Exogenous DNA Prevention		
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Exogenous DNA Prevention

1 Guiding Principles

1.1 Exogenous DNA is defined as the addition of DNA/biological fluid to evidence or controls subsequent to the crime. Sources of exogenous DNA could be first responders, crime scene technicians, NYPD personnel, or laboratory personnel, to name a few.

1.2 It is the goal of the Department of Forensic Biology to not transfer any DNA from employees to any casework sample. Several measures have been taken to prevent this, and this document will cover these measures in general.

2 Facility

2.1 The laboratory is divided into physically isolated areas for evidence examination, DNA extraction, pre-amplification (amplification setup) and post-amplification (amplification and DNA typing). Each area has its own dedicated equipment. Once samples are accepted into the laboratory, they move through these areas in one direction only. Samples are first processed in the evidence examination area. They are then moved to the DNA extraction area. Following DNA extraction, aliquots of each sample are quantitated in the DNA quantitation area. Following DNA quantitation, aliquots of each sample are moved into the pre-amplification area. Here fresh kit reagents are stored and samples are prepared for amplification. Finally, the samples are amplified and typed in the post-amplification area. This laboratory setup helps eliminate the travel of DNA from post-amplification areas back into non-amplified DNA areas.

3 Laboratory Clean-up

3.1 In addition to the separation of space between analyses, the Department has implemented a documented clean-up program on a monthly basis. The documented clean-up program may be more frequent in areas where High Sensitivity DNA Testing is performed. The clean-up program involves the decontamination of instruments/equipment, bench/counter tops, sinks, etc. While 10% Bleach is extremely effective in destroying exogenous DNA, it is also very corrosive. Care should be taken so that when 10% Bleach is used, it is immediately followed by 70% Ethanol and/or water to wash off the Bleach from the surface of instruments/equipment.

4 Sample Processing

4.1 Exemplar samples are processed separately from evidence samples. Also, only one sample is processed at a time using single-use disposable supplies whenever possible (e.g,. pipette tips), and scissors/tweezers are thoroughly cleaned between each sample.

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5 Personal Protective Equipment (PPE)

5.1 PPE is designed to protect employees from serious workplace injuries or illnesses resulting from contact with chemical, reagents, or biological hazards. PPE includes a variety of devices and garments such as goggles, gloves, lab coats, etc. Proper PPE must be worn during analysis, and required PPE may vary from location to location depending on the hazards of the area. While PPE is designed to protect employees, it can also prevent the transfer of DNA from employees to work surfaces or evidence.

6 Contamination Prevention Equipment (CPE)

6.1 CPE is designed to prevent the occurrence of exogenous DNA in samples. While all PPE are considered as CPE, not all CPE can be considered as PPE. For example, in clean-rooms of the laboratory where high sensitivity DNA testing takes place, the wearing of booties or bouffant caps is to prevent the transfer of DNA from employees. CPE must be worn when designated and available. If not available, employees must first seek permission to work in that area from the appropriate Technical Leader and exercise extreme caution to maintain a clean environment.

7 Identification

7.1 Exogenous DNA may be indicated by 1) the presence of signal in reagent blanks, 2) the presence of extraneous alleles in positive controls, or 3) the presence of extraneous alleles in case samples. The confirmation of exogenous DNA may reflect a system failure or contamination of the samples by an outside source. The source may be equipment, reagents, the working environment, laboratory/law enforcement personnel, or an analytical error. It can either be a single isolated event (such as cross-contamination between two samples) or it can be persistent (such as dirty reagents or equipment). To remedy a single isolated event, the appropriate extraction, quantitation, amplification and/or STR analysis is repeated.

7.2 To aid in the identification of exogenous DNA, the LAB TYPES DATABASE procedure is used.

7.3 The Quality Assurance Manager and/or the appropriate Technical Leader must be notified if exogenous DNA is detected. The source of this DNA should be identified, if possible, and eliminated. For persistent events, the QUALITY INCIDENT REVIEW procedure must be followed to prevent the recurrence of the problem.

8 Interpretation and reporting

8.1 Samples containing exogenous DNA must be interpreted and reported carefully. This is further discussed in the GENERAL GUIDELINES FOR DNA CASEWORK procedure.