3.0 BIOLOGICAL SAFETY

3.1 BACKGROUND

Biosafety is defined as a group of practices and procedures designed to provide a safe working environment for individuals working with and around potentially hazardous biological materials in the laboratory. The primary goal of biosafety is to reduce or eliminate risk of exposure to these agents through the use of containment. Containment refers to safe methods for managing potentially infectious materials (PIM) in laboratory environments. Containment includes not only good microbiological techniques and safety equipment (primary containment), but also the design and operation of the laboratory facility (secondary containment).

Two government agencies, the National Institutes of Health (NIH) and the Centers for Disease Control and Prevention (CDC), developed the biosafety guidelines that provide the foundation for this manual. These guidelines are designed to protect laboratory personnel and individuals in the surrounding community, and are described in two publications. The first is the *National Institutes of Health Guidelines for Research Involving Recombinant DNA Molecules (NIH Guidelines)*, http://oba.od.nih.gov/rdna/nih_guidelines_oba.html, which was last revised in 2011. The second is Biosafety in Microbiological and Biomedical Laboratories (BMBL), which is published jointly by the CDC and the NIH, http://www.cdc.gov/biosafety/publications/bmbl5/, and was last revised in 2009.

The NIH Guidelines and the BMBL classify work with biological agents into four distinct biosafety levels (BSLs). Each of these levels is matched with progressively more stringent practices and laboratory design features that have been developed to reduce the risk of exposure to potentially hazardous biological agents. All laboratories at the University work at BSL1 or BSL2. The following table summarizes BSL1 and BSL2 requirements.

Table 3.1 Summary of Biosafety Level Criteria for BSL1 and BSL2

Biosafety Level	Agents	Practices	Safety Equipment (Primary Barriers)	Facilities (Secondary Barriers)
BSL1	Not known to consistently cause disease in healthy adults	Standard Microbiological Practices	Personal Protective Equipment (PPE) includes laboratory coats; gloves; eye protection as needed	• Doors for access control • Sink for hand washing • Work surfaces, floors, benches, and furniture should be impervious to moisture, easily cleaned/disinfected, and resistant to heat and chemicals.
BSL2	Associated with human disease. Potential hazards from percutaneous injury, ingestion, and mucous membrane exposure.	BSL1 practices plus: • Limited access • Biohazard signs • PPE • Disposal or proper cleaning of PPE • Sharps precautions • Biosafety manual that defines any biological waste decontamination policies	• Primary barriers include Class I or II biosafety cabinets or other physical containment devices for all manipulations of agents that cause splashes or aerosols of infectious materials. • PPE includes laboratory coats; gloves; eye and face protection, as needed	BSL1 plus: • Self-closing, lockable doors • Properly-installed biosafety cabinets (refer to BMBL) • In-line vacuum filters • Readily accessible eyewash station. • A method for decontaminating all laboratory wastes should be available in the facility (e.g. autoclave, chemical disinfection, incineration, or other validated decontamination method).

PPE personal protective equipment