E33 DNA Mixtures in Criminal Litigation: Common Issues With DNA Mixtures at Trial

Anne C. Petty, JD, 69 W Washington, 17th Fl, Chicago, IL 60602*

After attending this presentation, attendees will understand some of the common issues that occur when DNA testing produces a mixture profile from an evidence sample.

This presentation will impact the forensic science community by educating attorneys and other "non-science" individuals involved in criminal litigation about common issues with mixture DNA evidence.

Mixtures of DNA profiles found on evidence at crime scenes are becoming more and more common in criminal trials. As DNA testing has become common in criminal cases, with an explosion in DNA testing for property crimes, attorneys, judges, jurors, and other non-science individuals involved in criminal litigation have had to become familiar with the science involving DNA testing. Mixtures can be particularly difficult for a non-science person to understand. Mixtures frequently occur when common evidence items are tested, such as guns, objects dropped by an offender, clothing, car doors, steering wheels, window frames, and door handles. This presentation will use a specific case to highlight some issues that must be addressed such as major/minor calculations, partial profiles, drop-out, multiple runs at different injection levels, as well as statistics issues.

The case example is a real case is presented with all identifying information of the defendant, victim, and analyst removed. The case was a first-degree murder case tried in the Circuit Court of Cook County in January 2013. The victim was found dead in the passenger side of his car. A witness saw the car involved in an accident and then saw the driver leave the scene. When EMS arrived, it was discovered that the victim had a gunshot wound in his left side. The driver's side air bag was swabbed and sent to the Illinois State Police crime lab for testing. The analyst tested the sample on Profiler® Plus and COfiler®. The profile generated from the testing revealed a mixture of at least three individuals from which the victim was excluded. A major profile was deduced at eight loci by the analyst and a CODIS search was conducted. A match to the defendant led to his arrest and subsequent identification by the eyewitness. The defense used at trial did not involve a challenge to the DNA due to other evidence in the case. Therefore, this is not a war story. It is; however, an excellent example of a real DNA-evidence profile which shows common issues with mixtures.

The sample was run at 5- and 10-second injections on two machines. Data from different runs were relied on to deduce the profile. The profile also had a great deal of data at some loci and none at others, indicating that the sample was degraded or inhibited or both.

A major contributor was deduced from the mixture. RFU levels varied greatly between loci so the major contributor is clear at some loci but not so clear at others. This impacted the decision by the analyst as to which loci will be included in the CODIS search. It also impacted the decision of what statistical model to use, the RMP or the combined probability of inclusion. The great variance in RFU levels also means that the analyst had to deal with the issue of drop-out.

The purpose of this presentation is to educate attorneys (prosecution and defense) on how to spot issues when they review testing and so that they can be better prepared to discuss these issues with the testing analysts as well as any experts that might be retained. Additionally, it is to help the attorneys with handling these issues at trial when evidence is presented to the jury.

Mixtures, DNA Evidence, Criminal Litigation

 ** Presenting Author*