



### **B46 Utilizing DNA Profiles Generated From Human Nail Clippings as a Means of Personal Identification**

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**Learning Overview:** The goal of this presentation is to discuss the modified DNA extraction technique utilized in obtaining nuclear DNA from keratinized cells and how this material can be utilized for identification purposes. Following this presentation, attendees will better understand how keratinized nail material from both living and deceased persons can provide an informative DNA profile and serve as a viable alternative to the utilization of soft tissue or bone for forensic identification purposes.

**Impact on the Forensic Science Community:** This presentation will impact the forensic science community by contributing to a growing body of knowledge regarding alternative and often underutilized source material for the generation of informative DNA profiles for personal identification.

Common materials used for genetic studies or during the course of medicolegal investigations include saliva, blood, and bone. The body fluids should be stored in a refrigerator or freezer until DNA purification takes place, and bone potentially requires a large amount of storage space. Nail clippings have the potential to serve as a suitable source material for the generation of DNA profiles in situations where unidentified human skeletal remains are discovered or when tissue samples must be stored for later genetic analyses. If nail material is present with unidentified skeletal remains, the generation of a DNA profile from the nails would prevent the destruction of bone during the DNA purification process. In situations where tissues must be stored for extended periods of time, the clippings can be stored in small, sterile microtubes. The ability to store nail clippings, rather than vials of body fluids or sections of bone, may be useful when biological material is archived for unidentified remains cases to await technological advances or case leads.

For this study, toenails were collected from ten living and six deceased individuals to test the hypothesis that full DNA profiles can be generated from this biological source material. DNA was extracted from the keratinized cells using the QIAGEN QIAamp DNA Mini Kit with modifications to the manufacturer's instructions to allow for an extended dissolution process. The samples were then amplified with the GlobalFiler™ PCR Amplification Kit and analyzed on an AB 3130xl genetic analyzer. Comparisons were made between the profiles generated from the nail clippings and the reference profiles obtained from buccal swabs.

The DNA profiles generated from the nail clippings were single source profiles consistent with the reference samples. These results illustrate the potential for nail clippings to be utilized for the generation of DNA profiles used for personal identification purposes. The ability to utilize nail clippings for genetic identification purposes could reduce the need to store potentially biohazardous body fluids for later DNA testing or prevent the destruction of bone for genetic analysis.

#### **DNA Analysis, DNA Identification, Toenail Clippings**