Biological Waste Disposal for the 14th floor (yellow containers)

1. **Definition:**
    a. Biological waste includes:
        i. liquids such as used cell culturing media, supernatant, blood or blood fractions (serum), etc., which contain viable biological agents;
        ii. materials considered pathological, including any part of the human body, tissues and bodily fluids, but excluding fluids, extracted teeth, hair, nail clippings and the like that are not infectious;
        iii. any part of an animal infected [or suspected to be infected] with a communicable disease;
        iv. non-sharp, solid laboratory waste (empty plastic cell culture flasks and petri dishes, empty plastic tubes, gloves, wrappers, absorbent tissues, etc.) which may be, or is known to be, contaminated with viable biological agents;
        v. all sharp and pointed items used in medical care, diagnosis, and research, including the manipulation and care of laboratory animals, which should be considered potentially infectious;
        vi. Laboratory glassware which is known or suspected to be contaminated with hazardous biological agents.

2. **Responsibility:**
    a. Laboratories which manipulate potentially hazardous biological agents and materials, and generate waste containing such agents are responsible for the separation, packaging and treatment of their laboratory waste prior to its removal and disposal.

3. **Precaution:**
    a. Materials contaminated with hazardous biological agents must be collected in the appropriate containers and sterilized or disinfected before disposal.
        i. Never Autoclave Yellow Bio Waste plastic 20 litre pails: it will damage the autoclave and ruin the integrity of the pail!
        ii. Do not autoclave mixed waste i.e., laboratory waste contaminated with a combination of viable biological and hazardous or radioactive agents. Refer to [https://ehs.utoronto.ca/laboratory-hazardous-waste-management-and-disposal-manual/mixed-waste] for more information.

4. **Storage:**
    a. Liquids containing Biohazardous Agents:
        i. Collect in leak-proof containers such as flasks or bottles
        ii. To autoclave, use liquid waste containers designed to withstand autoclaving temperatures.
        iii. Do not seal containers while autoclaving
    b. Solids containing Biohazardous Agents

i. Collect in the Bio Waste plastic 20 liter pail:
   - Non-sharp, solid laboratory waste (empty plastic cell culture flasks and petri dishes, agar plates, plastic tubes, gloves, wrappers, absorbent tissues, etc.)
   - For laboratories generating large volumes of agar gel in disposable petri dishes and tubes requiring sterilization, such waste should be collected in a yellow Bio Waste plastic 20 litre pail in the laboratory. After sealing the pail and filling in the tag, the pail must be placed beside other waste awaiting removal by EPS.
     NOTE: Autoclave bags filled with plastic ware containing agar gel tend to leak fluids during and after sterilization. The pail will contain the liquids released by the agar gel.

   - These plastic pails display the biohazard warning symbol and are available in the 14th floor waste disposal area near door 1472. If additional pails are required, please inform admin.tbep@utoronto.ca or reception.tbep@utoronto.ca

5. **Treatment Methods:**
   a. When necessary for safety reasons, inactivate the biological agents by either chemical disinfection or autoclaving (the most reliable and preferred method)

6. **Disposal**
   a. Liquid waste:
      i. After autoclaving or chemical disinfection, innocuous liquids may be disposed through the lab drainage system. Flush with sufficient clean water to purge the drain immediately after disposal of all liquids
      ii. Do **NOT** pour melted agar into sink or floor drains
   b. Solid Waste:
      i. Seal the pail with the rubber mallet, then fill in the tag with the lab's name and biosafety certificate number
      ii. Place the pail in the pickup zone (inside door 1472)

      NOTE: Pails that are not labelled as prescribed above will not be picked up by EPS.

7. APPENDIX

UNIVERSITY OF TORONTO

ENVIRONMENTAL HEALTH & SAFETY

Waste Information and Procedures for Bio Labs:

These procedures should be incorporated into your written SOPs (general tissue culture, etc.) and all personnel must be trained on your lab's waste procedures. This training must be documented and proficiency in the procedures verified.

Note: the procedures outlined below may need to be modified if for example the biological waste was also contaminated with chemicals or radioisotopes.

a) RG1 liquid waste: treat with a final of 1 % sodium hypochlorite for a minimum of 30 minutes or use disinfectant and contact time that is based on experimental validation of efficacy for your specific bio agent, before disposal into the sink. Or autoclave at 121 degrees Celsius for at least 20 minutes, once cooled dispose by pouring down sink. Do not autoclave bleach.

b) RG1 solid waste: autoclave at 121 degrees Celsius for at least 20 minutes and then dispose as regular garbage or as directed by Environmental Protection Service (EPS).

c) RG2 liquid waste: treat with a final of 1 % sodium hypochlorite for a minimum of 30 minutes before disposal into the sink or use disinfectant and contact time that is based on experimental validation of efficacy for your specific bio agent. Appropriate decontamination procedures can be obtained from product information sheets, Pathogen Safety Data Sheets (PSDS), etc. It is important to ensure that the appropriate dilution of the active ingredient (for example sodium hypochlorite in bleach) is used to decontaminate liquid waste and the contact time for complete decontamination is achieved.

d) RG2 solid waste: place in yellow biohazard buckets lined with yellow bags provided by EPS (see below for contact information)

e) Viral vectors and aerosolisable bioagents require more stringent waste procedures. All contaminated material (both liquid and solid (ex pipet tips, tubes, flasks, plates etc.)) must be fully decontaminated within the BSC prior to removal using the appropriate disinfectant (i.e. final 1% sodium hypochlorite or other suitable disinfectant as determined by the permit holder's risk assessment based on information from product sheets or PSDSs). Solid waste should have a contact time with the disinfectant of a minimum of 30 minutes. Disinfectant is then to be poured off and solid waste placed in biohazardous waste containers supplied by EPS. For any liquid waste follow the instructions above for RG2 liquid waste.

f) DNA Staining reagents (e.g. ethidium bromide, Redsafe): gels, tips and buffers to be disposed as chemical waste. Local municipal laws do not allow for disposal down drains.

g) Toxins and Human tissues: Some biologicals (medical waste) and some toxins for example cholera toxin, require incineration. There are designated incineration waste containers supplied by EPS for these agents and any material contaminated with them. If working with human tissue or toxins contact the Manager of Environmental Protection Service (EPS) for instructions (see below for contact information).

h) Animal tissues need to be returned to the animal facilities for incineration. Contact your animal facility for instructions and waste containers.

i) Plant pathogens/pests listed by the Canadian Food Inspection Agency (CFIA) and any material contaminated with them (plants, soil, pots etc.) though designated as RG1 is to be disposed of as RG2 material. Contact EPS for instructions and waste containers. For a list of Pests Regulated by Canada: http://www.inspection.gc.ca/plants/plant-pests-invasive-species/pests/regulated-pests/eng/1363317115207/1363317187811

j) GMOs: All genetically modified organisms (GMOs) including any invertebrates, plants and any of their products (i.e. germ cells – pollen, spores, etc.) must be rendered non-viable before disposal. Discuss your waste procedures with your HSO, a risk assessment must be completed by the investigator.

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k) Non-Native Species: Any non native organisms including any invertebrates, plants or their products must not be released into the environment. Discuss your waste procedures with your HSO, a risk assessment must be completed by the investigator.

l) Soil: All untreated soil that is foreign (from any other country) and from regulated areas in Canada must be sterilized prior to disposal. See CFIA directive D-95-26 for more information and approved sterilization methods. Discuss your disposal procedures with EPS. http://www.inspection.gc.ca/plants/plant-pests-invasive-species/directives/date/d-95-26/eng/1322520617862/1322525442569#a15d

m) All other waste (e.g. chemical, radioisotopes) or if you have any questions about mixed waste:

To set up a pickup service and request chemical/biological waste buckets call the Environmental Protection Technicians (EPTs) directly at 946-3473 or email hazwaste.ehs@utoronto.ca . If you have any questions on hazardous material disposal/waste, please contact Rob Provost (rob.provost@utoronto.ca) the Manager of our Environmental Protection Service (EPS).

EPS website: https://ehs.utoronto.ca/our-services/environmental-protection-services/

There is a summary guide for the packaging and handling of hazardous and nonhazardous waste here: https://ehs.utoronto.ca/laboratory-hazardous-waste-management-and-disposal-manual/summary-guide-for-packaging-handling-hazardous-waste/

Training on Hazardous Waste Management at UofT:

A short online course (EHS803) is available. This course is meant to help you get an understanding of how Chemical, Radiation and Biological wastes are handled at University of Toronto including supplies and services available, plus where to get more information and have questions answered. For information about taking this course please go to:
https://ehs.utoronto.ca/our-services/environmental-protection-services/eps-training-presentations/

Some quick facts about Bleach:

1. Active ingredient is sodium hypochlorite.
2. Bleach stocks come in a variety of different concentrations of sodium hypochlorite, from as low as 3% up to 12% for some industry brands.
3. Lab members MUST know the concentration in their stock to be able to calculate the final dilution of sodium hypochlorite. For example, if your bleach stock is 6% then 100 ml. of bleach stock can be added to 500 ml. of fluid to result in 600 ml. of 1% sodium hypochlorite (dilution often used for spills). Lab SOPs should state the final dilution of sodium hypochlorite required for disinfection NOT the % of bleach (since bleach stocks are so variable).
4. Diluted bleach breaks down very quickly and must be remade fresh every 24 hours.
5. Bleach is very corrosive, if using 0.5% or higher of sodium hypochlorite to disinfect surfaces then be sure to rinse them after the required contact time (usually 20 – 30 minutes depending on organism).
6. Bleach must never be autoclaved (can cause chlorine gas to be released).

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8. Reference:

a. https://ehs.utoronto.ca/laboratory-hazardous-waste-management-and-disposal-manual/biological-waste-disposal/