



A42 Characterizing DNA Contamination on the Outer Packaging of Forensic Biology Evidence

Rhonda C. Williams, PhD, Lisa Gefrides, MS, and Roger Kahn, PhD, Harris County Medical Examiner's Office, 1885 Old Spanish Trail, Houston, TX 77054*

After attending this presentation, attendees will appreciate the extent to which DNA contamination may be present on the exterior of evidence packaging. This presentation will characterize the DNA contamination found on outer packaging with respect to case type, rate, and possible sources. At the end of this presentation the attendee will be able to review their own evidence examination procedures and revise them if needed.

This presentation will impact the forensic science community by highlighting a potential contamination risk for evidence examination in forensic biology laboratories. Recognizing that outer evidence packaging has the potential to contain DNA will allow laboratories to put preventive measure in place to reduce or eliminate this potential contamination risk.

Forensic biology laboratories try to achieve the highest standards of contamination-free casework. Many strategies are used to eliminate contamination from individuals, consumables, or other case samples. Even with all the precautions used in the laboratory, a rare contamination event may be observed. One potential source of contamination in the laboratory may be overlooked – the outer packaging of submitted evidence.

In general, evidence items are packaged by law enforcement prior to being submitted to a crime laboratory. Packaging is usually done in an uncontrolled location such as crime scene, a residence, or a hospital. The outer packaging may be handled without gloves or with contaminated gloves. DNA may be introduced onto the exterior of evidence packaging by the collector or the transporter. The outer packaging may also be contaminated by contact with surfaces at the collection location or with surfaces encountered during transport.

To investigate the frequency and extent of DNA contamination on outer evidence packaging, the exterior of evidence packaging for three types of cases (homicide, sexual assault, and burglary) was swabbed and subjected to STR DNA testing with the ABI Profiler Plus and COfiler test systems. In the study, the exterior surface of randomly selected evidence from ten burglaries, ten homicides, and ten sexual assault kits were swabbed. The swabs were extracted and processed using the laboratory's standard procedure for evidence samples. Of the ten homicide cases, four bags produced partial profiles containing eight or fewer alleles. The three of the ten bags from burglaries exhibited partial profiles containing twenty or fewer alleles. Of the ten sexual assault kits that were tested only one produced a partial profile of eight alleles. Overall, 27% of the exterior packaging tested contained enough DNA to produce at least a partial profile with an average of 6 alleles (range 1-20 alleles).

While more profiles were obtained from the outer packaging of homicide and burglary cases (40% and 30%, respectively) than sexual assault kits (10%) it is unclear whether this observation is due to the type of case or the material of the outer packaging itself. Sexual assault kits have a smooth, less porous surface than brown paper bags in which evidence is commonly packaged. It may be that sexual assault kits are less likely to accumulate DNA than the comparatively rough surface of brown paper bags. Another consideration is that sexual assault kits are collected in hospital environments which are likely to be cleaner environments than a typical crime scene. Interestingly, the DNA

recovered from the exterior packaging of only one case, a homicide case, was consistent with the profile of the evidence from the case. Of the other seven partial profiles obtained, the profiles were either not associated with the case (five cases) or there was not enough genetic information to make a determination (two cases).

The observation that the DNA on the exterior of evidence packaging does not match the DNA on the inside suggests that the DNA may have been deposited by personnel transporting the evidence to the crime laboratory or anyone coming into contact with evidence packaging who did not wear gloves or a mask. The exterior packaging may also collect DNA from its environment, possibly from the containers that the evidence is transported in or from another surface it came into contact with, including another evidence container.

To be safe, we recommend that laboratories treat exterior evidence packaging as if it is contaminated with DNA. The packaging should be kept separated from the area used to examine evidence. Gloves should be changed after touching the exterior packaging and before touching anything else in the laboratory, especially evidence. These safeguards should reduce the possibility of introducing DNA from external evidence packaging onto items or samples cut for DNA processing. **Contamination, STR, Evidence Packaging**