APPROVED BY THE ENFSI DNA WORKING GROUP - QCSUBGROUP - REVISED BY ENFSI QCC

Contamination prevention guidelines

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Introduction

One of the goals of the ENFSI DNA working group is to establish forensic DNA analysis quality assurance guidelines. Contamination prevention is an important issue for every forensic DNA laboratory. The recommendations described below are an addition to the Quality Assurance Programme (DNA WG/QA prog).

The scope of this document is to provide recommendations concerning laboratory organisation and experiment design to prevent the occurrence of DNA contamination.

General Recommendations

- Facilities within the organisation will meet the ENFSI Quality Assurance Programme requirements in terms of separation of working areas and of reference and evidence samples.
- Dedicated areas close to the laboratories (pre and post PCR) should be designated as changing rooms/areas.
- Every laboratory must have its own dedicated equipment / reagents.
- Every laboratory should have its own dedicated laboratory coats or use different disposable coats in each laboratory.
- Molecular biology grade reagents and consumables must be used.
- Sterile and/or disposable consumables should be used.
- Items to be transferred between laboratories must be decontaminated prior to movement.
- Post PCR rooms should be under pressure or have an airlock space between the lobby and the room itself or be geographically separated from the rest of the laboratory areas (i.e. DNA extraction, Pre-PCR, etc.).
- Restricted access to laboratories must be enforced with warning signs.

Laboratory Recommendations

- There must be written procedures for cleaning and decontamination of facilities and equipment. Records must be maintained.
- Every laboratory must have its own cleaning equipment for benches. Pre and post PCR cleaning of the floor must be done with dedicated equipment.
- Cleaning personnel must be trained to work in laboratory conditions.

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- Where possible separate areas should be set up for the examination of “highly” and “lightly” loaded stained evidence samples.
- Environmental monitoring procedures should be written and records maintained. Monitoring can be done by swabbing instruments (centrifuges, vortex, ...), benches where exhibits are examined, door knobs and any other item relevant to the work done in the area where the monitoring is performed.

Staff Recommendations

- Training of staff must include contamination prevention guidelines.
- Competency testing should include contamination checks concerning anti-contamination precautions and results of negative controls.
- Staff elimination database (preferably including visitors, “external” equipment technicians, QC samples, …) must be in place where national legislation permits, to ensure that the result is not due to a member of staff or anyone having access to the laboratory.

Recommendations for Experimental design /set up

- Where possible, upon submission and before the DNA extraction stage, items for examination and sampling should be separated into high yielding (e.g. semen, tissue, blood) and low yielding DNA categories (e.g. items of skin contact, handled items). Low DNA yielding items should be sampled first and those yielding high quantities of DNA should be sampled last.
- Blank/negative controls will be used for every series of experiments.
- Separate batches must be processed for reference and crime scene samples.
- Intra and inter-batch contamination checks should be done.
- Sample results should be tested against the elimination database.
- Where possible, reagents should be divided and stored in as small aliquots as possible.