

Forensic Human Hair Examination and Comparison in the 21st Century

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ABSTRACT: Forensic hair examination and comparison is often undervalued as evidence. Significant information can be developed from a thorough microscopic examination and comparison of human and animal hairs that can assist criminal and civil investigations. Animal hairs can be distinguished easily from human hairs and often can be specified to a genus, species, or even breed. Human hairs often can be identified as to their body area origin and the racial ancestry of the person from whom they originated. Additionally, damage, disease, or cosmetic treatments can be identified and described. Finally, suitable hairs can be compared microscopically with known hair samples to determine if they could have come from the same source. This application is now being augmented by mitochondrial DNA analysis, which enhances the information already available from a microscopic examination of evidentiary hairs.

Training and qualification of forensic hair examiners is crucial to the quality and reliability of forensic hair examinations. Many of the weaknesses in forensic hair examinations seen to date are a result of inadequate training of forensic hair examiners and a lack of understanding about the fundamental nature of the examination of hairs. Mitochondrial DNA offers a chance for the rehabilitation and validation of microscopical examination of human, and potentially animal, hairs.

KEY WORDS: DNA analysis, human hairs, microscopy, trace evidence.
