

## OSAC Research Need Assessment

Evaluation of Combined Information Value of Microscopic Comparisons and Mitochondrial DNA Analysis for Hair Examinations

**Title of research need:**

see title above

**Date posted:**

Jan.29.16

**Keywords:**

hair, mitochondrial, DNA, microscopic, trace evidence, association

**Submitting subcommittee(s):**

Trace/ Materials subcommittee

*(If SAC review identifies additional subcommittees, add them to the box above.)*

### **Background information:**

#### 1. Description of research need:

The current research on the correlation of microscopical characteristics of hairs and mitochondrial DNA only evaluates the results of casework samples where the sample source is not known [a]. Research needs to be conducted on evaluating the discriminatory ability of performing microscopical hair comparisons coupled with mitochondrial DNA where the true sample source is known. In order to be reliable, this research needs to be conducted by experienced and qualified forensic examiners (e.g. in accordance with the SWGMAT hair training guidelines).

#### 2. Key bibliographic references relating to this research need:

See attached file.

#### 3a. In what ways would the research results improve current laboratory capabilities?

As many laboratories are eliminating microscopical hair comparisons, this research will show the value of conducting microscopical hair comparisons prior to DNA analysis and the necessity of using these as complimentary techniques

#### 3b. In what ways would the research results improve understanding of the scientific basis for the subcommittee(s)?

The basis of both scientific methodologies is understood however no current research exists using the methods in conjunction with each other on known samples. The proposed research would determine the discrimination power that can be achieved using the two methods together.



## OSAC Research Need Assessment Appendix

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### 2. Key bibliographic references relating to this research need:

- a. Houck, M. M., Budowle, B. (2002). Correlation of Microscopic and Mitochondrial DNA Hair Comparisons. *Journal of Forensic Sciences*, 47, 964---967.
- b. Bisbing, R. E., Wolner, M. F. (1984). Microscopical Discrimination of Twins' Head Hair. *Journal of Forensic Sciences*, 29, 780---786.
- c. Linch, C. A., Smith, S. L., Prahlow, J. A. (1998). Evaluation of the human hair root for DNA typing subsequent to microscopic comparison. *Journal of Forensic Sciences*, 43, 305---314.
- d. Linch, C. A., Whiting, D. A., Holland, M. M. (2001). Human hair histogenesis for the mitochondrial DNA forensic scientist. *Journal of Forensic Sciences*, 46, 844---853.
- e. Melton, T., Dimick, G., Higgins, B., Lindstrom, L., Nelson, K. (2005). Forensic Mitochondrial DNA analysis of 691 casework hairs. *Journal of Forensic Sciences*, 50, 73---80.
- f. Roberts, K.A., Calloway, C. (2007). Mitochondrial DNA amplification success rate as a function of hair morphology. *Journal of Forensic Sciences*, 52, 40---47.
- g. Sekiguchi, K., Hajime Sato, Kasai, K. (2004). Mitochondrial DNA heteroplasmy among hairs from single individuals.