

DNA Analyst Training Laboratory Training Manual

Protocol 2.21 Evaluation of Hair for DNA Analysis



This laboratory protocol (or part thereof) has been provided as an example of a laboratory SOP, courtesy of the National Forensic Science Technology Center. It has been included for training and example purposes only.

PRESIDENT'S
DNA
INITIATIVE



INTRODUCTION

Hairs are common pieces of trace evidence. Visual and general microscopic features (e.g. absence or presence of a medulla, types of scales, etc...) can provide useful information to the analyst and assist in determining if a hair is suitable for a particular DNA method.

SAFETY CONSIDERATIONS

Xylene: Caution! Skin and lung irritant! May cause organ damage with prolonged exposure.

Toluene: Caution! Irritant and teratogen!

PREPARATIONS

None

INSTRUMENTATION

- Microscope
- Diamond-edged scribe

MINIMUM STANDARDS & CONTROLS

- None

PROCEDURE OR ANALYSIS

Microscopic Examination

1. All hairs that may require DNA analysis should be evaluated microscopically to determine if a root and/or root tissue is present.
2. Characteristics including length, color, shaft profile, presence/absence of the medulla, and tip description will also be included in the analysis.
3. Determination of human or non-human origin will be made based on this analysis.
4. Further microscopic hair analysis and/or hair comparisons between known and questioned samples will only be performed by a qualified analyst.
5. A photograph should be taken of the roots of all human hairs that have been microscopically examined.

Recovering Root and/or Sheath Material from Slides with Cover Slips

1. For cover slips that are mounted with a mounting medium, use a diamond-edged scribe to cut a shape in the cover slip around the desired area. With the scribe, lightly press the center of the area to crack it and add a few drops of toluene or xylene.
2. Once loosened, tweezers can be used to remove the portion of the cover slip from the desired area.
3. A scalpel can be used to cut the root and/or sheath material from the hair.
4. The sample may be removed with tweezers and placed in a microcentrifuge tube and preserved for DNA analysis.

Interpretation Guidelines

For hair(s) that is microscopically determined to be human:

1. If a root with tissue is observed, further characterization may be possible using nuclear DNA analysis.
2. If a root is observed with no visible tissue, further characterization may be possible using nuclear DNA analysis. It is much less likely than a root with tissue.
3. If no root is observed (i.e. two blunt or tapered ends) and the hair is sufficient in length (>1 cm), further characterization may be possible using mitochondrial DNA.
4. If no root is observed (i.e. two blunt or tapered ends) and hair is <1 cm, it is insufficient for DNA analysis.

For non-human hair:

If the hair(s) is determined to be non-human in origin, it is insufficient for human DNA analysis. It may be suitable for forensic STR analysis using assays designed for specific domestic animals (e.g. dog and cat).

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