



B121 Developing a Contaminant-Abatement Method for Isolation DNA From Cancellous Bones

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Learning Overview: After attending this presentation, attendees will be familiar with the research that has been conducted for processing bone evidence for forensic DNA analysis. The method developed in this study shall produce a new approach for processing bone samples, particularly useful for processing cancellous bones (spongy bones).

Impact on the Forensic Science Community: This presentation will impact the forensic science community by possibly affecting the time and efficiency in processing skeletal evidence.

Forensic DNA analysis of bone evidence is important in investigating a variety of criminal cases involving identification. However, bone samples must be processed prior to isolating DNA. It is necessary to remove the potential presence of biological materials from co-mingled remains. Additionally, environment-borne contaminants namely PCR inhibitors that interfere with forensic DNA analysis must be eliminated. Routinely, the outer surface of a bone fragment is cleaned using manual or mechanical abatement methods such as sanding. While these methods can be effective for removing contaminants from cortical bones (compact bones), they are not applicable to bone fragments that are largely cancellous bone materials. These methods can also be laborious when dealing with irregularly shaped bone fragments. Thus, developing a processing method for cancellous bones is highly desired.

This study is to address this issue and develop a simple method for processing cancellous bones as well as cortical bone samples prior to DNA isolation. A liquid-based technique was applied to the sample cleaning process prior to DNA isolation. The bone samples were cleaned by incubating them in a solution for a brief abatement of bone samples, thus removing potential contaminants. Since swine (*Sus scrofa*) bone is a useful model system for simulating human bones, swine bones were tested in this study. The microscopic studies suggested that the method is effective in removing small amounts of surface bone materials of cancellous bones. The effect of the contaminant-abatement method on the yields of DNA isolated was studied. Four trials of experiments were carried out. The average DNA yields of treated samples were slightly lower than that of untreated samples. A single-factor ANOVA was conducted to compare the yields of the samples. There was no significant difference in the yields of these samples. Next, the quality of DNA isolated was studied. Direct sequencing of amplified fragment at *Sus scrofa* mitochondrial *Cytb* locus was carried out. The electropherograms of the untreated control samples and treated samples were compared side-by-side. No adverse effect was observed among treated samples. This study demonstrated that this contaminant-abatement method of the bone fragments can be potentially useful for processing bone evidence, in particular for cancellous bones, prior to DNA isolation.

Identification, DNA Isolation, Contaminant