FORENSIC EVIDENCE HANDLING

Background

Forensic evidence handling at the MUFSC follows the general procedure described below. The steps used are practical and designed to eliminate contamination between samples prior to extraction while preserving and conserving sample quantity.

Summary of Procedure

Once the evidence is retrieved from storage, the analyst should document the packaging of the evidence. A photograph and/or physical description of the outside packaging as well as internal packaging should be noted. The next step is to inventory the evidence using the ***Request for Analysis Form***.

Note: Evidence is received in a sealed condition. In instances of improper packaging of evidence, the Technical Leader and submitting agency is notified with respect to the event. The Technical Leader quarantines the case until the deviation from protocol is corrected. The submitting agency is notified when the quarantine is discontinued and the case becomes active. A Forensic Quarantine worksheet is completed and added to the technical case folder as a record of the event.

Based on the type of case and with input from the investigator and/or responsible attorneys, if appropriate, the analyst will evaluate the evidence and test those items identified as having probative value. Generally, a maximum number of eight items will be tested in a case involving one or two individuals. An additional four items may be tested for each additional involved individual if circumstances warrant. If the selected items do not provide probative information additional items can be tested.

Suggested Probative Rank of Evidence in Sex Crimes

1. Swabs
2. Undergarments/exterior clothing
3. Bed linen

Suggested Probative Rank of Evidence in Homicides

1. Bloodstains on suspect's clothing/possessions
2. Bloodstains on weapons
3. Scene samples
4. Victim's clothing

Sample Handling

Forensic samples may be in limited supply. Retain sufficient sample for replicate analysis. Label all samples with complete identifying information.

At the earliest opportunity evidence should be divided. The unused portion should be preserved for possible future analysis. The Laboratory's allotment may be consumed at the discretion of the Laboratory. If insufficient material is available to split then the analyst should request a consumption order from the responsible attorney before consuming the sample. If appropriate, an attempt will be made to identify the biological source material of a stain or sample prior to DNA analysis. Use the protocols provided in the ***Analytical Procedures Manual*** to perform specific presumptive and confirmatory procedures. If the screening tests would consume the entire sample, the sample should be preserved for possible DNA testing to maximize the information obtained from the evidence. The investigator and/or responsible attorneys should be consulted to determine a course of action when sample size or type dictates limited testing options. If a case has been in storage for several months the analyst may contact the investigating officer and/or responsible attorney to determine if the case is still active. If the analyst is informed that the case is no longer active testing will stop and the evidence will be returned. The

analyst will make a note of the conversation including the name of the responding individual and the date of the conversation and include that information in the report.

All biological samples and DNA must be treated as potentially infectious. Appropriate sample handling and disposal techniques should be followed. See:

- ***Safety Manual***, *Universal Precautions*
- ***Quality Assurance Manual***, *General Sample Control and Forensic Sample Preservation Policy*
- ***Analytical Procedures Manual***

Reagents and Materials

See **Appendix B** for reagent preparation

Bench paper
Kim-wipes
Permanent Marker
Gloves
Lab Coat
Ruler
Camera (optional)
Sample handling tools (scissors, scalpel blades, forceps, etc.)
Sterile microcentrifuge tubes
Evidence tape

Bleach (household)
10% Bleach
100% Ethanol
MBG Water

Reagents and Materials – Storage and Handling

All reagents and materials are to be kept under sterile conditions. Store all reagents according to the manufacturers' recommendations.

Do not use reagents beyond the listed expiration dates. Date and initial all reagents when put in use. Record in the **Reagent Log**.

Procedure

1. Document on the appropriate **Chain of Custody Worksheet** the evidence/sample(s) removed from secure storage.

2. Protect the integrity of the evidence in order to prevent the destruction or diminished utility of potential evidence. Use personal protective equipment to process the evidence using sterile laboratory techniques.

3. Limit access to the evidence. Process items in the evidence processing areas only, unless specific conditions are necessary (e.g. biological safety cabinet). Store items in secure storage areas.

4. Photograph, diagram, and/or describe all evidence prior to collection.

5. Label outer packaging and all items with an identifier (Initials, Case ID and date) without disturbing prior seals and identifying markings.

6. Review all documentation contained within the inner packaging. Copy the enclosed documentation and retain in the forensic case folder. Label the enclosed documents with the case number, initials and date. Return the original documentation to its place of origin.

7. No two forensic items are opened and examined at the same time.

8. When processing evidence, concentrate first on the evidence that is most fragile (i.e. hair, trace evidence, etc.)

9. Use a pattern when examining evidence to thoroughly cover the entire area. Evidence should be processed using alternate light sources when appropriate.

10. Descriptive details should be included in the case records of the examination of the item. The original location of collected stains may be marked on the evidence (unless evidentiary material prevents marking).

Note: Each individual item in a case should be described in enough detail to be able to identify that item at a later time. The physical description may include color, brand, size, stains, damage, etc. If a number of stains have been identified then the stains may be designated with numbers or letters to identify a particular stain. Photographs and/or diagrams will be used where appropriate, to document the location of stains on an item. The documentation of the testing results for each stain should be recorded as well as whether the stain was collected for further testing.

11. Collect sufficient evidence to do multiple tests, if possible. Collect sufficient sample for future retesting, if possible. In general, a 2 to 4 mm portion of a forensic stain, (selection based on the ***Request for Analysis***) is removed for analysis by cutting or swabbing. Given that no two forensic samples are the same in terms of genetic material quality and quantity, the stain size removed for analysis will vary. It is the policy of the MUFSC to use less than 1/2 of the observed stain. The position and size of the stain remaining is documented in the case notes. See ***General Sample Collection*** below.

Note: If a stain is being tested for the possible presence of blood, a positive presumptive test is sufficient for a preliminary report unless otherwise indicated. If a stain is being tested for the presence of semen, a positive confirmatory result is required from at least one item in the case for a preliminary report unless otherwise indicated.

14. Upon completion of the sample description, stain selection and removal; return the forensic item to the original container. Reseal the container with evidence tape. Label the tape with initials and date.

15. Upon completion of sample handling, return all evidence in sealed containers to outer packaging. Outer packaging is not securely sealed (with tape and initials) until returned to submitter.

16. Return the evidence to secure storage and document return on the appropriate **Chain of Custody Worksheet.**

General Sample Collection

Note: Forensic items and reference standards are separated by time and/or space.

Cuttings, swabs, scrapings, etc. will be collected and air dried if necessary from the evidence samples selected for further examination and analysis. Each item will be stored separately in a rectangular coin envelope. The coin envelopes will be labeled on the exterior with the following information: case #, item, date and initials. The coin envelopes will be collected into a larger envelope for storage. The exterior of the envelope will be labeled with the following information: case #, and initials of the analyst.

Small absorbent items such as cigarette filters and swabs should be collected intact. If the item is nonabsorbent then a swabbing of the stain is recommended. If a swabbing is to be made sterile water and swabs are used to collect the material. The swab should be lightly moistened and applied to the stain. If a sufficient amount of material is available three or four swabs should be collected. If the amount of material is limited try to use only the tip of the swab to concentrate the stain.

Potential blood evidence should be collected and stored in the following manner:

1. Liquid - absorbed onto gauze pad/swab - air dry-paper container
2. Stains (cloth/clothing/carpet) - cutting/swab - paper container
3. Crust (metal/wood/tile/glass) - swab - air dry- paper container

Potential semen evidence should be collected and stored in the following manner:

1. Liquid - absorbed onto a gauze pad/swab - air dry- paper container
2. Stains (panties/linen/clothes) - cutting/swab - paper container
3. Crust (metal/wood/tile/glass) - swab - air dry- paper container

Saliva evidence should be collected and stored in the following manner:

1. Liquid - absorbed onto gauze pad/swab - air dry- paper container
2. Stains - cutting - paper container
3. Crust (metal/wood/tile/glass) - swab - air dry - paper container

Stains will be made of all reference (known blood) specimens for future use. They will be packaged and stored according to the above procedure. The prepared samples will be stored in a separate envelope than the questioned samples.

Special Collection Notes

The sensitivity of PCR-DNA testing allows a larger variety of samples to be tested than ever before; stains that were too small or degraded in the past may be identifiable today. Blood, bone, tooth (pulp), tissue, semen, vaginal fluid, hair and saliva can all be used as a source of DNA. In certain situations even sweat can be used as a source of DNA. With increased sensitivity comes a greater chance that DNA accidentally introduced into the sample can be detected. Foreign DNA (non-crime related) can be introduced into a stain during the collection and handling process. Therefore every precaution should be taken to avoid the introduction of non-crime related DNA into samples processed by our facility.

The accidental introduction of non-crime related DNA can be reduced by using clean tools and sterile materials to collect the evidence. Instruments such as scissors, forceps, razor blades, etc., should be cleaned with distilled water or alcohol before and between each use. Likewise, sterile collecting materials, such as swabs and gauze, should be used.

Specimens should be collected and dried ASAP to avoid degradation and bacterial contamination. DNA can be adversely affected by heat, humidity, sunlight, and bacterial contamination, steps must be taken to minimize these conditions.

Proofread all casework notes/documentation prior to returning the evidence to secure storage. Document return on the appropriate **Chain of Custody Worksheet.**

Comments on Storage

Works in progress, or works left unattended for any period of time, are maintained in a limited access laboratory.

When work is complete, securely store forensic samples or proceed on to serological testing/extraction.