A220 Touch DNA on Shell Casing and Cartridges: A Case Study

Nasir A. Butt, PhD, OCME, 11001 Cedar Ave, Cleveland, OH 44106*

After attending this presentation, attendees will learn the importance of DNA analysis on shell casings and live cartridges found on crime scenes, these discoveries ultimately helping to identify the shooter.

This presentation will impact the forensic science community by encouraging the use of touch DNA from shell casings as a link between the crime and the perpetrator since touch DNA can withstand the firing heat released during the discharge of a gun and, with the present PCR technology, can be helpful in solving the crimes.

This presentation will reflect the importance of DNA analysis on shell casings and live cartridges found at crime scenes. Touch DNA found on a shell casing and live cartridge at a robbery of a gas station that resulted in a homicide and the touch DNA on a live cartridge and a gun on a robbery of a dollar store helped identify the shooter.

This case study reflects that the epithelial cells or touch DNA can withstand the firing heat released during the discharge of a gun and, with the present PCR technology, can be helpful in solving the crimes. Firearms are commonly used in a majority of violent crimes. Shell casings at the crime scene are sometimes the only evidence available for the investigation. These shell casings and/or live cartridges are often sent for the analysis of latent prints with almost no success. The chances of losing any touch DNA present on this type of evidence increases when the recovery and collection of touch DNA is delayed. Various studies have shown that the heat released during the discharge of a weapon has very limited effect on the DNA.

In December 2007, an armed robbery of a gas station resulted in the murder of the owner of the business. The police recovered from the scene a 9mm live cartridge and a 9mm shell casing. The only bullet entered the victim's chest and exited his back. The shell casing and the live cartridge were brought to the laboratory for the analysis. The shell casing and live cartridge were swabbed for the analysis of touch DNA. DNA was extracted on the whole swab from each using Organic extraction methods. The extracted DNA was quantified using Quantifiler® human quantification kit using an RT-PCR instrument. Furthermore, the DNA was amplified using an ABI Identifiler® kit. The amplified DNA was loaded onto an genetic analyzer for the detection of the DNA fragments. Fragment analysis was performed using ID software. The STR DNA profiles were developed from the shell casing and the live cartridge.

In January 2008, case detectives submitted two guns and live cartridges from another robbery which took place at a dollar store. Two suspects were developed in this robbery and their buccal swab samples were submitted for analysis. The DNA found on the firearm and the cartridge was consistent with the DNA found on the shell casing and the live cartridge recovered from the December 2007 robbery and homicide scene. The STR DNA profile was consistent with one of the suspects who was later found guilty of both crimes.

The firearm examination and test firing revealed that the cartridge casing recovered from the robbery of gas station was fired from the 9mm gun submitted from the robbery of the dollar store.

The analysis of touch DNA on the shell casings and live cartridges recovered at crime scenes can thus provide a link between the crime, suspect and/ or victim, which might sometimes be the only evidence in a case.

Touch DNA, Shell Casing, STR DNA Analysis

 ** Presenting Author*