



Acute Biological Toxins in Animals

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:

- Research staff must inform Animal Care Services (ACS) staff ahead of time that biological toxins will be used and arrange housing for the animals.
- Cages must be labeled with “HAZARD WARNING” sign (available from ACS), indicating the toxin name and date(s) of administration.
- For animals that require special care by research staff, place a “Special Care by PI” Card on the cage indicating what the research staff will be responsible for (e.g., cage changing, feeding, water, etc.).
- This card should include the name and phone number of the individual responsible for providing care.
- Husbandry care provided by the research staff will be documented in a Monthly Summary sheet, completed by the researcher(s).



Toxin Preparation & Transport

- Reconstitute powdered/lyophilized toxin in a certified 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™) labeled with:
 - A Biohazard sticker
 - PI name & Contact Number
- **FOR TRANSPORT OF ANIMALS ADMINISTERED TOXINS:**
 - Animals 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.*

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 Class II B2 Biosafety Cabinet (BSC).
 - *Please note that 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.



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 engineering controls.*
- 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
 - Once animals are transferred to clean standard caging, signage, and PPE are not required.*
- Cage changes may be done no sooner than 72 hours post-injection.**
 - This process is repeated if animals have been administered the toxin again.
- Standard PPE for working in **ABSL-1** (gown, gloves, and fluid-resistant sleeves) should be worn when handling animals.
 - More information on the standards can be found at <http://www.ehs.ufl.edu/programs/animal-research/rodent-housing/>.*

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
- Wash hands after removing gloves.
- Decontaminate safety glasses, safety goggles, and reusable face shields if used with an approved disinfectant, rinse with water, and store the PPE in a clean location for re-use.
- 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.

Waste Disposal after the First Cage Change:

- Cages (with bedding and feed) must be bagged in a red, biohazard-labeled, autoclavable bags and taped shut.
- 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 will be in the regular trash before leaving the work area.

Minimum PPE Requirements for Cage Dumping after the First Cage Change:

<ul style="list-style-type: none">• Facility dedicated scrub suits• Water resistant shoe covers• Double Nitrile or latex gloves	<ul style="list-style-type: none">• N-95 Respirator when dumping cages• Hearing protection• Face shield
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