



POLICY

The use of animals in research can present unique hazards in and of itself. Personnel who work with animals must be trained and proficient at proper handling and restraint methods in order to avoid injury to the animals or themselves. Engineering Controls such as air handling, caging, biosafety cabinets and personal protective equipment (PPE) can be used to protect the health and safety of research animals and personnel who work with them. Animal species, study parameters and zoonoses must be considered in order to complete a risk assessment, for both the safety of animals and personnel. As a general rule, all research studies should be conducted using the following standard safety practices:

- 1) Animal contact is limited to personnel who have completed all required training as assigned by the UNO IACUC and the UNO Animal Care and Use Program. This includes a risk evaluation and clearance to work with research animals by the Nebraska Medicine-UNO Health Center. Please follow the Policy for Occupational Health and Safety for Personnel with Animal Contact.
- 2) Protective laboratory coats, gowns or uniforms, and shoe covers must be worn when entering areas where research animals are present, in order to prevent the contamination of personal clothing. Open- toe shoes are not permitted in any laboratory areas. Lab coats/ gowns and shoe covers that are designated for animal facility use must be removed at the facility exits. Reusable PPE should be decontaminated/ laundered on site or by contracted professional services.
- 3) Gloves must be worn when handling animals, their caging, and all equipment used for animal research. Gloves must be removed when exiting animal containment areas.
- 4) All Personal Protective Equipment (PPE) must be removed in a manner that minimizes the transfer of animal bi-products such as dander, urine, feces, blood, etc.
- 5) All personnel must wash their hands after removing gloves/ before leaving an area where animals are used or maintained.
- 6) Eye, face and respiratory protection must be used as dictated by a risk assessment. Procedures should be performed carefully to avoid splashing or creating aerosols.
- 7) The following actions are prohibited in animal areas and labs: eating, drinking, applying cosmetics, smoking, handling contact lenses, taking or applying medicines.
- 8) Whenever possible, animals should be handled within biosafety cabinets to protect both human and animal health.
- 9) Keep doors to animal rooms and labs closed to maintain proper HVAC controls and to prevent security breaches.
- 10) All work surfaces must be decontaminated before and after procedures are performed.
- 11) For information on transporting animals outside of their primary holding rooms, please see The Policy for Transportation of Animals.
- 12) Use leak-proof, secondary containers to temporarily store or transfer cultures,

tissues or specimens.

- 13) The use of needles and sharps in the animal facility is limited to situations where there is no alternative to their use. Sharps with safety mechanisms should be used, when possible. Reusable sharps should be decontaminated and stored in a solid-walled container that is labeled, "Caution: Sharps".
- 14) Do not recap needles. All sharps, including pipette tips, needles, lancets, etc., must be disposed of carefully in an approved, solid-walled sharps container. Never leave sharps unattended or dispose of them in a regular waste receptacle.
- 15) Any animals and/ or housing equipment that are removed from the designated animal facilities must be returned for appropriate decontamination/ disposal.
- 16) Materials to be decontaminated outside of the immediate animal room are placed in a durable, leak-proof container and secured for transport. For infectious materials, the outer surface of the container is disinfected prior to moving materials and the transport container has a universal biohazard label.
- 17) See the Policy for Animal Transportation for specific requirements when transferring animals out of the animal facilities.

Many animal research studies require the use of drugs, chemicals, radioisotopes, biological agents, toxins and/ or other substances that pose potential threats to animal and/ or human health. All substances that will be used in animals or animal facilities must be defined within the IACUC protocol. As each protocol is reviewed, hazards are identified and, when necessary, additional safety practices are put in place. Initial hazard review is typically conducted by UNO Safety Manager but may also involve veterinarians, other IACUC members, the Environmental Health and Safety Office, the IBC, IRB, and/or relevant consultants. If required, approval must be obtained from all relevant departments, committees, and animal care offices, prior to starting any hazardous work in animals. Changes in hazard use must be approved by the IACUC and relevant oversight bodies.

REGULATION

[Guide for the Care of and Use of Laboratory Animals](#), ILAR, NAS, Eighth Edition 2011, pgs 17-18, Occupational Health and Safety of Personnel/ Hazard Identification and Risk Assessment, pg 113, Surveillance, Diagnosis, Treatment, and Control of Disease

[Occupational Health and Safety in the Care of Research Animals](#), NRC, pgs 42-50

[Biosafety in Microbiological and Biomedical Laboratories](#) (BMBL), 5th Edition, pgs 61-67

[The National Institute of Health Guidelines for Research Involving Recombinant or Synthetic Nucleic Acid Molecules](#) (NIH Guidelines)

[UNMC/UNO Institutional Biosafety Committee](#) (IBC)

UNO Environmental Health and Safety

PROCEDURE

1) Use of Animal and Human Cells/ Tissues

- a. Procedure:
 - i. All proposed use of biological materials must be included in the IACUC protocol.
 - ii. The Principal Investigator is responsible for contacting the institution's veterinarian at 402- 616-9613, prior to using biological materials in research animals.
 - iii. Appropriate testing methods will be determined based on consultation with the veterinarian.
 - iv. Contact the UNO Safety Manager prior to using RG2/ ABL2 agents, cells or tissues in animals.
- b. Biological materials such as tumor cell lines, stem cells, hybridomas, and blood products are frequently introduced into rodents for a variety of experimental purposes. The sources of these biological materials include other rodents, human tumors and cell lines maintained in tissue culture or frozen for long periods of time. The materials may originate from laboratories on campus, other research institutes or from commercial suppliers. All of these materials are subject to contamination with murine (mouse or rat) pathogens that may be transmitted to recipient animals. When introduced into research animals, contaminated biological materials may cause devastating outbreaks of disease and/or interfere with research results. Contamination poses a risk to multiple populations in an animal facility, and in the case of zoonotic agents such as Lymphocytic Choriomeningitis Virus or Hantavirus, there can be significant health risks for research staff.
- c. Rapid and effective assays are available to detect microbiologic contamination of biological materials. Products of animal origin, or human cells that have been passaged through animals, must be tested and certified pathogen-free prior to being used in research animals. Even if obtained from an impeccably clean source, testing is still crucial, as the material may have become contaminated at the time of collection, by co-housing in liquid nitrogen, or through handling and processing. It's important to recognize that cell lines obtained from commercial repositories (e.g., ATCC) typically have NOT been rigorously tested for the presence of murine pathogens.
- d. Risk Group (RG) and Biosafety Levels (BSL) for human cell/ tissue use in animals: Risk Groups are based on the NIH Guidelines and range from level 1 (lowest risk) to level 4 (highest risk). Biosafety levels (BSL) are the prescribed procedures for containment of the material in question and are also graded from levels 1-4. Animal Biosafety levels (ABSL) are containment procedures assigned for the use of these materials in animals. Detailed descriptions of each containment level can be found in the CDC-NIH Guidelines, Biosafety in Microbiological and Biomedical Laboratories. For



- the purpose of human cell/ tissue use in animals, the following Risk Groups and Animal Biosafety Levels typically apply:
- i. RG1/ ABL1: Cells/ tissues that have been tested and are verified free from human pathogens or are used in immunocompetent animals.
 - ii. RG 2/ ABL2: Cells/ tissues that have NOT been tested and verified to be human pathogen free (unknown pathogen status) OR, contain a known RG2 pathogen.
 - iii. RG 3/ ABL3: Cells/ tissues that contain a known RG3 pathogen. This work is not permitted at UNO.
 - iv. RG 4: Agents that are likely to cause serious or lethal human disease for which preventative or therapeutic interventions are not usually available. This work is not permitted at UNO.
- e. The use of human cells and/ or tissues from primary sources must be reviewed and approved by the Institutional Review Board (IRB) and Institutional Biosafety Committee (IBC). Cells/ tissues that are classified as Risk Group 1 or higher must be reviewed and approved by the IBC. An Operational Safety Protocol (OSP) must be developed with UNO ACUP and EHS and an Animal Biosafety Level laboratory inspection must be conducted prior to starting work with these materials in the animal facility.
 - f. The direct use of fetal tissue/ fetal cells/ human embryonic stem cells in animals must be reviewed and approved prior to use. Please contact the ACUP at 402-554-2943 prior to submitting protocols for research involving fetal tissue/fetal cells/human embryonic stem cells.

2) Use of Infectious Agents, Viral Vectors, Recombinant DNA or Synthetic Nucleic Acids, Bacteria or Biological Toxins

- a. The use of infectious agents, viral vectors, recombinant or synthetic nucleic acids, bacteria or biological toxins must be reviewed and approved by the Institutional Biosafety Committee (IBC). This includes agents/ vectors/ nucleic acids that have indirect contact with animals, e.g., are introduced into cells which are later used in animals. Researchers must submit an application to the IBC and the assigned IBC protocol number must be provided to the IACUC. Synthetic nucleic acids (miRNA, ShRNA, SiRNA) will also need to be evaluated by the IBC if synthesized in the presence of a living host such as plasmids or bacteria. Researchers should consult the most recent version of Biosafety in Microbiological Laboratories (The BMBL) and/ or the National Institute of Health Guidelines for Research Involving Recombinant or Synthetic Nucleic Acid Molecules (NIH Guidelines).
- b. Animal Biosafety Level (ABSL) 2 and 3 studies require special housing and animal laboratory space. An Operational Safety Protocol (OSP) must be developed between the principal investigator (PI), UNO ACUP, and EHS and the Operations Manager. An ABSL2 or 3 laboratory inspection must be completed before biohazard work is initiated within the animal facilities. The PI is responsible for reviewing the OSP with the UNO ACUP and on an annual basis and must ensure that all associated lab personnel are trained and informed of any changes. ABSL2 laboratory inspections are required

every three years. ABSL3 laboratories must be inspected annually. Please contact the UNO Safety Manager at 402-554-3921 for assistance with fulfilling these requirements.

- c. Animals that have been exposed to the hazards listed above must be handled with assigned biosafety precautions, even if they are transported to areas outside of the primary containment room (e.g., lab space, MRI, CT). All areas must be listed in the IACUC and IBC protocol and approval must be granted from the area directors.

3) Use of Radioisotopes

- a. The use of isotopes and/ or radiation emitting equipment must be specified in the IACUC protocol.
- b. A current RSO-35 form must be on file with the Radiation Safety Office for the use of radioisotopes in animals. If you need assistance, please contact the UNMC Radiation Safety Office at 402-559-6356.
- c. An Operational Safety Protocol (OSP) is required for the use of radioisotopes within the animal facility and will be posted at the entrance to the animal labs. This must be completed prior to working with radioisotopes in the animal facility. Please contact the UNO ACUP at 402-554-2943 for assistance with fulfilling this requirement.
- d. Animals that have been exposed to radioisotopes must be handled with assigned precautions, even if they are transported to areas outside of the primary containment room (e.g., lab space, MRI, CT). All areas must be listed in the IACUC protocol and on the RSO-35 form at Radiation Safety. Approval must be granted from the area directors.

4) Use of Carcinogens and or Toxic Chemicals

- a. The use of carcinogens and/ or toxic chemicals must be specified in the IACUC protocol, including the exact name and concentration, amount and proposed use.
- b. Material Safety Data Sheets (MSDS) or Safety Data Sheets (SDS) must be supplied in order to complete a risk assessment. A web link to the specific chemical should be included in the IACUC protocol but, if this is unavailable, please provide specific ordering information, including the manufacturer and product number.
- c. An Operational Safety Protocol (OSP) may be required for the use of hazardous chemicals within the animal facility and will be posted at the entrance to the animal labs. If required, this document must be finalized with the UNO ACUP, prior to working with hazards in the animal facility. Please contact the UNO Safety Manager at 402-554-3921 for guidance.
- d. Chemicals that do not require an OSP for the animal facilities should still be handled carefully by research staff.
- e. Share the MSDS/ SDS with your staff and ensure that it is readily available for reference.
- f. Follow all recommended safety precautions, including the use of PPE and mixing instructions.



- g. Certified chemical fume hoods should be used for mixing and only amounts needed for dosing should be brought to the animal facility.
- h. Contact EHS for guidance in the disposal of unused chemicals. The EPA may require special disposal practices.
- i. Animals that have been exposed to chemical hazards must be handled with assigned precautions, even if they are transported to areas outside of the primary containment room (e.g., lab space, MRI, CT). All areas must be listed in the IACUC protocol and approval must be granted from the area directors.

5) Use of Chemotherapy/ Cytotoxic/ Antineoplastic Agents in Animals

- a. The use of chemotherapy agents must be specified in the IACUC protocol, including the exact name and concentration, amount and proposed use.
- b. To ensure the safe use of these compounds within the animal facility and in laboratories, chemotherapy agents must be mixed in a chemical fume hood. Mixing should be performed outside of the animal facility in accordance with relevant parts of the UNO Chemical Hygiene Plan and UNO Laboratory Safety Manual.
- c. Only exact amounts used for dosing should be brought into the animal facility.
- d. A copy of the Material Safety Data Sheet (MSDS) or Safety Data Sheet (SDS) should be easily accessible in your lab and shared with research staff who will work with the agent(s).
- e. The following chemotherapy agents are regulated by the EPA, please contact the EHS and consult relevant parts of the UNO Chemical Hygiene Plan and the UNO Laboratory Safety Manual regarding disposal of leftover/ waste amounts.
 - i. Chlorambucil
 - ii. Cyclophosphamide
 - iii. Daunorubicin
 - iv. Diethylstilbestrol
 - v. Melphalan
 - vi. Mitomycin
 - vii. Streptozotocin
 - viii. Uracil Mustard

6) Nanomaterials

- a. Nanomaterials are defined as materials that have at least one external dimension that ranges in size from 1- 100 nanometers. Occupational risks associated with manufacturing and using nanomaterials are not yet clearly defined. Please follow CDC/ NIOSH recommendations for the safe use and production of nanomaterials: <http://www.cdc.gov/niosh/topics/nanotech/>
- b. Only bring amounts of compounds needed for dosing to the animal facility and dispose of leftover amounts in accordance with UNO Safety recommendations.

7) Other Drugs or Chemicals with Unknown Hazards



- a. Research studies may occasionally require the use of new and experimental compounds. Obtain as much safety data as possible before beginning work. For your safety, please treat all compounds with unknown toxicological data as potentially hazardous. The compounds should be mixed in a chemical fume hood and only amounts needed for dosing should be brought to the animal facility. PPE should be worn while handling these compounds. If a compound is determined to be toxic, please contact the Chemical Safety Office for information on proper disposal and the UNO ACUP office for safe handling practices in animals.

8) Use of Gas Anesthetics

- a. Please follow the [Policy for Inhalant Anesthetics](#) and the Anesthesia Machine Safety Checklist and Use Instructions (contact the IACUC office at IACUC@unomaha.edu).

9) Special Considerations

- a. Field Investigations
 - i. Please read and follow the [Policy for Field Studies](#). An assurance of safe practices must be provided to the IACUC.
 - ii. Studies which involve species that are high risk for rabies must follow the current CDC/ ACIP recommendations for human rabies virus transmission: <http://www.cdc.gov/mmwr/PDF/rr/rr5703.pdf>.