

SEROLOGY/DNA EVIDENCE COLLECTION MANUAL

MONTANA STATE CRIME LAB

Lab Contact Information

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Please note that not all situations can be addressed in this manual; however, the following guidelines can be used for typical types of evidence you may encounter. If you have any questions regarding evidence collection or packaging for DNA or serological evidence, please contact the laboratory.

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INTRODUCTION

The State of Montana Forensic Science Division Serology/DNA section is responsible for the forensic biochemical analyses of body fluids, stains, and cellular material not associated with bodily fluids and the DNA typing of biological evidence. The majority of examinations begin with a screening procedure to identify the presence of biological material on items of evidence. When biological material has been identified from the screening process, a sample of the material can be taken for DNA analysis. Biological screening can involve a series of chemical tests to indicate the presence of a bodily fluid (serology), or may be as simple as swabbing an item that has been reportedly touched or contacted in some way.

Serological testing will only be performed on suspected blood and/or semen stains. Biological material such as suspected saliva and cellular material which we are unable to test serologically is typically forwarded for DNA analysis. Please note that while the laboratory accepts cases for serological and DNA analysis, the laboratory does not conduct serological tests to identify the TYPE of biological fluid (saliva, urine, feces, or perspiration).

DNA CASEWORK EXAMINATIONS

Deoxyribonucleic acid (DNA) is analyzed in body-fluid stains and other biological tissues recovered from items of evidence. The results of DNA testing on evidence samples are compared with the results of DNA analysis of reference samples collected from known individuals. Such analyses can associate victims and suspects with each other, with evidence items, or with a crime scene. The Serology/DNA section conducts nuclear DNA testing on evidence samples as appropriate for the type of evidence. The type of evidence may also lend itself to additional testing such as Y-STR analysis. Y-STR analysis is a male-specific DNA analysis and is not performed at the Crime Lab. Should your case require Y-STR analysis, we will refer you to a private laboratory with that capability.

NUCLEAR DNA EXAMINATIONS

Nuclear DNA is the most discriminating type of DNA analysis and is typically performed on evidence containing blood, semen, saliva, body tissue, and hairs that have tissue at their root ends. The power of nuclear DNA testing lies in the ability to identify or include an individual as being the source of the DNA obtained from an evidence item, as well as exclude them as a possible source of the biological material. Where appropriate, the DNA-typing results from evidence items, including items related to missing persons, may be uploaded into the Combined DNA Index System (CODIS).

Known reference samples from subjects and victims are required for comparison with evidence materials. DNA profiles located in CODIS cannot be used as reference samples, and every effort should be made to submit a suspect reference standard with the initial submission of evidentiary items.

“TOUCH” DNA-TYPE SAMPLES

While it has been recognized that there is a potential for DNA recovery from “touched” samples, this type of evidence can present challenges in interpreting the resulting data. Samples that are likely to have been handled by multiple sources, such as swabs of door handles or steering wheels, can result in complex mixtures of DNA from multiple donors. Analysis of these samples often leads to limited or inconclusive results regarding exclusion or inclusion of a particular person of interest.

As such, these samples should be analyzed as samples of a last resort and, if other evidence with a higher potential for developing a probative profile is available, it should be submitted first. **Additionally, these samples will require the entire sample to be used up or consumed during the analysis procedure and therefore require consumption authorization from the county attorney or defense attorney assigned to the case.** Elimination reference standards from anyone has touched the item should also be submitted along with the evidentiary item.

ACCEPTANCE GUIDELINES FOR BIOLOGICAL EVIDENCE

In an effort to balance our limited resources with the needs of our customers, the increasing demand for DNA testing requires us to carefully evaluate lab requests that we receive.

The following case submission guidelines have been established to improve our efficiency and promote analysis of evidence that is most likely to yield informative results. These guidelines will support efforts to improve customer service by reducing backlogs and providing timely investigative information. There is great importance to and benefit from communication between customers and our DNA staff regarding case submissions.

DNA Case Submission Criteria:

- As discussed in the INTRODUCTION above, touch DNA samples rarely provide interpretable or CODIS-eligible profiles. **Wearer** DNA samples are generally not included in the touch category. Examples of touch DNA samples include firearms evidence (bullets, magazines, cartridge cases, and firearms), swabs collected from firearm evidence, samples collected from “public” surfaces (surfaces which have been in routine contact with many people), and drug possession cases (Ziploc-type baggies). These types of items should only be submitted to the laboratory if there is NO other informative evidence, if applicable reference standards are provided at the time of submission, and if written consumption authorization from an attorney assigned to the case is included.
- A tiered-approach to evidence submission will improve customer service. Customers should discuss evidence submissions of **cases with more than five items, not including reference standards** and/or atypical cases with Serology/DNA staff prior to submission. Initial submissions should be limited to the most informative and probative items in the case. **Should more than five items require analysis, please call the Serology/DNA section to discuss the case prior to submitting these items to the laboratory.** Items should be listed on the submission form in order of requested priority. Please note that items will be worked as prioritized, and should informative evidence be found on any one item, analysis will cease and a report will be issued. If no informative evidence is found, additional items may be submitted for second tier analysis.

REQUESTING EVIDENCE EXAMINATIONS FOR SEROLOGY/DNA

When submitting evidence for serological/DNA analysis, please be sure to include the following information:

- The submitting contact person’s name, agency, address, email, and telephone number.
- The names of and descriptive data about the individuals involved (subject, suspect, victim, or a combination of those categories) and the agency-assigned case identification number.
- If the evidence is a resubmittal or additional to an existing case, include the previous case identification numbers, evidence submissions, and communications relating to the case.
- The violation or offense.
- The name of the relevant prosecutor’s office or prosecutor assigned, if available, and, if applicable, authorization from the attorney allowing the consumption of known limited samples, such as “touch” samples and hairs.
- A list of the evidence being submitted.
- The type of examinations being requested.
- Narrative, police reports, sex kit forms, and/or a description of the nature and the basic facts of the case as they pertain to evidence and its examination.

Note: Most of this information is covered on the submission form if you fill it out completely, except for the narrative or report. This information will need to accompany the submission form. We require a narrative to determine the CODIS database eligibility for DNA profiles developed from evidentiary items. Without this information the DNA profile cannot be uploaded into CODIS.

COLLECTION, PRESERVATION, AND SHIPPING OF BIOLOGICAL EVIDENCE

Evidence may be recovered from many sites: The crime scene, a vehicle involved in the crime, the suspect's body and clothing, and the victim's body and clothing. In sexual assault cases, evidence such as penile swabs from a suspect, the suspect's underwear (for victim's DNA), and fingernail/tip samples may be useful evidence. When appropriate, collect as much evidence as possible as quickly as possible from the bodies of the victim and suspect. Biological evidence is fragile and can easily be destroyed. The recognition and recovery of such evidence must be performed properly by the investigator in order to make the best use of it.

GENERAL PACKAGING AND SHIPPING OF DNA EVIDENCE

Unless otherwise indicated in a specific section of this manual, please follow these general guidelines for packaging and shipping Serology/DNA evidence:

- Prior to packaging and shipping evidence, call the Serology/DNA section if you have any questions or are unsure of what to do.
- Take precautions to preserve the evidence. Proper drying and storage is critical. Wet or moist items will be subject to bacterial action and mold, destroying their value as evidence.
- Wrap and seal each item of evidence **separately** to avoid contamination. Multiple items of clothing and bedding should have its own packaging.
- Place the evidence in a clean, dry, and unused container. Paper bags, envelopes and boxes are appropriate containers. **DO NOT USE PLASTIC!**
- Because resealing generally uses up some of the volume in a bag, do not package objects placed into bags, boxes, or envelopes tightly; leave room so the packages can be resealed after examination. Comforters, blankets, pillows, coats, and other large items should be packaged in a way that allows them to be repackaged easily at the end of the forensic examination. Additional items produced during the examination may also need to be included in the item's original packaging.
- Label each item with a case number, item number, date, item description, source, and location.
- Package sharp and hazardous items in appropriate containers with proper labels such as BIOHAZARD or SHARPS.
- Evidence tape or other non-removable tape should seal any openings. Initial and date across the tape. All packaging should have tape over any openings to ensure that small particles are not lost. Only tape or self-adhesive seals should be used. Do not lick envelopes to seal them.
- Include the submission form and all requested case information.
- Dry items may be stored at room temperature until submitted to the laboratory. Avoid excessive heat. Liquids should be refrigerated. Diapers, food items, and other perishable evidence should be frozen and submitted to the laboratory as such.
- Although freezer storage is preferred for the **long term**, DNA typing results can be obtained from properly dried evidence stored refrigerated or at room temperature for an extended period of time. If freezing is not an option, biological evidence should be stored in a cool, dark, and dry place.

Some items that require special packaging consideration are:

- **Bottles/containers with liquid:** The liquid should be removed using a pipette or by poking a hole in the bottom of the receptacle. Liquid should not be dumped out due to potential biological evidence around the opening/lip/mouth area of the container. The removed liquid may be preserved in a sealable plastic container.
- **Metal objects/rocks:** Items such as guns, knives, rocks, or aluminum baseball bats should not be frozen as condensation forms upon removal of these objects from the freezer. These objects should be stored in a cool, dark, dry place.
- **Soft Tissue:** Body tissues are biological samples that need to be frozen and are the only item for DNA analysis that should be stored in sealed, plastic containers.

BIOLOGICAL EVIDENCE UNIVERSAL PRECAUTIONS

All evidence items submitted for biological testing should be handled using universal precautions. The handling of biological fluids and stains presents hazards due to the possible presence of pathogens. Investigators and other personnel transporting biological material should use universal precautions. Treat all evidence objects as sources of pathogens and take appropriate protective actions when processing or transporting evidence.

Always wear gloves when handling potential biological evidence. Change gloves frequently and always between handling different items of evidence to avoid cross-contamination. Additional personal protective equipment including Tyvek suits, boot covers, or masks may be needed to protect the collector and the potential biological evidence. Do not smoke, eat, or drink around potential biological evidence items. Avoid talking over or around potential evidence. Also avoid coughing, sneezing, or spitting around biological evidence. Observe good personal hygiene. Wash hands thoroughly after removing protective gloves, even if the gloves are not cut or punctured. Remove protective gear when exiting the crime scene and dispose of it properly.

COLLECTION OF DNA EVIDENCE

There are generally three methods of collection recommended by the Serology/DNA section:

- 1. Collecting the Entire Item:** Often the best way to collect an item of biological evidence is to collect the entire item. This primarily applies to smaller items such as clothing, weapons, or bedding. This method of collection allows the laboratory to process the evidence with the potential involvement of several forensic disciplines, such as latent prints or chemical analysis. It is critical to collect articles of clothing worn immediately after a sexual assault in which the suspect may have deposited body fluid evidence on the victim. These may not be the clothing that the victim wears to go to the hospital. It may be important to collect the clothes the suspect was reportedly wearing at the crime scene.
- 2. Collecting a Portion of the Item:** If the entire item is not able to be collected because the item is too large (such as walls, concrete, or flooring), a portion of the entire item may be removed. This method is preferred if it is necessary to preserve a stain pattern on a large item. A large enough area around the stain/pattern should be taken to avoid having the cutting instrument come in close contact with the biological material.
- 3. Removing the Biological Material:** A general swabbing technique may be used to collect many types of suspected DNA evidence. This method should be employed when it is impractical or impossible to send the item into the laboratory.

The following general techniques should be used when collecting swabs:

- If you are collecting **visible stains**, moisten a sterile cotton swab with clean (preferably sterile) water and rub the stain of interest. You do not want the swab to be dripping wet, just moist enough to dissolve the stain. If the stain is small, concentrate it on the tip of the swab. Collect larger stains on as many swabs as necessary. You may use a dry swab afterward to collect any remaining residue. If a moistened swab is used, let it air dry.
- If you are collecting **non-visible stains or cellular/contact material**, the area may also be swabbed as indicated above. Be sure to use a dry swab after swabbing with a moistened swab to collect any remaining residue. This technique is referred to as the “wet/dry technique.” Moistened swabs should be air-dried.
- If the suspected stain is liquid or wet there is no need to moisten the swab before swabbing. Swabs should be air-dried prior to packaging.
- Multiple swabs of the **same stain or area** may be packaged together. Swabs of different stains or areas should be packaged separately. For example, wet and dry swabs of the suspected blood stain should be packaged together while swabs of suspected blood on the door and the floor should be packaged separately.
- Use clean swab cartons, paper bags, envelopes, cardboard boxes, or some other breathable packaging material to package evidence to avoid the accumulation of moisture inside the package. **DO NOT USE PLASTIC BAGS OR CONTAINERS!** The presence of moisture enhances the growth of bacteria and mold, which can degrade DNA.

COLLECTING SPECIFIC EVIDENCE TYPES

Suspected Blood

- Absorb liquid blood onto a sterile cotton swab. For large stains, use multiple swabs. For small stains, concentrate the staining on the tip of a swab. Air-dry swabs and pack in an envelope, a paper bag, or a swab carton.
 - If the stain is dry, absorb onto a sterile swab moistened with sterile water. We prefer deionized, distilled water, but saline or bottled water will work. Air-dry swabs and pack in an envelope, a paper bag, or a swab carton.
 - Air-dry wet bloodstained garments or small, wet bloodstained objects. Preserve bloodstain patterns if important.* Avoid creating additional stain patterns during drying and packaging. You may wrap the dried bloodstained garments in clean paper. Do not place wet or dried garments in plastic or airtight containers. Use paper bags or boxes to submit large items. Envelopes may be used for smaller items. Pack to prevent stain removal by abrasive action during shipping. Pack in clean paper, a paper bag, or a box.
 - If needed, cut a large sample of bloodstains from immovable objects with a clean, sharp instrument. Pack to prevent stain removal by abrasive action during shipping. Pack in clean paper, a paper bag, or a box.
- * **Note:** Blood stain pattern analysis is not offered at this laboratory. Please contact us for a list of laboratories that perform this analysis.

Suspected Semen

Semen and Semen Stains:

- Absorb liquid semen onto a sterile swab. For large stains, use multiple swabs. For small stains, concentrate the staining on the tip of a swab. Air-dry the swabs and pack in an envelope, a paper bag, or a swab carton.
- Absorb dried semen stains on large or immovable objects onto a moistened sterile swab. Air-dry the swabs and place in clean paper, an envelope, or a swab carton.
- Air-dry wet garments. **DO NOT package multiple garments together!** This will help avoid contaminating the items and avoid the transfer of trace materials. You may wrap the dried garment in clean paper. Do not place wet or dried garments in plastic or airtight containers. Use paper bags or boxes to submit large items. Envelopes may be used for smaller items.
- Submit **small**, dry, semen-stained objects to the laboratory. Air-dry wet items before packaging. Pack to prevent stain removal by abrasive action during shipping. Pack in clean paper, a paper bag, or a box.
- If needed, cut a large sample of semen staining from large and/or immovable objects (mattresses, carpet, car seats, or couches) with a clean, sharp instrument. Pack in clean paper, a paper bag or box. **DO NOT SUBMIT OVERLY LARGE ITEMS TO THE LABORATORY WITHOUT PRIOR APPROVAL.**

Sexual Assault Kits:

- Sexual assault victims must be medically examined in a hospital or a physician's office using a standard sexual assault evidence kit to collect vaginal, oral, and anal evidence. Refrigerate the kit upon receipt, and submit the evidence to the laboratory as soon as possible. Sexual assault kits can be purchased from SIRCHIE (Item #MT100).
- Clothing may be collected at the time of the examination. Make sure that all items are packaged separately in paper bags or boxes.
- Toxicology samples may also be collected. Refrigerate and submit to the laboratory as soon as possible. Refer to the Toxicology portion of the Crime Lab's Evidence Handling Manual for additional information.

Suspect Swabs and Clothing:

- Collect samples from the suspect **as soon as possible**. A sexual assault kit may be used to collect samples; however, it is completely acceptable to use sterile swabs to collect samples from the suspect's body (penis, scrotum, and hands). If sterile swabs are used, air-dry and package in swab cartons or envelopes. Refrigerate sexual assault collection kits.
- Collect suspect underwear and additional clothing as needed. Package in paper bags or boxes.

Condoms:

- For condoms with a small amount of liquid, the liquid should be allowed to dry before packaging. Package in brown paper or an envelope. If the liquid cannot be dried, the condom should be packaged so that the liquid cannot spill out of the condom. A new or sterile twist tie or clamp may be used so biological material from the inside of the condom is not mixed with the biological material on the outside of the condom. Package in paper bags or boxes and refrigerate if liquid is present.

Bedding:

- Air-dry any wet staining. Package each item separately in paper bags or boxes. **DO NOT PACK MULTIPLE BEDDING ITEMS TOGETHER!** Your initial submission should only include the item where ejaculation was reported to have occurred. For example, if the suspect ejaculated on the comforter, please only submit the comforter. If the victim was lying on the fitted sheet during the assault, please only submit the fitted sheet.
- Indicate directionality (top, front, etc.) on the item should the case circumstances and item dictate. This should be done prior to collection and is especially helpful for items like bedding.

Note: There are no tests available at this time for vaginal fluid. Additionally, Serology/DNA cannot determine when a stain or cells were deposited on an item. Finding a suspect's semen on his own bed is not informative, and we have limited capabilities for determining if a victim is present on the bedding. Therefore, suspect's bedding **should not** be sent into the laboratory without prior approval. Please call the laboratory should with any questions regarding suspect's bedding or our capabilities.

OTHER TYPES OF SEROLOGY/DNA EVIDENCE

Suspected Saliva, Other Body Fluids, and Handled Items:

- Pick up cigarette butts, chewing gum, envelopes, and other items with potential body fluids with gloved hands or clean forceps. Air-dry as needed and place in a sealed envelope or paper bag. Package all items separately.
- Absorb liquid samples onto a sterile swab. Air-dry swabs and pack in a clean paper bag or an envelope with sealed corners. When possible, cut a large sample of suspected saliva, other body fluids, or nucleated cells from large or immovable objects with a clean, sharp instrument. Pack in a clean paper bag or box.
- Swab dried stains, suspected fluids, and handled items as per the section on swabbing above. Guns, handles, steering wheels, and other "touched" items may be swabbed. See the section regarding "Touch Samples" for additional information.

Collecting Apparent Hairs:

- Pick up the apparent hair carefully with clean forceps to prevent damaging the root tissue. Alternatively, pick it up with a Post-it style note and affix the apparent hair to the sticky side. Be careful not to place the ends of the apparent hair directly on the sticky surface.
- If needed, air-dry any apparent hairs mixed with suspected body fluids.
- Package each apparent hair or clump of apparent hairs separately in an envelope with sealed corners.

Note: The analysis of apparent hairs at this laboratory is done only to determine if the apparent hair is human in origin and whether or not it is suitable for nuclear DNA analysis. Comparisons of known hairs to unknown hairs are not done at this laboratory at this time. Please contact us for a list of laboratories that perform this service, if needed.

In addition, in the case of hairs submitted for DNA identification, a consumption letter from the attorney assigned to the case is required prior to DNA analysis.

Tissue, Bones, and Teeth:

Tissue:

- Pick up tissue with gloved hands or clean forceps. Collect 1-2 cubic inches of red skeletal muscle. Place tissue samples in a clean, airtight, plastic container without formalin or formaldehyde.
- **Freeze** the evidence, place in Styrofoam containers, and ship overnight on dry ice.

Bones and teeth:

- Pick up suspected bones and teeth with gloved hands and clean forceps.
- Submit whole bones. Cutting bones increases the possibility of contamination.
- Place teeth and bone samples in clean paper or an envelope with sealed corners.
- Bone and teeth evidence can remain at room temperature prior to analysis, provided there is no soft tissue.

Note: Please contact the laboratory prior to submitting bones or teeth for DNA analysis. In most cases, the laboratory recommends these items be submitted to a private lab for examination.

Collecting DNA Known Reference Samples (for casework submissions):

Please do not submit liquid blood to the laboratory as a reference standard unless no alternative exists. Buccal (oral) swabs are preferred. Dried blood standards, FTA cards, and other alternatives may be submitted; however, please contact the laboratory prior to submission of these types of items. **Do not use a convicted offender DNA collection kit.** To collect buccal swabs:

- Use sterile, cotton swabs. Rub the inside surfaces of the cheeks thoroughly. You do not need to swab left and right cheeks separately.
- Air-dry the swabs and place in clean paper, an envelope, or a swab carton. Do not use plastic containers. Buccal samples do not need to be refrigerated.
- Package buccal samples from *different* individuals separately. Multiple swabs from the *same* individual may be packaged together.
- Identify each sample with the date, time, person's name, location, collector's name, case number, and evidence number on the evidence label and submission form.

Note: A reference standard will be required for all individuals suspected to be in contact with evidentiary items. We may also need a reference standard from a victim's consensual sex partner. Please submit all required reference standards with your initial evidence submittal.

CONVICTED OFFENDER DNA COLLECTION KIT:

- Fill out the collection card, including all the requested information on the inside and back of card.
- Take the right thumb print as indicated.
- Collect the DNA sample by rubbing the foam swab on the interior of the offender's cheek for 30 seconds to one minute. Remove the swab and press onto the circle on the pink FTA card. Fold and press the swab in the circular area until it turns whitish. Dispose of the swab and allow the FTA card to air-dry.
- Dry the FTA card and place it in the Ziploc bag. Leave the desiccant pouch in the bag. Place the Ziploc bag in the mailing envelope, seal the kit with the shipping seal, and initial the seal.
- Mail to the lab marked "**DNA Registrants.**" Affix sufficient postage and complete the return address.
- You **DO NOT** need a laboratory evidence submission form for these kits.

Note: This kit is only for the collection of convicted offenders' DNA for entry into CODIS. DO NOT collect suspect or victim reference standards with this kit, as no chain of custody will be started upon receipt at the lab.

Additional information on the Convicted Offender DNA Collection Kit and a video on collection methods can be found on the Montana Department of Justice Forensic Science Division webpage at <https://dojmt.gov/crime/>.