ANALYSIS OF MITOCHONDRIAL AND Y-CHROMOSOMAL DNA FROM 400-YEAR-OLD MUMMIFIED HUMAN TISSUE

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This paper describes the successful DNA extraction and amplification, and analysis of mitochondrial and Y-chromosomal DNA from an approximately 400-year-old mummy exhumed from Kyunggi-do, South Korea in 2001.

Sample tissue was obtained from internal organs such as lung, liver, and muscle of the mummy. Mummy tissue was rehydrated in trisodium phosphate solution, and protein was digested by Proteinase K. Sample DNA was extracted using phenol-chloroform-isoamyl alcohol and silica column. Every step of DNA extraction and PCR was cautiously carried out according to general guideline to prevent contamination of the sample DNA.

PCR products of mitochondial DNA (mtDNA) were observed with good yield, and sequence analysis of the mtDNA was successfully accomplished in the control regions (HVI, HVII and HVIII). However, all Y-STRs were not amplified. DYS19, SYS3891, DYS3390, DYS391, DYS392 and DYS393 were only amplified and clearly genotyped. Sequence analysis of mtDNA and Y-STR genotyping were performed more than twice with time intervals, and the results were accepted only when they showed the even profile for authenticating mummy DNA.

There are some difficulties in the analysis of DNA from ancient mummified human remains such as low template quantity, poor quality of DNA, and the presence of PCR inhibitors. This implies that the most critical factor for ancient DNA analysis is extraction of DNA. In order to overcome these troubles, we used DNA extraction using phenol-chloroform-isoamyl alcohol and silica column and optimized PCR condition. Therefore, the analysis of mtDNA and Y-STRs from mummy was successfully performed.