The Collection and Preservation of Biological Evidence

Scientific and Legal Requirements

Outline

- Importance of CSI
- Role of Evidence
- Legal Requirements
- Scientific Requirements
- Missing Person Evidence

Investigation

- Most Crucial Step in a Forensic Investigation
- Majority of Scientific Evidence is Found/Lost During Initial Scene Search
- Only Get One Chance to Get It Right
- Based on Ability of Investigator to Recognize the Potential and Importance of Physical Evidence
- Education, Training and Experience
Steps in a Forensic Investigation

- Recognition - Physical Evidence
- Identification - Physical, Biological, Chemical
- Comparison - Standards, Unknowns, Controls
- Individualization
- Reconstruction - Crime Scene, Investigative Information

Use of Physical Evidence

- Information on the Corpus delicti
  Essential facts that will show a crime has occurred.
- Information on Modus operandi
  Personal or signature characteristic way of committing a crime.
- Linkage of persons to other people, objects or scenes
- Disproving or supporting witness statements or testimony

Uses of Physical Evidence

- Identification of suspect
- Providing Investigative Leads
- Identification of Unknown Substances
- Reconstruction of a Crime
- Body Identification
Investigative Process

- Recognition
- Documentation
- Collection and Preservation
- Identification
- Comparison
- Individualization
- Evaluation/Interpretation
- Reconstruction
- Reporting and Presentation

Investigative Process

- Individualization
- Evaluation/Interpretation
- Reconstruction
- Reporting and Presentation

Collection and Preservation

- Scientific Requirements
- Legal Requirements
Legal Requirements

- To be admissible in court each item of evidence must be shown to be identical to what was discovered at the crime scene or time of arrest.

What is Evidence

- Evidence is not Evidence Unless it is Collected Legally
- Evidence is Whatever a Judge Rules Admissible
- Frye or Daubert Standards: Will throw out Evidence on Grounds of Relevancy

Information Needed on Evidence Container

- Name of item and each individual who had custody of the item
- Dates and Time of Collection
- Agency Number, Case Number, Item Number and Type of crime
- Name of victim and suspect
- Brief description of item
- Each item should be packaged separately in a clean container that is specific for the item and type of evidence
Note #1

“Remember, any time evidence is moved, it is altered. Therefore, proper methods of scene documentation, collection and preservation are necessary so the scene and events leading to the crime can be accurately reconstructed”

Chain of Custody

Chain of Custody is the documentation of possession of property or evidence which allows one to trace the individuals who have custody of said evidence, the time and date of transfer of said evidence and where it was secured or stored. It provides accountability and insures that the evidence has not been tampered with or substituted.

Essential Information

- Case Number
- Item Number
- Item Description
- Date and Time of Transfer
- Written and signed name of person (include agency) of individual releasing and receiving information
Note#2

- Avoid making conclusions in your descriptions of evidence this can cause complications in court.
- Ex. Bloodstains on knife/ Stain on Knife
- Paint Transfer from responsible vehicle/ scraping from vehicle
- “Hair was pulled from screaming and kicking victim”/ Hair shafts with apparent tissue material

Clothing

- Name
- Date
- Type of Test and Result
- Avoid marking information on labels.

Scientific Requirements

- Loss by leakage seam in an envelope, tear in a bag, improper seal, evaporation
- Decomposition of evidence excess exposure to light, heat, moisture
- Intermingling of Evidence from various sources and locations
- Alteration of Evidence during collection
- Contamination
Proper Packing to Eliminate Those Problems
- Use clean leak proof containers, paper bags, pharmaceutical folds etc.
- Do not staple shut use packing tape and evidence tape.
- Package each item separately
- Keep out of direct sunlight or heat (OJ Simpson case)
- Deliver evidence to lab ASAP
- Minimize handling of evidence

Properly Sealed Bag?

Three Considerations
- 1. When possible variation must be controlled hair collection, soil collection
- 2. Collect background material
- 3. Quantity of sample must be sufficient

How to Do This?
- 1. Proper Control Samples
- 2. Blank sample for Background
- 3. Sufficient samples
Biological Evidence

- Found at a variety of crimes
- Variety of evidence
- Let item dry completely before packing.
- Almost always use paper bags, cardboard boxes etc. to package evidence exception is fetal material
- If an object at the crime scene is wet, put in a plastic bag but do not seal do not wait more then 3 hours before removing to dry
- Try to keep item intact when transporting to lab

Collection of Bloodstains at Crime Scene

- Document before removing
- Collection on cloth
- Scraping
- Tape Lift

Drying

- Removes Moisture, inhibit microbial growth
- Dry items separately do not let them come into contact with each other
- Dry in a secure area at or slightly below room temperature with low humidity
- Avoid direct light or moving air
Clothing

- Have individual (victim/suspect) stand on a large sheet of white paper while removing clothing.
- If wet allow clothes to dry (keep separate, use a drying cabinet or secure area, put paper underneath and between clothing).
- Note and try not to remove any evidence on clothing location can be important.
- Package each item separately, including paper sheets.

Missing Person Considerations

- DNA; More then one type per cell.
- Different Types useful for different Evidence.
- Need to Understand these differences to collect proper reference samples and to comprehend a DNA test result.

Nuclear DNA

- Make up Chromosome.
- Mendellian Pattern of Genetic Inheritance; both Biological Parents contribute evenly.
- Found in one copy per cell.
- Found in almost all types of tissue.
**Nuclear DNA**
- Difficult to obtain from Skeletal or Decomposed Tissue
- Reference Samples First Order Relatives: Biological Mother, Father, Full Sibs

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**Mitochondrial DNA**
- Found in the cells: Mitochondria
- Multiple Copies per cell
- Non-Mendelian Inheritance Pattern: Maternal Lineage

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**Mitochondrial DNA**
- Useful in skeletal and decomposed remains
- Reference Samples: Only those with in the known maternal lineage
- Less discriminating than Nuclear DNA
Y- Chromosome DNA

- DNA that makes up the Y, or male sex determining chromosome
- Non- Mendelian Inheritance Pattern: Paternal Lineage Reference Sample

Final Notes

- Reference samples find out what DNA test(s) are being performed ask lab for advice on reference samples
- Make certain that all biological relationships of the donors of the reference samples are understood by everyone
- Obtain and document legally (permission or court order, signed COC etc.
- 2-3 reference samples at least one maternal sample
- UNTCHI (800) 763-3147

Further Information

- Presidents DNA Initiative: www.dna.gov
- Dept. of Justice: www.usdoj.gov
- National Institute of Justice: www.usdoj.gov/ni
- National Forensic Science Technology Center: www.nfstc.org
- Joseph Warren, Ph.D., F-ABC: jwarren@hsc.unt.edu