BACKGROUND

Animal protocols involving hazardous chemicals must be planned and conducted appropriately in order to minimize the potential exposure to laboratory personnel, husbandry staff, and veterinarians. Hazardous chemicals include known or suspect carcinogens, reproductive toxins or other highly toxic substances (e.g., anti-neoplastic agents), and nanomaterials. Refer to the URI Chemical Hygiene Plan for hazardous chemical definitions.

As with any laboratory operation, the Principal Investigator (PI) and researchers must identify and understand the hazards associated with the chemical(s) being used (e.g., toxicity, reactivity, flammability, corrosivity, etc.) before they begin their work so that appropriate controls can be established. This information may be available from Safety Data Sheets (SDS) and other sources of safety information. It is important to understand all the hazards of the chemical and any other special considerations that may be required prior to beginning work (see References for suggested sources of information).

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

This policy describes required procedures that the PI and the animal care staff must follow for:

- Completing the IACUC Protocol
- Coordination with animal care staff and URI Environmental Health & Safety (EHS)
- Hazardous chemical preparation and handling and animal dosing
- Cage management

POLICY AND PROCEDURE

PLANNING YOUR ANIMAL PROTOCOL

When planning your animal protocol, you must

1. Identify the hazards of the chemicals.
2. Complete the appropriate sections of the IACUC protocol; and
3. Coordinate the use of the chemical with the animal care staff and EHS.
1. IACUC PROTOCOL SUBMISSION- HEALTH RISKS, METABOLISM, AND MEDICAL SURVEILLANCE

It is the responsibility of PI to understand the risks of working with chemicals. Information about the chemical(s) must be provided in Section 12[Hazardous Material] of the Institutional Animal Care and Use (IACUC) Protocol. Section 12 should include:

- Specific health risks to humans and animals from possible exposure.
- Proposed precautions to be taken to protect people and animals.
- Any information on recommended medical surveillance and/or use of antidotes.
- Information on how the chemical is metabolized in a specific animal species (if known).
  - Animals dosed with hazardous chemicals may excrete that chemical or metabolites, particularly during the first 48 hours after dosing. A review of peer-reviewed literature may yield this information, but it is often not documented. In the absence of such data, conservative controls will be required.

*Failure to properly identify or describe the chemicals to be used may result in inadequate provision of chemical safety measures and delay IACUC approval.*

2. COORDINATE WITH THE ANIMAL FACILITY

Following IACUC approval, it is the responsibility of the PI to contact the animal cares staff and Attending Veterinarian (AV) at least two weeks before beginning the dosing project to obtain:

- Permission to use the facility
- Room assignment
- Provisions for appropriate cage labeling and waste management

*NOTE:* The PI is also responsible for scheduling a meeting with EHS to review the Safety Data Sheet with all parties involved, just prior to the start of the experiment. Particular precautions will be identified; these might include management of contaminated food and/or bedding and hazardous waste disposal. Certain chemicals used in these protocols carry an additional regulatory burden and must be disposed properly, in compliance with federal and state regulations.

CONDUCTING YOUR ANIMAL PROTOCOL

1. HAZARDOUS CHEMICAL PREPARATION, HANDLING, AND DOSING

It is the responsibility of the PI to write Laboratory-Specific Standard Operating Procedures (SOPs) to cover the use of hazardous chemicals, reproductive toxins, and carcinogens, as well as processes or equipment that may be hazardous (URI Chemical Hygiene Plan 2.2). When introducing a hazardous chemical into animals, the written SOP should describe preparation,
handling, and dosing of the chemical. EHS can provide guidance on whether an SOP is needed and on SOP development.

At minimum, the SOP should describe:

- Use of a laboratory fume hood or other appropriate engineering controls.
- Appropriate personal protective equipment (PPE) (e.g. safety eyewear, chemical-resistant gloves appropriate for the chemical, lab coat, close-toed shoes).
- Methods to restrain or sedate animals per your IACUC protocol to reduce the possibility of accidental self-inoculation.
- Administration of chemical and methods to minimize risk of accidental exposures (e.g. use of safety syringe).
- Methods to be used to clean up spills and decontaminate lab surfaces and equipment using wet wiping methods and an appropriate cleaning agent such as Simple Green.
- Training of staff on SOP (ensure research personnel are trained on the SOPs and specific hazards associated with the chemicals. Maintain training documentation for at least one year).

The PI is responsible for providing a copy of the SOP and a current SDS to the animal care staff and AV.

2. CAGE MANAGEMENT

Cages
Animals dosed with hazardous chemicals will be housed in cages on ventilated racks or static cages with microisolator lids unless specifically approved by the AV and EHS. If feasible, disposable cages or alternative bedding (e.g., paper liners) will be used to minimize potential aerosolization of the hazardous chemicals during cage changing.

Based on risk assessment, controls will be established to minimize exposures during cage changes. It may be required that cages will be opened (including cage-change) in a biological safety cabinet. If not available, employees must wear N-95 respirators when working with open cages. Fit–testing and training are required prior to wearing an N-95 respirator; medical clearance may also be required depending on individual responses to the Animal Users Health and Safety questionnaire. Contact URI EHS for more information.

Cage Signage
PIs are responsible for ensuring that cages housing dosed animals are labeled with Health Alert cards with a Hazardous Chemical sticker on the card. The cards must contain the chemical name, dosage, and date/time animal was dosed.

If hazardous chemicals are administered by water/feed, also label the water bottle/feeder. 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.

**Door Signage**
Animal Care Staff are responsible for posting Animal SOP signs on rooms housing dosed animals. The door sign required to be posted must include the following:

- Name of hazardous chemical
- PI Name and IACUC approval number
- Investigator responsibilities
- Entry requirements
- Cage changing procedures
- Decontamination and spill procedures

**Cage Cleaning/ Bedding Management**
Animal Care Staff are responsible for all cage changing.

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, the following procedure will be followed:

- Wear required personal protective equipment (PPE): long-sleeved lab coat or disposable gown, disposable hair bonnet, disposable booties, chemical resistant gloves, and safety glasses. Use goggles/face shield where splash potential exists. Remove gloves and wash hands after working with animals, cages, and contaminated bedding.
- Dump contaminated cage waste into a red bag within a biological safety cabinet. Dispose red bags into biohazard waste boxes and marked “Chemotherapy Waste – For Incineration Only” to ensure proper disposal. N-95 respirators may be required if any of the aforementioned engineering controls are not feasible. Contact EHS for guidance.

**Cleanup of Water/Food Spills**
For small spills, a person knowledgeable about the hazards of the chemical and who has the appropriate spill cleanup materials can clean up spills. Proceed as follows for small spills:

- Wear appropriate personal protective equipment (PPE): long-sleeved lab coat, plastic apron, rubber boots or disposable plastic booties, chemical-resistant gloves, and safety glasses. Use goggles/face shield where splash potential exists.
- Transfer animals to clean cages following animal facility procedures.
• At a ducted ventilated dump station or laboratory fume hood, dump contaminated material into a red biohazard waste bag. Dispose the bag to a biohazard waste box. Check the box “Chemotherapy Waste – For Incineration Only” to ensure proper disposal.
  o Respirators may be required if any of the aforementioned engineering controls are not feasible. Contact EH&S for guidance.
• If unable to or not prepared to clean up a spill, call (401) 874-2121 during an emergency situation or EHS for general guidance at (401)874-7993.

Waste Disposal Procedures
• Dispose contaminated cage waste into a red bio- bag inside a biosafety cabinet. Dispose full bags into biohazard waste disposal boxes. Mark the boxes “Chemotherapy Waste – For Incineration Only” to ensure proper disposal.
• The Environmental Protection Agency (EPA) regulates the disposal of hazardous chemicals. Hazardous waste may include, but is not limited to, unwanted or outdated chemicals/drugs, spent chemical solutions, chemically contaminated debris or media. Follow the University of Rhode Island’s established chemical waste disposal procedures. Consult with EHS to ensure proper disposal. (See URI EHS Policy: Safe handling and Disposal of Antineoplastic and Other Drugs).
  o Label the waste container with chemical name(s) using a URI hazardous waste label and store in the satellite accumulation area (SAA).
  o Submit a hazardous waste pick-up request form by fax (401- 874-9069) or by email (srm@etal.uri.edu) when waste container is nearly full or no longer being used.

REFERENCES
• URI’s MSDS database: http://web.uri.edu/ehs/chemical/
• URI’s Laboratory Safety Classes:
  o Laboratory Safety and Hazardous Waste Management: http://web.uri.edu/ehs/training_schedule/
• Refresher: Prudent Practices in the Laboratory and Hazardous Waste: http://web.uri.edu/ehs/training_schedule/
• Management Select chemical safety resources: http://web.uri.edu/ehs/chemical/
• 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
## APPENDIX – SUMMARY OF HAZARDOUS CHEMICAL EXPOSURE CONTROLS

<table>
<thead>
<tr>
<th>Hazardous Chemical Prep and Handling</th>
<th>Animal Dosing</th>
<th>Cage Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Safety goggles/glasses</td>
<td>• Disposable long sleeved lab coat or gown</td>
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</tr>
<tr>
<td>• Chemical-resistant gloves</td>
<td>• Head and shoe coverings</td>
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</tr>
<tr>
<td>• Long sleeved lab coat</td>
<td>• Safety goggles/glasses</td>
<td>• Chemical-resistant gloves</td>
</tr>
<tr>
<td>• Appropriate street clothing</td>
<td>• Chemical-resistant gloves (double gloving)</td>
<td>• Safety glasses/goggles (also use face shield when splash potential exists; e.g. hosing down large animal cages, pens and runs)</td>
</tr>
<tr>
<td>(long pants and closed-toe shoes)</td>
<td>• Appropriate street clothing/scrubs</td>
<td><strong>NOTE:</strong> If engineering controls described below are not feasible, contact EH&amp;$S$ for respirator assessment.</td>
</tr>
</tbody>
</table>

### Work Practices/Engineering Controls
- Prepare and handle hazardous chemical in a laboratory fume hood, including weighing, mixing, filtering and heating.
  - **NOTE:** Do not use positive laminar flow hoods - air flows towards worker.
- Ensure fume hood and eyewash/safety shower are currently certified and maintained.
- Ensure personnel is trained on the SOP and the specific chemical hazards.
- Ensure proper disposal of sharps, PPE and chemical waste.
- Wash hand after removing gloves.
- For injections: Ensure animals are appropriately restrained per your research protocol to reduce possibility of accidental self-inoculation and use safety syringe. Follow sharps handling procedures per Biosafety Manual.
- Use fume hood when administering hazardous chemicals by aerosolization. If tablets are administered, avoid liberating dust. Consult EH&S for respirator assessment if fume hood is not used.
- For topical application, avoid dermal contact with animal’s application site.
- Ensure proper disposal of sharps, PPE and chemical waste.
- Wash hands after removing chemical resistant gloves.
- Maintain cages on ventilated racks or with microisolator lids.
- Follow IACUC guidelines on transporting animals. Consider using disposable cages or using alternative bedding (e.g., paper liner) to minimize aerosolization of bedding containing hazardous chemicals.
- Cage cleaning: Dump cages with hazardous chemicals contained in the bedding, food and/or water at biosafety cabinet into collection bin labeled “Chemotherapy waste – For incineration only”
- Wash hands after removing chemical-resistant gloves.
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</table>
| **Labeling/Signage** | • Ensure proper storage and labeling of hazardous chemical.  
• Consult chemical manufacturer’s instructions and/or URI’s Chemical Safety Database. | • Animal Care Staff will post signage on door with the following information: Name of hazardous chemical  
  o PI Name and IACUC Approval Number  
  o Investigator Responsibilities  
  o Entry Requirements  
  o Cage Changing Procedures  
  o Decontamination and Spill Procedures | If hazardous chemical will be present in cage:  
• Label the cage with “Health Alert Card” and Hazardous Drug sticker with the following information:  
  o Chemical name, dosage, and date/time animal was dosed  
• Maintain Health Alert Card for 72- hours after last dosing and until contaminated bedding/water/feed is changed.  
• Animal Care Staff will post signage on door with the following information: Name of hazardous chemical  
  o PI Name and IACUC Approval Number  
  o Investigator Responsibilities  
  o Entry Requirements  
  o Cage Changing Procedures  
  o Decontamination and Spill Procedures |
| **Disinfection** | • Decontaminated lab surfaces and equipment with appropriate cleaning agents. | |