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Paternity determination in criminal cases by DNA typing in South Ukraine

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The first DNA analysis usage in Odessa Region Forensic Service (South Ukraine) was in 1992 after the PCR-technique installation for DNA polymorphism investigation. It was the paternity determination by typing DNA isolated from blood. Since 1995, suspect genotypes identification by comparison of DNA-profiles from biological traces was begun. In the first stage (1995–1997), six minisatellite loci—D17S5, IgH, D1S80, ApoB, p33.6, RB1—were used. Since 1998, DNA typing has been carried out with the microsatellite loci HUMTPOX, HUMCSF1PO, HUMF13A01, HUMF13B, HUMHPRTB, HUMFES/FPS. HUMTH01, HUMLPL, HUMvWA, HUMCD4, HUMCYAR04, D6S336, D19S253, HUMvWFII, HUMSE33 and Amel for sex determination.

The principle and technique of paternity determination used for relatives ascertaining and for personal identification are in following examples.

(1) Identification of an unknown male corpse in a state of severe decomposition. For DNA isolation, the hair, cartilage and collar-bone fragment were used. Eleven STR-loci (HUMF13A01, HUMF13B, HUMTPOX, HUMFES/FPS, HUMTH01, HUMSE33, D19S253, HUMCD4, HUMLPL, HUMHPRTB, HUMCSF1PO) were analyzed. DNA profiles of the prospective victim's mother, daughter and biological remains were compared. Molecular-genetic analysis showed the woman might be the victim's mother with probability n=99.85% (value of the cumulative probability of casual concurrence of genotypes was $P_{cum}=1.49\times10^{-3}$), and the girl might be the victim's daughter with probability n=99.999% (value of the cumulative probability of casual concurrence of genotypes was $P_{cum}=2.51\times10^{-6}$).

(2) Identification of skeletal remains. DNA was extracted from skull, boiled down and open with varnish, and fired bones tested on seven microsatellite loci (D19S253, D19S253, HUMCYAR04, HUMCD4, HUMF13A01, HUMF13B, D6S336) and locus Amel. Obtained PCR-profiles were compared with those of the prospective victim's mother. The skull was female and might belong to the daughter of the prospective mother with

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probability n=99.99% (value of the cumulative probability of casual concurrence of genotypes was $P_{cum}=1.34\times10^{-5}$), and bone remains from the fire place were that of a male.

(3) Identification of blood spots found on asbestos pipe fragments; the blood spots might be that of a missing person. DNA was analyzed on microsatellite loci: HUMF13A01, HUMF13B, HUMTPOX, D6S336, D19S253, HUMFES/FPS, HUMTH01, HUMSE33 and Amel. Also, the prospective parents' DNA was investigated. Blood spots on the pipe belong to a man who might be these parents' son with probability n=99.99% (value of the cumulative probability of casual concurrence of genotypes was $P_{cum\ father}=8.65\times10^{-8}$ and $P_{cum\ mother}=2.16\times10^{-5}$).