

Analysis of mitochondrial DNA control region polymorphisms based on denaturing high-performance liquid chromatography

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The purpose of this study was to establish a novel method for the detection of mitochondrial DNA (mtDNA) polymorphism based on denaturing high-performance liquid chromatography (DHPLC) and to explore the new mitochondrial DNA polymorphisms in order to improve the discrimination power of mtDNA in forensic DNA typing. Primers were designed by Primer3 software to amplify two new polymorphism loci in control region of mtDNA. Using a technique of DNA pools and performing the analysis of pair-wise combining samples, the DHPLC methods that base on the most homologous and the retention time from the cartridge were evaluated and optimized. The methods established were employed to investigate the polymorphisms of mtDNA. Then, a series of validation experiments were carried out to evaluate its utilities for forensic purpose. Finally, the heteroduplexes from the two new loci in mtDNA control region were successfully separated by DHPLC and a protocol suitable for forensic rapid analysis was established with high efficiency and low cost, they were expected to be important methods for forensic mtDNA identification.

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