G89 Is DNA Purified From Forensic Autopsy Material Suitable for Molecular Biological Studies?

Iana Lesnikova, PhD, Department of Forensic Pathology of University of Aarhus, Denmark, Brendstrupgaardsvej 100, Aarhus N, 8200, DENMARK; Jakob Hansen, PhD, Department of Forensic Medicine, University of Aarhus, Brendstrupgaardsvej 100, Aarhus N, 8200, DENMARK; and Jytte B. Lundemose, Department of Forensic Pathology, University of Aarhus, Denmark, Brendstrupgaardsvej 100, Aarhus N, AK 8200, DENMARK*

After attending this presentation, attendees will understand more about the suitability of DNA, purified from forensic autopsy samples for advanced molecular research.

This presentation will impact the forensic science community by providing information about how decomposition and time from death to autopsy affects the usability of DNA for molecular studies. Knowledge about the degree of DNA fragmentation and degradation is an important tool for planning of future molecular biological studies.

The quality of molecular-biological studies obviously depends on the tissue in which the markers must be investigated. At forensic laboratories, a large number of frozen, biological samples are stored (collected at the autopsies), which can be used as templates for molecular biological studies. These samples are extremely valuable for all types of molecular biological studies in both diagnostic and research purposes. The decomposition and thereby the following changes in quality of DNA occur shortly after death. Degradation and fragmentation of DNA purified from autopsy material depends on several factors, such as time since death to autopsy, the degree of postmortem changes, the keeping of the corpse, external and environmental influences, storage of samples, and the addition of the chemicals to blood samples and other tissues for storage. It is believed there are no studies on this issue. The current study is a pilot for a major project, which is to define the molecular biological markers for sudden unexpected death. The suitability of purified DNA from tissues taken at autopsies including frozen blood with or without additional chemicals and paraffin embedded and frozen tissue is validated, as template for molecular biological studies in order to define the main risk factors for DNA fragmentation and degradation. By using PCR primer sets that amplify DNA fragments of varying length and DNA extracted from tissue samples with different degree of postmortem decomposition. Using the internal autopsy database the study group is defined consisting of tissue samples without signs of decomposition of tissue, with moderate decomposition of tissue and with severe decomposition. Frozen tissue samples of the detected cases (blood samples and muscle tissue) are available as well as frozen blood samples with the addition of potassium fluoride. DNA from tissue samples were purified using commercially available kits. Ten different PCR primer sets were designed to amplify 100 to 1000 basepair long fragments of human genomic DNA. PCR products were analyzed by agarose gel electrophoresis and ethidium bromide DNA staining.

Preliminary results suggest that the degree of fragmentation and degradation of DNA after death increases corresponding to grade of decomposition of tissue. The lengths of DNA fragments in samples with high grade of decomposition are significantly shorter than in samples without decomposition of tissue. It was possible to generate DNA fragments of at least 1,000 basepair lengths from samples taken from individuals that died within one week before autopsy was performed. On the other hand DNA samples from individuals that died at least two weeks before autopsies only could generate PCR product up to 600 basepair long.

Validation, DNA Fragmentation, Tissue Decomposition

 ** Presenting Author*