



B67 Microscopical Hair Examination - Why it is Ethically Irresponsible to Eliminate These Examinations

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After attending this presentation, attendees will gain knowledge of the benefits of microscopical hair examination as well as the benefits and short-comings of the different types of DNA analyses on hair evidence.

This presentation will impact the forensic community and/or humanity by demonstrating that microscopic hair examinations have their place in forensic analysis and by not conducting these exams, the forensic scientist is not providing the best evidence, and worse yet, they may be missing crucial evidence completely. It is ethically and fiscally irresponsible to skip over this examination.

Many laboratories today have stopped performing microscopical hair examinations. They claim that it is their ethical responsibility to eliminate these examinations in favor of utilizing today's more reliable sciences – DNA. They also claim that eliminating these exams will assure that the laboratory will deliver the most scientifically valid results in a more timely fashion, thus using their resources in the wisest fashion.

Eliminating microscopical hair examinations is ethically irresponsible because information can be gained from microscopical hair examinations that cannot be gained in any other way. For example, hairs that come from a decomposing cadaver will many times show post-mortem root banding, which can easily be seen by microscopical examination. In a case where the victim and suspect were known to be in contact on a regular basis (e.g. husband and wife, roommates) it would be important to know if a hair found on the suspect or on one of their possessions had a root showing this characteristic or not. Laboratories that just cut off the root to run nuclear DNA would never have this information if no hair examination is conducted.

It is also important to know that most hairs (in this examiner's experience, well over ninety percent of the hairs seen in casework) do not have enough cellular material present at the root to run nuclear DNA analysis. This makes sense, since hairs that are actively growing (anagen phase) are secured tightly into the follicle and would require force to remove them, along with the root sheath which is rich in the nucleated cells required to do nuclear DNA. On the other hand, hairs that are done growing (telogen phase) are sitting loosely in the follicle. It is these hairs that are commonly found at the crime scene, and these hairs rarely have tissue adhering to their roots; these telogen hairs would be suitable for mitochondrial DNA analysis. Mitochondrial DNA analysis does not provide a positive association to an individual; much like microscopical comparison does not provide a positive association. It is possible for two people to have the same microscopic characteristics present in their hair. Studies have even been conducted using identical twins head hairs and they can easily be discriminated from one another by microscopical hair examinations. Mitochondrial DNA cannot discriminate between maternal relatives even several generations apart. Using the microscopical examination and comparison along with mitochondrial DNA analysis is the best method and provides the strongest hair association possible when nuclear DNA cannot be obtained.

Eliminating hair examinations is also fiscally irresponsible. The non-hair examiner may think that the average case consists of one or two hairs which can easily be analyzed for DNA. In reality, one case may have thousands of hairs. Labs that do not perform hair examinations will look at the hairs macroscopically, and if they see hairs on the victim that look grossly different or if they find hairs on the suspect that look grossly like the victim, then those are chosen for DNA analysis. In reality, it is not so uncommon for victims to have hairs that look like the suspect's hair when examined with the naked eye. Microscopical examinations and comparisons of hair will always be able to determine the hairs most likely to yield DNA results, in addition to providing visual, phenotypic information. In the event that nuclear DNA cannot be obtained, microscopic hair examinations and comparisons, together with the mitochondrial DNA, provide the best possible evidence in a case.

This discussion will go into further detail regarding the benefits of microscopical hair examination by utilizing actual case examples.

Microscopical, Hair, DNA