Biosafety Levels (US)

₪*BIOSAFETY LEVEL 1*

(BSL-1) practices and procedures are suitable for work involving agents of no known or of minimal potential hazard to laboratory personnel and the environment. Work is performed with defined and characterized strains of viable microorganisms not known to cause disease in healthy individuals, although there are some agents in this category, which are termed opportunistic and may cause disease in compromised individuals (e.g., in immunosuppressed individuals, in the aged or in infants). In general at this level, **1)** the laboratory is not separated from the general traffic patterns of others, **2)** work is **generally** performed on open bench tops, **3)** special containment equipment and devices are not **usually** needed, **4)** laboratory personnel have specific training in the procedures conducted in the laboratory and are supervised by personnel with general training in microbiology or related field.

₪*BIOSAFETY LEVEL 2*

(BSL-2) practices and procedures are suitable for work involving agents of moderate potential risk to personnel and the environment. These agents can cause disease in healthy individuals and pose a moderate risk to the environment. Precautions for use of these agents include BSL-1 practices plus, **1)** access to the laboratory is limited when work with these organisms is being performed, **2)** the use of biological safety cabinets or protective equipment is recommended when performing work which can cause the potential for generation of aerosols (pipeting, centrifugation procedures, vortexing, etc.), **3)** laboratory personnel have specific training in handling pathogenic materials, are familiar with the hazards associated with the specific agents they are using, and are directed by scientists who are competent and familiar with good microbiological practices.

₪*BIOSAFETY LEVEL 3*

(BSL-3) practices and procedures are suitable for work involving indigenous or exotic agents where the potential for infection is real and the disease may have serious or lethal consequences. Work with these agents is performed in special containment facilities. Precautions for use of these agents require BL-1 and BSL-2 practices plus, **1)** access to the laboratory is limited to those individuals performing the work, **2)** all work with these agents is performed in biological safety cabinets with special laboratory practices and procedures. The laboratory has special engineering and design features, such as an airlock entrance zone, sealed floor and wall penetrations, and directional airflow (negative pressure to the surrounding areas), **3)** laboratory personnel **must** have specialized training to handle pathogenic and potentially lethal agents and are supervised by a competent scientist. They **must** adhere strictly to special practices and procedures.

₪*BIOSAFETY LEVEL 4*

(BSL-4) practices and procedures are required for work with dangerous and exotic agents which pose a high individual risk of life-threatening disease. This is the highest level of containment (maximum containment) and requires a containment facility that is generally a separate building or completely isolated zone with complex, specialized ventilation requirements and waste management systems to prevent release of viable agents to the environment. Specialized training of all laboratory workers is required and strict adherence to appropriate specialized practices and procedures is **mandated**. Precautions for use of these agents include BSL-1, BSL-2 and BSL-3 practices and procedures plus specialized BSL-4 procedures listed in the CDC Guidelines (includes entrance only through a clothing change room, removal of street clothes and donning of complete laboratory clothing along with showering upon leaving the containment area, complete isolation from agents used, as well as other specialized practices). Personnel must be specially trained and shown to be proficient in the use of the agents at this containment level.

*** Risk Groups are guidelines to classify biohazards according to their relative pathogenicity to healthy adult humans (e.g., infectious dose, invasiveness, mode of transmission, portal of entry, toxins produced, availability of vaccines/antibiotics, condition of host).**

*** Biosafety Levels are guidelines for the safe use of infectious organisms and are based on: The Risk Group of the organism; Laboratory Practices and techniques; Engineering Controls and building containment features.**