

A106 Recovery and Analysis of Nuclear DNA From Charred Muscle and Tendon Tissue Using White-Tailed Deer (*Odocoileus virginianus*) as an Animal Model

Jennifer M. Hornyak, 52 Riethmiller Road, New Wilmington, PA 16142; and Lisa R. Ludvico, PhD, Duquesne University, Department of Biology, 341 Fisher Hall, 600 Forbes Avenue, Pittsburgh, PA 15282*

After attending this presentation, attendees will be able to understand the recovery and utility of compromised DNA from charred muscle and tendon tissue burned with three of the most commonly used accelerants.

This presentation will impact the forensic science community by identifying the quantity of DNA available and also the quality of the DNA from charred muscle and tendon tissue obtained from white-tailed deer, which was used as an animal model. Both human and wildlife forensic investigators will benefit from the DNA analysis results from the charred soft tissue because perpetrators will often burn evidence in order to cover up a crime.

Among the top three reasons for arson is the concealment of crimes including homicides. A perpetrator will often burn their victim in order to make DNA identification more difficult. Historically, teeth have been used for the identification of badly burned remains largely due to the composition of enamel withstanding the burning process. However, dental records are needed for positive identification and are not always available. The proposed study examined the ability to recover nuclear DNA from both tendon and muscle tissue of white-tailed deer (*Odocoileus virginianus*) legs. It also examined the difference between the muscle and tendon samples in order to see if one of the tissues yielded higher DNA recovery. The white-tailed deer legs were subjected to one of the three accelerant treatment condition burns and a non-accelerant wood burn. Gasoline, kerosene, and lighter fluid were the accelerants chosen because they are frequently used to cover up a homicide in order to make victim identifications more difficult. The leg samples were obtained with a collection permit from the Pennsylvania Game Commission from road kill specimens found on Pennsylvania roadways. One leg from each deer was incinerated with the same volume of the three accelerants and the fourth leg was burned without any accelerants as a control. Approximately ten deer were used for this study leading to a sample size of 44 deer legs, using each a muscle and tendon sample from each leg when discernable.

DNA was extracted from each type of tissue sample using a standard organic extraction protocol. Each extracted DNA sample was then amplified using two in-house white-tail deer multiplexes optimized from the loci sequenced and cited from Anderson et al. (2002). The 11 individual primers in the multiplexes were separated into the two separate STR panels based on their base pair size range and fluorescent dye label on the forward primer. To date, DNA has been extracted, quantified, and amplified from the burned samples. Then, the samples were run on a genetic analyzer in order to obtain the genotype profile for each sample type. For the majority of samples, at least two or more loci were seen in the genetic profile, and the DNA concentrations obtained from the charred samples have been greater than anticipated. Also, the DNA recovery from the charred tendon samples was higher than that from the not charred tendon samples.

Even though this study uses white-tailed deer as an animal model, the application can be applied to charred human remains as well, leading to better identification of homicide victims that were burned by their perpetrators in order to destroy evidence. Overall, this study aims to illustrate that nuclear DNA can be extracted from remains in which the DNA in the soft tissue could be very degraded and very rarely used in the identification of badly burned remains.

Charred Tissue, DNA Recovery, Accelerants