

FORENSIC BIOLOGY TRAINING MANUAL

Training Specific Guidelines		
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A. Training Specific Guidelines

The training is divided into modules. The number of modules trained in depends on the job title of the trainee; fewer or additional modules may be given depending on the job assignment of the analyst. Required Modules are as follows.

	Criminalist I	Criminalist II and above
Lab Techniques/ Skills	X	X
Serology	X	X
Evidence Exam	X	X
Sexual Assault Kits	X	X
Extraction: Automated Differential by QIAcube and EZ1	X	X
Extraction: EZ1	X	X
Extraction: MaxSuite	X	X
Extraction: Zygem	X	X
Extraction: Fusion Direct	X	X
Extraction: Fingernail	X	X
Real-Time Quantitation	X	X
PCR Amplification	X	X
Capillary Electrophoresis Set-up	X	X
STR Analysis		X
Mixtures		X
PCR Data Interpretation and Statistics		X
CODIS and Databasing		X
Case Management		X
Oral Examination	X	X

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Serology Mock Court		X
DNA Mock Court		X
Technical Review		X

Additional Training

Additional training, such as bone processing and mitochondrial DNA testing, may be offered to analysts who require such training. In this case, training will be provided by a competent analyst and follow the standard model of observation, practice, and competency. In these cases, training samples may be provided.

	Criminalist I	Criminalist II and above
Organic Extraction	Selected Staff	Selected Staff
Bone Processing	Selected Staff	Selected Staff
POC Processing	Selected Staff	Selected Staff
Postmortem Blood Processing	Selected Staff	Selected Staff
mtDNA hair extraction	X	X
mtDNA duplex amplification	X	X
Agilent quantitation	X	X
mtDNA cycle sequencing	X	X
ABI 3130 set-up	X	X
mtDNA data processing & interpretation	No	X
mtDNA mock court	No	X
mtDNA oral examination	No	X
Sample Control	X	X

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	Criminalist I	Criminalist II and above
HPLC	X	X
Post Amplification PE-Testing	X	X
Post Amplification SC-Testing	X	X
PE Data Analysis	No	X
SC Data Analysis	No	X
Fingernail Extraction	Selected Staff	Selected Staff
Administrative Review	Selected Staff	Selected Staff

B. Required lectures

Most of the training modules have required lectures (see Section 4 – Modules). Each individual training module specifies the required lecture(s) associated with the module. See the list of **Required Training Lectures** in the Training Modules section of this manual.

Some lectures, e.g., Ethics, Review of the ANAB Guiding Principles, Lean Six Sigma Overview, Ethics and Root Cause Analysis are not associated with specific training modules and do not need to be completed prior to completion of bench training.

Lectures are given by staff members, during each training module. Many of the lectures are also available as computer presentations found in the departmental directories and can be reviewed as needed. The trainee’s attendance at the required lectures is documented in the Lecture Tracking Sheet and signed off by the lecturer.

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C. Required reading

All the training modules have required reading. Most of the required readings are found in the online reference folder. However, the analysts are also required to read the appropriate sections of manuals, chapters in books, etc. The required reading should be completed during the time allotted to the training module. Completion of all the required reading is documented by the analyst and direct supervisor.

D. Practice samples

For serology training practice samples can come from a variety of sources: the trainee, stains from previous or external proficiency tests or donated items.

The number of serology training samples is variable, depending on the training module.

Practice DNA training samples consist of coded swabs or specimens donated by laboratory personnel or from previous external proficiency samples. The DNA donor types, and associated codes are maintained by the Training Team and are kept confidential. When a trainee generates a DNA result for a sample the trainee or supervisor provides the DNA type and code to the Training Team to check for correctness.

The number of DNA samples may include any of the following: blood stains, semen mixed and non-mixed stains, saliva stains, and other samples. The number of DNA samples should be supplied in sufficient quantity for the trainee to be able to do more than one analysis if necessary.

Practice DNA training samples will generally be provided by the Training Team; however, for specialized training (e.g., bone or hair extraction and typing), samples may be provided by specific specialty team. The trainee will generally use these same practice samples for all DNA procedures - extraction, quantitation, amplification, and DNA typing. However, if needed, training samples can be provided as DNA extracts or amplified DNA.

For DNA analysis, interpretation and statistical training, trainees are provided with practice data sets to analyze and interpret.

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During observation, the trainer should evaluate the ability of the trainee for performance of the procedure. If the trainer determines the trainee is not performing the technique correctly, additional observation(s) and training is required. Once the trainer determines the trainee can correctly perform the technique, the observation period of training is complete. An independent practice(s) is then performed and evaluated by the trainee's supervisor or designee. If the supervisor or designee determines the trainee is not independently performing the procedure correctly additional practice(s) and or training is required.

Once the supervisor or designee determines the trainee can independently perform the procedure correctly, the practice period of the training is complete.

E. Knowledge, Skills, and Ability Assessments

All training modules have a written knowledge assessment test. The knowledge assessment test contains a set of questions designed to assess the Criminalist's practical understanding of the module. The results of each written assessment will be graded. A grade of 70% or higher must be attained on all written assessments to pass the module. A grade of less than 70% will be deemed a failure.

Each Criminalist shall have a maximum of two attempts to pass the knowledge assessment test for each module. After the first failing assessment, the Criminalist will be given the opportunity to remediate on the written assessment. If a Criminalist has not passed a written assessment after two attempts, the Criminalist fails the entire module.

F. Competency samples

For the DNA modules, trainees are provided with competency DNA samples that are coded in the same manner as the practice samples. When a trainee generates a DNA result for a sample, the trainees' supervisor or designee provides the DNA type and code to the Training Team to check for correctness.

The minimum number of competency samples is variable, depending on the training module.

If the trainee is competent in either the organic extraction or bone extraction procedures, this will also satisfy the competency requirements for the mitochondrial DNA hair extraction procedure.

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The trainee may use these same competency test samples for all DNA procedures - extraction, quantitation, amplification, and DNA typing.

Trainees who start training after extraction steps (e.g., they have previously passed extraction competency) will be given at least three coded DNA extracts or three coded samples of PCR amp product as their competency test. The DNA extracts/PCR amp product can be of any type (buccal samples or semen stains).

DNA module competencies are deemed passing if the correct profile is generated for each sample and all controls have met the laboratory's passing criteria.

For the DNA analysis, interpretation and statistical modules, trainees are provided with data sets to analyze and interpret. A grade of 90% must be achieved for all analysis, interpretation, and data sets to pass the competencies.

Once the supervisor or designee determines the trainee has performed and generated the correct results for the competency, the supervisor documents the successful completion of each module on the competency tracking sheet.

All competencies must be completed and passed prior to taking the oral exam.

G. Review procedures

The results from the trainee's practice samples and competency tests will be evaluated by his/her direct supervisor or designee in terms of sensitivity, consistency, and for possible contamination at each of the steps in the training. In addition, the supervisor or designee must ensure that the trainee is analyzing/using the proper control samples, correctly and completely filling out all documentation used to record sample analyses and is familiar with the operation of the equipment necessary to perform the tests. The trainer should be included in this review process.

Problems will be addressed at/during each module and additional practice(s) instituted, if necessary. For example, if possible, contamination is observed and/or detected during any of the procedures the supervisor must determine if the contamination is due to a reagent/instrument or the trainee. If determined to be the result of a contaminated reagent, the reagent may be changed, and additional practices may not be necessary. However, if the contamination is the results of the analysts' performance, then an additional practice must be performed to identify the reason for the problem.

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The direct supervisor or designee must document completion of all practical exercises and successful completion of the competency tests, if applicable, for all modules.

H. Completion of training

At the completion of each training module, a notification must be made to the trainee and training team that the trainee has successfully passed the entire module and associated competency test.

Once an analyst has completed all the requirements to become a DNA Technician and/or Interpreting Analyst, had their training folder reviewed by the Training Coordinator and had all the education and experience requirements as specified by the FBI DNA Quality Assurance Standards reviewed, the Technical Leader issues a written notification which acknowledges the successful completion of training. This notification is filed in the training folder. As of that date, the analyst may perform a casework on those modules they are trained in.

I. Review Training

Fully trained interpreting analysts that have been in their current title for at least three months have duties in addition to routine benchwork. To prepare for those duties, additional training consisting of result and case file reviews are done.

An experienced Criminalist demonstrates how to perform a review of the analytical test results on various procedures and technical reviews of case files. Each analyst must demonstrate their ability to perform reviews on these test results and case files before working on cases on their own.

For procedural reviews, i.e... Quantitation Review, a graded competency test is given. A score of 90% must be achieved on each review competency to pass the module.

For technical reviews, training case reviews may be given before working on actual case reviews. The number and type of case review is dependent on the level.

Criminalist II, **City Research Scientist I** or above may technically review Simple Cases: Serology cases; DNA cases where no DNA testing past the quantitation step is attempted.

Criminalist III, **City Research Scientist II** or above may technically review Moderately Complex Cases: Cases containing simple interpretation of STR typing results and do not

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require STRmix™ analyses or calculations (e.g. cases with only single source profiles, or mixtures of four or more contributors), and suspect cases without cross referenced evidence.

Criminalist IV, **City Research Scientist III-A** or above may technically review Highly Complex Cases: All of the above, as well as cases that contain complex interpretation of STR typing results and/or require STRmix™ analysis or calculations (e.g. deconvolutions of DNA mixtures, comparisons to exemplars requiring the use of STRmix™ and likelihood ratio calculations).

	Minimum Number Training Reviews	Minimum Number of Second Case Reviews
mtDNA Analysis	5	5
Simple Cases Review	5	5
Moderately Complex Case Review	5	5
Highly Complex Case Review	N/A	10

If the supervisor determines the analyst is not performing the reviews correctly, additional training and/or second case reviews may be required. Once an analyst has successfully completed the review training the analyst may perform casework reviews on their own.

Successful completion of review training is documented on the competency tracking sheet or via a certificate of completion issued by the Training Group.

J. Evidence Sign-In Training

As a supervisor, a Criminalist IV has duties in addition to routine case work. To prepare for those duties, additional training consists of evidence case sign in and scheduling case analysis.

An experienced Criminalist IV, Assistant Director or designee demonstrates how to sign in evidence which includes review of all NYPD paperwork, creating and reviewing of Forensic Biology Database records and scheduling analysis of evidence for different case

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types. A new Criminalist IV must then demonstrate their ability to perform these techniques. This is accomplished by having an experienced Criminalist IV, Assistant Director or designee perform a second review of all paperwork and scheduled analysis prior to the case acceptance into the laboratory. Successful completion of signed in cases is documented on the competency tracking sheet or via a certificate of completion issued by the Training Group.

If the supervisor determines the new Criminalist IV is not performing sign in correctly additional second reviews may be required. Once the minimum number of signed in cases has been successfully met the new Criminalist IV may now perform sign in on their own.

	Minimum Number of Second Reviews
Evidence Sign In	10

K. Assistant Director Training

As manager, an Assistant Director has duties in addition to casework supervision. To prepare for these duties, an Assistant Director is required to have successfully completed all other Criminalist review training.

L. Re-competency Training for Reinterpretation of Legacy Data

Analysts will be given a training lecture to review theoretical background and key concepts of the legacy data interpretation.

The training competency test will consist of two sets of cases to reinterpret. Analysts will be given a scanned copy of a legacy training file (both right side and left side), and a copy of the appropriate STR interpretation manual.

Analysts will be required to determine the number of contributors, perform deconvolutions (if possible), determine if the submitted reference samples can be associated to the evidence samples, and perform any applicable statistical calculations.

Results will be reviewed and graded by the Technical Leader (or designee).

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