Biological Laboratory Safety
REHS supports Rutgers University by providing comprehensive and professional health, safety and environmental services to the University community.

- Protect Rutgers employees, students and visitors.
- REHS ensures compliance with government regulations.
Regulatory Agencies

The safety standards and practices described here have been developed and are regulated by government agencies including:

- **CDC** (Centers for Disease Control)
- **NIH** (National Institutes of Health)
- **WHO** (World Health Organization)
- **OSHA** (Occupational Safety and Health Administration)
Lab Safety

- Safe Laboratory Practices
  - Lab coats
  - Safety glasses
  - Proper footwear
  - Hair back
  - No food or drink in the laboratory
  - No gum chewing
  - No application of lipstick or lipbalm
Biohazard

- An agent of biological origin that can cause disease in humans
  - Microorganism
  - Toxin
  - Allergen
Biosafety

The combined use of
- laboratory practices,
- laboratory facilities and
- safety equipment
to work with potentially infectious microorganisms.
Why use biosafety practices?

To protect:

- Workers/Students
- Products/Experimental results
- Environment/Laboratory classroom
Biosafety Levels

- BL-1: agents are not known to cause disease
- BL-2: agents are associated with human disease
- BL-3: agents are associated with human disease and are potentially transmitted as aerosols
- BL-4: agents of life threatening nature
Biosafety Level 1 (BL-1)

Use BL-1 when working with:
- Well characterized agents
- Agents that are not known to cause disease in health humans
- Agents that are of minimal hazard to lab personnel and the environment

**ALL ORGANISMS USED IN GENERAL MICRO ARE LEVEL 1 AGENTS**

**Examples of BL-1 Agents:**
- *E. coli* JM109, DH5a
- *Saccharomyces cerevisiae*
Biosafety Level 1 (BL-1)

Standard Work Practices

- Use mechanical pipetting devices
- Wash hands frequently
- Minimize splashes and aerosols
- Decontaminate work surfaces daily
- Handle wastes properly
- Maintain insect and rodent control program
Biosafety Level 2 (BL-2)

Use BL-2 practices when working with:

- Agents of moderate potential hazard to personnel and the environment

Examples of BL-2 agents:

- Human blood or body fluids
- *E. coli* 0157:H7
- *Clostridium botulinum*
- Retroviral vectors
- Human cells in cell culture
Biosafety Level 2 (BL-2)

- Adequate illumination
- Eyewash facility
- Negative air pressure
- Autoclave available
- Biological safety cabinet
- Lab must be separated from public areas
Biosafety Cabinets (BSCs)

- Provide product, personal and environmental protection.
- Various classes of BSCs are available
  - Amount of air exhausted
  - Amount of employee protection
Decontamination

Methods

- Heat: steam heat, dry heat, incineration
- Chemical: bleach, ethanol, hydrogen peroxide, ethylene oxide, paraformaldehyde
- Radiation
Biological Waste

**BL-1 Waste**

- **Solids**
  - Collect and package in clear autoclave bags
  - Autoclave to sterilize
  - Dispose of in regular trash dumpster (as long as no chemical or radioactive contaminants are present)

- **Liquids**
  - Collect in containers with lids
  - Autoclave or treat with 10% bleach to sterilize
  - Dispose of down the drain (as long as no chemical or radioactive contaminants are present)
Biological Waste

Special Practices

- Place used slides and coverslips in sharps containers, never in any other receptacle.

- Sharps containers are:
  - Red in color
  - Marked with the biohazard symbol
  - Puncture resistant
  - Leak proof
Biosafety and REHS

Protocol Approval

REHS provisionally approves experimental protocols.

- All protocols must be approved if they involve:
  - recombinant DNA,
  - non-recombinant human, animal or plant pathogens,
  - human cell culture,
  - human tissue/blood experiments

- Laboratory inspections

- RU Biosafety Committee provides final approval to protocols