

Essential Information for Work with Biological Toxins

Daniel Eisenman, PhD
Biosafety Officer
Medical University of South Carolina
eisenman@musc.edu
(843) 792-4304

Toxins are highly toxic biological molecules which can be lethal in low concentrations (low LD50).

Hazard Communication

- **Declaring Toxins on BSL-2 Placard**
- **When work with toxins is being performed post a sign stating,**

“Toxins in Use – Authorized Personnel Only”

Work with toxins should be performed in:

- **BSL-2 containment,**
- **Closed Door (restricted access)**

Toxins should be clearly labeled and kept in locked storage or a locked freezer.

Work with toxins should be performed in a biosafety cabinet or fume hood to contain aerosols.

Administration of toxins to animals:

- Animal BSL-2 containment**
- Biosafety Cabinet**
- Animal Restraint**
- Sharps precautions**

Personal Protective Equipment (PPE)

Gloves and lab coat (required)

If splashes, sprays or aerosols can be expected, goggles and N95 respiratory protection are recommended.

All personnel using respiratory protection should be fit tested by MUSC's Occupational Safety and Health Programs (OSHP) (2-3604).

- Proper fitting ensures adequate respiratory protection**
- Respiratory Protection Program**

Containing Risks Associated with Aerosols

<u>Aerosol Producing Procedure</u>	<u>Method of Containment</u>
Splash/Spray	biosafety cabinet, fume hood, splash shield
Vortexing	sealed tubes, biosafety cabinet
Centrifugation	sealed tubes, sealed rotor, safety cups
Homogenization	biosafety cabinet, fume hood, splash shield
Weighing lyophilized Toxin	Fume hood, gloves lab coat, goggles and N95 Respiratory protection
Injection/administration Into animals	biosafety cabinet, animal restraint
Cage cleaning (infected animals)	biosafety cabinet, PPE (contact Biosafety Officer to review procedures and PPE)

PPE for BSL2 labs: gloves and lab coats are required, eye and respiratory protection (as needed)

Deactivating Toxins

Check the Toxin's MSDS to determine the appropriate method of deactivation

If the protocol calls for bleach, ensure it is fresh

Toxins present in liquid waste must be deactivated prior to disposal

Never pour active toxins down the sink!

Toxins present on solid waste (culture dishes pipets, pipet tips) should be chemically inactivated or autoclaved prior to disposal as biohazardous "red bag" waste.

Select Agent Toxins

HHS Toxins	Amount
Abrin	100 mg
Conotoxin	100 mg
Diacetoxyscirpenol (DAS)	1000 mg
Ricin	100 mg
Saxitoxin	100 mg
Shiga-like ribosome inactivating proteins	100 mg
Tetrodotoxin	100 mg
Overlap Toxins	Amount
Botulinum neurotoxins	0.5 mg
Staphylococcal enterotoxins	5.0 mg
<i>Clostridium perfringens</i> epsilon toxin	100 mg
Shigatoxin	100 mg
T-2 toxin	1000 mg

Select Agent and Toxin Program in response to the 2001 Anthrax attacks

Registration of potential biological warfare agents with the federal government

These toxins must be registered if possessed in quantities greater than those listed

- **Log of use (quantities, dates, names, etc.)**

- **Biosafety Officer must observe destruction of stocks**

Additional Questions?

Please contact:

Daniel Eisenman, PhD
Biosafety Officer
Medical University of South Carolina
eisenman@musc.edu
(843) 792-4304