***STANDARD OPERATING PROCEDURE – B006***

**Working with Risk Group 1 microorganisms**

1. **Objectives**

The objective of this document is to establish standard operating procedures for working with Risk Group 1 microorganisms, ensuring the safety of laboratory personnel by mitigating potential risks associated with hazardous materials and injuries. Additionally, this SOP aims to enhance the efficiency of experimental workflows.

1. **Personal Protective Equipment**

To ensure safety when working with Risk Group 1 microorganisms, appropriate personal protective equipment (PPE) must be worn. This includes:

* Long pants and closed-toe shoes to protect against spills and splashes.
* A long-sleeved, buttoned lab coat to minimize skin exposure.
* Safety glasses or goggles to protect against splashes or flying debris.
* Disposable nitrile gloves prevent direct contact with hazardous materials.
* If the user has long hair, it should be tied back.

1. **Potential Hazards**

* Working with Risk Group 1 microorganisms presents various hazards that must be managed to maintain a safe working environment. This includes:
* **Biological Hazards:** Infection risk through skin contact, mucous membrane exposure, inhalation of aerosols, or accidental ingestion. **Allergic reactions** to microbial components or culture media. **Cross-contamination** between samples due to poor aseptic technique.
* **Physical Hazards:**
  + **Burns** from autoclaves, Bunsen burners, or hot media.
  + **Cuts/lacerations** from broken glassware.
  + **Slip hazards** from liquid spills.
* **Chemical Hazards:** **Exposure to disinfectants** (e.g., ethanol, bleach) used in decontamination procedures.

Laboratory workers with **pre-existing conditions,** including but not limited to allergies, immunocompromised states, chemical sensitivities, or those who are pregnant or planning pregnancies should notify their supervisors and medical specialists.

1. **Training**

Ensure all personnel have received proper training on their hazards and safe handling techniques. Undergo medical surveillance and register as a biohazard worker prior to start of work if needed.

* MC06 Biological Safety
* MC03 Chemical Safety II / Hazardous Waste Management
* MC07 Chemical Safety I / Chemical Safety for Laboratory Users

1. **Procedures**
2. Preparation

* Work in a laboratory facility that is BSL-1-approved.
* All workers should understand the risks associated with the microorganism they are working with, and the safety data sheet (SDS) should be placed nearby in the workplace.
* Familiarize yourself with the locations of all emergency equipment, including eyewash, the location of emergency exits, and all emergency evacuation procedures.
* Understand all risks associated with the organisms you handle. If there are any queries, consult your supervisor.
* Ensure all workers receive prior training in microbiological methods, particularly in aseptic techniques, or receive close supervision by someone with microbiological training.
* The work bench should be clear of clutter and other personal possessions (e.g. no bags or clothing). Only the equipment necessary for the tasks to be performed should be present on the bench.
* Disinfect the bench surface and any equipment and consumables required (e.g. the surface of Pipetman-type pipettes) with 70% to 80% (v/v) ethanol solution before lab work.

1. During Culturing and Manipulation

* Never eat, drink, smoke or apply cosmetics in the microbiological lab. Never place any objects in the mouth (e.g. chewing the ends of pens).
* Do not use mobile phones during the conduction of lab work as it may act as a vector to carry microbes out of the lab.
* Sterilize the microbiological loop immediately before each procedure by flaming using the Bunsen burner.
* Sterilize the glass spreader immediately before each procedure by dipping in 100% ethanol and briefly flaming using the Bunsen burner.
* Turn off the Bunsen burner when not actively doing lab work. Do not leave a Bunsen flame unattended.
* Work close to the Bunsen flame when streaking plates or transferring bacterial cultures, etc. to reduce deposition of airborne microbes onto/into media.
* Equipment and media must be sterilized either by filtering or autoclaving prior to use.
* When working with Risk group 1 microorganisms, a biosafety cabinet is not required. However, if a high level of sterility is required then it is recommended for manipulation inside a biosafety cabinet. Label all cultures with organism details (e.g. species and strain), worker's name, and cultured date. Incubate cultures in designated locations and avoid removing them from the lab unless necessary.

1. Post-Culturing

* Upon finishing work, sterilize the bench again with 70% to 80% (v/v) ethanol solution, and discard all unwanted cultures in the appropriate location.
* All microbial cultures must be autoclaved prior to discarding; cultures should never be poured down the sink or discarded in regular rubbish bags.
* Wash hands with antiseptic soap before leaving the lab.
* Remove lab coat / gown before leaving the lab. Lab coats /gowns may be removed from a BSL-1 laboratory as long as it is inside a sealed plastic bag. Wash it regularly.

**6) Spills or Incident Reporting**

* All biohazard spills must be cleaned up following Standard Operating Procedure 002 - Cleanup of Biohazard Spills.
* Any spills, accidents, or near misses must be reported to the PI and/or the departmental safety officer (DSO) immediately.
* In the case of serious incidents, immediately inform the Security Unit by calling the 24-hour hotline on **2358 8999**

**7) References**

* Campbell, L. (2016). *SOP\_SMB025: Working with Risk Group 1 microorganisms.* Risk Assessment. The University of Sydney.
* Campbell, L. & Coleman, N. (2014). *SOP SMB025.2 (NC LC 0414): Working with Risk Group 1 microorganisms.* Standard Operating Procedure. The University of Sydney.
* Safety and Environmental Protection Manual *- Chapter 9: Biological Safety | Health, Safety and Environment Office - the Hong Kong University of Science and Technology*