



**VIRGINIA DEPARTMENT OF FORENSIC SCIENCE**  
**EVIDENCE HANDLING & LABORATORY**  
**CAPABILITIES GUIDE**

**FORENSIC BIOLOGY**

**Contact Information**

If you have any questions concerning the Forensic Biology laboratory examination capabilities or evidence handling procedures, please call the Training Section or the Forensic Biology Section at the Forensic Laboratory that services your area.

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## OVERVIEW

When a biological substance, such as blood, semen, saliva or tissue leaves the human body and is left at the scene of a crime, the biological sample will begin to degrade (break down; be destroyed) if not properly collected, packaged and preserved. In addition, due to the sensitivity of the DNA technology used by the Department of Forensic Science (DFS), if proper precautions are not taken while collecting evidentiary samples there is an increased possibility of introducing contamination from a foreign DNA source unrelated to the crime. It is also possible to transfer unrelated sources of DNA between crime scene samples if the evidence is not packaged correctly.

### **PROCESSING OF EVIDENCE BY THE FORENSIC BIOLOGY SECTION**

The initial examination performed by the Forensic Biology examiner is screening the evidence to identify the possible presence of a biological substance (e.g., blood or semen). Probative biological evidence will then be analyzed using a DNA technology specifically designed to test minute amounts of biological material at 16 different genetic areas of the DNA. The DNA profile obtained from the evidence is compared to the DNA profile from the known samples (victim, suspect or elimination samples, such as a husband or boyfriend) to determine if an individual is included or eliminated as a possible source of the biological substance. If no suspect has been identified the foreign DNA profile will be searched against the Virginia DNA Data bank, which contains DNA profiles from convicted offenders and individuals arrested for specific felonies, to aid the law enforcement community to identify a possible perpetrator. The types of cases analyzed by the Forensic Biology Section using DNA analysis include, but are not limited to:

- Homicides (includes attempted homicide, manslaughter and death investigations)
- Sexual Assaults (includes rape, anal sodomy, oral sodomy and cunnilingus)
- Criminal Paternity
- Breaking & Entering/Grand Larceny
- Robbery/Car Jacking
- Assault/Maiming
- Malicious Wounding
- Missing Persons/Body Identification
- Miscellaneous (felony vandalism, arson, hit & run, illegal deer kills and sales, etc.)

These cases can be placed primarily into three (3) examination categories:

- Blood cases
- Secretion cases (semen, saliva, perspiration, etc.)

- Missing Persons/Body Identification

## **DEFINITIONS**

**Biological Substances** - Body fluids such as blood, seminal fluid, saliva, or urine or biological material such as tissue (muscle, fetal material, etc.) and feces

**Degradation** - Partial or complete deterioration of a biological substance by chemical or physical means (e.g., heat, moisture or bacteria)

**Deoxyribonucleic Acid (DNA)** - The genetic material found in various body tissues (muscle, fetal tissue, skin, etc.) and body fluids (semen, vaginal fluid, blood, saliva, etc.). Because an individual's DNA is the same from cell-to-cell within the body and is different from individual-to-individual, DNA can be used to determine whether a biological substance may have been deposited by a specific individual. NOTE: Identical siblings (twins, triplets, etc.) will have the same DNA profile.

**DNA Profile** - The combined results that are developed when testing 16 different areas of the DNA

**Mitochondrial DNA** - Small, circular DNA molecules located within cellular organelles called mitochondria. This type of DNA is inherited maternally. Mitochondrial DNA testing is conducted on samples (hairs with no root, bone, teeth, etc.) where nuclear DNA testing has not produced suitable results.

**Y-Chromosome DNA** - Male specific DNA found in the nucleus of most cells of the body. This type of DNA is inherited paternally. All males within a family (e.g., father, grandfather, brother, uncle, and cousin) will have the same Y-chromosome DNA profile, except where mutations occur.

**Physical Evidence Recovery Kit (PERK)** - Kits used for the recovery of physical evidence from the body of a sexual assault or homicide victim or suspect. These kits are designed to aid in the recovery of foreign secretions and trace evidence (e.g., hairs and fibers) from the victim or suspect.

**Semen** - A biological substance secreted by males that consists of a combination of seminal fluid and spermatozoa

**Seminal Fluid** - A biological fluid produced by males in which spermatozoa, if present, reside

**Touch Evidence** - "Touch" evidence is evidence resulting from casual contact by an individual with a surface or material. This would include primarily objects touched by an individual's hand(s), such as keys, gun grips and triggers, knife handles, steering wheels, etc.

**Virginia DNA Data Bank** - The Virginia DNA Data Bank is a collection of DNA profiles from convicted offenders and individuals arrested for certain felonies. A buccal sample is collected from these individuals and a DNA profile is developed. The DNA profiles from these individuals are stored in the Data Bank for comparison purposes. In addition, the DNA Data Bank also contains DNA profiles obtained from evidence samples (from solved and unsolved cases) which may be compared in order to connect the DNA profiles from two or more unrelated cases to a common perpetrator. The Virginia DNA Data Bank is also linked to the National DNA Data Bank which contains DNA profiles from laboratories across the country. All profiles eligible for the National DNA Data Bank are automatically

sent upon completion of the case.

**Wearer DNA** - DNA recovered from an article of clothing believed to have been worn by the individual in question. Areas on the clothing that should be tested include areas where the garment may have been in direct contact with the individual's skin.

## **CAPABILITIES AND SERVICES**

Identification of biological substances and determination of whether the biological substance may have originated from a specific individual through the use of DNA analysis is the primary function of the Forensic Biology Section. The types of biological materials that are routinely analyzed fall into the following three categories:

### **Serological testing**

A. Blood Cases – The screening and testing of the evidence in these types of cases is designed to answer two (2) questions:

1. Is the reddish/brownish stain blood?

The Forensic Biology Section can determine if blood is indicated in a stain through chemical testing. This testing is an integral part of the examination of a blood case.

To assist in the location of possible blood in cases where the blood has been cleaned up from a certain area and is no longer visible to the naked eye, the BLUESTAR® FORENSIC KIT may be used by the law enforcement agency. If a positive BLUESTAR® result is obtained, the sample(s) must be collected and submitted to the laboratory for further biological substance determination.

Information on purchasing this kit and the instructions for its use are available at [www.bluestar-forensic.com](http://www.bluestar-forensic.com).

NOTE: BLUESTAR® MAGNUM should not be used

2. If the stain is blood, is it human?

The Forensic Biology Section can determine if the blood stain is human blood during the initial DNA analysis. If the stain is not human and animal origin is not important, no further examinations will be conducted. However, in those cases where the animal origin must be established (e.g., illegal deer kills) contact the Forensic Biology Section for a list of private laboratories that offer this examination.

- B. Secretion Cases –These types of cases may include sexual assaults, breaking and entering, robberies, homicides, etc. that have items of evidence containing semen, saliva, perspiration, or touch and wearer DNA samples.
1. The first step is to identify the biological substance(s), if possible:  
Identify the presence of sperm (which confirms seminal fluid).
  2. The presence of some biological substances can be indicated, but cannot be confirmed:  
Indicate the presence of seminal fluid (in the absence of sperm).  
Indicate the presence of urine.  
Indicate the presence of feces.  
  
Sufficient unique characteristics do not exist with current technologies for the Forensic Biology Section examiner to absolutely confirm the presence of these biological materials to the exclusion of all other biological substances.
  3. Some biological substances are implied:  
  
Implied presence of saliva on envelope flaps, cigarette butts, bottles, cans or straws.  
  
Implied presence of vaginal fluid on vaginal/cervical swabs, subject pubic area swabs and subject underpants  
  
Implied presence of skin cells (for touch/wearer) on clothing and items that may have been handled by the person of interest.
- C. Missing Persons/Body Identification – These cases involve the analysis of blood, bones, hair, tissue and teeth from unidentified human remains. In addition, personal effects (tooth brush, razor) from the missing person or reference samples from biological relatives of missing people are analyzed to aid in the search for missing family members.

### **DNA Testing**

Once a sample has been selected for DNA testing the Forensic Biology Section examiner will attempt to determine if the biological material may have originated from a specific individual. The Forensic Biology Section utilizes a commercially available DNA typing kit which permits the examiner to test 16 different genetic areas of the DNA simultaneously for comparison to a known sample to determine if an individual could have deposited the biological substance. If the DNA profile obtained from the evidence is consistent with the DNA profile obtained from the known sample, the examiner will perform a

statistical calculation to provide weight to the conclusion that the biological substance was deposited by a specific individual.

### **Mitochondrial DNA Testing**

Utilized in Missing Persons/Body Identification cases to improve the reliability of identifications and to aid serious felony investigations when other methods of DNA testing yielded limited to no results. Mitochondrial DNA testing determines the linear order of the building blocks of the DNA molecule resulting in a “mitotype” which can be compared to reference sample “mitotypes”.

### **Y-Chromosome DNA Testing**

Utilized in cases involving mixtures with a high ratio of female DNA to male DNA or in cases involving lineage testing such as body identification or paternity or missing persons cases when traditional nuclear DNA testing has not yielded a result, Y-chromosome DNA testing involves the development of a DNA profile found only on the Y-chromosome that can be used for comparison to male reference samples. Y-chromosome testing does not yield searchable DNA profiles and therefore is not helpful in cases without known reference samples.

### **Virginia DNA Data Bank**

If the DNA profile obtained from the evidence does not match the known sample from the suspect or no suspect sample has been submitted for comparison, eligible DNA profile(s) obtained from the evidence will be searched against the Virginia DNA Data Bank (and at the national level) to help identify the possible perpetrator of the crime. Examples of profiles that may not be suitable for searching against the Virginia DNA Data Bank include mixture profiles (i.e., profiles containing DNA from more than one person) and partial DNA profiles.

### **Criminal Paternity/Maternity**

The Forensic Biology Section performs DNA analyses in cases involving incest or rape in which the assault results in the birth of a child and the known blood or buccal samples from the victim, suspect and child are submitted to the laboratory for comparison. In addition, DNA analysis can also be performed on fetal tissue obtained as a result of an abortion/miscarriage once the known samples from the victim and suspect are submitted to the laboratory.

## **COLLECTION GUIDELINES**

Biological fluids and body fluid stains are valuable evidence which can be used to either associate a victim or suspect with a crime/crime scene or eliminate them from consideration. The most frequently encountered biological fluids are blood, seminal fluid, and saliva.

**NOTE** - For the collection of blood for alcohol and/or drug analysis, refer to the instructions under [Toxicology](#).

## SAFETY PRECAUTIONS

It is imperative when collecting or packaging biological evidence for submission to the laboratory that clean latex or nitrile gloves, shoe covers, gowns, masks, head covers, and safety glasses, as appropriate, be worn and changed often. All biological materials and fluids must be handled with universal precautions. Body fluids, wet or dry, have been shown to carry diseases, so proper safety precautions must be observed. Dry stains may flake when disturbed or collected, sending minute particles airborne. These may be absorbed through mucus membranes (eyes, nose, mouth, etc.), open cuts, or chapped skin. Wearing this protective clothing also helps minimize possible contamination of the evidence sample with your DNA.

### ITEM - Biological Evidence

**METHOD** - All biological evidence where applicable should be air-dried prior to submission to the laboratory. When possible, the evidence (once packaged) should be submitted to the laboratory as soon as possible. If the evidence cannot be dried and submitted to the laboratory the same day as packaged, refrigerate the evidence until submission. However, the evidence should not be refrigerated for more than a week.

During the collection, air-drying or packaging of any body fluid stains, caution should be used to ensure that a stained area from an item of evidence does not come in contact with another stained or unstained area or in contact with contaminated gloves. This applies to outer surfaces and inner surfaces. For example, a shirt should not be folded or rolled so that a bloodstain on the front contaminates any stained or unstained area on the back or inside of the shirt. A barrier, such as paper or cardboard should be placed on the inside of the shirt, as well as under and over the garment to prevent stained areas from coming in contact with each other (see [Clothing in Paper Baffles](#)).

When air drying articles stained with body fluids, place them on or over a piece of clean paper. Any debris which falls from the material onto the paper during the drying process will be collected when the paper is folded with the article prior to packaging, labeling and sealing.

Body fluid evidence can be contaminated by the crime scene officer's own body fluids. The perspiration on the officer's hands may contaminate the cotton swabs used to collect the body fluids. To prevent such contamination protective clothing (i.e., fresh latex or nitrile gloves, gowns, masks and head covers) should be worn while collecting the evidence.

To avoid possible sample-to-sample contamination, change latex or nitrile gloves (and other applicable protective wear) when contaminated and between items when collecting evidence.

**DISCUSSION** - Refrigerating the evidence will retard bacterial growth. However it will not stop the growth which can then lead to degradation of the biological material if the evidence is not dried. The sooner the biological evidence is dried or submitted to the laboratory for drying, the more likely useful information can be obtained from the evidence through DNA analysis.

### ITEM - Wet (saturated) Biological Evidence

**METHOD** - Package the item of evidence in plastic only if there is a danger of contamination due to

saturation of wet items that cannot be air-dried prior to submission to the laboratory. Paper packaging is preferred if saturation is not a problem. **NOTE:** If it is necessary to package an item of evidence in plastic because it is wet, this information **MUST** to be indicated on the RFLE and the evidence submitted to the laboratory the same day as packaging, if possible.

**DISCUSSION** - Within a short period of time wet evidence stored in plastic, even if refrigerated will promote bacterial and fungal (mold/mildew) growth, which can destroy biological material and potentially preclude the examiner from obtaining DNA results.

#### **ITEM - Known Blood/Buccal Swab Sample**

Known blood samples (except for Toxicology purposes) are now collected as a stain card in PERKs.

Submit Toxicology samples – blood and urine – outside of PERK. These samples should be refrigerated until they are submitted.

**METHOD** - Known blood samples are taken by a doctor, nurse, or other qualified person and collected in a 7cc lavender top EDTA vacutainer tube. **NOTE:** Collect blood for alcohol and/or drug analysis separately and according to instructions under [Toxicology](#).

Known buccal swabs are collected by taking **two** (2) sterile swabs and swabbing the inner cheek of the mouth. The swabs should be rotated during the collection process to ensure that the swab has been saturated with saliva and buccal cheek cells. Place both swabs together into **one** (1) new swab box (labeled with individual's name) to air dry. It is not necessary to collect separate samples from the left and right inner cheeks. This is considered all one sample.

#### **ITEM - Wet Body Fluids on Non-Porous Surfaces (e.g, glass window, counter top, wood floor)**

**METHOD** - Absorb the stain onto a sterile cotton swab(s); saturating one swab before using another. Use the minimum number of swab(s) to collect the stain. Allow the swab(s) to air dry or place the swab(s) in a new swab box (labeled with location recovered) for drying. It is not necessary to collect more than 4 saturated swabs for submission to the laboratory. **NOTE:** double-tipped swabs and Q-tips should not be used.

**DISCUSSION** - Collection of wet body fluids in this manner assures that the best evidence is submitted in its most concentrated form. Any time water is added for collection, the chance of diluting the stain is increased.

#### **ITEM - Wet Body Fluids on Porous Surfaces (e.g., blanket, carpet, untreated wood)**

**METHOD** - Submit the air-dried item of evidence if possible. For large items (large carpets, upholstered furniture, etc.) it may be necessary to cut out the stained areas or swab the stained area with a sterile swab(s), concentrating the stain on the swab as much as possible. If cuttings/swabbings are taken, package the cuttings/swabbing from each area separately.

**ITEM - Dried Body Fluids Stains (blood/semen) on Non-Porous Surfaces or Porous Surfaces**

**METHOD** - Submit the item of evidence when possible or take a swabbing of the evidence and submit the swab(s) to the laboratory. For large items (large carpets, upholstered furniture, etc.) it may be necessary to cut out the stained areas or recover the stained area onto a slightly moistened sterile cotton swab(s) using one to two drops of distilled water. Saturate one swab with the stain before absorbing onto the next swab. Allow the swab(s) to air dry or place the swab(s) in a new labeled swab box for drying. It is not necessary to collect more than 4 saturated swabs for submission to the laboratory. NOTE: double-tipped swabs and Q-tips should not be used.

**DISCUSSION** - Avoid scraping crusts due to risk of airborne flakes.

**ITEM - Dried Body Fluids Stains (saliva/perspiration and touch DNA) on Non-Porous Surfaces or Porous Surfaces (e.g., bottles, cans, triggers or grips of firearms)**

**METHOD** - Submit the item of evidence or when possible use a single swab to take a swabbing of the evidence and submit the swab (not the item of evidence) to the laboratory. It may be necessary to absorb the stained area onto a slightly moistened sterile cotton swab using one to two drops of distilled water. Allow the swab to air dry or place the swab in a new labeled swab box for drying. NOTE: double-tipped swabs and Q-tips should not be used.

**DISCUSSION** - Avoid scraping crusts due to risk of airborne flakes.

A single swab is recommended for collection to concentrate the stain and to increase the likelihood of obtaining sufficient biological material to obtain a DNA profile.

By swabbing an item of evidence, such as the mouth of a bottle or areas of a firearm that are of no value for latent print examination, the swab(s) can be submitted to the Forensic Biology Section while the actual item of evidence can be submitted for examination to the Latent Print or Firearms Sections. If uncertain where to collect the swabbing it is best to contact the laboratory for guidance.

The Forensic Biology Section no longer analyzes control swabs, therefore there is no need to collect or submit a control swab to the laboratory.

**ITEM – Fresh Human Tissue Sample (example muscle tissue) or Moist Partially Eaten Food Item (example hamburger) Biological Evidence**

**METHOD** - Package the item of evidence in plastic. NOTE: this information **MUST** be indicated on the RFLE and the evidence submitted to the laboratory the same day as packaging, if possible. If the partially eaten food appears dry (example old pizza crust) proceed with the packaging used for dried body fluids stains described previously.

**DISCUSSION** - Within a short period of time wet evidence stored in plastic, even if refrigerated will promote bacterial and fungal (mold/mildew) growth, which can destroy biological material and potentially preclude the examiner from obtaining DNA results.

**ITEM - Body Fluid Evidence Not Readily Visible**

**METHOD I** - An Alternate Light Source (ALS) may be used to locate a possible biological substance (e.g., seminal fluid). Once the stain has been located, the stain(s) can be collected and submitted to the laboratory. Note: eye protection should be used with ALS.

Examples of ALS:

- UV light
- Omnichrome
- LumaLite/CrimeScope®

Short wave and long wave ultraviolet light: No filter is needed when using UV light, short wave UV light is emitted at 245 nm and long wave UV light is emitted at 366 nm. NOTE: long term exposure of DNA to UV light can cause degradation.

Omnichrome: fluorescence of body fluids is best at 450 nm; a yellow filter should be used.

LumaLite/CrimeScope: most sensitive of the Alternate Light Sources and can be used in daylight; fluorescence of body fluids is best at 450 nm; an orange filter should be used.

**DISCUSSION I** - At certain wavelengths of light, body fluids may emit light (fluoresce). This can be demonstrated by holding a UV light source over a particular item of evidence with suspected body fluid staining. For example, seminal stains on automobile seats and floors may not be readily visible to the naked eye but may be enhanced by using an ALS.

Certain chemicals (such as food and detergents) can mimic body fluid stains under certain lighting conditions.

**METHOD II - BLUESTAR® FORENSIC KIT** can be used to visualize traces of blood from a crime scene that has been cleaned up and residual blood still remains that cannot be seen in natural light. The BLUESTAR® reagent is a chemiluminescent compound which reacts with blood and emits light in a dark environment. Take a swabbing of the BLUESTAR® positive areas and submit to the laboratory for possible blood confirmation. If submitting a piece of evidence with a BLUESTAR® positive stain, make a wide circle around the area where luminescence was seen taking care not to contaminate the positive area with ink.

The BLUESTAR® reagent is sprayed in the dark and the luminescence may be photographed with SLR camera equipment by using long (30 second minimum) exposure times and an aperture setting around f8 while the camera is mounted on a tripod. The exposure times will vary based on the strength of the reaction.

Do not over saturate the stain area, otherwise the BLUESTAR® solution will dilute the possible blood stain.

Collect any visible stains **BEFORE** attempting any photography. The BLUESTAR® reagent must be reapplied to the affected area during the extended exposure time.

**DISCUSSION II** - The BLUESTAR<sup>®</sup> reagent can react with other substances such as metals and bleach.

**ITEM** - Victim Physical Evidence Recovery Kit (VPERK) – white box

A kit used for the recovery of physical evidence from the body of the sexual assault victim. Modifications to this kit are made for the collection of evidence from children and male victims.

**METHOD** - For use within 72 hours of the assault. Medical personnel are urged to follow the instructions supplied with the kit.

**DISCUSSION** - The kit contains supplies to recover foreign secretions and trace evidence (e.g., hairs and fibers) from the alleged victim. In addition, the kit contains supplies for the collection of known samples from the victim for comparison with the foreign secretions and hairs and fibers recovered which may be from the suspect.

PERKS are available at all regional laboratories for law enforcement officers and hospitals.

The kit should be sealed and initialed by the examining clinician/doctor and initialed by the officer receiving the PERK.

Do not open and air-dry the contents of the PERK.

Submit the PERK to the laboratory if a criminal complaint is made and DNA testing may be probative to the case.

The Evidence Transfer Bag should be left open since items inside have been sealed.

The submission of additional items, such as clothing, collected with the PERK may be made based on case scenario and in consultation with the laboratory or may be retained by the agency.

**ITEM** - Sexual Assault Victim's Underpants

**METHOD** - Submit underpants worn during and/or immediately after the assault if the examining clinician did not include them in the PERK.

**DISCUSSION** - Specifically ask if the underpants worn by the victim to the hospital are the same ones worn immediately after the assault. If not, it may be necessary to locate and collect them. Package them in paper to facilitate drying. The underpants worn by the victim immediately after the assault will likely collect vaginal drainage, which may include seminal fluid, saliva, and/or hairs/fibers left by the suspect. If no underpants were worn by the victim immediately after the assault, other clothing items (such as blue jeans or shorts) that were in contact with the genital area may be submitted.

Other victim clothing items may be submitted with laboratory approval based on case scenario (e.g., an external ejaculation). If submitted, describe the clothing on the Request for Laboratory Examination (RFLE) form (e.g., bag containing blue jeans, shirt and sweatshirt).

**ITEM - Physical Evidence from Sexual Assault Scene (i.e., bedding)**

**METHOD** - If the assault occurred on a bed, collect the top surface of bed linen which may hold stains, hairs, and/or fibers. If the assault occurred in a vehicle, collect actual seat fabric cuttings and/or swabs of stains. Collect towels or tissues used by the suspect and/or victim to clean up after the assault; package in paper to promote drying.

Swabs containing wet blood, seminal fluid, saliva, or distilled water used to moisten the swab for dried stain collection **MUST** be:

- a) Air-dried or put in a labeled swab box to dry, then submitted as soon as possible to the laboratory.
- b) Refrigerated until submitted to the laboratory. The evidence should be submitted to the laboratory within a week to reduce degradation.
- c) If the evidence has not been air-dried, this must be indicated on the RFLE

**DISCUSSION** - These areas may contain body fluid and/or hairs/fibers of the suspect and/or victim. This becomes especially important if the victim has washed or cleansed himself/herself after the assault.

Crucial evidence (i.e., trace evidence and biological substances) may still be obtained from clothing and bedding that has been washed. Therefore this evidence should still be collected for possible examination/evaluation if other evidence yields no probative information.

Bedding can be submitted in the absence of a PERK. If a PERK has been collected, the bedding should not be submitted to the laboratory until the PERK has been evaluated.

Please consult with the lab prior to the submission of bedding and/or similar items of evidence.

**ITEM - Suspect Physical Evidence Recovery Kit (SPERK) - blue envelope**

A kit to aid the recovery of physical evidence from the body of a sexual assault suspect.

**METHOD** - For use within 24 hours of the offense. Collection personnel are urged to follow the instructions supplied with the kit.

For digital penetration case, use 1 or 2 swabs to collectively swab the fingers from each hand. Place the samples from each hand in a separate, labeled swab box. Do NOT collect a separate swabbing from each finger.

**DISCUSSION** - The kit contains supplies to recover foreign secretions (as may be found on underpants or pubic area swabs) and trace evidence (e.g., hairs and fibers) from the suspect's body and underpants. Also collect a buccal sample from the suspect for comparison with foreign secretions and hairs recovered from the victim.

### **ITEM - Sexual Assault Suspect's Clothing**

**METHOD** - Collect the suspect's clothing which was worn during the assault.

Have suspect stand on large clean sheet of paper while disrobing to collect any possible trace evidence (e.g., hairs or fibers).

**DISCUSSION** - Secretions (e.g., vaginal fluid, saliva associated with fellatio), hairs, fibers, and/or other materials may be found on the suspect's clothing which may associate the suspect with the victim and/or the crime scene.

### **ITEM - Buccal Swabs Kit – orange envelope**

NOTE: The Blood and Hair Samples Kits have been phased out and have been replaced exclusively by the Buccal Swabs Kit.

This kit is for the collection of a known sample from a victim, suspect, or a third party for elimination purposes.

**METHOD** - The instructions supplied with the Buccal Swabs Kit should be followed when collecting the appropriate samples.

**DISCUSSION** - This kit may be used under the following specified circumstances:

- **SUSPECT** – when the collection of known samples takes place more than 24 hours after a sexual assault or for cases not involving a sexual assault.
- **VICTIM** - when the collection of known samples takes places more than 72 hours after a sexual assault or for cases not involving a sexual assault.
- **THIRD PARTY** - when an individual (e.g., husband or boyfriend) unrelated to the crime may have contributed biological substances to the evidence.

The sexual assault may not be reported immediately; therefore it is imperative that the time interval since the assault occurred be determined to ensure the correct kit is used for the collection of the samples

It is strongly encouraged that the victim and suspect known samples, as well as any elimination samples be collected and submitted to the laboratory for comparison with submitted evidentiary samples.

### **ITEM - Aborted Fetal Tissue Associated with Criminal Paternity Cases**

**METHOD** - If the fetus is 10 weeks old or more at the time of the abortion, request the medical doctor performing the procedure to place the entire aborted fetal material into a hard plastic container (e.g., specimen cup) or other appropriately sized container.

If the fetus is less than 10 weeks old at the time of the abortion, request the medical doctor isolate a portion of the fetal tissue from the maternal tissue and place the fetal tissue into a hard plastic container (e.g., specimen cup).

Submit the container to the laboratory the same day. If it is not possible for the aborted fetal tissue/material to be submitted to the laboratory the same day, place the container into a refrigerator or freezer and submit to the laboratory the next day.

**NOTE:** The fetal tissue/material should not be stored in a saline solution or any other type of preservative.

**DISCUSSION -** Within a short period of time fetal tissue/material, even if refrigerated will promote bacterial growth, which can destroy biological material and potentially preclude the examiner from obtaining DNA results.

Tissue (products of conception) collected from an aborted fetus that is 10 to 12 weeks old may contain identifiable body characteristics (e.g., hands and feet) that can easily be isolated by the DNA examiner from the remaining aborted fetal/maternal tissue. If the fetus is less than 10 weeks old, the body characteristics may not be easily identified by the examiner. Therefore assistance from the medical doctor performing the procedure may be required to isolate the fetal tissue from the maternal tissue prior to submission to the laboratory.

#### **ITEM – Touch Evidence**

**METHOD -** Submit the item of evidence or take a swabbing of the evidence with a single sterile cotton swab that has been slightly moistened with one (1) to two (2) drops of distilled water. Allow the swab to air dry or place the swab in a new labeled swab box for drying. **NOTE:** double-tipped swabs and Q-tips should not be used.

**DISCUSSION -** A single swab is recommended for collection to concentrate the DNA that may be present in the “touch” area and to increase the likelihood of obtaining sufficient biological material to obtain a DNA profile.

### **SUBMISSION REMINDERS**

#### **General Reminders**

Requests for DNA analysis of “touch” evidence will not be accepted without a written request specifying the reason for such testing from the Commonwealth’s Attorney. A letter of request from the Commonwealth’s Attorney will not be required for the analysis of “touch” evidence in major crimes cases where screening by a DNA examiner as described in paragraph 2 below has occurred. Refer to the [Evidence Submission Policy Notice](#) addressed to all agencies served by the Department of Forensic Science Laboratories dated October 12, 2004.

Prior to submission of a large number of items, a DNA examiner/supervisor must be contacted via telephone or through an in-person meeting to identify the most probative evidence for the respective case and evidence submission will be limited to those items. Refer to the [Evidence Submission Policy](#)

[Notice](#) addressed to all agencies served by the Department of Forensic Science Laboratories dated October 12, 2004.

- a. Determination of probative evidence will be decided based on a number of factors including the type of case, the evidence collected, the number of victims and perpetrators, etc.
- b. In the event that additional evidence submission is necessary, communication between the assigned examiner and the investigator will occur to facilitate this process and the examination of the subsequent submission in a timely manner.

DNA analysis of evidence associated with simple possession of controlled substances (e.g., cocaine, heroin) and misdemeanor offenses, except any sex-related misdemeanor offenses (such as peeping tom cases), will not be analyzed without a written request from the Commonwealth's Attorney specifying the reason for such testing. Refer to the [Evidence Submission Policy Notice](#) addressed to all Law Enforcement Personnel dated May 14, 2002. Any questions about whether an offense falls under this policy should be directed to the Department's Legal Counsel at (804) 786-2281.

To perform a complete DNA analysis and reach a conclusion, it is imperative that all appropriate known samples (i.e., victim, suspect, elimination samples, such as the husband or boyfriend) are submitted to the laboratory prior to the DNA analysis of the evidence.

Submit only the most probative item(s) of evidence to the laboratory. If necessary, additional items of evidence can be submitted at a later date. For example, the first submission in a sexual assault case should contain only the victim PERK and appropriate standards. Additional evidence such as clothing and bedding can be submitted later depending on the initial results obtained.

Prior to submitting evidence from a "cold case", please consult with the Forensic Biology Section examiner who performed the original analysis, if possible, or a section supervisor to determine which items of evidence should be submitted to the laboratory.

If it is not possible to dry a wet item of evidence prior to submission to the laboratory, please indicate on the RFLE form that the item of evidence is wet so that immediate attention can be given to this item and the sample(s) can be dried prior to storage.

The Forensic Biology Section no longer analyzes control swabs, therefore there is no need to collect or submit the control swabs to the laboratory.

### **EXAMPLES OF SUBMISSION SCENARIOS**

- The investigator plans to submit to the laboratory a convenience bag containing the Victim Physical Evidence Recovery Kit (VPERK), a sealed white bag containing a shirt, and a sealed bag containing a pair of shorts.

The RFLE form should list the items as follows:

Item 1 - VPERK from Jane Doe

Item 2 - Sealed white bag containing shirt from Jane Doe

Item 3 - Sealed white bag containing shorts from Jane Doe

- The investigator plans to submit to the laboratory a convenience bag containing the VPERK and a single sealed white bag containing an assortment of clothing. However, the investigator is not sure what items of clothing are inside of the bag.

The RFLE form should list the items as follows:

Item 1 - VPERK from Jane Doe

Item 2 - Sealed white bag containing clothing from Jane Doe

- The investigator receives a VPERK box from a hospital staff member and is told that the clothing is packaged inside the box. The investigator plans to submit the VPERK to the laboratory.

The RFLE form should list the item as follows:

Item 1 - VPERK from Jane Doe

- The investigator plans to submit to the laboratory two blood stained swabs collected from the point of entry of a residential breaking and entering. The stains were collected by moistening two cotton swabs with sterile water.

The RFLE form should list the item as follows:

Item 1 – two swabs of red stain from entry point (air dried)