Biological Safety

BIO Seminar
August 27th, 2015
Biohazard

• ALL biological tissue or fluids
  – bone, tendon, cartilage, heart
  – Any liquid that looks like blood or body fluid should be treated as biohazard!

• Biohazard areas
  – Room 118, 203, 207, 211, and 216
CDC/NIH Guidelines: Levels

• BSL1
  – Agents not known to cause disease

• BSL2
  – Agents associated with human disease

• BSL3
  – Indigenous/exotic agents associated with human disease and with potential for aerosol transmission

• BSL4
  – Dangerous/exotic agents of life threatening nature
Biosafety Level 2 (BSL-2)

- Work with moderate-risk microorganisms and agents (i.e. Hepatitis B virus, HIV, salmonella)
- Basic level of containment:
  - Standard microbiological practices
  - Secondary barriers (i.e. hand washing sinks, segregated waste, BSCs available)
  - Special practices (i.e. immunization program, access controls)
Standard Lab Practices

BSL 1-4

- Limit access
- Wash hands frequently
- No eating, drinking, etc. in lab
- No mouth pipetting
- Handle sharps carefully
- Contain hazardous materials & aerosols
Standard Lab Practices

**BSL 1-4**

- Decontaminate work areas
- Decontaminate waste materials
- Post hazard warning signs on equipment.
  - Levels 2 – 4 require signage on door
- Personnel must be trained
- Wear PPE; leave in lab
- Develop/follow SOPs
Standard Lab Practices

**BSL 2**

- *Lab safety manual developed which includes IBC Protocols*
- *Lab users must demonstrate work proficiency*
- *Medical surveillance program in place*
- *Incidents immediately treated, reported and evaluated*
- *Aerosol generating procedures done in a BSC or other containment device*
- *Transport containers used between labs*
- *Laboratory equipment decontaminated routinely*
Transportation

• Biological samples **MUST** be in closed containers **WITHOUT** wearing gloves
  – Remember, Hallways are **CLEAN**!
  – *Containers are safe* to handle without gloves – A *secondary container* may have to be used to keep primary container clean

• Human samples for the micro-CT
  – In closed covered containers
  – Place the biohazard sign next to the scanner
Personal Protective Equipment

• Volunteer Time!!
  – Proper Dress Attire for the Lab
Personal Protective Equipment

• Gloves are required anytime you are handling chemicals, biological and/or radioactive materials
• Eye protection must be used at ALL TIMES
• Lab coats must be worn
• Open toed shoes do not protect your feet and ARE NOT allowed in the laboratory. (NO FLIP FLOPS, SANDALS, CROCs)
• Tie back long hair
Cleanliness

- All equipment should be cleaned after use
  - **EACH TIME, EVERY TIME**
  - Work in Progress (WIP)
    - Name, Date, Time, Email, Phone Number

- Bleach solution to clean all tools and surface exposed to biological fluid
  - Use blue mats on surfaces
Biological Waste Removal

• Sharps Containers
  – Hypodermic needles, Scalpels, Containers are found in EACH ROOM

• Red Biohazard Bags
  – MUST store in freezer in Room 207
  – Known animal tissues should be placed in brown bags and placed in dumpster (not left in laboratory trash cans!!)
Biological Waste

- Render innocuous all infectious waste through:
  - Autoclaving
  - Treatment with bleach (5% sodium hypochlorite solution)
- Only then can it be discarded as regular trash
  - Labeled “Safe for Trash” in a dark bag

https://riskmanagement.nd.edu/assets/135228/infectious_waste_procedure_final.pdf
Biological Emergencies

1. Assess area of spill
2. Put on appropriate PPE
3. Remove sharps or solid lumps with tongs or forceps and place into sharps container
4. Cover entire spill with paper towels or another appropriate absorbent material
5. Remove bulk of spill as necessary and replace paper towels over spill area
Biological Emergencies

6. Saturate paper towel with disinfectant
7. Allow to sit for 20-30 minutes
8. Remove paper towels and place into biohazard bag
9. Remove and contaminated PPE and place into biohazard bag
10. Add 200 ml of water to bag, seal, label, and autoclave
Injury and First Aid

• If you cut yourself
  – WASH YOUR HANDS with soap and water
  – Use First aid
  – Go to health services

• If you cannot stop the bleeding or cut is too large
  – CALL EMERGENCY
    • 911 from campus phone
    • 631-5555 from cell phone

• Marked First Aid kits can be found in each room

Report ALL injuries to Lab Manager
BioSafety Conclusions

- Wear appropriate PPE
- Wash hands
- Get help and ask questions when needed
- Keep your work area clean
- If you *must* walk away, leave a note
- For more information:
  https://riskmanagement.nd.edu/assets/33594/ndbiosafetymanual2010.pdf
Cell Culture
Lab and Biosafety

August 27\textsuperscript{th}, 2015
Rm 203A/B – The Basics

• Cell culture and multiple assays are conducted in these rooms
• Sterility and cleanliness are very important
  – No food, no drinks
• Do not assume any surface is clean
  – Wear proper PPE
Cell Waste

– Any tissue or cells, or anything that has *touched* tissue, cells or a cell suspension is considered BIOHAZARD WASTE

– There are FIVE different trash receptacles for biohazard waste in 203/203A; each has a particular purpose. The information below outlines where to dispose of each biohazard item:
Cell Waste

- **GLASS disposal box:**
  - For glass
    - Aspirator tips, vials, slides

- **BIOHAZARD bin with lid:**
  - For culture plastic that has been in contact with live cells
    - Centrifuge tubes (µ-, 15 mL, 50 mL)
    - Used culture flasks, dishes and plates

- **Serological Pipette Waste:**
  - Pipets in contact with serum media
Cell Waste-Cont’d

• Sharps Container
  – For non-glass sharps (ie: needles and syringes, razor blades, etc)

• Bleach Trap
  – To right of hood
  – For used culture medium and solutions that contacted cells
Cell Waste-Cont’d

- Serological Pipettes
- BIOHAZARD bin
- Glass Waste
- Bleach Trap
- Trash
Fume Hood

• For histological staining and fixation
  – CLOSE the fume hoods when not in use

• Keep working surfaces as clean as possible
Liquid Nitrogen

- **Liquid Nitrogen (Gas Cage)**
  - *Only use the liquid nitrogen tanks after you have received one-on-one training from a lab manager!*
  - Goggles, Lab Coat, Freezer Gloves, Shoes **MUST** be worn when working with liquid nitrogen!
  - Door must be left open for ventilation.
  - Should always have someone else (who is also trained) informed when using LiNi
Autoclaving

• Only use the Autoclave after receiving one-on-one training from a lab manager!
General Advice

– LABEL EVERYTHING: Contents, concentration, name and date
– If applicable: pH, expiration date, sterility
Be Smart

- Working with a piece of equipment?
  - **TELL** someone
- Not sure about a piece of equipment?
  - **DO NOT** use it
- Need to use a piece of equipment?
  - **ASK** someone to properly teach you
Emergency Phone Numbers

• Security  911 or 1- 5555
• Risk Management & Safety  1-5037
• ND Fire  1-6200