did not result in an exposure (i.e. a near miss), must be communicated to the Principal Investigator or laboratory supervisor and reported to EHSS. Evaluation of near misses can lead to alternative work practices and implementation of engineering controls to minimize future incidents.

Investigation of Laboratory Incidents

EHSS, in cooperation with the Principal Investigator and laboratory personnel, will conduct the necessary investigation of a laboratory incident. The goal of the investigation is the prevention of similar incident, as well as obtaining information concerning the circumstances and number of individuals who may have been exposed to the agent in question. In addition, EHSS, in consultation with the Institutional Biosafety Committee, Health Services and/or a third party medical provider may institute further steps to monitor the health of those who may have been exposed to the material in question.

The University's Institutional Biosafety Committee will report significant research-related accidents to the National Institutes of Health Office of Biotechnology Activities as required.

TRAINING

Lab personnel shall demonstrate:

- Knowledge of the hazards of this material
- Knowledge of the specific work techniques necessary to control their exposure

Information contained in this document forms the basis for these competencies.

Training will be repeated annually.

BIOLOGICAL INVENTORY

This lab will maintain a continually updated record of all infectious agents and associated storage locations.

SECURITY

Infectious agents shall be stored in storage rooms, cabinets, or freezers when not in use.

Anytime you notice suspicious individuals or activities in your building call Public Safety at 711.

DESIGNATED USE AREA

Entryways to research and clinical area that handle human pathogens must be posted with a biohazard sign. The sign includes the international biohazard symbol, bears the legend "Biohazard", and identifies the name of the infectious agent, any special entrance requirements, and the name and phone numbers of the principal investigator or any other responsible persons.

Warning labels with the international biohazard symbol shall be affixed to vessels, equipment, and containers not disinfected after each use, including, but not limited to, refrigerators, freezers, incubators, waterbaths, sonicators, biological safety cabinets and centrifuges containing human pathogens. Warning labels shall also be affixed to other containers used to store, transport or ship human pathogens.

VALIDATION AND HISTORY FOR BIOSAFETY MANUAL

Principal Investigators Certification

I hereby certify that I have reviewed the contents of this manual and that it reflects my current operating policy for the laboratories [*XXXX*] and [*YYYY*] located in [*Location*] research building.

[*Principal Investigator's Name*]
[*Principal Investigator's Title*]

Signature _____ Annual Review Date _____

APPENDIX A – DESIGNATED USE AREAS

[*Provide a list of list of equipment to be used with the material*]

APPENDIX B - BIOSAFETY APPLICATION DOCUMENTATION

[*Provide a copy of the Institutional Biosafety Committee Approval*]

APPENDIX C – HAZARD INFORMATION FOR BIOLOGICAL MATERIAL

[*Provide hazard information regarding the biological material being used*]