

CHEMICAL SAFETY GUIDE

USE OF HAZARDOUS CHEMICALS IN ULAR



Document # CHE079-Use of Hazardous Chemicals in ULAR	Distribution: External
Section: Chemical Safety-Animal Research Involving Hazardous Chemicals	Effective Date: 3/2025
Total Pages: 11	Revision Date:

This document applies to the use of hazardous chemicals used in animal research in ULAR facilities. The TU Chemical Hygiene Plan provides guidance on the management of hazardous chemicals in research laboratories.

1. DESCRIPTION:

This document describes the minimum requirements and controls for the safe use of hazardous chemicals in animals research in ULAR facilities. The guide aims to ensure that the potential of exposure is reduced as much as possible and that these chemicals pose minimal risk to research staff, ULAR personnel, and other personnel working in the animal facility.

Contact EHRS via ehrschem@temple.edu for questions on the safe use of hazardous chemicals in ULAR.

2. DEFINITION OF A HAZARDOUS CHEMICAL

The Occupational Safety and Health Administration (OSHA) defines a hazardous chemical as any chemical which is a physical hazard or a health hazard.

- **Physical Hazard:** means a chemical for which there is scientifically valid evidence that it is a combustible liquid, compressed gas, explosive, flammable, organic peroxide, oxidizer, pyrophoric, unstable (reactive) or water reactive.
- **Health Hazard:** means a chemical for which there is statistically significant evidence based on at least one study conducted in accordance with established scientific principles that acute or chronic health effects may occur in exposed employees. The term "health hazard" includes chemicals which are carcinogens, toxins or highly toxic agents, reproductive toxins, irritants, corrosives, sensitizers, hepatotoxins, nephrotoxins, neurotoxins, agents which act on the hematopoietic system, and agents which damage the lungs, skin, eyes, or mucous membranes.

NOTE: Chemicals and drugs defined as hazardous by other recognized agencies (e.g. NIOSH, IARC, etc.) are included in this definition.

The table below gives examples of chemicals that are applicable to this guide. The table is not an exhaustive list of chemicals and is only meant to serve as a guide.

CHEMICAL SAFETY GUIDE

USE OF HAZARDOUS CHEMICALS IN ULAR



Examples of Applicable Chemicals	
Class	Examples
Acetyl cholinesterase inhibitors	Parathion, Physostigmine, Diisopropylfluorophosphate
Carcinogens	Benzidine, Ethyleneimine, Cyclophosphamide, Tamoxifen, Doxorubicin HCl, ENU, MNU, Streptozotocin, Nickel compounds, Dimethyl sulfate, Etoposide (VP-16), Urethane, Azoxymethane
Chemotherapeutics	Busulfan, Cisplatin, Paclitaxel, Erlotinib, Fludara, Sutent, Pentostatin
Highly regulated chemicals	Heptachlor, Physostigmine, DDT, ENU, MNU, Streptozotocin, Cadmium, Chromium, Lead, Mercury, Aldrin, Dieldrin, Heptachlor, PCBs
Irritants	5-FU, Phosgene
Irreversible illness	Thalidomide
Mutagens	BrdU, Ethidium Bromide
Nanoparticles	Carbon nanotubes, Polystyrene, Titanium Dioxide
Sensitizers	Malathion, Isocyanates, Nickel Salts
Acute or Target Organ Toxins	MPTP, Tetrodotoxin, Picrotoxin
Teratogens	Busulfan, 5-FU, Rotenone, RY 486, Bleomycin Sulfate, Erlotinib, Fludara
Toxic and Toxins	Rotenone, Chlorpyrifos, DMBA, Aldrin, Chlorpyrifos, Dieldrin, Dimethyl sulfate, Parathion, Phosgene, Potassium Cyanide, PCBs, Nickel Sulfide

3. EXEMPTED CHEMICALS:

The table below gives examples of chemicals that are not applicable to this guide. The table is not an exhaustive list of chemicals and is only meant to serve as a guide.

Examples of Exempted Chemicals	
Class	Examples
Standard of Care Medications	Acetaminophen, Amiodarone, Aspirin, Heparin, Meloxicam, Prozac, Saline, Sodium Bicarbonate
Analgesics & Anesthetics	Buprenorphine, Isoflurane, Ketamine, Telazol and Tricaine
Perfusion & Tissue Fixatives	Acrolin, Formalin, Formaldehyde, Glutaraldehyde, Paraformaldehyde

CHEMICAL SAFETY GUIDE

USE OF HAZARDOUS CHEMICALS IN ULAR



4. POTENTIAL HAZARDS:

Hazards associated with chemicals may pose a risk to all personnel involved. This includes research staff, animal handlers, ULAR personnel, and EHRS. The environment can also be impacted by hazardous chemicals; therefore, we must adhere to state and federal waste regulations.

Animals that have been administered a hazardous chemical may excrete some of that substance into bedding or microenvironment, usually during the first 72 hours after dosing. Excretion times may be extended past 72 hours for some hazardous chemicals. Personnel can be exposed to these chemicals through inhalation, ingestion, absorption or injection. Adverse health effects from hazardous drug or chemical exposure can include harm to internal organs, damage to the reproductive system, genetic damage, birth defects, and cancer.

Risk of exposure to hazardous chemicals can vary based on route of administration, dose administration, frequency, and number of animals being administered at a time.

Check the Safety Data Sheet (SDS) to determine the specific hazards of hazardous chemicals including route of exposure and other hazard classifications, such as flammable, corrosive, etc. Follow other hazard specific guidelines as appropriate.

5. REQUIRED TRAININGS & INFORMATION:

All personnel (PI, research staff, ULAR staff) must complete the following prior to beginning work with hazardous chemicals and/or animals that have been exposed to hazardous chemicals.

- Complete EHRS and ULAR Required Trainings (EHRS trainings are available via the [EHRS Management System](#))
- Review, understand and follow the procedures and information outlined in:
 - Any relevant Safety Data Sheet (SDS) available from the manufacturer or from the [TU-EHSA-Search for Safety Data Sheets](#)
 - CHE081-Chemical Safety Guide-Use of Hazardous Chemicals in ULAR- (This document)
 - ULAR Door Signage-Caution Chemical Hazard
 - Any required specific information determined by the Principal Investigator (PI).
 - Any relevant EHRS and/or ULAR procedures and recommendations.

6. IACUC-ACUP PROTOCOL REVIEW

CHEMICAL SAFETY GUIDE

USE OF HAZARDOUS CHEMICALS IN ULAR



All hazardous chemicals as defined in this document must be described in the Institute Animal Care & Use Committee (IACUC) Animal Care & Use Protocol (ACUP) submissions.

EHRS conducts a comprehensive review and risk assessment on all submitted ACUP protocol(s) for all hazardous chemicals administered to animals. EHRS will identify any chemical that requires further review to determine if additional measures are required other than those listed in this guide. A comprehensive review by the Principal Investigator (PI) in consultation with EHRS and ULAR Veterinarians may be conducted in these instances to identify additional requirements and/or controls.

7. GENERAL PRECAUTIONS

The following general precautions are required for use of hazardous chemicals administered to animals in ULAR facilities. Additional precautions and requirements identified by the PI, EHRS and/or ULAR may be more than what is required in this guideline.

- The Principal Investigator (PI) should communicate with the ULAR leadership prior to the treatment and or research of any animals with a hazardous chemical. It is the responsibility of the PI and ULAR leadership to determine animal care and husbandry responsibilities between research and ULAR personnel.
- A chemical fume hood must be used to prepare, reconstitute, or dilute hazardous chemicals being administered to animals. The preparation must take place in the chemical fume hood in the PI's research lab and concentrated or stock materials must not be brought down to the ULAT facility.
- All hazardous chemicals and accompanying Safety Data Sheets (SDS) for all hazardous chemicals must be inventoried and available in TU-EHSA. SDS must be accessible and all research and ULAR personnel should have a basic understanding of SDS and be familiar with how to access SDS.
- Individuals who are pregnant, breast-feeding or trying to conceive should refer to Temple University Employee Health Services prior to working with chemical hazards.
- Personal protective equipment (PPE) must be worn at all times when handling chemical hazards, in addition to any PPE requirements of the animal room. Wash hands after removing PPE.
- Needles and sharps used with chemical hazards must be disposed of immediately in a sharp's container. Do not bend or recap needles. Safety needles should be used whenever

CHEMICAL SAFETY GUIDE

USE OF HAZARDOUS CHEMICALS IN ULAR



possible.

- Thoroughly wash hands after handling or administering chemical hazards.
- When possible, look for alternative procedures or reagents that will eliminate the need for the hazardous chemical or substitute it for a less hazardous chemical.

8. PERSONAL PROTECTIVE EQUIPMENT (PPE)

The following minimum PPE must be worn when handling hazardous chemicals:

- Normal for Animal Biosafety Level (ABSL) plus:
 - Nitrile gloves (0.11 mm) or appropriate chemical resistant glove per the SDS
 - ANSI Safety Glasses
 - ANSI Safety goggles and Face Shield if there is a splash risk
 - Any additional chemical specific PPE required after EHRS risk assessment and/or required by the PI.

9. PREPERATION OF CHEMICAL SOLUTIONS

Solutions containing hazardous chemicals must be prepared in the research laboratory. Any handling of hazardous chemicals, including weighing, solution preparation, and drawing doses must be done in a chemical fume hood located inside the research laboratory and not in any ULAR facility.

Only pre-filled syringes are permitted in ULAR.

10. CHEMICAL HAZARD DOOR SIGNAGE

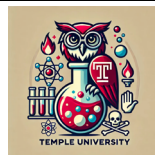
Animals administered hazardous chemicals must be housed in an animal room designated by ULAR for use of hazardous chemicals with the appropriate door signage. These chemical door signs are designed to provide:

- Hazard communication information.
- Appropriate PPE for entry and routine ULAR activities conducted in the animal room.
- Additional information and requirements for room entry.

EHRS has developed a [library](#) of “Caution-Chemical Hazard” doors signs for the most

CHEMICAL SAFETY GUIDE

USE OF HAZARDOUS CHEMICALS IN ULAR



common hazardous chemicals to assist the PI in meeting this requirement. The PI, in consultation with ULAR will complete the following sections of the door sign prior to placement.

- Responsibility for Cage Changing/Animal Husbandry
- Additional Entry Requirements
- Emergency Contact Information

In addition, EHRS has developed a template (CHE094-Caution-Chemical Hazard Door Sign) to assist PIs in developing door signs not currently in the EHRS library. The PI will need to ensure all the required sections are completed (including chemical name) prior to placement.

Exempted Chemicals do not require a door sign.

11. STORAGE & TRANSPORTATION

- All containers of hazardous chemicals must be clearly labeled with the correct chemical name (& concentration if diluted) and hazard warning. Handwritten labels are acceptable; chemical formulas and structural formulas are not acceptable.
- All containers must be labeled with the PI's name and contact information.
- Storage and transport containers should be unbreakable, rigid, shock-resistant, leak-proof and made of a non-reactive material which can be easily cleaned and decontaminated in the event of a leak.
- Transport hazardous chemical containers in a closed, leak-proof plastic bag, e.g., zip-lock bag.

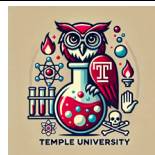
Storage of hazardous chemicals is not allowed in any ULAR facility area unless pre-approved by the ULAR administration and has provided a copy of the SDS for the material. All hazardous chemicals including unused solutions, mixtures and reaction residues must be returned to the research laboratory.

12. ADMINISTRATION OF HAZARDOUS CHEMICALS TO ANIMALS

- PPE must be always worn administering hazardous chemicals to animals. Wash hands after removing PPE.
- All hazardous chemical administration must be conducted in a certified chemical fume hood, a Class II Type B1, Class II B2 BSC or other appropriate ventilated enclosure until

CHEMICAL SAFETY GUIDE

USE OF HAZARDOUS CHEMICALS IN ULAR



animals are no longer considered hazardous. Pre-filled syringes must be used when using a Type II B1 BSC or a ventilated enclosure.

- If administering the hazardous chemical by:
 - **Injection:** Use a safety syringe to minimize risk of needlesticks. EHRS recommends the use of syringes and needles with a Luer lock to minimize risk of spray.
 - **Tablet:** Tablets should be dose-appropriate portions prepared in the research laboratory. Avoid liberating dust-if breaking up tablets, do so in a chemical fume hood or biological safety cabinet.
 - **Topical Application:** Apply with an applicator (e.g. gauze pad, cotton swab, etc.). Do not apply directly with a gloved hand.
 - **Water/Feed:** minimize aerosolization (e.g., do not shake food into dispenser).
 - **Aerosolization:** Use a chemical fume hood or other EHRS approved ventilated enclosed device ducted to the outside
- Needles and sharps used with hazardous chemicals must be disposed of immediately in a sharp's container. Do not bend or recap needles. Thoroughly wash hands after handling or administering hazardous chemicals.
- Work/administration areas should be protected from spills by placing an absorbent pad with an impervious backing (absorbent material facing up).
- Areas where chemical hazards are administered must be cleaned and decontaminated immediately following each procedure. Use a detergent solution followed by a 70% alcohol solution, or a chemical known to inactivate the chemical hazard, e.g., bleach, acetic acid, as described in the SDS.

13. ANIMAL HANDLING & HUSBANDRY

- All animal handling and cage manipulations for hazardous chemicals must be conducted in a certified chemical fume hood, a Class II Type B1, Class II B2 BSC or other appropriate ventilated enclosure until animals are no longer considered hazardous.
- Consider using compressed cotton fiber bedding pads (e.g. Alpha-dri/iso-PADS) instead of standard bedding when chemical hazards or metabolites are mainly excreted in the urine. The pads are more absorbent than traditional bedding and will minimize the creation of aerosols.
- Work areas should be protected from spills by placing an absorbent pad with an impervious backing (absorbent material facing up).

CHEMICAL SAFETY GUIDE

USE OF HAZARDOUS CHEMICALS IN ULAR



- Clean and decontaminate cages, surfaces and instruments after handling using a ULAR approved agent or process described in the SDS.

14. WASTE DISPOSAL PROCEDURES

All waste generated in ULAR facilities must be managed and disposed of properly. Follow appropriate ABSL requirements unless directed otherwise by EHRS.

WASTE DISPOSAL SUMMARY	
REGULATED MEDICAL WASTE	
General Waste	Red-Normal for ABSL
Sharps	Red-Sharps Container
Bedding	Red-Normal for ABSL
Carcass	Red-Normal for ABSL
CHEMOTHERAPEUTIC WASTE	
General Waste	Yellow-Normal for ABSL
Sharps	Yellow-Sharps Container
Bedding	Yellow-Normal for ABSL
Carcass	Yellow-Normal for ABSL
HAZARDOUS WASTE:	
• EHRS will make a hazardous waste determination on all reported hazardous chemicals and provide specific guidance on materials that require special disposal as hazardous waste. • Waste materials are considered a hazardous waste for 72 hours (unless otherwise specified) after the last administration. • Notify EHRS if a chemical is administered in water. Do not dispose of in the sink unless approved by EHRS.	
General Waste	Black- Place in a double bagged, labeled container provided by EHRS.
Sharps	Black-Sharps Container provided by EHRS
Bedding	Black- Place in a double bagged, labeled container provided by EHRS.
Carcass	Red-Normal for ABSL-unless directed otherwise by EHRS
Request disposal through EHRS via Chemical Waste Collection Request Form .	

15. EMERGENCIES

In the event of an emergency – Call Temple University Public Safety (TUPS) at (215) 214-1234 & EHRS at (215) 707-2520.

CHEMICAL SAFETY GUIDE

USE OF HAZARDOUS CHEMICALS IN ULAR



- **Health-Threatening Emergencies**

- Contact TUPS at 1-12234 from a campus landline phone or 215-203-1234 from a cell phone.
- Go to the Temple University Hospital or nearest emergency room. Bring a copy of the SDS for the chemical.

Temple University Hospital Emergency Department
Broad & Ontario Streets
Philadelphia, PA 19140

- Notify your PI/ Supervisor and Temple University-Human Resources-Absence Management
- Notify EHRS at 215-707-2520 or eh@temple.edu as soon as possible, but within 8 hours of the incident.

- **Non-Health-Threatening Emergencies**

- Notify your PI/Supervisor and Temple University-Human Resources-Absence Management.
- If necessary, go to Temple University Employee Health Services. Bring a copy of the SDS for the chemical.

Temple University Employee Services on Main Campus
1700 N. Broad Street, 4th floor
Philadelphia, PA 19122
Tel:215-204-2679

- **Additional Instructions:**

- **Skin Contacts**

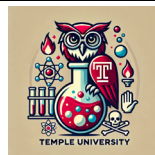
- Rinse body thoroughly using a safety shower for at least 15 minutes. If feasible, remove any contaminated or potentially contaminated clothing and/or jewelry.

- **Eye Contact**

- Rinse eyes thoroughly using an eyewash station for at least 15 minutes, occasionally lifting up the upper and lower eyelids to allow rinsing of the area beneath the eyelids. Remove contact lenses if possible.

CHEMICAL SAFETY GUIDE

USE OF HAZARDOUS CHEMICALS IN ULAR



- **Ingestion of chemical**
 - Do not induce vomiting unless directed otherwise by the SDS or Poison Control (800-222-1222), Rinse mouth with water.
- **Inhalation of chemical**
 - Move into fresh air.
- **Needle stick/puncture exposure.**
 - Wash the affected area with soap and water for 15 minutes. Contact Poison Control 800-222-1222
- **Fires:**
 - If a small fire occurs, you are trained in the use of fire extinguishers, and you feel safe doing so, use a fire extinguisher to put out the fire. If a single extinguisher cannot put out the fire, activate a fire alarm and evacuate the area. Wait for emergency responders to arrive so that you can provide information about the fire.
- Refer to ULAR Emergency Response Procedures for additional information.

16. SPILL RESPONSE

General Information

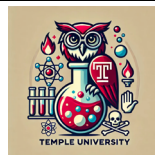
- Notify your PI/Supervisor, ULAR personnel and all individuals in the general vicinity that a spill has occurred.
- Isolate the area and keep other personnel from entering.
- Avoid breathing vapors, dusts, or aerosols from the spill.
- If safe to do so, help contaminated or injured persons evacuate.
- If possible, confine the spill to a small area using a spill kit or absorbent material.
- Keep others from entering the contaminated area (e.g., use caution tape, barriers, etc.)

Minor Spill

If the amount and type of chemical spilled presents no potential for a hazardous chemical exposure, wear appropriate PPE, and clean up the spill. Use absorbent paper/pads to clean up

CHEMICAL SAFETY GUIDE

USE OF HAZARDOUS CHEMICALS IN ULAR



all liquid spilled materials. Double bag any contaminated cleaning materials and manage as a regulated chemical waste.

Major Spill

Defined as any hazardous chemical spill that:

- would result in chemical exposure during cleanup,
- due to its size and/or hazards, requires capabilities beyond your training, or
- results in a release into the environment (e.g., a spill goes down a drain).

Call TUPS at 215-204-1234 from a cell phone or 1-1234 from a campus phone for assistance.

17. REFERENCES

- 29 CFR 1910.1200-Hazard Communication Standard-Occupational Safety and Health Administration (OSHA)
- 29 CFR 1910.1250-Occupational Exposure to hazardous chemicals in laboratories-Occupational Safety and Health Administration (OSHA)
- Prudent Practices in the Laboratory: Handling and Management of Chemical Hazards. National Research Council, Updated Version-2011