STANFORD UNIVERSITY

ENVIRONMENTAL HEALTH & SAFETY

Animal Research Protocols Involving Hazardous Chemicals

I. OVERVIEW

Hazardous Chemicals: Known or suspect carcinogens, reproductive toxins or other highly toxic substances (e.g., anti-neoplastic agents), and nanomaterials may be used in laboratory animal research protocols. Reference the SU Chemical Hygiene Plan for hazardous chemical definitions.

Potential Exposures: Research staff may be exposed to these hazardous chemicals during preparation, handling, and animal dosing. These substances may be excreted and/or secreted from the animal and, therefore, be present in the animal's bedding in extremely low concentrations. Animal husbandry staff and veterinarians may be exposed to these hazardous chemicals or their toxic metabolites during cage handling or when handling medicated water or feed.

How to Use this Guide: This guidance provides information for Principal Investigators to consider when ***planning*** and ***conducting*** their animal protocol involving hazardous chemicals so that appropriate controls are established in order to minimize potential exposure of laboratory personnel, husbandry staff, and veterinarians.

II. PLANNING YOUR ANIMAL PROTOCOL

❶ Identify Hazards of Chemicals

SU Chemical Hygiene Plan
The use of hazardous chemicals in animal research protocols falls under the SU Chemical Hygiene Plan.

As with any laboratory operation, the Principal Investigator (PI) and researchers must identify and understand the hazards associated with the chemical (e.g., toxicity, reactivity, flammability, corrosivity, etc.) before they begin their work so that appropriate controls can be established.

Intrinsic Hazards of Chemical
Review Material Safety Data Sheets (MSDSs) and other sources of safety information to understand the hazards of the chemical and any other special considerations.

Suggested Sources of Safety Information on Hazardous Chemicals

- SU's MSDS database: http://msds.stanford.edu
- SU's Laboratory Chemical Safety Toolkit chemical hazard classes:
  - Carcinogens - http://chemtoolkit.stanford.edu/node/46
  - Highly acutely toxic chemicals - http://chemtoolkit.stanford.edu/node/51
  - Reproductive toxins - http://chemtoolkit.stanford.edu/node/54
- SU's reproductive & developmental health protection program: http://www.stanford.edu/dept/EHS/prod/mainrencon/occhealth/Reproductive/links.htm

- SU's nanomaterials safety page: http://www.stanford.edu/dept/EHS/prod/researchlab/IH/nano/
- California Proposition 65 list: http://oehha.ca.gov/prop65.html
- NIH TOXNET hazardous material search: http://toxnet.nlm.nih.gov/
- National Toxicology Program carcinogen search: http://ehp.niehs.nih.gov/roc/toc10.html
- Common drugs considered hazardous by OSHA: http://www.osha.gov/dts/osta/otm/otm_vi/otm_vi_2.html#app_vi:2_1

Animal Metabolism of the Chemical

It is important to understand how the chemical is metabolized in a specific animal species so that appropriate controls can be implemented for safe animal and cage management after dosing. A review of peer-reviewed literature may yield this information, but it is often not documented. In the absence of such data, follow controls provided in Section III below.

Medical Surveillance

Medical surveillance and/or use of an antidote may, on the rare occasion, be required if the hazardous chemical used in an animal protocol is known to pose a serious health risk, such as diphtheria toxin or 1-methyl-4-phenyl-1,2,3,6-tetrahydropyridine (MPTP). The PI must identify these chemicals during the safety literature review for the experiment and consult with EH&S's Occupational Health & Safety Program at 723-0448.

❷ Submit Protocol for APLAC Review

- Complete the Administrative Panel on Laboratory Animal Care (APLAC) eProtocol form.
    - Describe the proposed use of hazardous chemicals in question #8 of the "Are You Using?" section.
    - Indicate that controls provided in Section III below will be implemented or its equivalent as described in your lab's Standard Operating Procedure (SOP).

Failure to properly identify hazardous chemical use may result in inadequate provision of chemical safety measures and may delay APLAC approval.

❸ Coordinate with the Veterinary Service Center

- Contact the Veterinary Service Center (VSC) at 723-3876 at least two weeks before beginning the project to obtain:
    - Permission to use the facility
    - Room assignment
    - Provisions for appropriate cage labeling
- Provide a copy of the MSDS or other hazard information so the VSC can ensure VSC personnel have chemical-specific hazard training.

III. CONDUCTING YOUR ANIMAL PROTOCOL

❶ Hazardous Chemical Preparation and Handling

- Follow the Standard Operating Procedure (SOP) established by the Principal Investigator. Guidance on SOP prioritization and development is available at SU's Laboratory Chemical Safety Toolkit. At minimum, handle hazardous chemicals using:
  - Laboratory fume hood or other appropriate engineering control.
  - Appropriate personal protective equipment: safety eyewear, chemical-resistant gloves appropriate for the chemical, and lab coat over appropriate street clothing (long pants and closed-toe shoes)
- Ensure research personnel are trained on the SOPs and specific hazards associated with the chemicals. Maintain training documentation for at least one year.

❷ Animal Dosing and Care

- Wear appropriate personal protective equipment: disposable solid-front gown, head and shoe coverings, safety glasses/goggles, and chemical-resistant gloves.
- Appropriately restrain or sedate animals per your APLAC protocol to reduce the possibility of accidental self-inoculation. Contact the VSC if your procedure does not allow for restraints or sedation.
- If administering hazardous chemical by:
  - **Injection**: Use safety syringe and follow sharps handling procedures as described in the Biosafety Manual. If unable to use a safety syringe, you must document the reasons for this.
  - **Tablet**: Avoid liberating dust.
  - **Topical Application**: Avoid direct dermal contact with animal's application site.
  - **Water/Feed**: Minimize aerosolization (e.g., do not shake feed into dispenser).
- Place animals back into cage and label cage with "Pink Card" (see below).
- Decontaminate lab surfaces and equipment using wet wiping methods with appropriate cleaning agent.
- Wash hands after removing gloves.

❸ Cage Management

HOUSING

- If feasible, consider using disposable cages or alternative bedding (e.g., paper liner) to minimize potential aerosolization of the hazardous chemical during cage changing.
- Maintain cages on ventilated racks or with microisolator lids.

SIGNAGE

- Label cages with the "Pink Card" as follows:

- Indicate the following information: “Animals treated with [name of chemical]. Excreta/bedding may be contaminated.” Affix “Hazardous Drug” sticker to card.
- Indicate dosage and date/time animal was dosed.
- Also label water bottle/feeder if hazardous chemical is administered via water/feed.

- Maintain label on cage for 72 hours after last dosing AND until contaminated bedding is changed, unless longer time frames are required as identified in the risk assessment during the planning phase.

CAGE CLEANING/BEDDING MANAGEMENT

(For all cage cleanings/bedding disposals performed up to 72 hours after animal dosing AND until contaminated bedding is changed, unless risk assessment requires longer time frame)

- Wear appropriate personal protective equipment: long-sleeved lab coat, plastic apron, rubber boots or disposable plastic booties, chemical-resistant gloves, and safety glasses. Also use goggles/face shield where splash potential exists.
- Using a ducted ventilated dump station or laboratory fume hood, dump contaminated bedding into the bin specially marked “Chemotherapy Waste – For Incineration Only” to ensure proper disposal by the VSC. To obviate this disposal requirement, contact the EH&S Environmental Programs Manager at 723-0448 for an assessment.
  - Respirators may be required if any of the aforementioned engineering controls are not feasible. Contact EH&S at 723-0448 for guidance.
  - Do <u>not</u> use laminar flow hoods which are commonly found in VSC animal rooms. These units do not provide personnel protection.
- For large animal pens (e.g., pig/dog runs) follow VSC procedures: hose down waste into the sewer, do not direct jet stream at excreta, etc.
- Manage animal carcasses as pathological waste (i.e., tissues must be incinerated).
- Remove gloves and wash hands after working with animals, cages, and contaminated bedding.

CLEANUP OF WATER/FOOD SPILLS

(If hazardous chemical has been added to water/feed)

Assuming that the person is knowledgeable about the hazards of the chemical and has the appropriate spill cleanup materials, proceed as follows for <u>small spills</u>:

- Wear appropriate personal protective equipment: long-sleeved lab coat, plastic apron, rubber boots or disposable plastic booties, chemical-resistant gloves, and safety glasses. Also use goggles/face shield where splash potential exists.
- Transfer animals to clean cages via VSC procedures. Contact the VSC Assistant Operations Manager at 723-6102 for information and training.
- Using a ducted ventilated dump station or laboratory fume hood, dump contaminated material in the bin specially marked “Chemotherapy Waste – For Incineration Only” to ensure proper disposal by the VSC.

    - Respirators may be required if any of the aforementioned engineering controls are not feasible. Contact EH&S at 723-0448 for guidance.
    - Do <u>not</u> use laminar flow hoods which are commonly found in VSC animal rooms. These units do not provide personnel protection.
- If unable to or not prepared to clean up a spill, call EH&S at 725-9999 on campus and 286 in the School of Medicine.