RULES AND REGULATIONS REGARDING THE USE AND WORK IN
BIOMECHANICS AND WET LAB FACILITIES

Located:
NINT 6-071

UPDATED VERSION – 30/01/2007
Dr. Jason Carey
1. Emergency and information contacts

UofA emergency number 492-5555
Campus security 492-5050
Dr. J. Carey 492-7168

Office of Environmental Health & safety, Biosafety 492-7790
⇒ Laboratory decontamination
⇒ Equipment decontamination
⇒ Disposition of Biohazards
⇒ Biosafety Registry
⇒ Obtaining human body substance permit

Forms available at www.ehs.ualberta.ca

Information about Hepatitis B immunization 492-5378

Canadian Laboratory Biosafety Guidelines, 3rd edition, Health Canada.
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2. Introduction

PURPOSE
This document is intended for all students, researchers, and faculty members (referred herein as “USER”) using the Mechanical Engineering Biomechanics/wet lab for the purpose of teaching or research. The rules and regulations found in this document apply to all users, whether or not affiliated with the University of Alberta. The Department of Mechanical Engineering at the University of Alberta reserves the right to deny access to its laboratory facilities and resources to any person not complying with the rules and regulations contained within this document. It is the responsibility of the user to read the rules and regulations as outlined and persons using the Biomechanics/wet lab facilities acknowledge by this use, their understanding and compliance with these rules. Any questions, concerns or inability to comply with these rules and regulations must be addressed by the USER with administrative authority at the Mechanical Engineering prior to use of the facilities. Non-University of Alberta USERS will be required to sign a waiver of liability before being allowed access to the facilities.

The USER also acknowledges that non-compliance with these rules and regulations may result in increased health risks and consequences for which the Mechanical Engineering cannot be held responsible. Non-compliance of these rules and regulations could result in removal from or denial of the use of the facilities.
3. Universal Precautions

To be used with all human clinical specimens. Researchers are to suspect all human clinical specimens of containing blood-borne pathogens regardless of the source or case history. Therefore:

- All work is to be conducted in a Biosafety Level 2 containment laboratory
- Anyone handling the specimens or untreated waste should be immunized against Hepatitis B. Hepatitis B immunizations may be arranged through the Occupational Health Division at the Environmental Health and Safety (EHS) website (www.ehs.ualberta.ca). In the event that a researcher wishes to decline receipt of the Hepatitis B vaccine, they must fill out a formal declination form available at the EHS website.
- Anyone handling the specimens or untreated waste must wear a buttoned down laboratory coat or fully tied laboratory gown, gloves, protective glasses, close-toed shoes and floor length pants
- All manipulations of the specimens that could potentially generate aerosols are to be conducted inside a biosafety cabinet or in centrifuges and other equipment with biosafety containers
- All sharp instruments and syringes are to be disposed of immediately after use into a SHARPS container without attempting to cap or clip the instrument
- All work-related injuries involving needlesticks, cuts and broken skin are to be reported immediately to the PI and the Occupational Health Division. An incident report form is available at the EHS website.
- Personnel who have had surgical or cosmetic procedures (including, but not limited to tattoos and piercings) or physical injuries (i.e., cuts, abrasions, burns, etc.) involving significant alteration to the normal integrity of the skin should not work with the specimens until the injury has healed. This is especially important where the area involved is on the face, head, neck, hands or arms.
- Regularly decontaminate work surfaces and equipment with a disinfectant effective against both viruses and bacteria (MicroChem is one example)
- All waste material is to be autoclaved for at least 30 minutes prior to disposal including filled SHARPS containers
4. Additional Protocols

4.1. Laboratory biohazard rating
The biomedical/wet lab is ONLY rated for level 2 biohazard research.

4.2. Immunization
It is mandatory that all persons using the facilities be immunized for hepatitis A and B. Immunization takes 3 shots. Forms are provided on the Office of Environmental Health & Safety, Biosafety website.

4.3. University of Alberta Concepts in Biosafety Training
It is recommended that all persons who could be a risk to attend and pass the examination of the Biosafety Training session.

4.4. Information form
A Mechanical Engineering Biomechanics/Wet lab information form must submitted to the laboratory director two (2) weeks prior to the intended start date of the experiments. The information form must be fully filled and additional requested documents must be attached with the submission. A check list is provided in appendix. The university also requires information sheets and must approve any use of cadaveric tissue.

Approval for use of the facilities is contingent on the completeness of the documentation and review of the submitted information. In the interest of safety of all using the facilities, the laboratory director reserves the right to refuse access/use of the facilities until such time as the forms are correctly completed.

4.5. Applicable to all laboratory facilities
⇒ The Biomechanics/wet lab facilities are located in the NINT 6-071. Access to these areas is restricted to students, academics or research activity approved in writing by the Facilities Director.

⇒ Under no circumstances will unauthorized persons (e.g., family member, friend, spouse, etc.) be admitted to any laboratory facility for any reason without the express written approval of the Facilities Director.

⇒ All human material (i.e., dry bone and cadaveric tissue) must be treated with the utmost respect and dignity. All tissue (cadaver, prosection, skeletons, or individual bones) made available for teaching or research belongs to a human body thereby making you honour-bound to treat this tissue with dignity and care.
⇒ Laboratory doors must be kept closed at all times.
⇒ It is the responsibility of the USER to adhere to appropriate standardized precautions (gloves, lab coat, eyewear, etc.) commensurate with their level of activity to limit their exposure to chemicals and possible pathogens. The level of protection utilized should be proportional to the level of invasiveness of the activity to be performed and the type of tissue under study (fresh or embalmed). Users unfamiliar with the necessary precautions must first consult with an appropriate authority at the department of Mechanical Engineering or the Facilities Director.
⇒ Footwear must be worn at all times. No footwear with an open design or narrow heel (sandals, high-heeled shoes, etc.) is allowed in the laboratory facilities.
⇒ Hands must be washed before exiting a laboratory facility whether or not human tissue has been handled.
⇒ All incidences of injury, regardless how minor, must be reported to the facilities Director. All sharps must be treated with extra precaution. Cuts and puncture wounds should be washed and disinfected immediately. Medical attention should be sought if infection develops within 24 to 48 hours. First aid supplies and eyewash facilities are located in all anatomy laboratories. It is the responsibility of the USER to know the location and appropriate use of these items.
⇒ Used sharps must be discarded in the containers identified appropriately “for sharps only”.
⇒ It is the responsibility of the USER to ensure familiarity with the use and operation of all laboratories. The USER is also responsible to ensure the use of appropriate safety equipment and precautions in conjunction with the use of these tools.
⇒ Food and drink are NOT PERMITTED in any of the laboratory facilities at any time.
⇒ Music or radios are NOT PERMITTED in any of the laboratory facilities at any time.
⇒ The USER is responsible for maintaining the cleanliness of their work environment. This includes the table surface and the floor in their vicinity. Unchecked spills can lead to extremely slippery floors and promote injuries. Spills must therefore be immediately wiped with paper or a mop if necessary. Ensure that gloves and paper towels are placed in the general trash and/or biohazard receptacles.
⇒ General operational practices for laboratories as set out by Health Canada are provided in appendix for quick reference.
4.6. **Working with embalmed tissue**

It is the responsibility of the USER to use standardized precautions (gloves, lab coats, eyewear, etc.) where necessary in order to minimize contact of the skin, eyes, and mucosa with embalming fluid. Some of the chemicals composing the embalming fluid are toxic and potential carcinogens. Allergic reactions (e.g., skin rash or coughing) may also develop when working with embalmed tissue. Medical advice should be sought if chronic allergies develop after normal exposure.

⇒ The USER is responsible for the assessment of their state of health prior to, and during, their tenure in the use of the laboratory facilities. Persons with specific health concerns should check with their primary care practitioner to determine whether it is appropriate for them to enter the laboratory facilities. This includes those individuals who are pregnant or who are in the process of planning a pregnancy.

⇒ DO NOT throw out tissue. Contact the university disposal of biohazard service for proper disposal of all tissue. **Information provided in Emergency and information contacts.**

4.7. **Working with fresh tissue**

Working with fresh human cadaveric tissue increases the risk of being exposed to various pathogens. There are four main routes of exposure that one must try to avoid when working with fresh cadaveric tissue in the laboratory:

1. Inhalation
2. Absorption
3. Ingestion, and
4. Transcutaneous migration via percutaneous injury.

⇒ It is the responsibility of the USER to ensure the use of standardized precautions (gloves, lab coats, eyewear, etc.) in order to minimize contact with possible pathogens. This is especially important when working with fresh, non-embalmed human/animal cadaveric tissue.

⇒ It is the responsibility of the principal investigator to ensure that all participants under their charge within the research or teaching activity (e.g., students, research assistants, co-investigators, etc.) involving fresh human/animal cadaveric tissue take the necessary steps towards minimizing contact with potential pathogens.

⇒ All activities involving fresh human/animal cadaveric tissue can only take place in the laboratory facilities administered by the Department of Mechanical Engineering. All research involving fresh human tissue needs to be approved by the Department of Mechanical Engineering prior to commencing the activity in question. A protocol needs to be submitted by the principal investigator for approval by the Director of the biomechanics/wet lab facilities.
The Facilities Director reserves the right to suspend any and all activity occurring within the lab at his/her discretion. The privilege of access to the facilities will be revoked, without possibility of appeal, for non-compliance to any of the aforementioned rules and regulations.
5. Decontamination Procedures of Equipment

All equipment and working surfaces will be decontaminated after contact with blood or other potentially infectious materials. Work surfaces will be washed with disinfectant after completion of contaminating procedures.

Protective coverings, such as plastic wraps, aluminium foil, or impervious-backed absorbent paper used to cover equipment and surfaces must be replaced as soon as feasible when visibly contaminated or at the end of the day. All receptacles (bins, garbage pails, sharp bins,…) intended for reuse and can be expected to become contaminated with potential contaminants must be routinely inspected, cleaned and decontaminated using university services. They must be immediately decontaminated when visibly contaminated.

6. Disposal of human and animal tissue samples

The university has a service for disposal of tissue. Forms are available at www.ehs.ualberta.ca. Biohazardous materials should always be segregated from nonbiological waste. All solid and liquid biological waste must be properly collected and contained for decontamination and disposal.

7. Biosafety Guidelines

A biohazard risk arises from any procedure that releases microorganisms into the environment or that otherwise allows them to access the human body. Infection may be initiated by inhalation, ingestion, through broken or unbroken skin. For additional information, please refer to the Canadian Laboratory Biosafety Guidelines, 3rd edition produced by Health Canada¹.

The inherent risks of a pathogen are made on the basis of such factors as the disease severity, infection route, virulence and infectivity. The classification assumes ordinary research laboratory conditions or growth in small volumes for diagnostic and experimental purposes.

Class 1: Defines an agent of no or minimal hazard under ordinary manual handling conditions or techniques generally acceptable for non-pathogenic materials. This class includes all bacterial, fungal, viral, rickettsial, Chlamydia and parasitic agents not included in higher classes.

**Class 2:** Defines agents of ordinary potential hazard. This class included agents that may produce disease of varying degrees of severity from accidental inoculation, injection or other means of cutaneous penetration but that can usually be adequately and safely contained by ordinary laboratory techniques. (See appendix for a list of agents)
References

Rules and regulations regarding the use of human tissue and work in the anatomy laboratories and morgue facilities, Division of anatomy, faculty of medicine and Dentistry, University of Alberta, Edmonton, AB, fall 2005.

Health Canada, Canadian Laboratory Biosafety Guidelines, 3rd edition, 2004
Appendix

Check list
Forms
Check list for use of Biomechanics/wet lab

To be submitted to facilities supervisor for approval prior to use of faculties

☐ Completed Hepatitis immunization form for all intended users
☐ Ethics approval
☐ Mechanical Engineering Wet lab facilities information form, which includes:
   ☐ Acknowledgement of having read and understood facilities procedures
   ☐ Research proposal (Copy of ethics committee submission accepted)
   ☐ Research procedures (Copy of ethics committee submission accepted)
   ☐ Risk assessment
   ☐ List of equipment to be brought in the facilities and/or intended use of facilities equipment
   ☐ Proposed handling, containment and storage of tissue
   ☐ Forms for decontamination of facilities and equipment and disposal of tissue (if applicable)

Required during use of facilities

☐ Personal Protective Equipment
   ☐ Gloves (Disposable or reusable)
   ☐ Face Protection/eye wear
   ☐ Gowns, Aprons, Lab coat
   ☐ Closed shoes
   ☐ Surgical caps, hood (gross contamination possibilities, cleanup)
Operational practices for laboratories

Excerpt from ²

“General Practices
The following general practices are required for all laboratories handling infectious substances.

1. A documented procedural (safety) manual must be available for all staff, and its requirements followed; it must be reviewed and updated regularly.

2. Personnel must receive training on the potential hazards associated with the work involved and the necessary precautions to prevent exposure to infectious agents and release of contained material; personnel must show evidence that they understood the training provided; training must be documented and signed by both the employee and supervisor; retraining programs should also be implemented.

3. Eating, drinking, smoking, storing of either food, personal belongings, or utensils, applying cosmetics, and inserting or removing contact lenses are not permitted in any laboratory; the wearing of contact lenses is permitted only when other forms of corrective eyewear are not suitable; wearing jewellery is not recommended in the laboratory.

4. Oral pipetting of any substance is prohibited in any laboratory.

5. Long hair is to be tied back or restrained so that it cannot come into contact with hands, specimens, containers or equipment.

6. Access to laboratory and support areas is limited to authorized personnel.

7. Doors to laboratories must not be left open (this does not apply to an open area within a laboratory).

8. Open wounds, cuts, scratches and grazes should be covered with waterproof dressings.

9. Laboratories are to be kept clean and tidy. Storage of materials that are not pertinent to the work and cannot be easily decontaminated (e.g., journals, books, correspondence) should be minimized; paperwork and report writing should be kept separate from such biohazardous materials work areas.

² Health Canada, Laboratory Biosafety Guidelines, 3rd Edition, 2004
10. Protective laboratory clothing, properly fastened, must be worn by all personnel, including visitors, trainees and others entering or working in the laboratory; suitable footwear with closed toes and heels must be worn in all laboratory areas.

11. Where there is a known or potential risk of exposure to splashes or flying objects, whether during routine operations or under unusual circumstances (e.g., accidents), eye and face protection must be used. Careful consideration should be given to the identification of procedures requiring eye and face protection, and selection should be appropriate to the hazard.

12. Gloves (e.g., latex, vinyl, co-polymer) must be worn for all procedures that might involve direct skin contact with biohazardous material or infected animals; gloves are to be removed when leaving the laboratory and decontaminated with other laboratory wastes before disposal; metal mesh gloves can be worn underneath the glove.

13. Protective laboratory clothing must not be worn in non-laboratory areas; laboratory clothing must not be stored in contact with street clothing.

14. If a known or suspected exposure occurs, contaminated clothing must be decontaminated before laundering (unless laundering facilities are within the containment laboratory and have been proven to be effective in decontamination).

15. The use of needles, syringes and other sharp objects should be strictly limited; needles and syringes should be used only for parenteral injection and aspiration of fluids from laboratory animals and diaphragm bottles; caution should be used when handling needles and syringes to avoid auto-inoculation and the generation of aerosols during use and disposal; where appropriate, procedures should be performed in a Biological Safety Cabinet (BSC); needles should not be bent, sheared, recapped or removed from the syringe; they should be promptly placed in a puncture-resistant sharps container (in accordance with Canadian Standards Association [CSA] standard Z316.6-95(R2000))(6) before disposal.

16. Hands must be washed after gloves have been removed, before leaving the laboratory and at any time after handling materials known or suspected to be contaminated.

17. Work surfaces must be cleaned and decontaminated with a suitable disinfectant at the end of the day and after any spill of potentially biohazardous material; work surfaces that have become permeable (i.e.,
cracked, chipped, loose) to biohazardous material must be replaced or repaired.

18. Contaminated materials and equipment leaving the laboratory for servicing or disposal must be appropriately decontaminated and labeled or tagged out as such.

19. Efficacy monitoring of autoclaves used for decontamination with biological indicators must be done regularly (i.e., consider weekly, depending on the frequency of use of the autoclave), and the records of these results and cycle logs (i.e., time, temperature and pressure) must also be kept on file.

20. All contaminated materials, solid or liquid, must be decontaminated before disposal or reuse; the material must be contained in such a way as to prevent the release of the contaminated contents during removal; centralized autoclaving facilities are to follow the applicable containment level 2 requirements.

21. Disinfectants effective against the agents in use must be available at all times within the areas where the biohazardous material is handled or stored.

22. Leak-proof containers are to be used for the transport of infectious materials within facilities (e.g., between laboratories in the same facility).

23. Spills, accidents or exposures to infectious materials and losses of containment must be reported immediately to the laboratory supervisor; written records of such incidents must be maintained, and the results of incident investigations should be used for continuing education.

24. An effective rodent and insect control program must be maintained.

**Containment Level 2**

In addition to the general practices required for all laboratories handling infectious substances, the following describe the minimum operational practices required for containment level 2.

1. Good microbiological laboratory practices intended to avoid the release of infectious agents are to be employed.
2. BSCs must be used for procedures that may produce infectious aerosols and that involve high concentrations or large volumes of biohazardous material. Laboratory supervisors, in consultation with the Biological Safety Officer/Institutional Biosafety Committee, should perform a risk assessment to determine which procedures and what concentrations and volumes necessitate the use of a BSC.
3. Appropriate signage indicating the nature of the hazard being used (e.g., biohazard sign, containment level) must be posted outside each laboratory; if infectious agents used in the laboratory require special provisions for entry, the relevant information must be included on the sign; the contact information of the laboratory supervisor or other responsible person(s) must also be listed.

4. Entry must be restricted to laboratory staff, animal handlers, maintenance staff and others on official business.

5. All people working in the containment area must be trained in and follow the operational protocols for the project in process. Trainees must be accompanied by a trained staff member. Visitors, maintenance staff, janitorial staff and others, as deemed appropriate, must also be provided with training and/or supervision commensurate with their anticipated activities in the containment area.

6. Emergency procedures for spill clean-up, BSC failure, fire, animal escape and other emergencies must be written, easily accessible and followed. A record must be made of other people entering the facility during an emergency.