

OVERVIEW

Toxins with a mammalian LD₅₀ ≤100 µg/kg body weight, called “acute toxins”, pose the greatest risk. They are highly toxic in minute quantities, have no established safe exposure limits, and there is limited toxicological data applicable to human exposures. This document outlines the **occupational hazards** associated with handling animals administered acute biological toxins, <http://www.ehs.ufl.edu/programs/bio/toxins/>, which may result in adverse health effects

HIGHER RISK PROCEDURES:

- Aerosol or splatter generating procedures
 - Ex. Vortexing, grinding, centrifuging, and/or intra-nasal inoculation of animals
- Using concentrated stocks or large quantities of toxins
 - **NOTE:** Vials may contain more than a LD₅₀ for an average-sized person! Calculate in advance.
- Work with powdered or dried toxins: potential for inhalation and a tendency for electrostatic attachment to gloves, weighing spatulas, etc.
- Use of needles or sharps in experimental procedures
- Reconstitution of lyophilized toxin:
 - Highly concentrated material
 - Sealed vials that are difficult to open (glass breakage, sharp metal band)
 - Removal of septa may result in dispersal of concentrated powder
 - Alternatively, puncturing the septum with a needle and syringe provides potential for sharps injuries

NOTIFICATION AND SIGNAGE

- Use of an Acute Toxin in animals **MUST** be approved in the lab’s IACUC animal use protocol.
- Research staff must inform Animal Care Services (ACS) staff at least 2 business days in advance that biological toxins will be used and arrange housing for the animals.
- Cages must be labeled with “BIOHAZARD WARNING” label (available from ACS), indicating the toxin name, date(s) of administration, and clear date.

TOXIN PREPARATION & TRANSPORT

- Reconstitute powdered/lyophilized toxin in a certified Class II Biological Safety Cabinet (BSC) or fume hood.
- Whenever possible, individual toxin doses should be loaded into a single-use, disposable luer-lock syringe
- Safety syringe/needle combinations should be considered as well
- If multiple doses must be loaded into one syringe, place the uncapped needle/syringe inside a sterile conical tube in between injections to avoid the need to recap the needle and minimize the risk of an accidental needlestick.

FOR TRANSPORT OF TOXINS:

- Syringes must be placed in a conical tube and secured using parafilm, OR a safety syringe/needle combination, with protective sheath that has a transport position.
- Then, place the enclosed syringes/needles in a secondary hard-walled, sealable container (e.g., Tupperware™) with absorbent material. Label container with:
 - A Biohazard sticker
 - PI name & Contact Number

FOR TRANSPORT OF ANIMALS ADMINISTERED TOXINS:

- Animal cages must be placed in a secondary hard-walled container labeled with:
 - A Biohazard sticker
 - PI name & Contact Number
- Decontaminate the outside of the container prior to transport and avoid high traffic areas.
- *Note: The secondary container is required in the event that a spill occurs. In addition, precaution should be taken to ensure animals are humanely transferred. Please check with the veterinarian to ensure that transport does not cause stress or harm to the animals.*
- For animals other than rodents, please consult with the Biosafety Office and the ACS veterinarian.

Upon Request, the Biosafety Office will provide Small Vial Access Devices (as pictured below):



TOXIN ADMINISTRATION

- The Buddy System should be used for all animal injections.
- Injections should be performed in a chemical fume hood or Biosafety Cabinet (BSC).
 - *Note: There is limited availability of chemical fume hoods in ACS.*
- For i.p. injections:
 - Anesthesia is recommended for toxins that are hazardous at low doses to minimize risk of self-inoculation.
 - Disposable gloves must be worn. Consider the use of double gloves to improve protection.
 - After injections, the needle/syringes must be placed in the puncture-resistant sharps container.
 - Sharps boxes must be autoclaved as described below prior to disposal in a Biomedical Waste Box.

ANIMAL HANDLING & CAGE CHANGES

AFTER ADMINISTRATION:

- Animals must be maintained in microisolator cages with filter tops at ABSL-1-i (unless otherwise stated by the Biosafety Office).
 - *Note: For animals too large to be housed in cages with microisolator lids or on ventilated racks, you must consult with the Biological Safety Officer in advance to determine appropriate safety precautions.*
- Cages will be opened (including for cage-changing, animal care or experiment-related reasons) in one of the following:
 - Certified Class II Biosafety Cabinet (BSC)
 - Animal Transfer Station
 - Chemical fume hood
- **Cage changes should be done no sooner than 72 hours post-injection.**
 - This process is repeated if animals have been administered the toxin again.
 - Depending on the dosing schedule, this may need to be adjusted and will be documented in your IACUC protocol.
- Standard PPE for working in **ABSL-1** (gown, gloves, and fluid-resistant sleeves) should be worn when handling animals.

WHEN WORKING:

- Gloves must be changed:
 - Every two (2) hours,
 - When they become torn or obviously contaminated with excreta, **AND**
 - Before handling animals in other experimental groups
- Decontaminate the biological safety cabinets after each use with approved disinfectant followed by a water rinse. Begin cleaning the least contaminated area to the most contaminated area.
- Decontaminate safety glasses, safety goggles, and reusable face shields with an approved disinfectant, rinse with water, and store the PPE in a clean location for re-use.
- All disposable PPE is disposed of in the regular trash before leaving the work area.
- Wash hands after removing gloves.

WASTE DISPOSAL FOR THE FIRST CAGE CHANGE

- Cages (with bedding and feed) must be bagged in a red, biohazard-labeled, autoclavable bags and loosely tied shut. Opening is secured with a zip-tie or bag is placed in a secondary container to transport to autoclave.
- Spray bags with freshly prepared disinfectant and allow to sit for a minimum of 5 minutes prior to removing from the BSC.
- Autoclave cages promptly when de-populated after the first cage change.
 - The recommended cycle for inactivating heat-labile toxins is: **121°C, 15psi for 1 hour.**
- Once autoclaved, bedding can be dumped according to standard practices and disposed of as general trash.
- Animal carcasses will be placed in biohazard bags and incinerated.
- All disposable PPE is disposed of in the regular trash before leaving the work area.