



A DNA Evidence Primer

Just as today's law enforcement officer has learned to look routinely for fingerprints that could identify the perpetrator of a crime, that same officer needs to think routinely about evidence that could contain DNA.

Due to recent advancements in DNA technology, investigators with even a basic knowledge of how to identify, preserve, and collect DNA evidence properly can solve cases in ways previously unimaginable. DNA also can be the evidence that links different crime scenes to each other.

So, what do you know about DNA? Perhaps not as much as you should. But a brochure produced by the National Institute of Justice and the National Commission on the Future of DNA Evidence can help. *What Every Law Enforcement Officer Should Know About DNA Evidence*, summarized here, explains DNA and the related identification, preservation, and collection issues that every law enforcement officer should know.

DNA, or deoxyribonucleic acid, is the fundamental building block for an individual's entire genetic makeup. It is a component of virtually every cell in the human body, and a person's DNA is the same in every cell. However, each person's DNA is different from every other individual's, except for identical twins. Because of that difference, DNA collected from a crime scene can link a suspect to—or eliminate a suspect from—a crime. It can also identify a victim through comparison with DNA from relatives, even though there may be no body associated with a suspected homicide. And when DNA evidence from one crime scene is compared with evidence from another, it can be determined if the crime scenes are linked to the same perpetrator.

DNA is similar to fingerprint analysis in how matches are made. When using either DNA or a fingerprint to identify a suspect, the evidence collected from the crime scene is compared with a "known" print or sample. If the identifying features are the same, the DNA or fingerprint is determined to be a match. If, however, a feature of the DNA or fingerprint is different, there is no match.

DNA evidence can be collected from virtually anywhere and has helped solve cases in which investigators collected evidence from nontraditional sources (see "Identifying DNA Evidence" below). One murder was solved when the suspect's DNA, taken from saliva in a dental impression mold, matched the DNA swabbed from a bite mark on the victim. Numerous cases have been solved by DNA analysis of saliva on cigarette butts and postage stamps.

Every officer, from the first responding patrol officer to the experienced detective and the crime scene specialist, should be aware of important issues involved in the identification, collection, transportation, and storage of DNA evidence. Because extremely small samples of DNA can be used as evidence, greater attention to contamination issues is necessary. Evidence can be contaminated when DNA from another source gets mixed with DNA relevant to the case. This can happen when someone sneezes or coughs over the evidence or touches his or her mouth, nose, or other part of the face and then touches the area of the evidence containing the DNA.

When transporting and storing DNA evidence, keep the evidence dry and at room temperature. Once the evidence has been secured in paper bags or envelopes, it should be sealed, labeled, and transported in a way that ensures proper identification of where it was found and proper chain of custody. Never place DNA evidence in plastic bags because the moisture retained in the bags can be damaging to the DNA. Direct sunlight and hot conditions also may be harmful to DNA. Avoid keeping evidence in places that may get hot, such as a room or police car without air conditioning. For long-term storage issues, contact your local laboratory.

To avoid contamination of evidence that may contain DNA, always take the following precautions:

- Wear gloves. Change them often.
- Use disposable instruments or clean them thoroughly before and after handling each sample.
- Avoid touching the area of the evidence where you believe DNA may exist.

- Avoid talking, sneezing, scratching, and coughing over evidence.
- Avoid touching your face, nose, and mouth when collecting and packaging evidence.
- Air-dry evidence thoroughly before packaging.
- Put evidence into new paper bags or envelopes, not into plastic bags. Do not use staples.

As with fingerprints, the effective use of DNA may require the collection and analysis of “elimination samples.” These samples are necessary to determine whether the evidence came from the suspect or from someone else. An officer must think ahead to the time of trial and possible defenses while still at the crime scene. For example, in the case of a residential burglary where the suspect may have drunk a glass of water at the crime scene, an officer should identify appropriate people, such as household members, for future elimination sample testing. These samples may be needed for comparison with the saliva found on the glass to determine whether the saliva is valuable evidence.

One investigative tool available to law enforcement is CODIS (COMBINED DNA INDEX SYSTEM). CODIS, an electronic database of DNA profiles that can identify suspects, is similar to the AFIS (Automated Fingerprint Identification System) database. All 50 States are in the process of implementing a DNA index of individuals convicted of certain crimes, such as rape, murder, and child abuse. Upon conviction and sample analysis, perpetrators’ DNA profiles are entered into the DNA database. Just as fingerprints found at a crime scene can be run through AFIS in search of a suspect or another crime scene link, DNA profiles can be entered into CODIS. Therefore, law enforcement officers have the ability to identify possible suspects when no prior suspect existed.

To receive copies of the brochure, What Every Law Enforcement Officer Should Know About DNA Evidence, contact the National Criminal Justice Reference Service at P.O. Box 6000, Rockville, MD 20849-6000; 800-851-3420 or 301-519-5500; or askncjrs@ncjrs.org.

IDENTIFYING DNA EVIDENCE

Since only a few cells can be sufficient to obtain useful DNA information to help your case, the list below identifies some common items of evidence that you may need to collect, the possible location of the DNA on the evidence, and the biological source containing the cells. Remember that just because you cannot see a stain does not mean there are not enough cells for DNA typing. Further, DNA does more than just identify the source

of the sample; it can place a known individual at a crime scene, in a home, or in a room where the suspect claimed not to have been. It can refute a claim of self-defense and put a weapon in the suspect’s hand. It can change a story from an alibi to one of consent. The more the criminal justice community knows how to use DNA, the more powerful a tool it becomes.

EVIDENCE

baseball bat or similar weapon
hat, bandanna, or mask
eyeglasses
facial tissue, cotton swab
dirty laundry
toothpick
used cigarette
stamp or envelope
tape or ligature
bottle, can, or glass
used condom
blanket, pillow, sheet
“through and through” bullet
bite mark
fingernail, partial fingernail

POSSIBLE LOCATION OF DNA

handle, end
inside
nose or ear pieces, lens
surface area
surface area
tips
cigarette butt
licked area
inside/outside surface
sides, mouthpiece
inside/outside surface
surface area
outside surface
person’s skin or clothing
scrapings

SOURCE OF DNA

sweat, skin, blood, tissue
sweat, hair, dandruff
sweat, skin
mucus, blood, sweat, semen, ear wax
blood, sweat, semen
saliva
saliva
saliva
skin, sweat
saliva, sweat
semen, vaginal or rectal cells
sweat, hair, semen, urine, saliva
blood, tissue
saliva
blood, sweat, tissue

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