F15 Presenting Probabilistic Genotyping Evidence in Court

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After attending this presentation, attendees will better understand how to approach the presentation of probabilistic genotyping evidence in court at both *Daubert/Frye* admissibility hearings and at eventual trials.

This presentation will impact the forensic science community by addressing the unique concerns in presenting probabilistic genotyping evidence in court, at both *Daubert/Frye* hearings and trials, so that the evidence is understandable, persuasive, and sufficiently comprehensive.

Many crime labs throughout the United States are now using probabilistic genotyping software to assess DNA profiles, especially in DNA mixture cases or cases with compromised samples. The two most common products being used are STRMix™, from the Institute of Environmental Science and Research (ESR), New Zealand, and TrueAllele®, from Cybergenetics of Pittsburg, PA. Both products have now been admitted in several cases in the United States.

The case of *People v Muhammad*, 14th Circuit Court, Muskegon, MI, which was the first civilian case in the United States to offer STRMix™ evidence.[1] The case involved an armed robbery of a gas station in which the victim could not identify the robber because he was wearing a mask; however, during the robbery, the victim managed to pull out his own gun and started shooting at the robber. As the robber fled the victim's gunfire, he literally ran out of his left shoe. The entire episode was captured on video and the video will be available as part of this presentation.

The shoe was confiscated as evidence and analyzed at the Michigan State Police Crime Lab. The laboratory found a DNA mixture of four or more persons that was too complex for further analysis, using then available (2014) analytical tools. The shoe was subsequently sent to a private DNA laboratory for further testing and a profile was developed from a previously untested part of the shoe (toe area of the sole) where a mixture of two persons was found; however, that sample was too compromised to permit a conclusion using traditional DNA statistical analysis. The DNA profile developed at the private laboratory was then forwarded to Dr. John Buckleton of ESR whose team was able to use the STRMix™ software to conclude that the suspect, Mr. Muhammad, was one of the two donors, with a likelihood ratio of one trillion to one.

There will be a discussion of materials available to educate the attorney on the science of probabilistic genotyping. Attention will then be directed to the types of evidence available for *Daubert* or *Frye* admissibility hearings. Subjects will include expert testimony, validation studies, peer-reviewed literature, presentations, and approvals by various government boards, commissions, and other authoritative bodies. The exhibits used in the Michigan case will be presented and made available for copy online or by email.

There will be a discussion regarding preparing for the opposing expert witness. In the Michigan case, the defense called a well-qualified DNA expert, but he was not particularly well-versed on the nuances of probabilistic genotyping.

Finally, focus will be on how to best present probabilistic genotyping evidence to the jury; how to convince jurors that the science is well-tested and reliable; how to communicate complicated issues without losing substance; and strategies for presenting the evidence for the most persuasive impact.

Reference(s):

1. *People v Muhammad,* Case No. 14-65263 FC, 14th Cir Ct (Mich) (12-15-15).

Probabilistic Genotyping, DNA Mixtures, STRmix