

Standard Operating Procedure for Chemical Carcinogens & Mutagens Handling

Dr. Ragauskas Group Safety Meeting

Definition of Carcinogens & Mutagens

- **Carcinogens:** Any substance that is capable of causing cancer.
- **Mutagens:** Any substance that cause damage to chromosomes and have adverse effects on fertility and general reproductive performance in human and animals.
- **Carcinogens/Mutagens** are chronic toxins. They cause damage after repeated or long-duration exposure. They may have not immediate apparent harmful effects, but damages develop only after a long period.

What is a chemical carcinogen/Mutagen?

- Any discrete chemical compound which has been shown to cause cancer or damage general reproductive performance in human or animal studies.
- Hundreds of individual compounds have been proved to be carcinogens/mutagens. Many thousands of additional compounds are "suspect" carcinogens/mutagens.
- Many are commonly used in laboratory operations.

Some classes of chemicals tending to be carcinogens/mutagens

- **Epoxides:** Ethylene oxide, Propylene oxide
- **Organohalogenes:** Carbon tetrachloride, Chloroform, Hexachlorobenzene
- **Hydrazines:** Hydrazine (and salts), 1,2-Dimethyl-hydrazine
- **Aromatic Amines:** Benzidine, Aniline, o-Toluidine
- **Aromatic hydrocarbons:** Benzene, Chlorobenzene

Some Miscellaneous Organic or Inorganic Carcinogens/Mutagens

- **Misc. organic compounds:**
 - Formaldehyde
 - Acetaldehyde
 - 1,4-Dioxane
 - Ethyl carbamate
 - 2-Nitropropane
 - Styrene
 - Thiourea
 - Thioacetamide
- **Misc. inorganic comp.:**
 - Arsenic and its comp.
 - Chromium and its comp.
 - Thorium dioxide
 - Beryllium and its comp.
 - Cadmium and its comp.
 - Lead and its comp.
 - Nickel and its comp.
 - Selenium sulfide

How do chemical carcinogens/mutagens enter the body?

- **Skin absorption:** Many chemical carcinogens/mutagens go directly through the skin.
- **Ingestion:** Swallowing a chemicals.
- **Inhalation:** Breathing chemical gases, fumes and vapors is the most common form of exposure.

Personal protective equipment

- **Respiratory protection:** dust masks, respirators (training required). Respirators are primarily for use in non-lab areas, except for emergency response (spill cleanup).
- **Eye protection:** safety glasses, splash goggles, face shields.
- **Hand protection:** nitrile gloves or chemical resistant gloves.
- **Protective clothing:** lab coats, aprons.
- **Special equipment:** carcinogen/mutagen glove box.

Personal hygiene

- Wash hands and any exposed skin if potentially contaminated--face, neck, forearms, etc.
- No shorts or open toed shoes.
- Remove lab coat or other potentially contaminated protective clothing before leaving the work area. Lab coats need to be cleaned regularly. Contaminated disposable clothing should be treated as hazardous waste.

Additional Work Practices

- **Training:** Be apprised of the hazards of carcinogens/mutagens to work with or in your work areas (**MSDS**).
- **Fume hoods operation:** No bench-top work in a laboratory setting.
- **Labeling containers:** All containers of chemical carcinogens/mutagens need to have a warning label affixed to them.
- **Housekeeping and maintenance**

How do we dispose of waste Chemical carcinogens/mutagens?

- Chemical carcinogens/mutagens may never be discharged to the sanitary sewer.
- Chemical carcinogens/mutagens may never be disposed of in the ordinary trash.
- Waste bottles containing chemical carcinogens/mutagens must be properly labeled, tightly capped at all times (except when adding or removing waste) and they must have secondary containment. Check "Poison" on the waste label.
- Dry wastes must be shipped out as regulated medical waste .

Decontamination and emergency procedures

- Safety shower and eyewash station nearby.
- Spill mixtures and cleanup materials for spills on hand.
- Specific first aid treatment required by the type of carcinogens/mutagens handled in the laboratory.
- The method used to alert personnel in nearby areas of potential hazards.
- All used spill cleanup materials must be treated as hazardous waste.
- **Major spills:** alert others, leave/close the area immediately, and contact: D. Wolfe-Lopez (5-2924), Dr. Ragauskas (4-9701), Jerry Nunn (4-5332), GT Police (4-2500).