Purpose

Exposure of animals to biohazards, including microorganisms, viruses, human-derived materials, biological toxins and recombinant/synthetic nucleic acid molecules may require special containment practices and facilities to protect the health of research and animal husbandry staff and prevent environmental contamination.

Regulatory Background

Minimally, research with biohazards in animals is conducted in accordance with:

- NIH Guidelines for Research Involving Recombinant or Synthetic Nucleic Acid Molecules
- Biosafety in Microbiological and Biomedical Laboratories (BMBL), 5th edition, CDC/NIH
- Occupational Safety and Health Administration Bloodborne Pathogens Standard (29CFR 1910.1030)
- New Jersey Department of Environmental Protection Solid Waste Regulations (N.J.A.C. 7:26)

Scope

This policy applies to research that involves the experimental administration of biohazards, human-derived material, biological toxins, and recombinant and synthetic nucleic acids to animals housed in Princeton University facilities.

Responsibility

Principal Investigator and Research Staff:

- Complies with containment conditions recommended by the Institutional Biosafety Committee (IBC).
- Provides information to Laboratory Animal Resources (LAR) Associate Director for biohazard room door signs. (See Attachment 1.)
- Notifies LAR Associate Director prior to beginning experiments that will expose animals to biohazards.
- Notifies LAR Associate Director when experiments exposing animals to biohazards have ended.
- Uses a biohazard label and cage card to identify animals that have been exposed to biohazards.
- Notifies LAR Associate Director if the Institutional Biological Safety Committee has approved of downgrading Biosafety Level 2 containment procedures.
Prior to conducting research with a biohazard that requires animal biosafety level 2 or higher containment that has not previously been used in the animal facility, the Principal Investigator or relevant researcher must meet with the LAR Associate Director and husbandry staff to review the hazards associated with the organism, containment precautions and special husbandry practices.

Laboratory Animal Resources Facility Manager
- Provides personal protective equipment required by this policy.
- Posts biohazard room door signs when notified by the Principal Investigator.
- Monitors compliance with personal protective equipment use.

Laboratory Animal Resources Husbandry Staff
- Complies with containment procedures posted at entrance to each animal housing room.
- Notifies LAR supervisor of non-compliance with containment

Office of Environmental Health and Safety (OEHS)
- Provides Intro to Biosafety training for all research staff who work with BSL 2 materials and recombinant/synthetic nucleic acid molecules
- OEHS provides annual biosafety training to all faculty, research, and LAR staff.
- Participates in training of animal husbandry and research staff upon introduction of a biohazard that is new to the animal research program.
- Conducts a biosafety survey in animal housing/procedure areas to determine compliance with the IBC containment recommendations, upon initiation of the biohazard research. Notifies Principal Investigator and LAR Facility Manager of audit findings.

Definitions
- Animal Biosafety Level 1: Practices, equipment and facilities suitable for animal research involving well-characterized agents that are not known to cause disease in healthy human adults and present minimal hazard to personnel and the environment.
- Animal Biosafety Level 2: Practices, equipment and facilities required for animal research involving agents that are associated with human disease and pose moderate hazards to personnel and the environment. Applies to work with broad spectrum of moderate-risk agents that are generally present in the environment at large and are associated with human disease of varying severity.

Policy

Required Approvals
- IACUC approval of protocols requiring animal biosafety level 2 or higher containment and work practices will be contingent upon IBC approval.
Access to Facilities that House Animals Exposed to BSL 1 and 2 Materials

- The Associate Director of Laboratory Animal Resources is responsible for granting access to animal research facilities. To obtain access, University staff and faculty must complete Animal Worker Health and Safety for Animal Workers. Completion of training is documented in the University’s learning management system.

Entry and Personal Protective Equipment

- All persons entering an animal facility must wear long pants and closed-toed shoes.
- Remove outer coats/lab coats.
- Minimum personal protective equipment required to enter an animal facility that houses BSL 2 research includes:
  - disposable tyvek gown or coveralls
  - shoe covers
  - gloves
  - head cover/bonnet
  - surgical mask
- Don additional PPE, if indicated by information on room door signs.
- Change gloves and perform hand hygiene after completing research/husbandry and when moving from one animal room to another.

Prior to Administering a Biohazardous Material to an Animal:

- When purchasing animals from an external vendor using the electronic management system please indicate approximate date that animals will be exposed to biohazards, if known.
- If animals have been bred at Princeton University, indicate that animals will be exposed to biohazards on the room transfer request.
- The LAR Associate Director and OEHS reviews the door sign content and notify the PI of revisions that may be needed, in accord with NIH, CDC and/or Princeton University IBC.
- LAR Associate Director prints and posts the approved room door sign.
- Submitting Room Door Sign Template:
  - At least two days prior to exposing animals to biosafety level 1 material in an animal facility, Principal Investigators or designated research staff must complete the room sign template (Attachment 1) and email it to the LAR Associate Director and the Office of Environmental Health and Safety.
At least ten working days in advance of initial administration of material requiring biosafety level 2 or higher containment, Principal Investigators or designated research staff complete the room sign template (Attachment 1) and email it to OEHS and LAR Associate Director.

**Rooms with Multiple Users**

- Rooms with more than two biohazardous agents can be posted with a composite sign. If composite signs are used, the names of each agent and agent-specific precautions must be listed. Consult with the LAR Associate Director.

**Cage Identification**

- After an agent has been administered to the animal, the Principal Investigator is responsible for labeling the cage with a biohazard symbol, name of the agent and date of administration. Cage cards with biohazard labels will be available in animal housing rooms and procedure rooms.
- Cage card with biohazard sticker should stay on the cage for the life of the animal.

**Work Practices**

**Animal Biosafety Level 1**

- [CDC/NIH Animal Biosafety Level 1](#) practices must be followed.

**Animal Biosafety Level 2**

- [CDC/NIH Animal Biosafety Level 2](#) practices and IBC containment recommendations must be followed.
- All procedures must be performed in a manner that minimizes the creation of aerosols, sprays or splatter of infectious materials and waste. Whenever possible, procedures that may produce aerosols must be performed in a biological safety cabinet. In certain cases, the research set-up may preclude the use of a biosafety cabinet. Appropriate PPE and containment practices may be used as an alternate to the biosafety cabinet; however, these exceptions must be approved by the IBC and the IACUC prior to initiating any animal work.
- All personnel must wash their hands after handling animals, animal tissues and prior to leaving animal care and use areas, even if gloves are used. If a sink is unavailable, use alcohol hand gel, but hands must be washed with soap and running water as soon as possible upon exiting the facility.
- Research staff must use the disinfectant provided by the LAR facility to disinfect work surfaces upon completion of work and after spills.
Researchers are responsible for disinfecting equipment that is removed from the animal facility and brought to the researcher’s lab.

**Housing for Infected Animals**

- Negative-pressure ventilated cage racks should be used to house animals requiring ABSL-2 containment and precautions.

**Cage Changing**

- LAR staff are responsible for changing cages following LAR SOP 5.20 Handling of Cages and Rodents Exposed to Biohazardous Agents.

**Exiting a Procedure or Animal Housing Room Used for Animal Biosafety Level 2 Research**

- Prior to exiting, remove outer gloves, if worn and place into a medical waste container.
- Proceed to facility anteroom and remove PPE in the following order:
  - Remove gown.
  - Remove shoe covers.
  - Remove mask, eyewear and hair bonnet.
  - Remove inner gloves.
  - Use alcohol hand gel and then wash hands as soon as possible.

**Transport of Animals Exposed to Biohazardous Agents out of the Animal Facility**

- Transport of live animals exposed to biohazardous material out of the facility must be approved by the IBC and the IACUC.
- If PI has permission from the IACUC and IBC to transport infected animals out of the animal facility, OEHS will include the site in the animal biosafety audit.
- Animals will be transported inside of a cage on a cart with sides. The cage must be placed in a bag and labeled with the universal biohazard symbol. The outer surfaces of potentially contaminated containers must be disinfected prior to transport.
- Researcher is responsible for cleaning spills of bedding that occur during transport.
- When returning soiled caging from a satellite facility, caging must be on a cart with sides, contained in a biohazard bag.

**Work with Live Animals Exposed to Biosafety Level 1 and 2 Organisms outside of the Animal Facilities**

**Biosafety Level 1 Material**
• **CDC/NIH Animal Biosafety Level 1** procedures must be followed.
• A sign incorporating safety information must be posted at the entrance to the areas where infectious materials and/or animals are housed or are manipulated. The sign must include the animal biosafety level, general occupational health requirements, personal protective equipment requirements, the supervisor’s name (or other responsible personnel), telephone number, and required procedures for entering and exiting the animal areas. Identification of specific infectious agents is recommended when more than one agent is being used within an animal room.
• The sign template found in Attachment 1 can be used to label the door when animals exposed to Biosafety Level 1 agents are housed in the laboratory.

**Biosafety Level 2 Material**

• **CDC/NIH Animal Biosafety Level 2** procedures must be followed, as must any additional containment recommendations issued by the IBC.
• Special attention must be taken to keeping this work separate from research in the lab that does not involve the use of biohazards and/or animals. Laboratories used to temporarily hold animals classified as ABSL-2 must be appropriately identified with a room door sign. The sign must include the universal biohazard symbol, animal biosafety level, general occupational health requirements, personal protective equipment requirements, the supervisor’s name (or names of other responsible personnel), telephone number, and required procedures for entering and exiting the areas.
• The template found in Attachment 1 may be used to label the room door when animals classified as BSL-2 are temporarily housed in the laboratory.
• Research staff must disinfect all surfaces in the laboratory using LAR-approved disinfectant solutions.
• Procedures with animals classified as ABSL-2 that cause aerosolization, splashes or splatters should be conducted in a biosafety cabinet. If this is not possible, due to size or configuration of testing equipment, consult with the Biosafety Officer to review precautions that must be taken to prevent exposure.

**Transporting Biohazardous Material to the Laboratory Animal Resources Facility**

• Transport all biohazardous materials in a rigid, securely sealed, watertight primary container, contained within a second rigid, sealed, watertight container. Sufficient absorbent must be added to the second container to take up contents of the first container in case of leakage. Label the outer container with the universal biohazard symbol.
• Animal cages must be placed in (loose) plastic bags labeled with the biohazard symbol.

**Duration of Containment**
• Containment conditions typically last for the lifetime of the animal, unless the IBC has stipulated that ABSL-2 precautions can be downgraded after a defined amount of time. Permission to downgrade containment will be communicated to the PI on the IBC approval letter.
• Animal carcasses and tissues from ABSL-1 and ABSL-2 or higher protocols must be placed into a plastic bag and returned to the animal facility freezer designated for carcass disposal.
• Bedding and cages of animals classified ABSL 2 will be autoclaved by LAR staff prior to disposal of soiled bedding and cleaning of cages.
• Bedding from cages classified as ABSL1 will be handled as directed by the BSO and/or IBC, who may direct the first cage change-out after administration of a BSL1 organism or material to be autoclaved or disposed as regulated medical waste.

Biosafety Audit

• When notified by the PI, OEHS will schedule a biosafety audit with the PI or her/his designee. Audit will include: a review of containment practices during exposure of the animal to the biohazard, cage and room labeling and procedures followed for removal of a live animal from the facility.
• Audit results will be sent to the LAR Associate Director, Attending Veterinarian, the responsible Principal Investigator. Summary of audit results are presented to the IBC at regularly scheduled meetings.
• Verification of compliance with containment precautions is also conducted by the BSO during semi-annual IACUC facility inspections.

Personal Injuries/Exposures

• In the event of an exposure to a biohazard, the following guidelines should be used:
  o Intact skin
    ▪ Remove contaminated clothing
    ▪ Vigorously wash contaminated skin for 1 minute with soap and water
  o Broken, cut or damaged skin or puncture wound
    ▪ Remove contaminated clothing
    ▪ Vigorously wash contaminated skin for 5 minutes with soap and water

Eye

• Immediately flush eyes for at least 15 minutes with water, preferably using an eyewash; if no eyewash is available, pour water on the eye(s) for 15 minutes, rinsing from the nose outward to avoid contamination of the unaffected eye.
• Hold eyelids away from your eyeball and rotate your eyes so that all surfaces may be washed thoroughly.
• Seek medical attention at McCosh Health Center

Researcher is responsible for cleaning spills of the biohazardous agent or other potentially infectious material that occurs during exposure/inoculation or performance of diagnostic or research procedures. Researcher is also responsible for cleaning spills that occur during transport of animals into and out of an LAR facility.

Follow spills cleanup procedures from the University’s Biosafety Manual

**Cessation of Experiments with BSL 1 or BSL 2 Agents**

• Room signs must accurately reflect the research that is taking place. Therefore, when researchers anticipate that experiments with BSL-1 or BSL-2 agents will no longer be performed, they should inform the LAR Associate Director, who is responsible for removing room door signs.

• If research with previously used agents will recommence after removal of the room signs, it will be subject to the same polices described above, including the 2 day notification for ABSL 1 research and 10 day notification for ABSL 2 research.

**References**

• CDC/NIH Biosafety in Microbiological and Biomedical Laboratories 5th edition (2007)
• NIH Guidelines for Research Involving Recombinant or Synthetic Nucleic Acid Molecules (March 2013)

**Version History**

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<td>1.0</td>
<td>October 22, 2010</td>
<td>Initiation, written by J. Wagner</td>
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### General Requirements

**Training:**
- Animal Worker Health/Safety Training
- Lab Safety Training

**Occupational Health:**
Participation in: Animal Worker Medical Surveillance Program

**Standard Personal Protective Equipment:**

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### Emergency Contacts

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