



**Biosafety Manual
And Standard Operating Procedures (SOP)
For Animal Imaging at
Biosafety Level 2**

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Marsico Hall, 125 Mason Farm Rd.

Rooms SB223, SB227, SB228, SB229, SB230, and GMB UB61



STANDARD OPERATING PROCEDURE FOR SMALL ANIMAL IMAGING LABORATORY

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TITLE:
**BRIC SMALL ANIMAL IMAGING FACILITY STANDARD OPERATING
PROCEDURES**

APPROVALS

Approver's Name & Dept. (Typed)	Approver's Signature	Date
Principal Investigator(s): Hong Yuan		
Biological Safety Officer: Deborah Howard		
UEOHC: Dr. James Hill		
EHS Director: Mary Beth Koza		



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Authorization

All investigators accessing to the BRIC Small Animal Imaging facility are to be approved prior to entry into the following imaging labs located in room SB223, SB227, SB228, SB229, and SB230 in the Marsico, and GMB UB61. Any person conducting animal imaging studies, must submit a signed Project Form in your Lab Safety Plan (Appendix-A) certifying that all IACUC and EHS requirements have been met including registrations, training, and immunizations.

1. Purpose

This document provides a comprehensive source for performing imaging of small animals that do or may contain Biosafety Level 2 level organisms. **Biosafety Level 2** organisms are a broad spectrum of indigenous moderate-risk agents that are present in the community and associated with human disease of varying severity. Described are procedures to be used to insure a safe working environment while working with regulated recombinant DNA modified cells, infectious microorganisms, human cell lines, or human ex vivo cells. The manual will be reviewed annually by the Facility Director in conjunction with personnel from UNC EHS and the Institutional Biosafety Committee for changes and corrections.

2. Introduction and Scope

As a core facility, the type of work performed and agents used will vary with investigator. Animal species anticipated are mice and rats mainly. Types of samples anticipated to be used within the Imaging Room are live animals or animal tissues injected with BSL2 organisms, or cells lines either human or animal containing BSL2 organisms. Investigators will be required to detail on the Project Form (see Appendices A) the species, samples, sources, and known microorganisms.

The potential may exist for aerosol generation with viable biohazardous or potentially biohazardous materials during animal imaging. Therefore, containment and protection of the instrument operator from these potentially infectious materials is a safety priority. Biological specimens can harbor unknown as well as known pathogens. Materials may include laboratory animals deliberately infected with infectious agents and/or handling human samples that may contain agents such as human immunodeficiency virus and hepatitis viruses. The procedures described below are designed to protect the instrument operator and eliminate any dispersed organisms by proper cleaning and disinfectant procedures.



3. Description of Physical Environment.

The BRIC Small Animal Imaging Labs are located in the suite SB210G (for floor diagram see Appendix B) in the Marsico and a satellite imaging lab in the GMB UB61. Imaging labs that allow BSL2 study are described in the Table-1. Each imaging lab will contain all support equipments. Each imaging lab is under negative pressure relative to the hallway. Supply and exhaust air has been approved by IACUC as meeting requirements for animal studies. The door to the hallway is posted with a sign that identifies when BSL-2 imaging work is in progress. Each lab is equipped with ID card reader for room access. No cell culture, harvesting, or other manipulations not directly related to Imaging will be performed in the Imaging Labs.

Table-1: BSL2 Lab and room number within SAI Facility

Imaging Modality/Labs	Room Number
Optical Imaging	Marsico SB223
Ultrasound Imaging	Marsico SB229
SPECT/CT Imaging	Marsico SB227
PET/CT Imaging	Marsico SB228
Procedure Room	Marsico SB230
Satellite Imaging Lab in GMB	GMB UB61

4. Emergency Contact Information and Procedures

4.a. Emergency Phone Numbers

Fire and Medical Emergencies	911
Security Issues/Police.....	911
Police Non-Emergency.....	2-8100
.....Environment Health & safety.....	2-5507
Environmental Health and Safety/Biosafety Officers	
Deb Howard	2-5722
Kara Milton.....	2-0259
Nick Chaplinksik.....	2-5726
Employee Health.....	6-9119
Facility Director's contact - Office: 919-843-3813	
Emergency/After Hours: 919-641-8696	

4.b. Emergency Procedures

In case of fire, push alarm button, remove PPE, secure the animal(s) and evacuate immediately with the animals.

If a very small fire is involved, a fire extinguisher is located in the hall. If any injury to a laboratory worker occurs it should be reported to the Facility Director immediately.

Medical attention, if required, shall be initiated immediately. Administer first aid outside



of the Imaging room. Move the person only if the individual is ambulatory unless risk of additional injury is likely.

If a personal injury accident involves a biohazardous material spill, move the individual away from the spill. If the individual is ambulatory, remove all PPE material (especially if contaminated) following approved PPE doffing procedures. Do not attempt to move a non-ambulatory patient unless failure to do so may result in further injury. Medical personnel will determine whether it is safe to move injured individual. Inactivate spill after individual is removed.

5. General Practices

All general laboratory safety practices (BMBL current edition, Lab Safety Manual) will apply to this laboratory including the following.

1. No eating, drinking, smoking, handling contact lenses, or applying cosmetics is permitted.
2. Gloves are to be worn at all times.
3. Mouth pipetting is not permitted.
4. All procedures should be performed in a manner to minimize the likelihood of spills and aerosols.
5. Razor blades, scalpels, hypodermic needles or any other sharp objects are to be used only when no alternative exists. Storage of such devices should be done to prevent accidental cutting/piercing of skin. All such devices will be discarded in a provided approved "sharps" disposal container.
6. Any work surface used should be decontaminated using Roccal or 70% isopropyl alcohol. All general work surfaces (especially horizontal) will be decontaminated weekly.
7. All materials supplies provided by the Imaging Lab should be stored in cabinets, drawers or other containers to minimize exposure to any aerosols.
8. All waste materials will be discarded into orange biowaste plastic bags and returned to the investigator's lab to be autoclaved.
9. Only plastic ware will be used – no glass pipettes, test tubes etc.
10. Only closed toe shoes will be permitted.

6. Medical Surveillance



All research personnel that work in the Imaging Lab must comply through University Environment, Health and Safety (EHS) with the requirements listed on the Biohazards Section of the Laboratory Safety Plan.

All exposures, accidental or potential, shall be reported to University Employee Occupational Health Clinic (UEOHC) immediately by calling 6-9119 (or Healthlink, 966-7890 if after hours/weekend/University holidays) and EHS. Examples are PPE failure, splash to the face or to un-intact skin, or sharps injury. The UEOHC representative will help categorize the risk of developing occupationally-acquired infection and providing advice on appropriate post-exposure treatment. UEOHC is open M-F, 8:30am-4:30pm.

7. Requests for Use of Imaging Lab

The safety of the Imaging Lab staff and its users are of primary concern. To assure assignment of proper safety practices, procedures, and to document potential exposure in the event of accidents it is necessary to collect detailed accurate information about all materials used in the Imaging Lab. Prior to use the imaging facility a "Project Form" (Appendix A) must be properly filled out, and submitted online (See the online instruction <https://www.med.unc.edu/bric/small-animal-imaging/Study%20Initiation>). These forms must be received at least 48 hours before the scheduled use time. Any changes to a previously submitted form must be changed in writing at least 48 hours before the time. The form will be reviewed by the Facility Director and an appropriate containment assigned based on risk. Failure to submit forms in a timely manner may result in loss of appointment and incurring of charges.

8. Transport To and From the Imaging Lab

The transportation of animals and samples to and from the BRIC Small Animal Imaging Lab must be performed following the UNC IACUC and EHS guidelines. All samples will be transported in a leak proof container that reduces the likelihood of spills (e.g. Igloo cooler). Containers with hard plastic surfaces are best. The outer surfaces of the carrier must be sprayed with disinfectant before the carrier leaves the PI's laboratory. Gloves should not be worn when transporting carriers from the investigator's laboratory to the imaging lab. A biohazard warning label must be affixed to the surface of the outermost container.

9. Personal Protective Equipment

When handling and imaging materials in the BRIC Small Animal Imaging Lab, minimum PPE will include a lab coat, disposable gloves, and eye and/or face protection (shield).

10. General Lab Rules

10.a. Before Imaging Study



Visually check the lab space. If apparently uncleaned areas are seen from previous experiment, please contact the facility staff or call the phone number listed on the wall.

Gently wipe the table top with Roccal solution (the green solution provided in the imaging room) before any study.

No eating, drinking, smoking, and cosmetics in the imaging facility.

10.b. After Imaging Study

Shutdown the anesthesia system, exit the imaging software by closing the software window, and copy all your image data to your own portable drive or CD disks

Clean and disinfect the imaging platform inside the imaging chamber, the workspace, the induction chamber, the nose cone, and any other areas that may have come into contact with animals. All surfaces that come into contact with the animal must be wiped down with the Roccal solution. Wipe the imaging platform/sheet with the 70% Isopropyl alcohol solution after Roccal wipe as Roccal might produce artifact signal if left wet on the sheet.

There should be no debris (e.g. blood, fur, tape, or fluids) left on any part of the imaging system or workspace.

Discard all needles in the sharp container provided, and discard all other remaining waste in the trash.

Take off gloves before leaving the lab.

11. BSL-2 Study Rules

Note: For BSL2 study, the above general cleaning procedures should be followed in addition to the following BLS2 specifically related procedures.

- 1) Prior to your BSL2 study, the "Project Form" (Appendix A) must be properly filled out, and submitted online:
<https://www.med.unc.edu/bric/small-animal-imaging/Study%20Initiation>
- 2) The form must be received at least 48 hours before the study. For emergency usage, please contact the Director of the Small Animal Imaging facility, Dr. Hong Yuan (919-843-3813) about your BSL2 study and send a copy of EHS approved Laboratory Safety Plan Biohazard Registration Form along with your approved animal protocol.
- 3) Users will schedule the study 24 hours prior to the study on the iLab calendar. (iLab calendar instruction can be found in our website). **It is preferred that BSL2 studies are scheduled as the last study for the day.** If you can't schedule at the end of the day, please let our staff know before the study. We will block 30min out on the calendar after your study. When scheduling studies on the iLab calendar, please explicitly indicate the "BSL2 study" on the study notes in the reservation page.
- 4) All BSL2 study should be done during the normal university hours (8am-5pm, Mon-Fri.) No after-hours or holiday studies are allowed.



- 5) On the day of the study, please bring an orange biohazard trash bag with you when you come to the imaging facility. Please also bring your own lab coat, and safety eyewear. The facility will provide gloves and masks. If you need additional supplies from the facility, please contact Dr. Hong Yuan or other facility staff before your study.
- 6) Positioning the provided BSL-2 sign on the Imaging Lab door, close the door during your study, and handle materials carefully to minimize the formation of aerosols.
- 7) Remember to dispose of all biological wastes in your orange biohazard bag. The facility will provide biohazard sharps container to collect all sharps in contact with biological hazards.
- 8) After the imaging study, thoroughly wipe off all external surfaces with the disinfect solution (Roccal). Collect all of the wastes from your imaging study into your own biohazard bag. **Please note that you can not leave the biohazard bag in the imaging facility. You must return it to your lab.**
- 9) Remove gloves and apply hand sanitizer before opening the door. Take off the BSL-2 sign on the Imaging Lab door.
- 10) Take all animals, wastes, and other supplies back to your lab.

12. Spill cleanup

If materials are spilled in the Imaging Lab or onto the floor during BSL-2 Imaging they will be immediately cleaned up and the surface disinfected with Roccal Solution as follows:

1. Remove contaminated outer gloves.
2. Notify others in lab of spill.
3. Decontaminate all personnel, clothing and exit laboratory
4. Notify Facility Director (Director will notify EHS if necessary).
5. Allow aerosols to settle for 30 minutes.
6. Re-enter wearing PPE.
7. Carefully dilute spill from outside edges using appropriate disinfectant.
8. Allow 20 minutes contact time.
9. Clean-up with paper towels.
10. Decontaminate clean-up materials.
11. Wash hands thoroughly.

13. Waste Decontamination

13.a. Solid Waste - All solid waste shall be collected in an orange biohazard bag provided by the investigator. No sharps shall be placed in this bag. Filled bags are loosely closed with tape and returned to the investigator's lab for autoclaving according to the EHS biohazard waste policy. The exterior of the bag should be wiped or thoroughly sprayed with disinfectant prior to removal from the imaging room.



13.b. Sharps – Sharps are to be disposed of in the metal puncture-proof cans that are provided by the Imaging Lab. The sharps cans will be removed and capped at 2/3-full to prevent over-filling. Sharps containers will be autoclaved in the Marsico Hall before disposing.

14. Exposure Response

14.a. Non-intact skin exposure (needlestick, cut, bite)

1. Remove contaminated gloves.
2. Use hand sanitizer before opening door.
3. Quickly go to the restroom just outside the door and wash the wound with soap and water for 5 minutes.
4. Ask facility staff for help. If no one is available, call the facility contact phone number posted on BSL-2 door sign.
5. Decontaminate and/or remove protective lab clothing and proceed immediately to UEOHC. If the injury requires immediate medical attention, go to the Emergency Room.

14.b. Mucous membrane exposure (including contact with eyes, nose, and mouth):

1. Remove contaminated gloves.
2. Use hand sanitizer before opening door.
3. Quickly go to the procedure room SB230 (eye wash provided by the sink) and flush the area with running water for at least 5 minutes. Eyes should be flushed for 15 minutes.
4. Ask facility staff for help. If no one is available, call the facility contact phone number posted on BSL-2 door sign.
5. Decontaminate and/or remove protective lab clothing and proceed immediately to UEOHC. If the injury requires immediate medical attention, go to the Emergency Room.



Appendix A

Online Project Registration Form is located in the following webpage:

<https://www.med.unc.edu/bric/small-animal-imaging/Study%20Initiation>

BRIC SAI Project Registration Form

** Required*

Date *

PI Name *

PI Organization/Department *

PI Phone *

PI E-mail *

Other Participants names and E-mail contacts *
(If no other participants, please indicate "None")

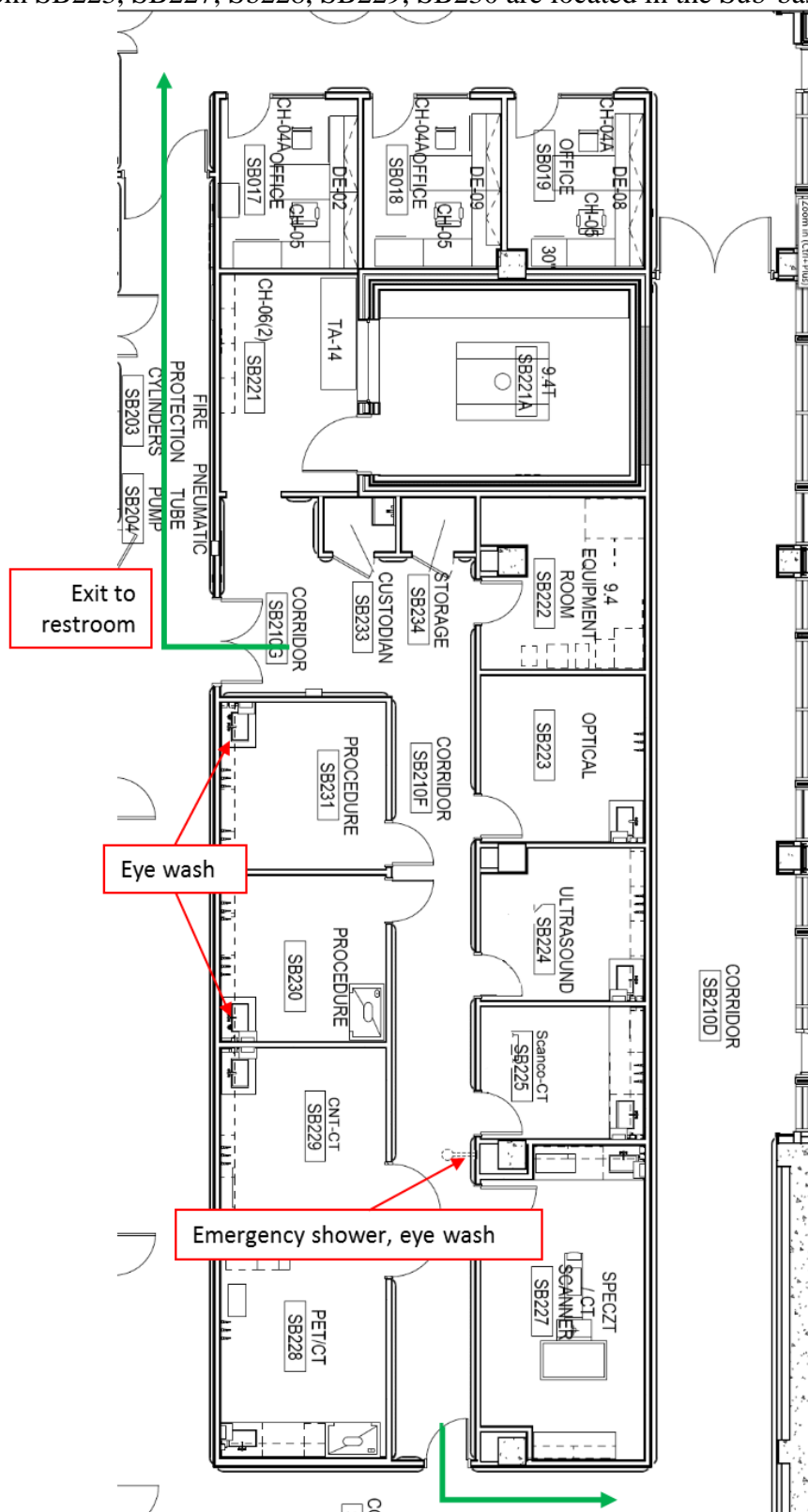
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Appendix B

BRIC Small Animal Imaging Facility Floor Layout

Room SB223, SB227, SB228, SB229, SB230 are located in the Sub-basement, Marsico Hall:



History of Revisions

Revision	Page(s)	Date
Updated floorplans	14, 15	4/14
Updated building information/room numbers	Throughout	4/14
Room number changed from 124/125 to 122	Title page, pgs 4 & 5	3/11
Deleted “and the door to the room 125 is equipped with punch code entry security system”	5	3/11
Changed Darren Trembl to Kara Milton under Environment, Health and Safety	5	3/11
Changed University Employee Occupational Health Clinic to Environment, Health and Safety	6	3/11
Added HealthLink information	6	3/11
Changed “exposure to the skin to non-intact skin exposure (needlestick, cut, bite)”	9	3/11
Added Medical Surveillance and Entry/Training requirements when working with human samples	6	10/11