	Intermountain Forensics	SOP #	LAB-100
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Forensic DNA Technical Leader Approval		Issue Date	
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General Laboratory Processing

1. Purpose

This document describes the standard laboratory processing policies for evidence and extracts.

2. Summary

To maximize quality and repeatability of testing performed at Intermountain Forensics, this document describes the laboratory's standard processes. This includes sample processing standards, contamination prevention, naming conventions, consumption policy and sexual assault kit standard processing. Standardization and best practices are key to quality results.

3. Procedure

General Evidence Handling and Processing Practices:

1. Serology and DNA processing should be performed by the same individual wherever possible to limit the number of individuals processing a case. This includes any rework that is required for the sample(s).
2. Use 20% bleach to decontaminate the work areas, made weekly.
3. Bleach pads may be used to decontaminate gloves with care taken not to allow bleach to mix with the samples or reagents.
4. Processing of unknown evidence samples and known reference samples are to be separated by either time or space. Questioned items should be processed before any associated known reference items.
5. Only one item should be open at a time. Evidence should be resealed, and instruments/gloves decontaminated or replaced before opening and processing the next item or subitem.
6. Clean or replace any cutting utensil (scissors, scalpel, razor blade etc.) thoroughly with bleach and ethanol after cutting/touching each item.
7. All destination tubes must be labeled with its unique sample ID before the addition of sample substrate or extract.
8. Disposable aerosol resistant pipette tips will be used for transfer of liquid samples and reagents.
9. All Sample and Reagent Blank tubes must be labeled with its unique sample ID before use.
10. Centrifuge tubes before opening to prevent the release of aerosolized sample after incubation or storage.
11. When opening tubes, take caution to avoid touching the interior of the lid, de-cap using a decapper tool or by carefully touching the very edge of the front of the lid.
    a. If contact occurs, change or decontaminate gloves prior to handling other surfaces or items.

Evidence Consumption Policy:

1. A portion of evidence and/or extract shall be preserved for all samples unless specifically directed by a court and/or documented agreement by both prosecutor and defense counsel.

a. ½ of physical evidence shall be retained and repacked with the evidence.

b. If retention of ½ of physical evidence is not possible, at minimum half of the DNA extract obtained from the evidentiary item shall be retained.

i. Wherever possible, retention of DNA extract should be maintained for future advancements in DNA testing regardless of physical evidence status.

Evidence/Work Product Policy:

1. Evidence and work product are defined below (See 5. Definitions)
2. Evidentiary items shall always be secured in a lab personnel's possession or secure evidence location.
    a. Chain of custody will be maintained and documented from receipt to return for all evidence items.
3. Work product will not require chain of custody documentation; however, all work products must remain in secure laboratory locations (lab and admin spaces) and stored properly within those secure locations (e.g., fridge and/or freezer) during processing.

Sexual Assault Kit Processing:

1. Sexual assault kit evidence will be differentially extracted with Qiacube Connect separation protocol and EZ1 Investigator kit on the EZ1 Advanced XL extraction and quantified with rt-PCR (ABI Quantifiler Trio or Qiagen Quantiplex Pro).
    a. Processing will be stopped after quantitation for kits where no male DNA is detected for male suspect/female victim and a report will be issued.
    b. All samples being taken forward to amplification will be assessed for the presence of possible body fluids with RSID-Saliva and RSID-Seminal Fluid.
2. Three items will be selected for processing based on scenario and/or general probative value.
3. For positive samples, the two (most positive and most probative) samples will be sent forward to amplification.
4. Order of General Probative Value
    a. Female Kit
        i. Cervical Swabs or Vaginal Swabs
        ii. Rectal Swabs or Anal Swabs
        iii. Oral Swabs
        iv. Other Body Swabs
        v. Underwear/Menstrual Care Products
        vi. Clothing
    b. Male Kit
        i. Rectal Swabs or Anal Swabs
        ii. Oral Swabs
        iii. Penile Swabs
        iv. Other Body Swabs
        v. Clothing

5. Processing beyond this policy (additional amplified samples, additional screened/extracted samples etc.) will be subject to general DNA processing policy (non-sexual assault kit) and the associated fees.

Serology Processing:

1. Performed upon client request.
2. Serology/Supernatant Testing:
    a. Semen: PSA - RSID
    b. Saliva: Saliva - RSID
    c. Blood: Phenolphthalein

DNA Processing:

1. All tube combinations are performed after extraction.
    a. Cuttings or extracts from different evidentiary items will not be combined.
    b. Cuttings from different locations on a single piece of evidence should not be combined unless evidence remains from the original piece of evidence for retesting.
2. Non-Differential Extraction Method (unknowns and references): Extracted with the EZ1 Investigator kit on the EZ1 Advanced XL (Qiagen) and quantified with rt-PCR (ABI Quantifiler Trio or Qiagen Quantiplex Pro).
3. Differential Extraction: Separation is performed using the QIAcube Connect (Qiagen) instrument. Extraction with the EZ1 Investigator kit on the EZ1 Advanced XL and quantified with rt-PCR (ABI Quantifiler Trio or Qiagen Quantiplex Pro).
4. Reagent Blanks: 1 Reagent blank per client, per batch, plus one general for the batch.
    a. A Reagent Blank must be processed concurrently with their associated samples.
5. Extracts are eluted in water.
6. After processing, extracts should be refrigerated until the case is completed or further processing is required.
    a. Upon completion of the case, extracts will be dried in GenTegra® tubes until returned to the client.
7. All unknown samples and their associated reagent blanks must be quantified prior to amplification.
8. Quantification is performed using the Quant Studio 5 instrument (ThermoFisher).
9. Virtual Standard Curves are used for Quantification Plate analysis.
10. Amplification Positive and Negative Controls are required on all amplification plates.
    a. Quant: Positive controls are the standards used to generate the curve or a DNA dilution when virtual curves are used. TE is used as the NTC. Each new manufacturer lot should have a standard curve dilution set made and quantified in triplicate. This is used as the virtual standard curve for that lot. At least one standard must be included on each quant plate.

b. Amplification: Positive control provided by each individual amplification kit. Negative control is the same water aliquot used for normalization. Each new lot must be quality tested before use on casework samples.

11. Amplification performed using Proflex thermalcycler (primary) or Benchmark 9639 thermalcycler (backup).
12. Amplified Product:
    a. Amplified product will be stored frozen for up to 4 weeks after the completion of the testing.
    b. Amplified product is not allowed to leave Post Amp room except within a sealed biohazard container.
13. Load Plates:
    a. Load plates will be stored for up to 2 weeks frozen.
    b. Load plates are not allowed to leave Post Amp room except within a sealed biohazard container.

Case File:

1. Analysis: Data quality assessment, sample interpretation, report writing, and case file assembly should be performed by the same analyst for each case if possible.
2. Reports: Each case that undergoes any amount of testing will have a report issued.
3. Reviews: Each case that has a report issued will have the technical and administrative aspects reviewed.
    a. The technical reviewer assesses all aspects of the case (Technical and Administrative review).
        i. Signing off on the case acknowledges the potential for courtroom testimony in place of the author of the report.
    b. A second review may be performed at the analyst or technical reviewer's discretion.
        i. Signing off on the case acknowledges the potential for courtroom testimony in place of the author of the report.
    c. A technical reviewer is qualified in the method, technology, typing test kit, platform, and interpretation software used in the report being reviewed.
    d. Conflict resolution between analysts will be referred to the technical leader.
4. Case File Portal:
    a. Cases with Batch Submission Due Dates: Case Files are sent every month or per contract.
    b. Cases with individual Case Due Dates: Cases Files are sent upon completion of the Review Process.
5. Final Case Consultation: Will be performed by the Director of Business Development after completion of the Case File.
6. Evidence Return
    a. Extracts are returned dried in GenTegra®-DNA tubes after completion of the case and returned at least 3 months after case completion date, unless specifically requested by the client.

b. Evidence will be returned at least 3 months after completion date unless specifically requested by the client.

   i. Evidence will be packaged room temperature and shipped standard shipping.

c. Unless contractually agreed to otherwise, shipping costs will be billed to submitter.

7. Outsourcing

   a. The DNA Technical Leader will review the technical aspects of all outsource laboratories.

   b. All outsource testing must have approval from the submitting agency.

4. References

N/A

5. Definitions

Bleach Pad: A kimwipe or other laboratory grade wipe that is soaked in 20% bleach and used to apply bleach to instruments, gloves etc. for decontamination purposes.
Case File: Consists of the Forensic Case Report, Allele Summary Table, Statistics worksheets, Electropherograms, Client documents, Laboratory Notes, Control Electropherograms, and Review Form, as applicable by case.
Evidence: The physical items that are submitted for testing and the resulting cuttings and extracts from those items
Report: Forensic Case Report document
Work Product: Any portion removed from the evidence that undergoes downstream processing including extract dilutions (dilutions are discarded after use), supernatant, supernatant test cards, quantification plates, amplification product, and load plates.