A134 The Use of mRNA Markers Allowed an Alleged Sexual Assault Casework Solution

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After attending this presentation, attendees will gain an understanding about how body fluids analysis can be useful to solve real caseworks, in particular, the use of mRNA markers as a valuable tool to identify the origin of body fluids.

This presentation will impact the forensic science community by providing results from a real casework in a relatively new field of forensic sciences with a little previous research.

Body fluid stains recovered at crime scenes are important types of evidence to forensic investigators. The first step of identifying a particular body fluid is essential since the nature of the fluid is itself very important to insure the correct handling of the sample (e.g., in mixtures from different source).

In the last years, mRNA and miRNA analysis has demonstrated to be a promising method for identification of body fluids: RNA can be isolated simultaneously with DNA, avoiding sample loss, and bypassing conventional body fluids identification methods.[1-3]

First publications showed that RNA can be isolated in suitable quality and quantity from blood, menstrual blood, saliva, and vaginal secretion.[4,5] Afterwards, a number of articles regarding the applications of RNA to further stains as seminal fluid and epithelial cells were published by several authors.

This presentation will present a case report of an attempted rape of a young woman assaulted by a friend's husband. She reported that the violence began with a "finger penetration" and then was stopped before a complete penetration was carried out. Moreover, the woman reported that during the assault, she had a fluid like discharge from her vagina (a fair amount of a reddish liquid) that stained her panties. Three days after the alleged abuse, the woman went to the emergency rescue of a local hospital for a gynecological examination, which did not detect any sign of physical violence.

The panties were collected by the prosecutor and sent to the Istitute of Legal Medicine of University of Perugia in order to evaluate the presence of biological traces attributable to the alleged assailant. Genetic analysis of the reddish liquid stain performed with the commercial DNA kit showed a mixture: the presence of Y-chromosome showed that one of the contributors was a male.

The analysis of Y-STRs performed with the DNA kit on the reddish liquid stain showed a haplotype which, compared with the suspect's haplotype, was a different one. The prosecutor questioned the woman again, she answered the questions, underlining that she did not have any sexual intercourse with any other person the day of the alleged violence. She also reported that five days before the alleged violence she had unprotected sexual intercourse with her partner and had taken a progestin pill.

Thereafter, an analysis of mRNA was performed on the reddish liquid stain, using two different markers: MMP11 (present in the endometrial cells and commonly used for the diagnosis of menstrual blood) and PRM2 (specific for sperm cells).

The analysis of the mRNA was positive for PRM2 and negative for MMP11. The presence of sperm was suggested. Therefore, an analysis of Y-STRs on the victim's boyfriend was performed. The obtained Y-haplotype matched with the Y-haplotype achieved from reddish liquid stain. Probably the reddish fluid discharge from the vagina was the consequence of progestin pill consumption.

References:

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Body Fluids, mRNA Analysis, Sexual Assault

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