Identification of the Human Body Fluids Using Messenger RNA Biomarkers

Gavrilo Hadžić, BSc. in Microbiol., Forensic expert, National Forensic Laboratory, General Police Directorate, Ministry of the Interior, Slovenia.
E-mail: gavrilo.hadzic@policija.si

Katja Drobnič, Ph.D., Professor of Forensic Science, Faculty of Criminal Justice and Security University of Maribor, and Head of biology department, National Forensic Laboratory, General Police Directorate, Ministry of the Interior, Slovenia.
E-mail: katja.drobnic@policija.si

Identifying human body fluids using a messenger RNA (mRNA) is important for forensic work, as well as for the further criminal investigation, because it allows "insight" into criminal events. Conventional body fluids identification methods, such as chemical and morphological tests, are still being used in most routine forensic investigations; however, these tests have certain limitations. They are not specific, and with these tests the specific body secretions, such as vaginal secretions, cannot be determined and we cannot distinguish between menstrual and venous/arterial blood. On the contrary, a molecular approach with mRNA allows a simultaneous identification of several different biological fluids. An additional advantage is that the mRNA and DNA can simultaneously be isolated, and a number of mRNA markers, that are specific for a particular body fluid, have been identified. Recent studies have shown that it is possible to effectively isolate the mRNA also from older forensic samples. In this article, the authors present a general overview of the field of forensics and the latest mRNA biomarkers. Furthermore, results from the National Forensic Laboratory and their usefulness for solving criminal cases, especially in the area of sexual violence, are presented.