



EHS COLLOQUIUM SERIES – October 12, 2011

Safe Handling: Highly Toxic Chemicals, Reproductive Toxins  
(Mutagens & Teratogens) and Biologically-derived Toxins

*Presented by Scott Batcheller, Sigma Aldrich Chemistry R&D*

OUTLINE

Definitions:

<b>Mutagen</b>	a substance that is suspected to cause mutation in cellular DNA
<b>Carcinogen</b>	a substance that is suspected to cause cancer
<b>Teratogen</b>	a substance that is suspected to impact fetal development
<b>Reproductive Hazard</b>	a toxic substance that targets reproductive organs and cells
<b>Biotoxin</b>	a toxin with a biological origin; source can be microorganisms, insects, reptiles, fish, and amphibians
<b>Cytotoxic</b>	a substance that is lethal to cells or limits their ability to divide

MSDS Information

Sections to Review

- Hazard identification
- First-aid measures
- Personal protection
- Toxicological information
- Regulatory summary

Details to Look For

- Health hazard placard
- Acute toxic effect
- Chronic toxic effect
- Target organs
- Exposure level for effect
- Recommended precautions
- Applicable standards and regulations
- Antidotes or countermeasures

Toxicology measures

- LD50 (lethal dose, 50% of population);  
generally given with tissue exposed and species tested
- LDLo (some lethal cases reported)
- LC50 (lethal concentration in air, 50% of population); for inhalation hazards

## “Red Flags”

Evidence of lethality by means other than ingestion  
Substance listed or suspected as carcinogen, mutagen, teratogen, or  
“highly toxic”  
Very low LD50 or LDLo values (<1mg/kg)  
Recommended use of unusual handling equipment or PPE  
Specific and detailed regulatory limitations and requirements

## Biotoxins

### Resources

Local: [http://ehs.unl.edu/sop/s-bio-containment\\_levels.pdf](http://ehs.unl.edu/sop/s-bio-containment_levels.pdf)  
<http://ehs.unl.edu/sop/s-bio-aerosol.PDF>  
<http://ehs.unl.edu/sop/s-bio-disinfectants.pdf>

CDC: <http://www.cdc.gov/biosafety/publications/bmb15/index.htm>

### Select Agent List

The Select Agent List is a schedule of federally regulated **biotoxins**. All items on the Select Agent List must be registered with government and the UNL Biosafety Office if over the threshold amount.

The Select Agent List may be found at this link:

<http://www.selectagent.gov/Permissible%20Toxin%20Amounts.html>

## Glove Information

For breakthrough rates for different styles of gloves:

Showa/Best Glove: <http://www.showabestglove.com/site/chemrest/>

North (Honeywell): <https://www.northsafety.com/>

Mapa Gloves: <http://www.mapaglove.com/ChemicalSearch.cfm?id=1>

## Waste Disposal Information

Ethidium Bromide Disposal SOP

[http://ehs.unl.edu/sop/s-ethidium\\_bromide\\_disposal.pdf](http://ehs.unl.edu/sop/s-ethidium_bromide_disposal.pdf)

Disposal of Chloroform Contaminated Materials SOP

[http://ehs.unl.edu/sop/s-disposal\\_chloroform\\_materials.pdf](http://ehs.unl.edu/sop/s-disposal_chloroform_materials.pdf)