



DNA Evidence And Its Role In Criminal Investigation

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Abstract

The criminal justice system now faces added difficulties because of changes in societal socioeconomic norms and scientific and technological advancements. The rate of crime has increased along with societal and technological advances. Due to its ability to produce scientific evidence that is beyond a reasonable question, forensics plays a vital role in both criminal and civil investigations and judicial proceedings. The discovery of DNA has created new opportunities, and the development of DNA technology and its application in legal proceedings has aided in the settlement of both civil and criminal cases. 1989 saw the introduction of DNA technology in India during a paternity issue. Nonetheless, it has long been acknowledged that laws and regulations are required to provide justification for the use of DNA profiling for forensic investigations in India. The DNA Technology (Use and Application) Bill 2019 was presented to the Indian parliament in July of 2019.

Keywords

DNA profiling, advantage and disadvantage, evidence value.

INTRODUCTION

The lengthy molecule known as deoxyribonucleic acid (DNA) is present in the cellular nuclei of living things. Scientists have known since 1954 that information about a person's inherited traits can be decoded from the chemical structure of their DNA. Although some research indicates that in the future, investigators may be able to distinguish specific physical traits like hair, eye, and skin colour from forensic samples, direct DNA analysis will only yield limited information about an individual's characteristics due to the limitations of current genetic science.

Over the course of about 16 years, a number of creative ideas and astute technological applications have helped DNA profiling develop into the most potent scientific tool at the crime investigator's disposal since the use of fingerprints for personal identification at the turn of the 20th century. It is common to anticipate that DNA profiling evidence will be essential in apprehending the offender when a significant crime makes national news.

DNA profiling has become something of a template for how new methods ought to be applied in the forensic field. While there are many technical components to validation, in this paper we focus on the fundamental inferential problems. Some of these need the study of population genetics models, while others are statistical in nature. The most intriguing, in our opinion, have to do with the basic issues of how scientific evidence ought to be arranged in relation to the legal proceedings in order to give juries or courts fair and impartial instructions.

LITERATURE REVIEW

With its high reliability derived from each person's unique genetic profile, DNA evidence in criminal investigations highlights the significant role of DNA analysis in identifying suspects, clearing wrongfully accused individuals, and providing strong evidence in criminal cases. However, concerns remain regarding proper collection, interpretation, and potential biases in DNA database usage, particularly with regard to minority populations.

DISCUSSION

DNA can be used to identify possible criminals and link specific people to a crime by proving they were present at a particular site. The effectiveness of the criminal justice system is further enhanced by DNA profiling. Reports from witnesses are not reliable, particularly in situations where there is a lot of pressure, like while a crime is being committed. According to researchers in the paper "The Neuroscience of Memory: Implications for the Courtroom," memory disorders might cast doubt on eyewitness testimony. Contrarily, DNA is more difficult to refute because it is supported by science.

By demonstrating a person's presence at a given location, DNA can be used to link specific individuals to a crime and identify potential offenders. DNA profiling contributes to the criminal justice system's increased efficacy. Witness accounts are not always trustworthy, especially when there is a lot of pressure present, such as during the commission of a crime. In their work "The Neuroscience of Memory: Implications for the Courtroom," researchers speculated that memory problems could potentially undermine the credibility of eyewitness accounts. On the other hand, DNA is harder to disprove because it is backed by scientific evidence.

As long as the accused's specimen's DNA matches the evidentiary sample, the accused can still be considered a potential source of the specimen. One can assume that another individual has the same DNA profile because only a portion of STR markers is analysed. A profile that can be linked to a small number of individuals within a community if the genes in the DNA sample are unusual increases the likelihood that the suspect is the source of the evidence. Because of this, the significance of matching profiles needs to be evaluated based on accepted statistical concepts.

Law enforcement professionals should be aware of the limitations of DNA evidence despite all of its advantages and applications. Evidence containing DNA can be destroyed by environmental elements such as heat, sunshine, bacteria. The DNA of identical twins is the same. Compared to DNA from unrelated people, DNA from close relatives is more similar. It is not possible to ascertain when the suspect visited the crime scene using DNA. The potential for contamination, human error in collection and analysis, limitations in identifying the exact time of a crime scene presence, privacy concerns related to storing DNA profiles, the possibility of misinterpreting complex mixed DNA samples, and the potential for misuse of genetic information, particularly when dealing with familial searches or close relatives with similar DNA profiles. Because DNA evidence may be used to identify or rule out individuals, it is an extremely useful tool in criminal investigations. Compared to other forms of crime scene evidence, DNA evidence is thought to be more dependable. Here are some explanations for the high value of DNA evidence.

DNA Profiling in criminal investigations and Indian Justice System

Evidence makes it evident what kind of crime has been done, and forensic evidence establishes the crime's location as well as its circumstances—that is, when, who, where, and how it was committed. In essence, DNA profiling is the technological examination of material evidence that has been created, gathered, and examined from the site of the crime.

One of the primary components of a case study that deals with the formal or methodical analysis of evidence is the investigation. Evidence from the crime scene is gathered during an investigation, and it is subsequently studied and analysed in crime laboratories. The findings are then submitted in court (Forensic Science 2019). Every crime scene is Sui genesis (unique), and every case presents different difficulties. DNA profiling is crucial to the functioning of the Indian criminal justice system since it provides scientific validation for the identification of the guilty and the exoneration of the innocent by analysing physical evidence such as fingerprints, blood, hair, stain, and sperm.

Either directly or via the medical officer, the investigating officer finds and gathers the evidence. He sometimes enlists the assistance of a forensic scientist. But it is ultimately his obligation to analyse the evidence.

CONCLUSION

This analysis makes it clear that DNA evidence is rarely important during a trial. Prior to the trial, in the early phases of an inquiry, DNA profiling is mostly valuable. It is an effective investigative strategy for eliminating persons who are highly suspected of having committed a crime. It can offer extremely convincing proof of involvement, which is frequently sufficient to persuade the defendant to enter a guilty plea or to proceed with the prosecution based just on consent. To obtain definitive proof, samples from the crime scene—such as hair, bloodstains from clothing, sperm, fingerprints, footprints, etc.—are collected and compared with the suspects. Despite it being urgently needed, governments are not taking it seriously: DNA technology ensures that results are conclusive and aids in criminal investigations. The issue with DNA analysis is not only that it can provide information about a person's appearance, genetic relationships, or eye or skin colour, but it can also be abused to reveal personal information about a person. For this reason, greater caution must be used when gathering, evaluating, and preserving each person's genetic information.

References

- KHAN, A. A. (Director). (2020). FORENSIC [Motion Picture].
- PATEL, D. N. (2013). THE ROLE OF DNA IN CRIMINAL INVESTIGATION. MADHYA PRADESH: ISSN.
- SALLAVACI, O. (2014). THE IMPACT OF SCIENTIFIC EVIDENCE ON THE CRIMINAL TRIAL. LONDON: ROUTLEDGE.
- URBAS, J. G. (2002). DNA IDENTIFICATION IN THE CRIMINAL JUSTICE SYSTEM. AUSTRALIA: AUSTRALIAN INSTITUTE OF CRIMINOLOGY .

