



B14 Sensitivity and Specificity Study of Published Microscopic Examination and Mitochondrial DNA of Forensic Hair Analysis

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The goal of this presentation is to develop a metric that assists in the appreciation of the value of hair microscopy. However, it important to emphasize that the two techniques used in junction provide a much more powerful analytical tool.

This presentation will impact the forensic community by showing the value of microscopic hair examination and providing evidence that when the two techniques of microscopic examination and mitochondrial DNA are combined they provide greater resolution in terms of results than either do individually.

Two methods currently used for forensically evaluating hair are microscopic examination and mitochondrial DNA analysis. These two techniques evaluate different but equally valuable criteria and, therefore, have different resolving power. Mitochondrial DNA analysis assesses genotype, while microscopic examination assesses phenotype. Several clinical studies have been published to assess the efficiency of the two methods. In this study, data was collected from the works of Gaudette,¹ Gaudette and Keeping,² Lamb and Tucker,³ Strauss,⁴ Wickenheiser and Hepworth,⁵ Houck and Budowle,⁶ and Melton⁷ and calculated the sensitivity and specificity of the combined data to give an overall assessment of the reliability of microscopic examination and mitochondrial DNA analysis of hair. Sensitivity and specificity are statistical tools used to determine how often the method correctly categorizes the individual as positive or negative, respectively.

Microscopy of hair has often been derided as a weak science⁸ but those arguments come from a less-than-enlightened appreciation of the science of forensic hair comparisons.⁹ This paper seeks to develop a metric that assists in the appreciation of the value of hair microscopy. However, it important to emphasize that the two techniques used in junction provide a much more powerful analytical tool.

References:

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Forensic Science, Mitochondrial DNA, Microscopic Examination