



Introduction of Innovative International Experience of Molecular Genetic Expertise in Ukraine: Legal Aspect

Yurii V. Filei¹, Anatolii V. Musiienko², Viktor O. Gubka³, Andriy O. Gubar⁴, Mykhailo A. Anishchenko⁵

¹Candidate of Juridical Sciences, Dean of Juridical Faculty, of Institute of Management and Law of National University «Zaporiz'ka politekhnika»

²Candidate of Juridical Sciences, Associate Professor, Head of the Department of Criminal Law, of the Institute of Management, Technology and Law of the State University of Infrastructure and Technology

³MD, PhD, Professor of Hospital Surgery Department of Zaporizhzhia State Medical University

⁴Assistant Professor of Urology Department of Zaporizhzhia State Medical University

⁵Candidate of Juridical Sciences, Associate Professor of the Department of Management and Economics of Pharmacy, Medical and Pharmaceutical Law of Zaporizhzhia State Medical University

ABSTRACT

The article highlights the legal aspect of introducing innovative international experience of molecular genetic expertise in Ukraine. The authors provide specific proposals for regulatory regulation of such examinations. The authors conclude that genetic analysis is one of the most modern, effective and indispensable for crime detection and law enforcement in general. The practical application of genetic analysis with predictable and positive results is not possible without effective legal regulation that responds to current challenges and technologies. The purpose of the article is to investigate the legal aspect of introducing innovative international experience of molecular genetic expertise in Ukraine, to identify ways to improve legal regulation. Materials and Methods: The study material is a modern international regulatory framework that defines the principles and procedure for the application of molecular genetic methods. Methods of searching, analyzing, organizing, and summarizing information were used in writing the article. Molecular genetic studies are becoming more widespread and widely used. At the same time, the use of such technologies requires a proper settlement of ethical and legal issues. Genetic analysis is one of the most modern, effective and indispensable methods for crime detection and law enforcement. The practical application of genetic analysis with predicted and positive results is impossible without effective legal regulation that has to meet current challenges and technologies. The current legal and regulatory support for expertise in Ukraine, especially molecular genetic ones, does not meet current requirements and does not meet the needs of justice. Improving Ukrainian law requires a comprehensive approach, and adopting a separate law is one aspect of such improvement..

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INTRODUCTION

The constant change of social realities puts before the law practice new tasks that require qualitatively new approaches to their decision. This requirement increasing can be explained by a number of factors, which are famous for its leading development of social relations and scientific progress, the improvement of technology. Such tasks are fundamentally new, but having been known for a long time, some of them are still causing some

difficulties. Such tasks include the identification of a person, whose applied value is connected with the disclosure of serious crimes against the life and health of the person, crimes against sexual freedom and against sexual integrity of the person, the search for the missing persons. In the era of man-made disasters, which are characterized by mass deaths of people, large-scale destruction of the bodies of the dead, without qualitatively new methods of identification can not do. The issue of

^{*} **Contact** Mykhailo Anishchenko Medical and Pharmaceutical Law of Zaporizhzhia State Medical University amakpu@ukr.net
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paternity is not relevant; people's interest in their ethnicity and their predisposition to certain diseases is growing as hundreds of years ago. The current level of biological and medical science allows us to address such issues through qualitatively new methods, such as molecular genetic studies.

At the same time, the use of such technologies requires a proper settlement of ethical and legal issues. This is due to the fact that the legal regulation of such methods must include safeguards for the protection of human rights and freedoms, the preservation of personal data, the privacy of the person and, ultimately, his physical integrity and security, and at the same time be effective. In turn, there are certain difficulties in creating and implementing such legislation, due to the lack of prior experience in dealing with such issues.

LITERATURE REVIEW

Some issues of legal regulation of genetic identification have been considered in the works of such scientists as Bilous V.V., Hrevtsova R.Iu., Klymenko N.I., Musiienko A.V., Stetsenko S.H., Shcherbakovskiy M.H., Shoshyn S.V. The work of such foreign scientists as Perepechyna Y.O., Pymenov M.H. Kondrashov S.A., Margarita Guillén, María Victoria Lareu, Carmela Pestoni, Antonio Salasand Angel Carracedo, Berdine S.G. etc.

Genetics is quite young as an independent science, but its achievements have already found wide application. One of these applied areas is medical forensic research. The method, itself, is based on the study of a DNA molecule (deoxyribonucleic acid), which was discovered by F. Misher in 1896, but its leading role in the development and functioning of living organisms for a long time remained unclear. When it has been proved that DNA stores, transmits and implements a genetic program for the development of the organism, British researchers A. Jeffreys and P. Gillu proposed to use its analysis for human identification in 1985. In 1986, such study was firstly used in the UK jurisprudence in order to investigate a double homicide with the result that exceeded all expectations [1]. The fundamental difference between these methods and others (the previous ones) is their unmatched (at least so far) ability to detect individualized personality traits. The individual capabilities of potential systems depend on their polymorphism, that is, on the degree of their variability and the number of variants in the population. In all known biochemical markers, the individual potential is not high enough for positive identification, because of their specific group. Therefore, identification, if it is possible, using many different systems, each of which, if it is taken separately, has only a relative value. The progress of molecular biology has made it possible

to solve the problems of forensic medical forensic identification of a person, enabling the identification of individualizing features of a person at the level of genotypic identification [2, p. 1087].

The effectiveness of using DNA analysis in order to identify individuals can be explained by a number of features:

each person's DNA is unique and remains intact throughout life;

the DNA of a child consists of equal parts of the DNA of his parents (according to the laws of Mendel's heredity);

the study provides a unique DNA profile of a person, which can then be compared with other profiles (unidentified corpses, relatives of missing persons suspected of committing a crime);

when receiving positive results (comparative) gives a high degree of probability;

DNA can be isolated from an extremely small amount of biological material (ten cells containing nuclei are sufficient);

unlike proteins, the DNA molecule in solid tissues, such as bone and tooth, is characterized by stability and longer shelf life, which makes it possible to isolate and investigate it several decades after the death of a person [3, p. 174-176].

At the time of its appearance, the method was called genetic, or genomic "fingerprinting", by analogy with the analysis of fingerprinting, because the basis for expert opinion was often the display of individual characteristics of DNA in the form of a graphic image that resembles a picture of the so-called bar code. Today in the scientific vocabulary it is accepted to use the term DNA-typing or genetic identification [2, p. 2-4].

AIMS

The purpose of this article is to provide a theoretical study of relevant aspects of regulatory and legal support for molecular genetic examination in Ukraine.

METHODS

The research material is a modern international regulatory framework that defines the principles and procedure for the application of molecular genetic methods. Methods of searching, analyzing, organizing, and summarizing information were used in writing the article.

RESULTS

Thus, molecular genetic identification analysis allows us to investigate specific regions of DNA specific to each individual, and to obtain a unique genetic "mapping" of a person that can neither be hidden, altered nor tampered with [4, p. 125-127].

DISCUSSION

Widespread use of molecular genetic expertise has recently been observed in the investigation of serious and particularly grave crimes against the individual. For example, a criminal case can be brought against a person charged with premeditated murder and further attempted life of a collector in order to seize large sums of money. When considering this criminal case, the results of molecular genetic examinations were the main ones. In all, about ten were held in the case. The objects of expertise were blood, tissue, car items, explosive device components, cigarette butts [5].

The objects of forensic molecular genetic examination are most often the samples of blood and saliva from living persons, as well as blood and tissue samples (including bone and tooth) from corpses, except for traces of sweat and urine that make it impossible to determine a person's DNA profile. [6]. Genetic material can be obtained from personal use items (toothbrush, shaving machine, comb), or undergarments (non-washable, lingerie). For comparative analysis of DNA profiles of missing persons, relatives' genetic material is used.

The practical application of such technologies requires appropriate regulatory support, as it is about protecting human rights and freedoms. The task of the state is to create a balanced legal model for regulating such research, which will ensure their effectiveness, protection of human rights and freedoms, prevent possible abuse in the process of applying such methods. Such legal rules exist in countries that use these technologies. They are based on fundamental humanistic principles, which are primarily reflected in the documents of international organizations. One of such document is the Universal Declaration on the Genome of Human and Human Rights, adopted on November 11, 1997 by the United Nations General Conference on Education, Science, and Culture. Such documents are intended to establish the basic principles of national legislation to address certain issues. In particular, such studies should be based on the full respect for dignity, freedoms and human rights, as well as the prohibition of any form of discrimination on the basis of genetic characteristics [7].

However, it should be supported by the thesis that one of the most important aspects is the possibility of using forensic records of human genetic traits with information-retrieval automated systems [4, p. 125–127]. In Ukraine, the field of research application is expanding and it requires the improvement of such research legal regulation of [8].

One of the topical issues, according to the authors, is the regulatory definition of the range of persons to whom such research is envisaged. It is followed by the entry of their DNA profiles into the database.

There are different models in the world of practice to solve this problem - from the concept of maximum coverage of the population and the insertion of DNA profiles into the database, and to the personal application of such research, depending on the circumstances of the case. Each of these models has its advantages and disadvantages. Yes, assuming that the country's database contains the DNA profiles of all its inhabitants, it will make its use in the investigation of crimes extremely effective.

Persons, who are required to sample DNA by law, are the major "providers" of DNA profiles for genetic databases in all countries, where such systems are created. Such DNA profiles in the national databases have the highest share. For example, in the UK National Database, 4.7 million DNA profiles account for the convicts and suspects genotypes and only about 350,000 for DNA traces from the scene. The presence of a database of test persons provides the implementation of the basic mechanism of information search engine functioning, which leads directly to the identification of the person [9].

A convincing indicator of the effectiveness of such a model is the opening of the case more than a hundred years ago, which became the world heritage of forensics and fiction of the detective genre. It is about a criminal known as "Jack the Ripper". British scientists have compared the DNA sample of the crime scene with the sample of one of the descendants of the alleged "Jack the Ripper" - Aaron Kosminsky [10]. A blood-stained handkerchief was allegedly found not far from the mutilated body of Katherine Eddows, one of the victims of the serial killer, which was purchased by Russell Edwards, who was the amateur detective, at an auction. Despite the previous owner's assurance that his ancestor was one of the police officers who discovered the body, there was no evidence of the authenticity of the handkerchief's origin. To establish the truth, Edwards enlisted the help of Dr. Jari Lohelainen, associate professor in the Department of Pharmacology and Biomolecular Sciences at John Moore University.

IR spectroscopy confirmed the nature of the dark spots on the tissue, recognizing traces of blood in them. Fluorescence analysis revealed residual seminal fluid, epithelium and, importantly, one kidney cell. The latter finding is particularly notable given that the organ was removed from the victim.

Comparing the mitochondrial DNA of the evidence with the specimen provided by Eddow's great-granddaughter, it was found that the handkerchief was indeed located at Mitter Square at 1:45 a.m. on September 30, 1888, where the victim's body was discovered.

Aaron Kosminsky, the prime suspect in the Whitechapel murders, immigrated from the Polish

town of Klodawa to London at the age of 16, fleeing the 1881 pogroms. Moving to the refugee-populated Eastern Europe area of Whitechapel, Aaron went to work as a hairdresser. By the time the known killings occurred, Kosminskyi was already suffering from signs of mental disabilities. Despite his continuous surveillance, Scotland Yard was unable to provide substantial evidence to apprehend the alleged perpetrator. Aaron died at the age of 53 at Köln Huch Psychiatric Hospital.

And here, more than 100 years after the tragic events, Edwards found one of the descendants of Aaron Kosminskyi's sister. The extremely complicated procedure of extracting and amplifying DNA copies from a handkerchief allowed Dr. Lohelainen to establish that the epithelial cells were precisely belonging to the same Aaron Kosminskyi. The Jack the Ripper case was closed [10].

This case demonstrates not only the power of modern technologies in general and the specific method in particular, but also confirms the effectiveness of the organization of the British system of molecular genetic examination. However, in practice, it is quite difficult to achieve this. This requires some legal framework, technical capabilities, time and significant financial support, which can be millions of dollars a year. And this is only to maintain the functioning of the existing DNA profile database [9].

The opposite to this is the other model, which involves taking samples from a specific person who is involved in a particular case. This model will be much less expensive, but it will not show high efficiency. Therefore, a balanced model has become widespread, providing DNA analysis of sample types of crimes and fixing the DNA profiles of all evidence found at the crime scene of these specific crimes.

The effectiveness of this approach is confirmed by the successful investigation of many complex cases. The molecular-genetic method is also used in the investigation of serial crimes.

Between 1998 and 2003, in the city of Bremerhaven 9 women were raped or abused in their homes. DNA analysis revealed that stains from four crimes were identical. Since the perpetrator wore a mask, little additional information was available for the police. Profiling limited the geographical area of the perpetrator to a city quarter called Lehe. Within that area, about 2.300 young men between 24 and 46 years should be included in a mass testing. One day after police decision, the State General Prosecutor considered the test as illegal and interdicted the ILS. This was overruled by a local court decision one month later. During the test, about 100 persons refused to give a sample. Within that group, police investigations led to a 36-year-old man who had no alibi for most of the times of crime. By court order, a sample was taken and the

profile yielded a match to the crime scene stains. The man confessed four rapes and was sentenced to nine years in prison in December 2005 [11].

Legal and regulatory support for molecular genetic identification in Ukraine is regulated in accordance with the Instruction on the Organization of the Functioning of Forensic Records of the Expert Service of the Ministry of Internal Affairs of Ukraine [12, paragraph 2.12]. It provides, in particular, an automated account of human genetic traits that function at the central and regional levels. Operational search collections are formed from the DNA profiles of persons suspected or accused of committing crimes of conviction if they have voluntarily consented; biological footprints removed during a scene inspection (WMD), including the facts of a person's disappearance, other investigative activities and search operations; unrecognized corpses [12, paragraph 2.12].

The Central Operational Search Collection is maintained at the DNDECC and is formed from the DNA profiles of persons suspected or accused of committing crimes in custody; biological footprints recovered from WMD, investigative and search operations; unrecognized corpses.

Regional search and retrieval collections are maintained at the NDECC and are formed from the DNA profiles of persons suspected or accused of committing crimes, sentenced, in cases of voluntary consent; biological footprints recovered from WMD, other investigative and search operations; unrecognized corpses. The DNA profile is obtained through expert research at the NDECC, the CME Bureau.

DNA profiles obtained by genetic analyzers and defined by a number of standard marker systems (STR loci) that are the only ones for expert laboratories according to the recommendations of the European Network of Forensic Institutions (ENFSI) are subject to accounting. After the establishment of DNA profiles, a registration card of the DNA profile (biological trace removed during the inspection of the crime scene or other investigative and search activities; an unrecognized corpse; biological trace of a missing person, a specimen of a specimen, an obnoxious person, a specimen, is filled within three days. the victim) [12, paragraph 2.12].

It should be noted that the Instruction provides for the creation of DNA profiles of persons suspected or accused of committing crimes, sentenced prisoners, that is, defines a wide range of such persons. In addition, it is quite acceptable, because in the world practice it is applied, for example in Great Britain, Spain. At the same time, the legislation of France, Germany, Norway, and Hungary contains specific types of crimes, such as crimes against life and health, sexual crimes [13].

Nevertheless, according to the authors, we should first turn to the realities of national criminal procedural legislation. Examination is conducted by an expert institution, one expert or experts, on the instructions of the investigating judge or court, provided at the request of the party of criminal proceedings according to Art. 242 of the CPC of Ukraine. In addition, Part 6 of Art. 244 of the Criminal Procedure Code of Ukraine establishes that an investigating judge shall grant a request for the appointment of an examination if the person who has requested the relevant request proves that the involvement of an expert is necessary to resolve issues of significant importance for criminal proceedings. In the scientific environment, it is believed that these changes to the CPC of Ukraine do not contribute to the task of rapid pre-trial investigation (Article 2 of the CPC), since they make the appointment of examination a long process [14, p. 255]. This aggravates the procedural position of the accused, suspect, and victim, especially when it is necessary to assign molecular genetic expertise, which is explained by the technological complexity of such examination, the increased requirements for the quality of objects of such expertise, the need for quick decisions. Therefore, such procedural rules, on the one hand, may contribute to the savings of finance and other resources in such expertise, but are doubtful in terms of their effectiveness, rapid expansion of DNA profiles, and ultimately the effectiveness of the investigation. Therefore, according to the authors, the current departmental regulatory framework of the Ministry of Internal Affairs is clearly not enough today for the effective application of such high-tech methods as molecular genetic examination.

It is obvious that the issue in question cannot be solved in isolation, as it is complex and requires the same approaches. According to the authors, the preconditions for the adoption of qualitatively new legislation, a separate law that would provide regulation of molecular-genetic research at a new level in accordance with modern requirements, set the legal basis for obtaining, storing, using and destroying genetic information. For comparison, in Russia a similar law was adopted in 2008, although it applies only to law enforcement activities [15].

But, the authors believe, the core of such a law should be the protection of human rights in carrying out such research, based on the principles set out in international instruments, in particular the UN declarations, the WMA. Of course, such a law should significantly increase the fight against crime (especially in the fight against terrorism and extremism), facilitate the creation of a state database of genetic information of unrecognized corpses, unidentified persons convicted of serious and particularly serious crimes, as well as all categories of crime against the offender. and sexual

freedom of the individual. But more than that, it should shape public policy in the use of such technologies, and perhaps even not only for law enforcement but also for medical (organ or tissue transplantation, prevention and treatment of hereditary diseases), by creating the preconditions for effective use of genetic databases. The need to regulate such research is extremely important in Ukraine today. The level of such technologies and the lack of effective legal regulation allow commercial companies to carry out molecular genetic studies as freely as, for example, to sell exotic fruits [16]. Today, we often face warnings about the misuse and protection of our personal data. This is appropriate. However, after surfing the sites with similar offers, their capabilities are so striking to the average consumer that he may not think about the security guarantees of his genetic data. Obviously, in the perspective of technological development, the importance of protecting not only personal data, but also genetic ones, will increase. It is also important in the aspect of clinical medical sciences that will be able to treat serious diseases by molecular genetic methods. Therefore, in the opinion of the authors, such a substantive legal act should absorb the resolution of all outstanding issues in the application of molecular genetic technologies in Ukraine.

CONCLUSIONS

The study allowed the authors to reach the following conclusions:

genetic analysis is one of the most modern, effective and indispensable for crime detection and law enforcement;

the practical application of genetic analysis with predicted and positive results is impossible without effective legal regulation that responds to current challenges and technologies;

current regulatory legal support for expertise in Ukraine, especially molecular genetic, does not meet current requirements and does not meet the needs of justice;

the improvement of Ukrainian legislation requires a comprehensive approach, and the adoption of a separate law is one aspect of such improvement. The need for change is demonstrated by the analysis of the rules of criminal procedure legislation of Ukraine, in particular Art. 242, 244 CCP of Ukraine;

the legal regulation of the application of molecular genetic method in all applied fields, lies in the plane of adoption of a separate, single law.

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