

Case Western Reserve University  
Department of Environmental Health & Safety

CWRU Biosafety Manual

*Special Considerations for Recombinant or Synthetic Nucleic Acids*

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Background/NIH

Experiments which utilize recombinant or synthetic nucleic acids that alter gene expressing in cell culture, animals or humans are regulated by the National Institutes of Health, Office of Science Policy (NIH OSP). These materials are considered to be biohazards by the NIH, Centers for Disease Control (CDC) and CWRU. Information regarding these regulations can be found in the *NIH Guidelines for Research Involving Recombinant or Synthetic Nucleic Acids (NIH Guidelines)*. As described in the NIH Guidelines, such research must be reviewed and approved by the CWRU Institutional Biosafety Committee (IBC). This portion of the CWRU Biosafety Manual addresses these experiments and procedures explicitly.

Risk Assessments/ ECPs

All laboratories utilizing recombinant or synthetic nucleic acids (further referred to as 'recombinant materials')













3. Contain the spill and decontaminate. All workers using the Biosafety Cabinets should have a supply of absorbent materials and decontaminating agent within the cabinet. This avoids the need to withdraw your arms from within the cabinet should a spill occur and allows you to decontaminate yourself prior to leaving the cabinet.
4. Wear appropriate personal protective equipment during decontamination procedure. The spill should be covered with paper towels or other absorbent materials soaked with a proven decontamination agent (e.g., 1:10 dilution of bleach containing sodium hypochloride) for 15 to 20 minutes.

NOTE: A 10% bleach solution will eradicate most infectious agents. One exception is prions including the select agent bovine spongiform encephalopathy (BSE), or Mad Cow Disease. Decontamination of this infectious substance requires a 40% household bleach solution or a 1N NaOH solution, which must remain in contact with this infectious material for at least one hour.

5. Use paper towels to wipe up the spill, working from the edges into the center.
6. Place paper towels in a red or orange biohazard bag containing the proper universal biohazard label.
7. Thoroughly rinse area with water using clean paper towels or other absorbent materials and dry.
8. Decontaminate equipment and utensils. Items that are not readily or easily surface decontaminated should be carefully placed into autoclave bags and removed for further treatment (e.g., decontamination by autoclaving or other approved methods).
9. Contaminated gloves and clothes must be decontaminated or properly disposed of after decontamination of area is complete.
10. Remove protective gear. Individuals involved in the spill and clean-up should remove protective clothing (either disposing as biohazardous waste or decontaminating), wash their hands and face with an appropriate decontamination soap, and report to the University's Health Services or the University Hospital Emergency Room for any required evaluation or follow-up.

#### Spills outside biological safety cabinet

Biological spills outside biological safety cabinets will generate aerosols that can be dispersed in the air throughout the laboratory. Appropriate protective equipment is particularly important in decontaminating spills involving microorganisms.

This equipment includes lab coat with long sleeves, back-fastening gown or coveralls, disposable gloves, disposable shoe covers, and safety goggles and mask or full-face shield. Use of this equipment will prevent contact with contaminated surfaces and protect eyes and mucous membranes from exposure to splattered materials. For minor spills (less than 10 ml and generating little aerosol) on equipment, laboratory benches, walls, or floors:

1. Close laboratory doors and post warning signs to prevent others from entering the laboratory.
2. Thoroughly wash hands and other apparently contaminated areas with soap and water.





9. Let decontamination solution / microorganism mixture stand for 30 minutes or longer to allow adequate contact time.
10. Wipe up the spill with the soaked paper towels and properly dispose of towels.
11. Remove all PPE immediately upon leaving the work area and as soon as possible if overtly contaminated. Contaminated PPE must either be DISPOSED of as biohazardous waste or properly decontaminated.

If using an autoclave, BE CAREFUL that strong oxidizers do not come in contact with organic materials (See Point 10 of "Autoclaves" under "Equipment" in Chapter 5).

12. Thoroughly wash hands, face, and other apparently contaminated areas. Special care in decontamination may be necessary. The PI and/or the University Biosafety Officer may require the collection of sample cultures to determine that the area has been effectively decontaminated.

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#### Fire Fighting Procedures

Personal safety is each worker's primary concern in the event of fire.

1. Upon learning of the threat of fire within the building, laboratory personnel will, to the extent possible:
  - a. Turn off all gas burners, biological safety cabinets, electric motors, and other electrical equipment.
  - b. Place containers of infectious materials into autoclaves, incubators, refrigerators, freezers or other storage areas.
  - c. Leave the laboratory as quickly as possible using designated fire evacuation routes.
2. Personnel should be trained by the acting University Fire Marshall in the operation of fire extinguishers.