



B89 Establishing mtDNA Database and its Application on Forensic Examination

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After attending this presentation, attendees will be briefed on the development of the mtDNA database and its application to forensic samples.

This presentation will impact the forensic community and/or humanity by demonstrating how mtDNA used on degraded samples is very efficient and its discrimination power is enough to suggest the positive identification

Mitochondrial DNA analysis is useful for the analysis of bones, hairs, and especially helpful for highly degraded specimens when no information could be obtained from nuclear STR analysis. In contrast to nuclear DNA, mtDNA follows maternal inheritance patterns. Therefore, mtDNA haplotypes are inherited from generation to generation through the maternal line, and owing to its resistance to degradation, it was widely used in the research of evolution and also in forensic examination. It provides enough information and could be recognized as an assistant role to CODIS 13 STR. MJIB (Ministry Justice Investigation Bureau) uses mtDNA techniques to match the degraded bones of the unidentified bodies to the families and to confirm the identification of drug abusers by analyzing urine mtDNA.

Samples of 825 unrelated individuals living in Taiwan were collected; DNA from blood or saliva was analyzed to get the sequences of HV I and HV II. There were 751 haplotypes found in the 825 individuals, the DP (Discriminating power) 0.9985, GD (Genetic diversity) 0.9997, the data showed that the mtDNA system with high DP and GD would be a good auxiliary system to currently most popular CODIS 13 STR systems for human identification, especially for the non-first-degree blood relative confirmation cases. Besides, 278 bone related forensic DNA examination cases from 2001 to 2002 that MJIB investigated, 19 in 40 cases which could not be STR typed were mtDNA sequenced. There was a 92% success rate for urine samples stored in room temperature from 1 month up to 22 months. The successful situation provided the confirmation of the mtDNA's advantages to STR typing in this type of degraded samples. In conclusion, owing to the high resistance to degradation and high discriminating power, mtDNA is very suitable for forensic examination.

Forensic Science, mtDNA, Degraded Urine