A20 DNA Extraction and STR Typing of Compact Bones from Decomposed Human Skeletal Remains by Using Decalcification Treatment

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The goals of this presentation are to investigate the effects of decalcification treatment using 0.5 M EDTA - 3K on DNA typing of compact bones from decomposed human skeletal remains. After attending this presentation, attendees will understand that decalcification treatment with 0.5 M EDTA - 3K improve the success of genomic DNA typing in identification of decomposed human skeletal remains.

This presentation will impact the forensic comminuty by demonstrating the decalcification treatment with 0.5 M EDTA -3K improved genomic DNA recovery and results in higher detatability than undecalcification process during DNA

Multiplex PCR-based STR analyses are suitable in human identification and forensic casework dealing with different tissues, even when the sample is heavily decomposed. The extraction of DNA from forensic skeletal remains can provide quite powerful data for analysis, but is plagued by a unique set of methodological problems. Bone is the most resistant tissue in deceased bodies to time depending degradation and putrefaction, but it is often hard to extract DNA from it due to its highly mineralized structure, which makes DNA extraction and/or purification hard to carry out. DNA extraction was performed and STR typing of decomposed human skeletal remains by using both undecalcified and decalcified methods. The postmortem periods of the studied remains ranged from two weeks to eighteen years. In some cases, they were buried with exhumation.

Decalcification using 0.5 M EDTA-3K at 56 overnight and repurification were used prior to the digestion and extraction to overcome inhibition of amplification process. DNA was isolated using standard phenol/chloroform/isoamyl alcohol extraction. This study detected human DNA in 15 STR loci (D8S1179, D21S11, D7S820, CSF1PO, D3S1358, TH01, D13S317, D16S539, D2S1338, D19S433, vWA, TPOX, D18S51, D5S818, and FGA) from skeletal remains using the Applied Biosystems' kit. Standard phenol/chloroform/isoamyl alcohol extraction followed by decalcification method has been proved as the most successful method. Decalcification with 0.5 M EDTA-3K was shown to improve the success of DNA typing in this study. A duo case, the Combined Paternity Index (CPI) value of the 15 STR loci from decalcified bone sample was higher than undecalcified bone sample in the paternity testing (99.677 % / 99.997 %). This study demonstrated that DNA extracted from highly decomposed bony tissues of human remains up to eighteen years old by using decalcification treatment was successfully amplified and greatly increased our ability to positively identify previously unknown skeletal remains by a comparative genetic analysis with presumative relatives.

Decalcification, Human Skeletal Remains, Combined Paternity Index

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