

## **MTEXPERT™: DEVELOPMENT OF AN AUTOMATED SYSTEM FOR MTDNA DATA ANALYSIS AND TYPE GENERATION.**

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Mitochondrial DNA (mtDNA) sequencing is an effective tool to analyze highly degraded or limited quantity forensic samples, such as hairs, bones and teeth, when a nuclear DNA profile cannot be obtained. In cases involving missing persons, a maternal relative or deduced known can be used to compare to the degraded sample, because of the maternal inheritance of mtDNA.

For purposes of weight assessment, concordant sequences are compared to a database of mtDNA sequences derived from anonymous individuals from various populations.

The increasing automation of sample processing and sequencing has increased sample throughput particularly in the generation of mtDNA types used for forensic mtDNA population databases. Thus, there is also an increasing need to automate data analysis of these database samples. A data analysis system has been developed by MitoTech that automates the routine and repetitive tasks in mtDNA sequence data analysis and sequence type description, improving laboratory efficiency and sample type generation. The goal of the software is the full automated analysis of high quality data, replacing one of the two independent analyses needed to validate a mtDNA type for deposition into the forensic mtDNA population database. Of particular importance is the automation of the nomenclature rules that are used to describe the mtDNA type. Automation of this type description process allows for rapid sequence alignment, provides for absolute stability and consistency within and between laboratories, as well as increased database accuracy. The status and performance of the software will be discussed along with the results of independent efforts to evaluate and validate this tool.