

Chapter 2 – TRAINING AND INFORMATION RESOURCES

This chapter describes training and information resources to assist the MU community in working safely with biohazardous materials. Classification of biohazardous materials is included in this chapter.

2.1 Training Policies

All persons working with biohazardous materials must have appropriate training (EHS provided):

- Registered User (on-site) training is required for Principal Investigators (PIs) involved in BSL-1 recombinant or synthetically derived nucleic acid molecule research and BSL-2 or higher biohazardous materials activities. Once initial training is completed, an on-line Registered User Refresher is required every three years.
- MU Recombinant and Synthetic Nucleic Acid Molecule Training (on-line ONLY) is required for all personnel involved in recombinant or synthetically derived nucleic acid molecule research activities. Once initial training is completed, this training must be repeated every three years. As of 1/1/2014 the training is required for all laboratory staff listed on IBC protocol submissions involving recombinant or synthetically derived nucleic acid molecule research activities (Recombinant DNA).
- MU Introduction to Biosafety (classroom) training is required for all personnel involved in BSL-2 or higher biohazardous material activities. Once initial training is completed, an ON-LINE MU Biosafety Refresher is required every three years.
- MU Introduction to Laboratory Safety (classroom) training is required for all personnel working in MU laboratories. Once initial training is completed, refresher training is required every three years.
- MU Chemical Management online training is required for all personnel working in MU laboratories. Once initial training is completed, refresher training is required every three years.
- MU Blood Borne Pathogens (on-line ONLY) training is required for all personnel involved in work with human blood/tissues/cell lines and/or certain human bodily fluids. Once initial training is completed, this training must be repeated annually.
- Specialized biosafety training is available: BSL3/ABSL3 containment, Select Agents and Toxins, Regulated Medical Waste Shipment, Autoclave Safety, Use of Biological Safety Cabinets, and others.
- All persons working with or around biohazardous material(s) must have appropriate training (PI provided): The Principal Investigator is responsible for determining the type of training for every individual based on their contact with the research project.
- Written documented instruction in the biohazard risk assessment, including:
 - ◀ safe microbiological practices and techniques
 - ◀ biosafety entry controls and biohazard containment procedures;
 - ◀ the meanings of the various signs, signals or other controls used;
 - ◀ the biohazards and precautions to be taken;
 - ◀ applicable directives (including this manual), policies and emergency procedures;
 - ◀ recognition and prevention of dangerous situations and/or exposures;
 - ◀ symptoms (acute and chronic) of potential exposures.
 - ◀ specific preventative control methods and requirements of their work and work area.

Use the Biohazard Worker Training Validation form ([Appendix O](#)) to document this training and maintain document in your Laboratory-Specific Biosafety Manual. This is NOT a replacement for Institutional Biosafety Committee required training – Introduction to Biosafety or rDNA Biosafety Level 1 Research Practices.

2.2 Biosafety Training Courses Provided by EHS

EHS provides the following training courses for those involved with biohazardous materials.

- Biohazard User Introduction

- Recombinant and Synthetic Nucleic Acid Molecule Training (rDNA)
- Introduction to Biosafety
- Biosafety Refresher
- Bloodborne Pathogen Safety Initial and Annual
- Regulated Medical Waste Shipping
- Category A, B, Genetically Modified and Patient Specimens Shipping (optional)
- Category B, Genetically Modified and Patient Specimens Shipping (optional)
- Biohazard Awareness for Ancillary Workers (optional)
- Biological Safety Cabinet Training (optional)

REQUIRED TRAINING COURSES	NEW MU STAFF MEMBER					PREVIOUSLY TRAINED MU STAFF MEMBER				
	PI		LAB WORKER		ANCILLARY WORKER*	PI		LAB WORKER		ANCILLARY WORKER*
Biosafety Level	BSL1 ABSL1	BSL2/3 ABSL 2/3	BSL1 ABSL1	BSL2/3 ABSL 2/3	ALL	BSL1 ABSL1	BSL2/3 ABSL 2/3	BSL1 ABSL1	BSL2/3 ABSL 2/3	ALL
Registered User Introduction (PI Office)	Initial	Initial								
Recombinant and Synthetic Nucleic Acid Molecule Training (rDNA) (On-line ONLY)	Initial	Initial	Initial	Initial		Triennially	Triennially	Triennially	Triennially	
Introduction to Biosafety (Classroom)				Initial						
Biosafety Refresher (On-line)							Triennially		Triennially	
Introduction to Laboratory Safety (Classroom)	Initial	Initial	Initial	Initial						
Introduction to Laboratory Safety Refresher (On-line)							Triennially		Triennially	
Chemical Management (On-line)	Initial	Initial	Initial	Initial			Triennially		Triennially	
Bloodborne Pathogen Safety (On-line ONLY)		Initial		Initial			Annually		Annually	
Regulated Medical Waste Shipping (Website ONLY)	Initial	Initial	Initial	Initial		Triennially	Triennially	Triennially	Triennially	

*NOTE: Ancillary Workers are defined in Section 1.5.3 above.

These courses are provided to general audiences or can be customized to the specific needs of individual departments or work groups. EHS also provides training to meet related departmental needs or interests upon request

2.3 Schedules and Registrations

The current MU EHS training course schedule can be found at: <http://mubsweb.missouri.edu/ehsweb/training/>. Registration can be completed at the same site. If a course is not available at a convenient time, contact EHS (882-7018) to make other arrangements.

2.4 Classifications of Biohazardous Materials

Proper classification of biohazardous material is the first step of the risk assessment process. The resources listed below can assist users in identifying and understanding risk factors associated with the specific biohazardous material used. In addition to the classifications of biohazardous materials below, please refer to [Section 4.3.3 Risk Assessments for the "Biohazardous Materials Risk Assessment Checklist"](#) which is a practical guide to risk assessment resources in the biosafety manual.

Infectious Agents and Biological Toxins

- University of Missouri Department of Environmental Health & Safety Biosafety Webpage
<http://ehs.missouri.edu/bio/index.html>
- MU IBC Policy Statement on Toxins of Biological Origin
<http://ehs.missouri.edu/bio/ibc/ibc-biotoxins.html>
- MU IBC Policy Statement on Human/Nonhuman Primate Cell Lines
<http://ehs.missouri.edu/bio/ibc/ibc-humancellines.html>
- MU IBC Guidelines for Core Facilities
<http://ehs.missouri.edu/bio/ibc/ibc-corefacility.html> and
<http://ehs.missouri.edu/bio/forms/bio-corefacilityreview.doc>
- Biosafety in Microbiological and Biomedical Laboratories – 5th edition (BMBL)
◀ Prudent Biosafety Level 1-4 practices, procedures, and facilities described for manipulations of infectious agents in laboratory settings and animal facilities.
<http://www.cdc.gov/biosafety/publications/bmb15/index.htm>
- World Health Organization (WHO) Laboratory Biosafety Manual 3rd edition
◀ The third edition of WHO *Laboratory biosafety manual* is a helpful reference and guide to nations that accept the challenge to develop and establish national codes of practice for securing microbiological assets, ensuring their availability for clinical, research & epidemiological purposes.
<http://www.who.int/csr/resources/publications/biosafety/Biosafety7.pdf>
- Public Health Agency of Canada Infectious Substances Material Safety Data Sheets (MSDS)
◀ The intent of this document is to provide a safety resource for laboratory personnel working with biohazardous materials.
<http://www.phac-aspc.gc.ca/msds-ftss/index-eng.php>
- American Biological Safety Association Risk Group Classification for Infectious Agents
◀ Risk group classifications that are primarily used in the research environment as part of a comprehensive biosafety risk assessment.
<http://www.absa.org/riskgroups/index.html>

- CDC Select Agents Regulation (42 CFR 73.0)
 - ◀ Registration program for infectious agents and biological toxins designated as “Select Agents”.
 - Note: University of Missouri is registered with the CDC rather than APHIS. CDC Select Agents Regulations (42 CFR Part 73) (published October 16, 2008)*
 - <http://www.selectagents.gov/Regulations.html>
- Office of Biotechnology Activities (OBA) Dual Use Research
 - ◀ The Dual Use Research Program is a focal point for the development of policies addressing life sciences research that yield information or technologies with the potential to be misused to threaten public health or other aspects of national security.
 - <http://osp.od.nih.gov/office-biotechnology-activities/biosecurity/dual-use-research-concern>
- U.S. Occupational Safety and Health Administration (OSHA) Blood-borne Pathogens Standard (29 CFR 1910.1030)
 - ◀ Covers human blood, other potentially infectious human body fluids or tissues and human cell lines.
 - http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10051
- U.S. Public Health Service (USPHS) Foreign Quarantine (42 CFR 71)
 - ◀ CDC Importation Permits for Etiologic Agents
 - <http://www.cdc.gov/od/eaipp/>

Recombinant or Synthetic Nucleic Acid Molecules

- NIH Guidelines for Research Involving Recombinant or Synthetic Nucleic Acid Molecules (NIH Guidelines)
 - ◀ NIH requirements for Campus Research with recombinant or synthetic nucleic acid molecules in humans, animals, and plants.
 - <http://osp.od.nih.gov/office-biotechnology-activities/biosafety/nih-guidelines>
- MU Campus Institutional Review Boards (IRBs)
 - ◀ The Campus IRB is comprised of a diverse membership with the scientific expertise and regulatory knowledge to review human subject research activities primarily from the Behavioral and Social Sciences research community.
 - <http://research.missouri.edu/cirb/>
 - ◀ The mission of the Health Sciences Institutional Review Board is to protect persons participating in research. The HSIRB maintains this focus through processes and training to assist faculty and staff to develop a successful project wherein the benefits outweigh the risks to participants.
 - <http://research.missouri.edu/hsirb/index.htm>
- USDA Introduction of Genetically Engineered Organisms Regulations (7 CFR 340)
 - ◀ Biotechnology transport/introduction permits issued by APHIS Biotechnology and Scientific Services--Biotechnology Quality Management System (BWMS)
 - <http://www.aphis.usda.gov/wps/portal/aphis/ourfocus/biotechnology>

Animal or Animal Products

- MU IBC Policy Statement on Transgenic Animals
 - <http://ehs.missouri.edu/bio/ibc/ibc-transgenicanimals.html>

- MU Animal Care and Use Committee (ACUC)
 - ◀The main purpose of the site is to assist MU researchers and teachers who use animals in experiments. The committee guides and monitors research activities that involve animals by reviewing MU animal care and use protocols and conducting routine inspections of facilities. <https://research.missouri.edu/acqa/>
- Association for Assessment and Accreditation of Laboratory Animal Care (AAALAC)
 - ◀Promotes the humane treatment of animals in science through a voluntary accreditation program <http://www.aaalac.org/>
 - ◀Presents an overview of governmental regulations regarding use of animals <http://www.aaalac.org/resources/usregs.cfm>
- U.S. Department of Agriculture (USDA) Import-Export Regulations (7 CFR)
 - ◀Animal and animal product import and export information http://www.aphis.usda.gov/import_export/index.shtml
- Occupational Health and Safety in Care and Use of Research Animals (National Research Council)
 - ◀To promote occupational health and safety by recognizing and considering hazards and health risks associated with the care and use of research animals. <http://www.nap.edu/catalog/4988.html>
- Guide for the Care and Use of Laboratory Animals, National Research Council (2011)
 - ◀Provide information that will enhance animal well-being, the quality of biomedical research, and the advancement of biologic knowledge that is relevant to humans or animals (new edition?). http://www.nap.edu/catalog.php?record_id=12910
- Guide for the Care and Use of Agricultural Animals in Research and Teaching Third Edition, Federation of Animal Science Societies (January 2010)
 - ◀This guide provides the basis for professional judgments about the appropriate treatment and use of agricultural animals in research and teaching activities. http://www.fass.org/docs/agguide3rd/Ag_Guide_3rd_ed.pdf
- Iowa State University Center for Food Security and Public Health Animal Disease Factsheets <http://www.cfsph.iastate.edu/DiseaseInfo/factsheets.php>

Plants or Plant Pests

- USDA Import-Export Regulations (7 CFR)
 - ◀Plant and plant pest import/export permits issued by the APHIS Plant Protection and Quarantine
 - Plant import: http://www.aphis.usda.gov/import_export/plants/plant_imports/index.shtml
 - ◀Plant export: http://www.aphis.usda.gov/import_export/plants/plant_exports/index.shtml
- Arthropod Containment Guidelines Version 3.1, The American Committee of Medical Entomology of the American Society of Tropical Medicine and Hygiene
 - ◀This document described the arthropod handling practices, safety equipment, and facilities constituting Arthropod Containment Levels 1-4 (ACL 1-4). [http://www.sc.edu/ehs/Biosafety/Arthropod%20Containment%20Guidelines%20\(ACME\).pdf](http://www.sc.edu/ehs/Biosafety/Arthropod%20Containment%20Guidelines%20(ACME).pdf)
- MU IBC Transgenic Plant Policy <https://ehs.missouri.edu/bio/ibc/ibc-transgenicplants.html>

2.5 Other Biosafety Information Resources

- American Biological Safety Association Resources
<http://www.absa.org/resmenu.html>
- American Industrial Hygiene Association (AIHA) Publications and Resources
<http://www.aiha.org/publications-and-resources/Pages/default.aspx>
- Laboratory Health & Safety Committee Technical Topics-Biosafety (AIHA)
◀ Information to address questions about laboratory, health care, and biotechnology biohazards in the workplace
<http://www.aiha.org/get-involved/VolunteerGroups/LabHSCCommittee/Pages/Technical-Topics---Biosafety.aspx>
- National Sanitation Foundation/ANSI Standard 49-2009 (Laminar Flow) Class II Biosafety Cabinetry
<http://www.nsf.org/> <http://www.nsf.org/Certified/Biosafety-Certifier>
- Primary Containment for Biohazards: Selection, Installation and Use of Biological Safety Cabinets 3rd Edition, Centers for Disease Control and Prevention and National Institutes of Health (9/2007)
http://www.cdc.gov/biosafety/publications/bmb15/BMBL5_appendixA.pdf
- Regulating Antimicrobial Pesticides, EPA Office of Pesticide Programs
<http://www.epa.gov/oppad001/>
- Guidelines for the Safe Transport of Infectious Substances and Diagnostic Specimens, World Health Organization (1997)
<http://www.who.int/csr/resources/publications/biosafety/whoemc973.pdf>
- Laboratory Biosafety Guidelines 3rd Edition, Public Health Agency of Canada (2004)
<http://www.phac-aspc.gc.ca/publicat/lbg-ldmbl-04/index-eng.php>
- Laboratory Biosecurity Guidance, World Health Organization (2006)
http://www.who.int/csr/resources/publications/biosafety/WHO_CDS_EPR_2006_6.pdf
- References: Inactivation of HIV
http://www.cdc.gov/hicpac/Disinfection_Sterilization/3_2contaminatedDevices.html
- CDC Guidelines for Safe Work Practices in Human and Animal Medical Diagnostic Laboratories
◀ <http://www.cdc.gov/mmwr/pdf/other/su6101.pdf>
- **Other Internet Biosafety Resources:**
 - ◀ Belgian Biosafety Server (European Biosafety Topics)
<http://www.biosafety.be/>
 - ◀ European Biosafety Association
<http://www.ebsaweb.eu>
 - ◀ State of Missouri—State Emergency Management Agency (SEMA)
<http://sema.dps.mo.gov>
 - ◀ Federal Emergency Management Agency (FEMA)
<http://www.fema.gov>