

HAZARDOUS CHEMICALS IN RODENTS STANDARD OPERATING PROCEDURE

1. GENERAL OVERVIEW

1. This standard operating procedure (SOP) is intended to provide general guidance on how to safely work with hazardous chemicals used in animals, specifically rodents such as mice and rats. For the purposes of this SOP, **hazardous chemicals are defined as a known/suspected carcinogen, known/suspected reproductive toxicant/mutagen, highly toxic compound, novel compound, environmental hazard, nanomaterial, or unknown hazards.**
 - a. **Note:** This SOP applies to hazardous chemicals in rodents. For hazardous chemical work with other species, please contact EH&S.
 - b. **Note:** This SOP does not apply to work involving MPTP (1-methyl-4-phenyl-1,2,3,6-tetrahydropyridine), and may not apply to work involving Complete Freund's Adjuvant (CFA), diphtheria toxin, and pertussis toxin. If you are working with any of these, you **must** contact EH&S for more specific guidance. All of the above require medical evaluation and screening at the Occupational Health Center for researchers.
 - c. If you have questions concerning the applicability of any item listed in this general guidance, contact the Principal Investigator/Laboratory Supervisor of your laboratory or contact Environmental Health and Safety (EH&S) at (650) 725-0448.
2. Check [PubChem](#) or the manufacturer's SDS for safety and hazard information of all compounds used in your animal procedures. If a compound falls under any of the above hazardous chemical categories, please follow the general guidance in this standard operating procedure. Refer to the [Animal Research Involving Hazardous Chemicals](#) document for additional guidance.
3. **Fill out the relevant safety and contact information for sections 7-9 at the end of this general guidance.**
 - a. Print a copy of the SDS. Have this readily available whenever working with the chemical to bring to the [Occupational Health Center \(OHC\)](#) or the Emergency Department in the event of an exposure.
4. **Provide at least two weeks' advance notice and a copy of this SOP and pertinent SDSs to the Veterinary Service Center (VSC) before the procedure work begins using this [link](#).**
5. **Storage:** Ensure secondary containment and segregation of incompatible chemicals per guidance within the Stanford University [Chemical Hygiene Plan](#). Follow any substance-specific storage guidance provided in SDS documentation.
6. **Engineering/Ventilation Controls:** Use a properly functioning chemical fume hood when preparing or handling hazardous chemicals. If you do not have a chemical fume hood available, please contact EH&S at (650) 725-0448.
 - a. **Note:** When a chemical fume hood is used appropriately, respiratory protection is not required.

2. PERSONAL PROTECTIVE EQUIPMENT (PPE)

- Appropriate street clothing (long pants or equivalent that covers legs and ankles, and closed-toed non-perforated shoes that completely cover the feet)
- Appropriate [chemical-resistant gloves](#)
- Safety glasses (if there is risk of splash, wear safety goggles and face shield)
- Lab coat or protective covering
- Respirators are not within the scope of this SOP. Contact EH&S prior to wearing a respirator for personal protection. Note: a surgical mask is source control for animal welfare, not PPE.

More information about personal protective equipment can be found [here](#).

3. CHEMICAL RECEIVING

Receiving hazardous chemicals in the lab:

1. Wear appropriate [chemical-resistant gloves](#), safety glasses (if there is risk of splash, wear safety goggles and face shield), and a lab coat. For DMSO solutions, wear Dermatril® P gloves (Aldrich Z677388) or equivalent.
2. Inspect the outer package and review shipping manifest to confirm that the correct type and amount of chemical is received.
3. Inspect the outer package to make sure it is intact. If the outer package is intact, place the package in the chemical fume hood before opening it. Verify that the airflow is functioning properly. In the hood, place a tray containing lab absorbent paper or paper towels to place the inner package on.
 - a. **Note:** If the outer package is NOT intact, place the package in the hood, and contact EH&S. Place a sign on the hood to alert others to not use that hood until further notice.
4. Open the outer packaging carefully and inspect the container. If the container is not damaged, dispose of excess packing materials and the outer shipping box as regular trash.
 - a. **Note:** If the inner container is NOT intact, leave the package in the chemical fume hood and contact EH&S. Place a sign on the hood to alert others to not use that equipment until further notice. If needed, refer to the Spills section under Emergency Procedures.

4. USE AND ADMINISTRATION OF HAZARDOUS CHEMICALS

Reconstituting or diluting original stock powder in the lab:

1. Place a tray with bench protector/paper towels on it in the chemical fume hood. Confirm the fume hood is working properly.
2. Set up necessary waste containers inside the hood to collect the waste as hazardous chemical waste. Waste containers must be labeled with a [hazardous waste tag](#) before waste enters the container.

3. If needed, take the hazardous chemical powder out of cold storage and equilibrate at room temperature before weighing.
4. Weigh the powder on a balance inside the chemical fume hood or use the tare method to weigh powder safely outside of a chemical fume hood.

The tare method:

- a. Use an empty Eppendorf tube, scintillation vial, or similar container with a lid.
 - b. Weigh the empty tube on the balance outside of the fume hood. Tare the balance to read 0 (Zero the balance).
 - c. In the fume hood, add an approximate amount of powder to the tube and close the lid.
 - d. Outside of the fume hood, weigh the tube with the powder inside to determine the total weight of the powder.
 - e. In the fume hood, open the tube to add or remove powder if necessary. Repeat until the correct weight is achieved.
5. If adding a solution (e.g., sterile water or DMSO) to the powder, add the solution inside of the chemical fume hood.
 6. If using a rocker to mix the solution and powder, place the rocker inside of the fume hood if feasible. Ensure all containers are tightly sealed to prevent leakage or release. Parafilm around the tube lid further ensures protection from liquid or aerosol leaks.
 7. Label tubes with the chemical name and primary hazard. Follow manufacturer's storage recommendations.
 8. See the "Waste Disposal" section for disposal procedures for the original container or any wastes generated.

Administration of hazardous chemicals in animals:

1. Contact the Veterinary Service Center at least two weeks in advance by submitting a Housing Request for Protocols that Have Hazardous Chemicals at the following link:
https://stanfordmedicine.qualtrics.com/jfe/form/SV_9vmYwCGbLUg4MTj.
2. For transportation to and from the lab, the hazardous chemicals should be put in a hard-sided, covered, leak proof secondary container labeled with the contents and lab contact information.
3. If injecting the hazardous chemical into animals, EH&S recommends use of syringes and needles with a Luer lock to minimize risk of spray. Use safety sharps to minimize risk of needlesticks.
4. When possible, perform injections inside of a chemical fume hood. If a chemical fume hood is unavailable, a biosafety cabinet may be appropriate if administering non-volatile chemicals. If neither are available, please contact EH&S to determine alternatives.
5. If administering hazardous chemical by:
 - a. **Injection:** Use a safety syringe and follow sharps handling procedures as described in the [Biosafety Manual](#). Injections may be done in a chemical fume hood or biosafety cabinet.
 - b. **Tablet:** Avoid liberating dust - if grinding or breaking up tablets, do so in a chemical fume hood.

- c. **Topical Application:** Avoid direct dermal contact with the animal's application site. Apply to the animal using gauze pads or a cotton swab instead of directly using a gloved hand.
 - d. **Water/Feed:** Minimize aerosolization (e.g., do not shake feed into dispenser)
 - e. **Aerosolization:** Use the chemical fume hood or other enclosed device ducted to the outdoors. If unable to use these equipment, contact EH&S.
6. All items (e.g., tips, pipettes, etc.) coming in contact with the hazardous chemical must be disposed of as chemotherapy waste (Yellow chemotherapy waste bin). Dispose of hazardous solvents, solutions, mixtures, and reaction residues as hazardous chemical waste. A waste tag can be printed and a waste pickup request submitted to EH&S at wastetag.stanford.edu.
7. Label the cages with **purple Lab Changes Cages card** and **yellow Hazardous Drug sticker**. On the purple Lab Changes Cages card, indicate the Barcode, Start Date of dosing, End Date of dosing, and an Emergency Phone Number. Under the Emergency Phone Number, write:
- Animals treated with _____.*
Excreta/Bedding/Water/Feed may be contaminated. In an emergency, don PPE as per the SOP to open cage. Otherwise, Lab staff will perform all cage change(s), up to the final one, 72 hrs. after last dose.
- a. If a hazardous chemical is administered via water/feed, also affix the yellow "hazardous drug" sticker to the water bottle/feeder.
8. The lab members must perform all cage changes until 72 hours after the last dose of chemical has been given. Please ensure that researchers who change cages wear the proper PPE and perform cage changes inside of a chemical fume hood or biosafety cabinet. 72 hours after the last dose, the lab must perform the final cage change to dispose of the contaminated bedding and cage before VSC staff can handle anything. After the 72-hour cage change, the purple Lab Changes Cages card and yellow sticker may be removed.
9. Following hazardous chemical dosing, the work area should be thoroughly cleaned with appropriate cleaning agents. Any visible contamination or spills should be cleaned. Any cleaning material (e.g., paper towels) contaminated with hazardous chemicals must be disposed of as solid hazardous waste.
10. Remove PPE and wash hands with soap and water.

5. WASTE DISPOSAL

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| Carcass disposal | Manage carcasses as pathological waste (i.e., tissues must be incinerated). |
| Items coming into contact with hazardous chemicals (e.g., tips, pipettes, etc.) | All items (e.g., tips, pipettes, napkins, etc.) coming in contact with the hazardous chemical will be disposed of as chemotherapy waste in a yellow chemotherapy waste bin. |
| Chemical Waste | Dispose of hazardous chemicals, hazardous solvents, solutions, mixtures, and reaction residues as hazardous chemical waste. A waste tag can be printed and a waste pickup request submitted to EH&S at wastetag.stanford.edu . |

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| <p>Sharps</p> | <p>Syringes and other sharps must be disposed of in an appropriate sharps container.</p> <p>Sharps used with chemotherapeutic agents or pharmaceutical drugs may go into a chemotherapy sharps bin or pharmaceutical sharps bin.</p> <p>Sharps used with biohazards must be disposed of in either a pharmaceutical sharps bin or a red biohazard sharps container.</p> <p>A waste tag can be printed and a waste pickup request submitted to EH&S at wastetag.stanford.edu.</p> |
| <p>Animal cage bedding</p> | <p>Dispose of animal cages and bedding as chemotherapy waste in the yellow chemotherapy bins.</p> |
| <p>Food/drinking water dosed with hazardous chemicals</p> | <p>If food or drinking water have been dosed with hazardous chemicals, dispose of the entire cage together in the yellow chemotherapy bins. If larger chemotherapy waste bins are needed for large amounts of cages, notify the VSC.</p> |

6. EMERGENCY PROCEDURES

A. Health-Threatening Emergencies

a. Fire, explosion, health-threatening hazardous material spill or release, compressed gas leak, valve failure, etc.

1. Call 911 (9-911 if on campus landline).
2. Alert people in the vicinity and activate the local alarm systems. Evacuate the area and go to your Emergency Assembly Point (EAP).
3. Remain nearby to advise emergency responders.
4. Once personal safety is established, notify your PI and EH&S. Call the EH&S incident hotline at (650) 725-9999 (and 286 if on a landline in the School of Medicine).
5. Submit an incident report form (eSU-17) [here](#).

b. Injuries or Exposures:

1. Flush contamination from eyes/skin using the nearest emergency eyewash/shower for a minimum of 15 minutes. Remove any contaminated clothing.
2. Call 911 (9-911 if on campus landline) if immediate medical attention is required.
3. Remove the injured/exposed individual from the area unless it is unsafe to do so because of the medical condition of the victim or the potential hazard to rescuers. Administer first aid as appropriate.
4. Bring copies of SDSs to the hospital for all chemicals the victim was exposed to.

5. Once safety is established, notify your PI and EH&S. Call the EH&S incident hotline at (650) 725-9999 (and 286 if on a landline in the School of Medicine) to report the exposure to EH&S.
6. Submit an incident report form (eSU-17) [here](#).

B. Non Health-Threatening Emergencies

a. Hazardous Material Spills - For hazardous material spills or releases which can not be cleaned up by local personnel, or hazardous material spills or releases which have impacted the environment (via the storm drain, soil, or air outside the building):

1. Notify your PI and EH&S. Call the EH&S incident hotline at (650) 725-9999 to report the spill and request cleanup assistance. The hotline and spill cleanup services are available 24 hours a day, 7 days a week.
2. Submit an incident report form (eSU-17) [here](#).

b. Injuries and Exposures

1. For injuries and exposures that are not considered urgent or a medical emergency, call the [Occupational Health Center \(OHC\)](#) at (650) 725-5308 between 8:00 am-4:00 pm M-F for immediate phone triage and to schedule an appointment. Walk-in appointments are also available.
2. For urgent medical conditions when the OHC is closed, go to the Stanford Emergency Department located at 1199 Welch Rd. Notify the OHC of the emergency department visit by calling them during business hours at (650) 725-5308.
3. Notify your PI and EH&S of the incident.
4. Submit an incident report form (eSU-17) [here](#).

c. Local Cleanup of Small Spills - In the event of a minor spill or release that can be safely cleaned up by local personnel using readily available equipment (e.g., spill kit from EH&S) and laboratory Personal Protective Equipment (PPE):

1. Notify personnel in the area and restrict access. Eliminate all sources of ignition.
2. If knowledgeable of the hazards and comfortable cleaning the spill, review the SDS for the spilled material to determine the appropriate level of protection.
3. Wearing the appropriate PPE, clean up the spill. Collect any materials used to clean up the spill as hazardous waste.
4. Submit an online waste pickup request to EH&S at wastetag.stanford.edu.
5. Notify your PI and EH&S.
6. All spills cleaned up locally must be reported if they occur outside of secondary containment. A spill that occurs within secondary containment must be reported if it is greater than 30 ml or if it takes longer than 15 minutes to clean up. To report a spill that you cleaned up, submit an incident report form (eSU-17) [here](#).

7. CONTACT INFORMATION AND SAFETY EQUIPMENT LOCATIONS

Please fill out the below information and submit the entire SOP to the VSC using this [link](#).

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| Procedure Title | | | |
| Procedure Author | | | |
| Creation/Revision Date | | | |
| Primary Investigator (PI) | | | |
| Responsible Person (RP) | | | |
| PI Approval Signature | | | |
| APLAC Protocol | | | |
| Animal Work Locations Building name and room number | Housing: | | |
| | Procedures: | | |
| Emergency Assembly Point (EAP) | | | |
| Safety Equipment Locations Building name and room number | | Preparation | Administration |
| | Chemical Fume Hood/Other Ventilation Control | | |
| | Eyewash/Safety Shower | | |
| | First Aid Kit | | |
| | Chemical Spill Kit | | |
| | Fire Extinguisher | | |
| | Telephone | | |
| | Fire Alarm Manual Pull Station | | |

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| Emergency Contacts - Name and phone number Please include at least one person who can be reached at all times, not just during working hours. | Principal Investigator | |
| | Responsible Person | |
| | Alternate Contact | |

8. CHEMICAL HAZARD SUMMARY & SAFETY LITERATURE REVIEW

List all chemicals, their hazards, and references below.

1. Hazardous Chemicals and Hazards

2. Brief Description of Procedure

3. References (e.g., SDS, PubChem, etc)

