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Forensic aspects of decision theory application to court decisions using the results of DNA analysis: Mathematical model and empirical (sociological) data

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The decision point concerning identity of a person is inevitable irrespective of the degree of reliability of the DNA identification and, therefore, accurate decision justification is of demand. Decision theory develops formal models of rational decision making under incomplete information and provides solid ground to recommendations on forensic DNA identification use in legal studies, as suggested by Goubko and Perepechina (2001). We report a revised model of forensic aspects of decision theory application to court decisions based on DNA information (conditionally assuming that the court's decision on a particular criminal case depends directly on the results of the DNA analysis). The refined mathematical model employs hypothesis of the rational behavior to reveal factors influencing decision-making, and to study border probability values, which can be assessed as sufficient for the judgment. The key element of the model is the empiric adoption the level of type I vs type II judgment errors by the society. Our analysis shows that under realistic values of model parameters contemporary DNA analysis methods provide enough level of reliability of DNA identification. To identify the model we develop a questionnaire and execute a poll.

Biography

Irina Perepechina is a Professor of Department of Criminalistics of Legal faculty of Lomonosov Moscow State University. She has both Medical and Legal Education, PhD degree (1990) and Doctor of Medicine degree (2003) in Forensic Medicine (Genetic Identification). Her scientific interests focus on forensic DNA analysis, DNA evidence interpretation, DNA database, DNA phenotyping, forensic serology; legal aspects, theory and methodology of forensic science/medical law. She has more than 140 scientific publications and manuals. She is a Member of the International Society for Forensic Genetics (ISFG), INGO, in 1995-1999-Representative of Russian Federation in DNA WG of ENFSI. At the University she lectures forensic medicine, criminalistics, forensic genetics and forensic science.

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