	Intermountain Forensics	SOP #	LAB-100
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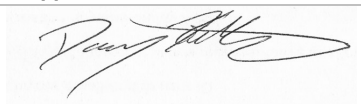		05/04/2020	

General Laboratory Processing

1. Purpose

This document describes the standard laboratory general laboratory best practice and processing policies for evidence, extracts.

2. Summary

To maximize quality and repeatability this describes the laboratory's standard processes to obtain results. 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. Deviation from these standards should only occur in rare and unavoidable circumstance and should be documented in case notes.

3. Procedure

General Evidence Handling and Processing:

1. Serology and Laboratory processing should be performed by the same individual wherever possible to limit the number of individuals processing a case request. 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. All destination tubes must be labeled with its unique sample ID before the addition of sample substrate or extract.
7. Use disposable aerosol resistant pipette tips for liquid transfer of samples and reagents.
8. All Sample and Reagent Blank tubes must be labeled with its unique sample ID before use.
9. Centrifuge tubes before opening to prevent aerosol after incubation or storage.
10. 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.

Evidence Consumption Policy:

11. 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 15µl 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:

12. Evidence and work product are defined below (See 5. Definitions)
13. 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.
14. Work product will not require chain of custody documentation; however, all work product must remain in secure laboratory locations (lab and admin spaces) and stored properly within those secure locations (e.g. fridge and/or freezer).

Evidence Processing:

15. All cases receive a unique Intermountain Forensics (IMF) case number (distributed by JusticeTrax LIMS).
    a. **IMF-YY-(Count)** EX: IMF-20-0001

16. Evidence items as well as any subitem documented during processing will receive a unique IMF identifier (distributed by JusticeTrax LIMS).
    a. Parent Item: **Case Number-(Count)** EX: IMF-20-0001-01
    b. Child Subitem: **Case Number-Evidence Item Number-(Count)** EX: IMF-20-0001-01-01

17. Cutting through evidence seals should be avoided unless physically impossible.
    a. Evidence should be resealed with laboratory staff initials and date.
    b. Where possible, initials/date should be written across the evidence seal.

18. Laboratory staff should initial and date evidence and subitems at the time of processing and/or itemizing.
    a. Photo documentation is recommended for unique items (underwear, clothing, or to document staining.
    b. Photo documentation is not necessary for non-unique items (swabs, MVAC filters, envelopes etc.).
        i. Any discoloration/staining (estimated size and color) should be noted within case documentation.

Sexual Assault Kit Processing:

19. Sexual assault kit evidence will be differentially extracted with Qiacube Connect separation protocol and EZ1 Advanced XL extraction and quantified with rtPCR (ABI Quantifiler Trio or Qiagen Quantiplex).
    a. No male DNA (for male suspect/female victim) detected indicates a negative kit and processing is stopped and a negative report will be issued.
    b. All Positive samples being taken forward to amplification will be assessed for serological significance (RSID-Saliva, RSID-Seminal Fluid).

20. Items are selected for processing based on scenario and/or general probative value.
    a. If a scenario is provided, up to three items are cut for processing based on the scenario.
    b. If no scenario is provided, up to five items are cut for processing based on General Probative Value.

21. For positive samples, two (most positive and most probative) samples will be sent forward to amplification

22. Order of General Probative Value
    a. Female Kit
        i. Cervical Swabs
        ii. Vaginal Swabs
        iii. Rectal Swabs
        iv. Anal Swabs
        v. Oral Swabs
        vi. Body Swabs
        vii. Clothing
    b. Male Kit
        i. Rectal Swabs
        ii. Anal Swabs
        iii. Oral Swabs
        iv. Penile Swabs
        v. Body Swabs
        vi. Clothing

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

Serology Processing:

24. Only the physical evidence from one processing batch should be in possession at one time. The examiner has the responsibility to ensure that the evidence is secure until it is returned to storage. The evidence packages should be sealed and returned to evidence before starting on a new processing batch.

25. All subitems and cuttings receive a unique IMF identifier (distributed by Justicetrax LIMS)
    a. Child Subitem: **Case Number-Package Count-Item Count** EX: IMF-20-0001-01-01
    b. Item cutting: **Case Number-Package Count-Item Count-Cutting Count** (**letter**) EX: IMF-20-0001-01-01-A
    c. Multiple cutting Tubes: **Case Number-Package Count-Item Count-Cutting-Tube (number 1-9)** EX: IMF-20-0001-01-A-1.
        i. Reporting after consolidation of multiple cutting tubes into one extract will be on the "1" labeled cutting.
    d. Final tubes - differential: **Case Number-Package Count-Item Count-Cutting-Tube-Epithelial Fraction/Sperm Fraction (a or b)** EX: IMF-20-0001-01-A-1-b
        i. a = Epithelial Fraction
        ii. b = Sperm Fraction

26. Clean or replace any cutting utensil (scissors, scalpel, razor blade etc.) thoroughly with bleach and ethanol after cutting/touching each item.

27. Use a clean cutting surface for each piece of evidence (butcher paper, Kimwipe, etc.).

28. Serology/Supernatant Testing:
    a. PSA - RSID
    b. Saliva - RSID
    c. Blood
        i. Phenolphthalein used for presumptive blood testing.

Laboratory Processing:

29. All tube combinations are performed before extraction.
    a. No combinations of any cuttings or extracts are allowed between evidentiary items at any time.
    b. Cuttings from different locations on a single piece of evidence should not be combined unless absolutely necessary to obtain a usable result.

30. Non-Differential Extraction Method: EZ1XL (Qiagen). Protocol provided by Qiagen.

31. Differential Extraction: Separation is performed using the QIAcube Connect (Qiagen) instrument. Protocol provided by Qiagen.

32. References: Direct Amplification. Individual kit protocols are provided by manufacturer.

33. Extraction batch Naming Convention: **E(YYMMDD)(Initials)-(Pathway) EX**: E200127DC-EQD
    a. Pathway Abbreviations

EZ1 ND	END
EZ1 QIAcube Differential	EQD

34. 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.
    b. Reagent Blank Naming Convention: **(Batch ID)-RB(Count)** EX: E200127DC-END-RB1
        i. Differentials: a = Epithelial Fraction, b = Sperm Fraction EX: E200127DC-EQD-RB1a

35. Extraction runs elute in water.

36. After processing, extracts should be refrigerated until case is completed or further processing is required.
    a. Upon completion of the case, extracts should be stored frozen until returned to the client.

37. All unknown samples and their associated reagent blanks must be quantified prior to amplification.

38. Quantification is performed using the Quant Studio 5 instrument (ThermoFisher).

39. Virtual Standard Curves are used for Quantification Plate analysis.

40. Plate Naming Convention:
    a. Quant: **Q(YYMMDD)(Initials)(Count)** EX: Q200114DC-1
    b. Amp: **A(YYMMDD)(Initials)-(Kit) (Count)** EX: A200115DC-6C1

c. Load: **L(YYMMDD)(Initials)-(Kit) (Count)-(Injection)** EX: L200115DC-6C1-2

ii. Kit Abbriviations:

Globalfiler	GF
Globalfiler Express	GFE
Fusion 6C	6C
Fusion 6C Direct Amp	6CD
Fusion 5C	5C
Fusion 5C Direct Amp	5CD
Investigator 24Plex	INV
Investigator GO!	INVGO
YFiler Plus	YFP
YFiler Plus Direct Amp	YFPD

iii. The Load plate refers to the Amp plate. The Load plate "date" will always match the amp plate date, even if the load plate preparation occurs on a different date.

41. Amplification Positive and Negative Controls are required on all amplification plates.
    a. Quant: Positive controls are the standards used to generate the curve or the stock DNA dilution when virtual curves are used. TE is used as the NTC. Each new manufacturer lot has a standard curve dilution set made and quantified in quadruplicate. This is used as the virtual standard curve for that lot. 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.

42. Amplification performed using Proflex thermocycler or Benchmark 9639 thermocycler (backup).

43. 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.

44. 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:

45. Analysis: Data quality assessment, sample interpretation, report writing, and case file assembly should be performed by the same analyst for each case if possible.

46. Reports: Each case that undergoes any amount of testing will have a report issued.

47. 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 assumes co-ownership.
    b. A second review may be performed at the analyst or technical reviewer's discretion.
        i. Signing off on the case by the second reviewer also assumes co-ownership.
    c. A technical reviewer is qualified in the method, technology, typing test kit, platform, and interpretation software being reviewed.
    d. Any disagreements between analysts and reviewers are settled by the technical leader.

48. 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.

49. Final Case Consultation: Scheduled by the client with the individual analyst after receipt of the Case File.

50. Evidence Return
    a. Extracts will be frozen after completion of the case and returned 3 months after case completion date.
        i. Extracts will be packaged cold and shipped overnight.
    b. Evidence will be returned 3 months after completion date.
        ii. Evidence will be packaged room temperature and shipped standard shipping.

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

51. 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
Report: Forensic Case Report document
Work Product: Any portion removed from the evidence that undergoes downstream processing including cuttings, extracts, extract dilutions (dilutions are discarded after use), supernatant, supernatant test cards, quantification plates, amplification product, and load plates.