



B29 Physical Separation and STR Analysis of Male / Female Epithelial Cell Mixtures and Male / Female White Blood Cell Mixtures Using Interphase Fluorescent in Situ Hybridization Techniques and Laser Capture Microdissection

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Upon completion of this presentation participants will learn a four step procedure to produce a single STR profile from evidence consisting of male and female mixtures of epithelial cells and blood cells. The procedure incorporates the use of X and Y chromosome fluorescent in situ hybridization probes, laser capture microdissection techniques, and STR amplification methods using ABI AMPFLSTR Identifiler and Minifiler system kits.

The research presented will impact the forensic science community by providing the forensic community with a method to analyze mixtures. The method will result in single STR profiles and identify individuals from evidence containing male and female epithelial cell mixtures and male and female white blood cell mixtures.

Mixtures from two different individuals cannot be easily resolved when the mixtures consist of similar cell types. Laser capture microdissection (LCM) has been successful in physically separating sperm cells from epithelial cells in order to resolve DNA mixtures associated with sexual assault evidence. Often sexual assault evidence involves cells not associated with spermatocytes. Therefore we have developed a four step procedure to resolve mixtures of male and female epithelial cells or male and female blood cells. The four step protocol consists of the following methods:

1. Identification of male and female cells using fluorescent in situ hybridization (FISH) techniques with the Vysis CEP X® alpha satellite and CEP Y® satellite III probes.
2. The physical separation and collection of male and female cells using the Arcturus® PixCell Ile ® LCM System.
3. DNA extraction using Qiagen QIAamp® DNA Micro collection kits.
4. The amplification of the LCM collected cells using Applied Biosystem Inc. (ABI) AMF/STR Identifiler® and ABI AMPF/STR MiniFiler® systems.

Using the above protocol, STR profiles have been resolved from male / female mixtures of epithelial cells, white blood cells, and combinations of both. Additionally we have used this procedure to develop single STR profiles from blood and saliva stains placed on paper substrates, cotton fabric, and stainless steel surfaces. Using ABI Identifiler and Minifiler amplification systems, full and partial STR profiles have been obtained from DNA extracted from 500 to 5 FISH processed cells collected by laser capture micro-dissection.

DNA Mixtures, Laser Capture Microdissection, Fluorescent In Situ Hybridization