

The Application of Fluorescent STR Technology for Unusual Casework Specimens

Demris A. Lee, MSFS, Daniel E. Katz, MFS, Mitchell M. Holland, Ph.D., and
Colonel Vernon Armbrustmacher, USAF, MC
The Armed Forces DNA Identification Laboratory, Office of the Armed Forces Medical Examiner,
The Armed Forces Institute of Pathology, 1413 Research Boulevard, Rockville, MD 20850-3125



The Armed Forces DNA Identification Laboratory supports the Office of the Armed Forces Medical Examiner (OAFME) utilizing various DNA methods for human remains identification. Additionally, since AFDIL is a part of the Armed Forces Institute of Pathology our laboratory provides assistance in identifying sources of various cytological specimens.

In 1994, our laboratory was asked to determine whether Anna Anderson Manahan was the lost daughter of Czar Nicholas II, Anastasia. The only specimen available for DNA analysis was a paraffin block containing bowel tissue. As a result, our laboratory developed a protocol for extracting tissue from paraffin blocks. Since then AFDIL has performed DNA analysis on a number of cases involving cytological specimens in an attempt to identify the contributor. Recently, our laboratory was asked to perform DNA analysis on paraffin blocks to refute or support the presence of a complete hydatidiform mole.

Hydatidiform moles (complete and partial) are a result of chromosomal abnormalities. Complete moles result from the duplication of a haploid sperm fertilizing an empty ovum. Complete moles are paternally derived with a 46,XX karyotype. A complete mole lacks maternal contribution. Contrary to complete moles, most partial moles are triploidy (69 chromosomes). A partial mole contains two paternal sets and a maternal chromosome complement. Seventy percent are XXY, 27% are XXX and 3% are XYY. Specimens were submitted from separate areas of the paraffin blocks which were suspected to be the mole tissue and the maternal tissue. The paraffin-embedded tissues were extracted according to our modified Chelex protocol. The extracts were amplified using the Perkin Elmer AmpF/STR™ Profiler STR system. Complete STR profiles were obtained for all three specimens.

Results from this case and other applications of the AmpF/STR™ Profiler STR system in casework will be presented.

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