

Review Article

## The Role of Genetic Identification in the Scientific Discovery of Crime through the Review of DNA in the Crime Scene

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### ABSTRACT

**Background and Aim:** DNA fingerprinting, one of the great discoveries of the late 20th century, has revolutionized forensic investigations. DNA analysis is frequently used to acquire information from biological material to aid inquiries associated with criminal offenses, disaster victim identification, and missing person investigations.

**Methods:** This analytical-descriptive research gathered relevant data in a literature search. After a description of the fundamentals and definitions, ethical texts were subsequently analyzed.

**Ethical Considerations:** Ethical principles were considered in searching and citing the literature.

**Results:** In our country, since the year 1388, the need for having a genetic database in Iran was felt and the head of the judiciary ordered the creation of a genealogy database in light of the sensitivity of the matter and helped to resolve the cases quickly.

Legal genetic laboratories in Iran began their work in the 1970s. In Iran, firstly, the forensic laboratories in Tehran, Mashhad, and Isfahan began their activities.

**Conclusion:** The actions of governments in the field of criminal law are not always conducive to accountability through the use of punishment. Today, the Special Criminal Tribunal is focused on taking preventive measures. Prevention of the commission of crimes is carried out in a variety of ways, in which we focus on preventive methods with an emphasis on genetic science in this paper. If the genetic information of the criminals present in the genealogy bank exists and is also an example of a crime scene, it would be possible to identify the offender before using other methods of identifying criminals and arresting individuals. It helps to quickly retrieve the accused and to succeed. Experiences in many countries have shown that by doing this, you can significantly reduce costs and achieve less favorable results with less testing.

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### Introduction

The ultimate goal of the states and the laws in the community is to provide comfort and means of achieving prosperity and excellence. Of course, any legal system, following its ideology and attitude, acts on prosperity. At the same time, regardless of the attitude of the systems, their goal in creating order, justice, and security is almost the same, and

they all try to secure their society from stability and security. Based on this, each criminal system uses certain methods while the preventive aspect of the criminal justice system in different countries is seen as an effective and low-cost tool. Therefore, since prevention has always been more effective than treatment, and the imposition of various penalties, they have still not been able to reduce the number of crimes, despite their

widespread scope. Governments are now focusing more on other aspects of responding to punishments, including prevention. In addition, the preventive aspect of deterrence has other benefits, including decentralization in handling various criminal cases in the courts and reducing the costs of proceedings. Given the role criminal science plays in criminal law, it is necessary to obtain up-to-date information on this science and the common ground with other sciences. One of the related sciences that are closely related to cognitive science today is medical genetics. One of the issues that have changed the knowledge of criminology today is medical genetics and its impact on criminology. As we said, scientific criminology is multi-faceted and uses many sciences to advance its goals, one of which is genetic science. The advances and developments of genetic and molecular medicine, not only in the field of prevention, diagnosis, and treatment of genetic diseases but also because of the impact on criminology, are recognized as an indispensable factor in modern criminology. In recent years, many studies have been done on the role of genetics in human delinquency. The study of the genetic role on crime has been done in the field of "behavioral genetics". The growing importance of this knowledge and its position among the world's leading science and technology is not overlooked by experts. Genetic engineering, which is the pivot point of molecular biotechnology, seeks to identify and understand how the genes are structured and functioned through the use of different technologies, such as the combination of DNA. The exploitation that criminology knowledge of this science has been in detecting crimes, identifying criminals, and more important subject is crime prevention. By carrying out a simple experiment using the traces of the scene of a crime, one can identify the identity of the criminals. Accordingly, the scene of the crime should be preserved until the arrival of specialist forces, from the confounding elements of the crime scene. In this way, you can even reveal the most complex crimes. In this article, one of the key categories, biotechnology, has been pointed out as criminal science that should be one of the most applied sciences to benefit from the advances in biotechnology. Given the objective evidence in various criminal cases, the use of DNA molecular analysis to identify perpetrators through works left at the crime scene is superior to other guessing traditional reasons, such as

confession and testimony of witnesses. Because studying the reason for this scientific method guarantees the judge, and if it conflicts with the theoretical reasons in the case, it leads to a rejection or a serious doubt about the evidence. The reason for DNA, as it helps in important crimes such as murder and deductions, can be effective in minor offenses. Contrary to the fact that the lack of gathering and analyzing DNA samples in less important offenses could prevent legal coercion for arresting perpetrators before committing major crimes. Today, in many countries, molecular techniques are used to detect crime and examine the identity of individuals, and information from people in the community is recorded in a gene bank that helps in identifying criminals. DNA has been used in recent years to identify criminals. This identification method is highly valued so that the biological samples obtained from the scene of the crime are analyzed in a very precise way and match the samples taken from the defendants. Research has shown that crime rates have dropped significantly in advanced countries that carry out DNA testing to identify offenders and the genetic identity bank has been working to match genetic data. Indeed, the effort in this article has been to highlight the importance of the linkage of criminal and medical law to us and to make it clear that DNA as one of the means of identification can help in the scientific discovery of crime that would be through the creation of a genealogy identity card.

### Ethical Considerations

Ethical principles were considered in searching and citing the literature.

### Methods

This analytical-descriptive research gathered relevant data in a literature search. After a description of the fundamentals and definitions, ethical texts were subsequently analyzed.

### Findings

#### 1. The Role of the Genetic Identification Technique through Crime Scene Investigation

The requirements for the implementation of justice and the rights of the parties to the criminal procedure comply with the provisions of the relevant procedural rules and collecting evidence in criminal cases is one of these regulations. This action begins in criminal cases, and particular criminal cases, from the scene of a crime.

Therefore, the crime scene will have a double significance in the criminal justice process by connecting to the grounds of crime and the discovery of the truth and, ultimately, the enforcement of justice. The scene of the crime must be carefully reviewed by the responsible authorities and the confusing factors. One of the general principles in investigating the crime scene is the discovery of a meaningful relationship between the two objects that are related to each other. The theory of exchange or transfer is based on these facts:

1. The offender takes the victim's scenes and the crime scene.
2. The victim keeps the trace of the offender on his own or leaves the traces and signs of himself in the offender.
3. The offender will leave traces at the scene offense.

This basic principle and guidance that justifies any investigation of the crime scene are attributed to Ormond Lukard. Luard, head of the French Institute of Criminology at the University of Lyon, published the Police Methodology as the "Theory of Exchange" at the crime scene in his name. Research judges, legal practitioners, and other experts on the crime scene should answer the question "What has happened?" And this answer is possible when the scene of the crime is deliberately and carefully examined and the traces and indications are collected and their relationship with each other is assessed by experts from a medical and criminal point of view. Documents and traces are any tangible, small, or large material that leads to the rejection or proof of a suspicious point. These documents may be left in place and tracked on the scene, suspicious statements, and eyewitness or autopsy findings. The value of a document is not merely that it is found at the crime scene. Those who analyze the crime scene are looking for the interpretive value of the crime evidence that a detective discovers from the crime scene. The scene of the crime remains a puzzle. Often, when the police arrive on the scene, there is no question in my mind; it throws the scene in question. Each of these questions is a piece of that puzzle. Unfortunately, all the puzzle pieces are not at the disposal of the police. Additionally, there is no general picture of the puzzle to help put the pieces together. However, crime scene experts should answer a myriad of questions. For example, one of the most common questions would be "Is the piece of the

puzzle, as one of the evidence on the scene of a crime, belongs to the same events that occurred on the scene, or were they before or after the crime was committed?"

### 3. DNA Application in Proving Crimes

The human body has over 100 trillion cells, with similar versions containing all the genetic information of each individual, and with genetic knowledge, if only one cell is available, the identity of the person can be identified from the information. Today, the advancement of science and technology has revealed its effects in all areas, including the tools for the discovery and establishment of crimes, so that in the age that they called "scientific evidence", even traditional proofs such as martyrdom and confession in some cases helped new scientific evidence is being measured. This evidence encompasses a wide range of actions and experiments and scientific and technical examinations that cover most of the crime-related issues in forensic medicine. The key to genetic identity is that the genes of no two individuals are similar, so the biological effect of each individual is specific to him, and if left behind at the scene of a crime, then it can be understood through its processing to the identity of the owner. Of course, this requires the use of new scientific methods and technologies for identifying, such as the DNA technique in the crime scene. The requirements for the implementation of justice and the rights of the parties to the criminal procedure are to comply with the provisions of the relevant court procedure and the collection of reasons for criminal cases is one of these regulations. This action begins in cases and especially criminal ones, of crime scenes. Therefore, the crime scene, with a connection to the grounds of crime and the discovery of truth and ultimately the enforcement of justice, will be of great importance in the criminal procedure process, and the scene of the crime must be investigated by the responsible authorities and the expert and the confounding factors are eliminated. Since the decisions made by the court are exclusively based on the evidence presented in the court, the persons involved in the investigation of the crime scene must do their utmost to collect and maintain accurate documents before they are destroyed, corrupted, or lost.

The method of identifying genetics is a modern and efficient way of working out as a

manifestation of biology science in law has been considered by advanced countries. This procedure plays a leading role in the criminal procedure, which is considered objective evidence. The results of the DNA tests at the various stages of preliminary research and trial are provided to judges. In the event of a conflict between its results and the traditional evidence, it can be ruled out, or questioned the authenticity of the traditional argument.

#### **4. The Value of Genetic Detection Technique in the Code of Criminal Procedure**

DNA is mainly used to prove the guilt or non-conviction of the accused. This method is simply possible because DNA can be extracted from hair, tissue, and any biological member that contains a sufficient number of cells. For example, a small amount of dry blood, saliva, sperm, very microtubules, hair roots, and many other things can be found. Gene detection is probably possible when the accused is already present at the crime scene and her hereditary cells can be adapted to the cells obtained at the crime scene; in this case, if the two are the same, the suspect will be convicted. However, when the accused is not at the scene or is at the scene but there is no biological evidence, genetic identification cannot be used. Genetic identification in the criminal procedure can be one of the proofs of the lawsuit. Regarding the principle of the freedom to provide reasons in the criminal procedure, it is theoretically the parties to the case are free to provide reasons for their genetic condemnation or acquittal. If we know the burden of proving the cause is in the direction of the defendant's conviction. In this regard, the prosecutor is trying to prove his criminal offense with the trace he left behind on the scene of the crime. The French Criminal Procedure Code allows the prosecutor to go to the prosecutor immediately and also the Genetic Experts to interpret the genetic rejection that has been obtained by the judicial police. In the case of an evident crime, the judiciary may, individually or on behalf of another person, take on tissue samples for testing the marks obtained at the crime scene, in light of the necessity of preliminary investigations. Texture removal from any person suspected of being present at the crime scene or from any person who has an effective and strong cause to intervene in the scene of the crime or who is involved in it or who intends to begin to perform it. How genetic tracing is based on a comparative and probabilistic method,

because, as it was said, it is based on the comparison of two genetic features (one trace that the offender left behind and another sample taken from the defendant) if these two are the same, there is only a very low probability that the identification does not correspond to reality.

"Due to the evolution of criminal justice systems in the context of the system of reasons, today the system of spiritual reasons based on proof of crimes through the persuasion of the unconditional conscience of science, certainty, and restraint of the judge's soul has been accepted by the scholars of justice. This system of judges can benefit from all the instruments and legal grounds prescribed by law, to obtain its conscientiousness, and the judge will have the freedom to assess the evidence in the case, as well as determine the credibility and methods of obtaining them. Thus, all evidence " to prove the accuracy or otherwise of the charge in the case of technology is, if the judge is inconsistent with the moral content of the law is null and void and so is not a matter of doctrine.

In the system of spiritual reasons, the material reasons or objective evidence that has been made by the police by the works left at the crime scene, such as blood, fingerprints, sperm, hair, saliva, skin, etc., is of particular value because such reasons are often somehow caused by the judge's innocence or the immortality of the soul in proving or removing the charges from individuals. In many cases, after collecting physical evidence, the confession of a defendant under unfavorable conditions or false indoctrination or motivated by the emotional criminal investigation is taken, interpreted as invalid, and then the actual perpetrator in the face of physical evidence and assurance to the real description of the crime and the confession to committing the crime.

#### **5. Judicial Assessment Based on Laboratory Data Compared With Other Evidence**

In the era of information and communication technology, laboratory data is considered one of the most important examples of evidence of a crime. In the light of the advancement of science in recent years, new horizons of scientific and empirical discovery of crimes have been opened. This article seeks to answer this dubious argument that due to the scientific nature and despite the smallest error of the results of the forensic examinations as well as the obligation to refer to

experts and compliance with expert opinions in technical and technical matters, why in practice the judges are respected there is no legal requirement for experts and doctors of this legal device?

Given the importance of the issue and the elimination of this doubt, the present paper seeks to explain the value of judicial decisions based on laboratory data, in comparison with other evidence. Methodology: This analytic descriptive statement, the relatively comprehensive investigation of forensic experiments is inaccurate. Findings: The findings of this article are that, although in the afterthought, laboratory data as a shred of new scientific evidence in the judiciary is regarded as very important and serious, the lack of commitment of judges to practice according to these views indicates their influence on the principles and rules of jurisprudence and the validity of the judge's knowledge in crimes. Therefore, to curtail the system of forensic medicine and the judiciary, it is necessary to adopt the necessary rules for determining the value of the judge's judgment based on these tests, based on scientific principles and standards, that is, the principle of the authority of the forensic opinion as an expert certified and credible, unless otherwise judged by experts.

From the view of forensic medicine, judges are respected in their expert and scientific opinions on the system of legal and voluntary forensic medicine (which the law allows them to do), and the lack of a solid legal certainty on this issue has caused a lot of doubts to the forensic medicine, including why, firstly, compliance with expert opinions in specialized matters is required by rational tradition; secondly, only if the outcome of the forensic medicine is clear in the circumstances the case does not conform, the court has the right to refuse the expert opinion (Article 265 of the law The criminal procedure); Thirdly, the expert's opinion is necessarily rejected only by the opinion of the expert and more and more, the judges cannot accept their expert opinion, regardless of forensic medicine, why despite thorough medical tests with the lowest error rate, the judiciary is considered to be an important tool in resolving the rights of the parties to the dispute. The judiciary, based on the views of the forensic experts, is one of the essential requirements of the judicial system, and respects the judiciary in the detection of crime, in particular, criminal investigations are

compliant and there is no legal requirement in this regard? Can I find a compelling answer to this unwillingness by judges in jurisprudence and Sharia law? In the category of evaluating the judiciary based on laboratory data, there are no published books and works, and there are only writings and articles from lawyers and physicians on this issue.

## **6. The Place of Using the Genetic Identification Technique in Iran**

**Head of Iran's Genetic Identity: Identifying offenders from genetic DNA / genetic information of criminals stored in Gene Bank.**

The history of genetic fingerprinting in the world and the use of this technique in the accurate identification of criminals led to the order to establish a genetic identity bank in Iran in 1388. The history of genetic fingerprinting dates back to about a quarter of a century ago. When in 1985 Elie Jeffrey began to design DNA through DNA, and in 1986 he used this method to remove the charge from a suspect accused of rape in England.

By establishing the first genetic database in Britain in 1995, a revolution in the process of crime detection and recognition of offenders and ultimately crime prevention took place in the country.

By the end of 2008, more than 5 million genetic profiles were registered at the bank. In the years 2008-2009, there were a total of 17,643 similarities between crime scene information and the genetic database of the UK.

Considering the important point, according to some studies, that more than 60% of violent offenders released from prison were released in the next three years after being released again for similar crimes, the role of the genetic identity bank in identifying those criminals Using evidence in the scene of the crime is more than ever before. According to research, the bank's formation in England has just reduced the number of crimes by 26 percent. The FBI launched the system in 1998 in eight US states. Many of the criminal cases that have long been the subject of European and American courts have come to the fore. Polls from criminals in the United States indicate that many, with knowledge of the launch of the Gene Bank, have refrained from repeating the crime.

In our country, since the year 1388, the need for having a genetic database in Iran was felt and the

head of the judiciary ordered the creation of a genealogy database in light of the sensitivity of the matter and helped to resolve the cases quickly. Legal genetic laboratories in Iran began their work in the 1970s. In Iran, firstly, the forensic laboratories in Tehran, Mashhad, and Isfahan began their activities.

Laboratories naturally respond to queries from a judicial authority that needs genetic testing.

In general, information from genetic tests is stored electronically in laboratories. By establishing a database of genetic identity data, the information obtained from the criminals, the scene of dead bodies, and the missing bodies of unknown identity, in addition to the laboratories, are adapted as a country in the bank's system of comparison.

Part of the genetic information is related to the unknown bodies of identity, which after the experiments can be used to identify their genetic profile with the list of missing relatives and the identity of the corpse.

Since the year 1388, it was decided that the genetic information obtained in various laboratories should be centrally located in a place to be accessible throughout the country.

Thus, if a crime occurs in one part of the country and the offender is arrested at another location, it is easy to reconcile the information and prove his conviction. This case was seen in the fifth law of the country's development, and the judiciary was obliged to provide the identity of the genetic identity of individuals.

The judiciary gave this responsibility to the legal medicine organization to compile this database in cooperation with law enforcement and the Attorney General's Office.

In the instructions for the creation of the Iranian Genetic Database, which was announced by the head of the judiciary in February 2013, the cases of data registration are specified.

If we have information about all people in our database, is it better?

This is what the world of lawyers has been discussing with each other for years, and there is a controversy among them.

Iran is not the only country with a genetic database, apart from Iran, there are 60 other countries with this bank and these issues are discussed.

The dominant legal thinking in the world is that we cannot collect the genetic information of individuals unless the offender is a party or the law has issued such a license. On the one hand, genetic testing is costly and requires the training of experienced personnel, complex laboratory equipment, and sensitized chemicals. Now the priorities for getting genetic information include:

A. Defendants, criminals, and convicts.

B. Samples obtained from the scene of the crime, victims of criminal events, and arrests of human remains.

C. Irrelevant corpses that cannot be detected in other ways.

D. Dependent Relatives in Identifying.

E. Experts or samplers working in the transfer or testing of biological samples for identification.

Why the staff?

For if they mistakenly reported their DNA in the trial, it can be detected.

The sample of defendants has now begun?

Currently, the board is reviewing various offenses to determine the priorities for registering information in the bank system.

According to Note 8 of the Gene Bank's Guidelines, determining the priority for receiving genetic information is the responsibility of the board of directors. What is the status of the genetic bank now?

Due to the cruel sanctions against the Islamic Republic, we could not use foreign software, so we decided to make software inside the country. Transmission of information from different units is done through a software network that needs to be high security. At the moment, the preparation of this software runs the final stages, which will be installed after the confident operation on the Gene Bank system.

How does this software work?

Gene Bank software, in addition to storing information, simultaneously compares genetic identifiers and reports genetic similarities.

Where are the samples taken since the year 1388 now?

The genetic information obtained in laboratories is currently stored in genetic labs until the integrated software system begins to function.

What is the genetic information of individuals?

In general, two types of information are stored in the bank system, which includes the person's profile or crime scene and genetic identifiers. The genetic identifiers of the 16 regions of the DNA

## Conclusions

molecule, which vary in size from one person to another, are identified in terms of identification.

How many genetic laboratories are active in the country right now?

The forensic organization has 9 laboratories nationwide located in nine provinces of the country. There is also a police lab in Tehran. Private laboratories are also active, but they do not interfere in judicial cases, given the importance of the issue.

What is the number of referrals to which genetic labs are more and which are less?

Due to a large number of Tehran and the volume of judicial cases, the number of visits to Tehran is higher than other laboratories and there are fewer recruiting laboratories.

Who are the board members of the genetic database?

1. Head of the National Forensic Medicine Organization (Chairman of the Board)
2. Attorney General or his authorized representative
3. Commander of the Police Force or his authorized representative
4. The head of the Judiciary Information Security Center or his authorized representative
5. Head of the Prisons and Provisional Education and Training Center of the whole country or his representative
6. Deputy Medical and Laboratory of Forensic Medicine Organization
7. Educational and Research Officer of the National Forensic Medicine Organization
8. Three related science professionals
9. Gene Bank (Secretary of the Board)
10. One person high ranking judge with the announcement of the head of the judiciary

Given that we have jails and detention centers in almost all cities and that according to the law, we should be guilty of genetic testing; do we not need to increase the number of our laboratories?

Yes, it is needed and we hope that this work will be done. By the year 88, the number of laboratories was 3; from this year until the end of 92 this number reached 9. If credits still allow us, we should increase the number of laboratories according to the huge project of the Gene Bank.

How much is it necessary to identify the traces of the crime scene and human remains left by the killer so we can identify the killer?

If the previous information is registered in the bank system, the comparison of the new

information with the previous reserves is immediate and does not take much time.

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The author declares that they have no conflicts of interest.

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