



Training on New and rapid Tuberculosis diagnostics (first and second line Probe Assay)

Module 2: Biosafety in Molecular laboratories

**Uganda Supranational
Reference Laboratory**

Outline

- Biosafety in TB laboratories.
- Personal Protective Equipment in molecular labs.
- Disinfection in Molecular laboratories.
- Assessment
- Summary

Biosafety levels in a TB lab

- BSL1 - AFB smear microscopy
 - Can use countertop if airflow is directed away from laboratory staff
 - Need for exhaust fan to draw air away from area
 - BSC preferred
- BSL2 - Specimen processing for TB culture
 - Work performed in a BSC
 - Safety centrifuge cups opened only in BSC
- BSL2 - Molecular laboratory
 - Three areas with separate airflow
 - NO LIVE TB; dead cells only
- BSL2 and/or BSL3 - TB Culture: Identification and DST
 - All work performed in a BSC
 - Isolation and air exhaust needed for manipulating large quantities of live TB

TB culture lab

Follow all biosafety protocols for work in the TB culture lab

- Collect samples for molecular testing
- Disinfect outside of tubes before removing from BSC
- Heat kill samples if DNA extraction occurs in the moderate-risk TB laboratory

Molecular laboratories

Three separate rooms

- No mixing of air between the three rooms
- No sharing of supplies, laboratory coats and gloves

Good laboratory practices

- Minimize aerosol generation - cross contamination
- Disinfect areas with freshly prepared 0.5- 1% concentration of bleach

PPE in a molecular lab

Each laboratory room should have its own set of PPE

- Laboratory coats
 - Front closing
 - Long sleeved
 - Washable at the lab or disposable
- Gloves
 - Powder free (powder may increase cross contamination)
 - Single use
 - Latex free (due to allergies)

Disinfection in a molecular lab

- Freshly prepared 0.5-1% bleach
 - potency is reduced due to dilution
- 70% ethanol
 - wash inside the BSC and where metal surfaces are present
- Nucleic acid contamination
 - disinfection removes nucleic acid contamination from pipettes and metal and plastic surfaces

PPE demonstration

- Donning and doffing of PPE
 - Gloves
 - N95 respirator
 - Lab coats/gowns
 - Shoe covers/lab shoes

Example: Doffing Gloves



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Assessment

1. What is the required concentration of bleach in a molecular laboratory.
2. What biosafety level is ideal for a molecular lab.
3. How many rooms are required for an LPA lab.

Summary

- Heat killed specimens pose reduced risk of TB infection in a molecular lab.
- Conduct an appropriate risk assessment for a molecular TB lab prior to selection of the appropriate PPE.
- Bleach should always be freshly prepared.
- Good lab practice should be maintained at all times

References

- GLI TB training package
<http://www.stoptb.org/wg/gli/trainingpackages.asp>

Acknowledgments

