XIII. Laboratory Safety

Microbiology laboratories pose special risks to persons working in or near them. Laboratory workers must take proper precautions to minimize the risks to themselves and others. Most laboratory-acquired infections can be attributed to one or more of the following common hazardous procedures:

1) Procedures that produce aerosols and constitute inhalation risks. For example, streaking agar plates, pipetting, centrifugation, homogenization, flaming loops, opening cultures;
2) Procedures that may allow ingestion, such as mouth pipetting or handling specimens, smears and cultures;
3) Procedures that may allow inoculation through the skin with equipment such as hypodermic needles or Pasteur pipettes, or with broken glassware;
4) Procedures that involve direct contact with infectious materials or infected animals.

Every laboratory should adopt a code of biosafety principles and safe work practices. This code must be supported by management and enforced by the laboratory director. It must be strictly adhered to by visitors and workers.

A safety or operations manual should be prepared and should identify known and potential hazards and specify practices and procedures to minimize or eliminate such risks. Personnel should be advised of special hazards and be required to read and follow standard practices and procedures. The following are basic biosafety practices that should be universally applied in microbiology laboratories and should be part of the laboratory biosafety procedures:

1) No mouth pipetting
2) No eating, drinking, smoking, storing food, and applying cosmetics in the laboratory work area
3) Keep the laboratory neat, clean, and free of unnecessary materials
4) Decontaminate work surfaces at least once a day and after each spill of viable or potentially infectious material
5) Wash hands with soap and water after handling infectious materials and animals and when leaving the laboratory
6) Minimize the creation of aerosols during laboratory procedures; conduct procedures that may cause a potentially infectious or hazardous aerosol in a biosafety cabinet or a chemical fume hood with appropriate filters

7) Decontaminate contaminated liquid or solid wastes before disposing or otherwise handling
8) Wear laboratory coats, gowns, or uniforms in the laboratory, but not in public areas
9) Always wear safety glasses, face shields, gloves, or other protective devices when appropriate
10) Only persons who have been advised of the potential hazard and meet specific immunization and other entry requirements should be allowed to enter the laboratory
11) Keep doors closed when work is in progress and control access to the laboratory
12) Do not admit to the laboratory persons at increased risk for infection or for whom infection may be unusually hazardous, such as children, pregnant women, and immunocompromised individuals
13) Restrict the use of hypodermic needles and syringes to parenteral injection and aspiration of fluids from laboratory animals and diaphragm vaccine bottles. Other restricted uses may be permitted if approved by the laboratory director. Do not recap needles and syringes before disposal in a container designed for sharps disposal. Do not substitute hypodermic needles and syringes for automatic pipetting devices in manipulating infectious fluids
14) Report spills, accidents, and overt or potential exposures to infectious materials to the laboratory supervisor immediately
15) When handling human sera, follow procedures for prevention of laboratory infections from bloodborne pathogens

References

1. Centers for Disease Control and Prevention, National Institutes of Health. Biosafety in Microbiological and Biomedical Laboratories. 3rd ed. Washington, DC: US Government Printing Office, stock no. 017-040-00523-7, 1993.
2. National Research Council. Biosafety in the Laboratory: Prudent Practices for the Handling and Disposal of Infectious Materials. National Academy Press, Washington, DC, 1989.