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Localization of DNA on a dishcloth used as a strangulation tool allowed perpetrator identification within a family

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Abstract. A case report of a domestic murder is presented. The victim was strangled with a kitchen cloth; the suspect, victim's ex-husband, who still frequented the house, admitted of having used that cloth, though to dry his hands only. The pattern of DNA amplified from the cloth, belonging to both victim and suspect, allowed suspect's version to be rejected. © 2003 Published by Elsevier B.V.

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1. Introduction

In cases of strangulation by ligature, it is often possible to extract DNA of both the victim and the assailant from the tool used in the homicide [1,2]. In the case presented here, the dead body of a woman 37 years old was found on the floor of her bedroom whit a dishcloth knotted around her neck. Postmortem examination ascribed death to asphyxia. The last individual to see her alive was her ex-husband. He admitted to have had an altercation with her, from which he had suffered some scratches (he showed finger nail scratches on his face), but denied any involvement in the homicide. He also claimed to have used a kitchen cloth to wipe his hands, so that it was not unlikely that his DNA could be found on the body of evidence.

2. Materials and methods

DNA was extracted from blood and nails of the victim, from a cigarette butt smoked by the suspect, and from samples of the cloth. In particular, small fragments were obtained from the cloth edges clutched by the murderer, whereas other fragments were randomly taken from the center and from the two other edges. DNA was extracted using the QIAamp DNA mini kit (Qiagen, Hilden, Germany). We use Profiler plus AND Cofiler plus kit for the

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Table 1
The victim's DNA profile (2nd column), suspect's DNA profile (4th column) and the mixture of DNA obtained from the cloth edges

DNA markers	Victim	Dishcloth	Ex-husband
D3S1358	15–17	14–15–17	14–14
vWA	15–17	14–15–16–17	14–16
FGA	20–25	20–23–25–26	23–26
D8S1179	12–15	11–12–13–15	11–13
D21S11	30–31	29–30–31	29–31
D18S51	12–17	12–13–14–17	13–14
D5S818	12–12	12–13	12–13
D13S317	11–11	11–13	11–13
D7S820	11–12	8–11–12	8–12
D16S539	9–12	9–11–12	9–11
TH01	8–8	7–8–9.3	7–9.3
TPOX	8–11	8–11	8–8
CSF1PO	11–12	10–11–12	10–10
AMEL (sex)	XX	XY	XY

amplification of 13 STR loci; electrophoresis was carried out in the ABI 310 automated sequencer (Applied Biosystem) following standard protocols. The DNA profiles were compared with those of the victim and the suspect. The biostatistical analysis of the mixed profile was in accordance with Ref. [3], assuming that the victim was one of the contributors.

3. Results

Both a profile identical to that of the suspect (5th right finger) and other profiles compatible with a mixture of victim's and suspect's genotypes (1st right finger and 2nd, 3rd, 4th left fingers) were obtained from the nails of the victim. A mixture compatible with a combination of DNA of both victim and suspect ($LR = 1.9 \times 10^{11}$) was also obtained from the edges of the cloth held by the murderer; on the contrary, only victim's DNA was obtained from all other cloth fragments (Table 1).

4. Discussion

Whereas the DNA evidence from the nails of the victim was compatible with the statement of the suspect, the localization of DNA on the cloth rejected his version. In fact, it was extremely improbable that the ex-husband could have used only the diagonally opposite ends of the cloth to dry his hands, precisely the same ends used by the murderer in the strangulation. In addition, no alleles of anyone other than the victim and the suspect appeared in the mixed profiles (the suspect afterwards confessed to the crime).

This case is an example of the importance of studying the distribution of DNA on crime weapons.

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