



Warning

PI Name:

## Safety Protocol for working with \_\_\_\_\_ toxin

### ***Hazard Communication Statement***

Biological toxins are toxic substances that can be produced by bacteria, fungi, protozoa, insects, animals or plants and are classified separately from chemical toxins. They are nonreplicative, noninfectious materials but can be extremely hazardous, even in minute quantities. The toxicity and health hazard of biological toxins vary greatly and toxins may be cytotoxic, neurotoxic, hemolytic or cause necrosis. Of primary concerns are acute biological toxins.

State information about biotoxin, refer to pertussis protocol as example.

Refer to MSDS and/or <http://www.cdc.gov/biosafety/publications/bmbl5/index.htm> Section VIII-G: Toxin Agents

In the laboratory setting, typical routes of exposure are through inhalation, mucous membrane contact (eyes, nose and mouth) and/or to open sores on skin, sharps injuries with contaminated materials, and ingestion of trace amounts of the material if hands are not washed prior to eating or smoking. Some biological toxins can be absorbed through intact skin, especially when solubilized in substances such as dimethyl sulfoxide (DMSO).

Please refer to MSDS and/or <http://www.cdc.gov/biosafety/publications/bmbl5/index.htm> Section VIII-G: Toxin Agents for the specific hazards of the biotoxin you are registering with the IBC and state potential health hazards associated with the biotoxin you are registering to use. Researchers working with a toxin should weigh the risks and benefits of vaccination if a vaccine is available (include a statement on vaccine availability. Vaccination is not mandatory but can be offered)

All personnel working with a biotoxin or accessing a toxin laboratory should be familiar with the signs and symptoms of toxin exposure.

### Hazard statement(s)

Refer to MSDS and/or <http://www.cdc.gov/biosafety/publications/bmbl5/index.htm> Section VIII-G: Toxin Agents

### Symptoms may include:

Refer to MSDS and/or <http://www.cdc.gov/biosafety/publications/bmbl5/index.htm> Section VIII-G: Toxin Agents

## **2. Laboratory Precautions**

### Standard Laboratory practices

Toxins shall be handled with appropriate precautions consisting primarily of **good microbiological laboratory techniques** as well as Biosafety Level 2 (BSL-2) containment. The following precautions should be employed:

- A. Access to the laboratory is limited or restricted at the discretion of the laboratory director.
- B. Placards should be placed on the entrances to the lab listing biological hazards and the PI's name and 24/7 contact information for the PI and/or laboratory personnel familiar with the biohazard.
- C. In addition, when performing work with toxins, access to the room should be restricted and a sign stating the following should be placed on the door: "Toxins in Use—Authorized Personnel Only."

- D. Do not store food in lab.
- E. Do not eat, drink, smoke, handle contact lenses, apply cosmetics (including chap stick), etc. in the lab.
- F. Do not mouth pipette.
- G. Plants or animals not involved in experiments are not allowed in the lab.
- H. Vacuum lines must be HEPA filtered
- I. Liquids should be handled carefully to minimize creation of splashes and aerosols. Centrifugation should be performed using sealed tubes and sealed rotors or safety cups.
- J. Sharps should be handled with extreme caution to avoid cuts or autoinoculation during use and disposal. Needles should not be bent, sheared, or recapped. The needle and syringe should be promptly placed in a puncture-resistant container and decontaminated by autoclaving.
- K. Transport: Toxin must be transported in a sealed primary container inside a sealed durable and leak proof secondary container that has been labeled with a warning label.
- L. Lab personnel must wash their hands after they handle the toxin and or animals injected with toxin, after removing gloves, and before leaving the laboratory or animal facility.
- M. Laboratory personnel must be appropriately trained.
- N. The safety protocol (SOP) serves as training documentation and reference information. A copy signed by laboratory personnel should be stored in the lab's safety manual.

Toxin-specific laboratory and animal precautions:

2. Personal Protective Equipment (PPE)

- A. Wear protective gear including disposable gloves (double gloves recommended) and a dedicated cloth or disposable lab coat. Ensure gloves are compatible with any solvent your toxin may be dissolved in.
- B. Wear safety glasses and face protection when not working in a fume hood or biosafety cabinet.
- C. Dispose of contaminated PPE in biohazard bags/containers.
- D. No personal protective equipment shall be worn outside of the lab.

3. Working Procedures

Before working with toxin:

- If applicable, prepare inactivating agent in appropriate containers for disinfecting supplies that may come in contact with the toxin.
- Put on PPE

Working with toxin:

- If at all possible, avoid working with lyophilized toxin (i.e. weighing of toxin, etc). Ideally, the toxin is purchased in solution. If you must weigh a toxin, then the scale must be located in a certified chemical fume hood.
- Sharps use:
  - Some toxins come in glass ampules that must be "snapped" to have access to the powder within for resuspension. Use great care in cracking the ampule to avoid an accidental cut.
  - Some toxins arrive in rubber septum sealed vials. If using a needle and syringe to plunge through the septum to resuspend, then use a hands-free device to stabilize the vial to avoid an accidental needle stick.
  - Whenever possible, use needle-free techniques to resuspend toxins
- Use a biological safety cabinet (BSC) for resuspension of biological toxins or manipulation of stock concentrations that can create aerosols, such as pipetting, harvesting or infecting cells, filling tubes and containers, and opening sealed centrifuge containers. Aerosol resistant tips must be used when pipetting.
- Immediately replace gloves, if contamination is suspected.

After working with toxin:

- **Toxins should NEVER be disposed of without prior inactivation.**

Toxin stability varies considerably outside of physiological conditions depending on the temperature, ionic strength, pH, and other characteristics. Inactivation is not always linear with function of heating time and some protein toxins possess the ability to re-fold and partially reverse inactivation caused by heating. In addition, the conditions for denaturing toxins in aqueous solutions are not necessarily applicable for inactivating dry, powdered preparations.

Recommended parameters for chemical or heat inactivation for some common biological toxins can be found at <http://www.cdc.gov/biosafety/publications/bmbl5/index.htm> Section VIII-G: Toxin Agents and Appendix I- Guidelines for Work with Toxins of Biological Origin

Materials that are potentially contaminated with toxins shall be disposed of as biohazardous waste and sharps must be disposed in a red sharps container.

### **3. Emergency procedures**

#### **3A. Spills of the agent:**

- 1) Notify workers in the area.
- 2) Leave the area for 15 minutes to allow aerosols to settle. Replace contaminated PPE.
- 3) Upon return, decontaminate the area with an **appropriate inactivating agent**
- 4) Allow **appropriate of contact time** for inactivation.
- 5) Absorb spill with paper towels and dispose them into biohazard bags.
- 6) Use dustpan and broom to sweep up debris. Broken glass must be deposited into broken glass or sharps box.
- 7) Wipe the spill area clean using **appropriate inactivating agent**.
- 8) Dispose of contaminated PPE in autoclavable biohazard bags.
- 9)

#### **3B. In the event of injury or exposure**

- 1) **WOUNDS (including needle sticks and animal bites):** Wash all wounds immediately with antiseptic soap and a high volume of water for up to 15 minutes.
- 2) **SKIN:** Wash with plenty of soap and water for 15 minutes
- 3) **EYES:** Rinse cautiously with water for several minutes. Remove contact lenses if present. Continue rinsing for 15 minutes.
- 4) **INHALATION** Remove victim to fresh air and keep in rest position comfortable for breathing.
- 5) **ACCIDENTAL INGESTION:** Rinse mouth with water but do not swallow.
- 6) **SEEK IMMEDIATE MEDICAL FOLLOW-UP** (*do not wait 24 hrs*). Antitoxins are available for some biological toxins and immediate medical "first aid" interventions may help prevent or lessen the severity of the reaction.

Employees *and* students go to:

- **Employee Health Services** (during business hours: Monday-Friday, 7:30 am -4 pm).  
Address/Location: 57 Bee Street, Charleston SC 29425; Phone: (843) 792-2991
- **MUSC Emergency Room** (after business hours)  
Address/Location: 96 Jonathan Lucas Street, Charleston SC 29425  
Bring the MSDS and be prepared to discuss the nature of the toxin.

- 7) **REPORT EXPOSURE IMMEDIATELY** to the Principal Investigator and notify Biosafety Officer (843-792-3604).
- 8) **NOTIFY** Employee Health Services within 24 hours by filing an ACORD First Report of Injury form at [Care Team Member/Workplace Injury Form](#)

By signing below I attest that I have read and understood these safety instructions and agree to adhere to these rules at all times. Furthermore, I feel I have been properly notified and trained of the hazards in this laboratory.

