

## Role of DNA Technology in the Administration of Criminal Justice System

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### Abstract

DNA technology (also called DNA profiling or forensic genetics) is a technique employed by forensic scientists to assist in the identification of individuals or samples based on their respective DNA profiles. Although more than 99.1% of the genome is the same throughout the human population, the remaining 0.9% of human DNA shows variations between individuals. These variable DNA sequences, termed polymorphic markers, can be used to both differentiate and correlate individuals. This paper will examine the science of DNA identification, which deals with the source of a sample to trace the actual culprit. It also deals specifically with the relevancy and admissibility of DNA evidence in criminal cases with the help of landmark judgments. This paper further deals with how DNA technology will work as stakeholders to help in the administration of the criminal justice system. Finally, this paper suggests that use of DNA fingerprinting testing to identify the accused and acquittal of decent in criminal cases is very significant and need of the hour for the speedy disposal of criminal cases.

**Key Words:** - *Criminal Justice, DNA Identification, Admissibility, Criminal Justice etc.,*

### Introduction

The advancement of technology has made it possible to investigate the similarities and differences among humans in a variety of ways, using both molecular identification and macro-observation. This similarity and uniqueness have advantages for scientific and legal applications across the different forensic science domains. With the advancement of science and technology, DNA testing has become a standardized procedure in the legal system. DNA's strong development and evolution provide evidence for its academic trustworthiness. Since DNA is regarded as "The Gold Standard" of identification, it is highly valued when discussing evidence in court. DNA is not always entirely accurate, despite its success in establishing a standard that is widely accepted in courtrooms and enhancing scientific validity. Due to its high value and clarity DNA has been placed on a pedestal and is not often questioned.<sup>1</sup>

Alec Jeffreys, a geneticist at the University of Leicester in Britain, invented the first usable version of DNA fingerprinting in 1984.<sup>2</sup> Few years later, a chemical company, Imperial Chemical Industries (ICI), launched the first kit commercially available. Although it is a relatively new

<sup>1</sup> Poonam Patel, Leen Zuhour and Amber McDermott, "Chapter 2 Introduction to DNA in the Criminal Justice System."

<sup>2</sup> Sergio D. Pena, *DNA Fingerprinting: State of the Science* (Springer Science & Business Media, 1993).

discipline, it had a great impact on the criminal justice system and society in all over the world.<sup>3</sup> The application of forensic genetics to the legal arena is aimed to resolve legal problems, such as paternity tests and inheritance matters, to establish identity in criminal cases where biological evidence is found at crime scenes, and to identify victims of mass disasters and missing persons from human remains.<sup>4</sup>

Deoxyribonucleic acid, or DNA, is the fundamental building block for an individual's entire genetic makeup. DNA is a powerful tool for law enforcement investigations because each person's DNA is different from that of every other individual (except for identical twins). By analyzing selected DNA sequences (called loci), a crime laboratory can develop a profile to be used in identifying a suspect. DNA can be extracted from many sources, such as hair, bone, teeth, saliva, and blood. Because there is DNA in most cells in the human body, even a minuscule amount of bodily fluid or tissue can yield useful information. Obtaining a DNA sample is not complicated; it can be as simple as a swab of the inside of the mouth to obtain cheek cells and white blood cells in saliva. State and federal DNA databases have proved instrumental in solving crimes, reducing the risk of wrongful convictions, and establishing the innocence of those who were wrongly convicted. DNA evidence is used to solve crimes in two ways:

1. If a suspect is known, a sample of that person's DNA can be compared to biological evidence found at a crime scene. The results of this comparison may then help establish whether the suspect was at the crime scene or whether he or she committed the crime.
2. If a suspect is not known, biological evidence from the crime scene can be analyzed and compared to offender profiles in existing DNA databases to assist in identifying a suspect. Through the use of DNA databases, biological evidence found at one crime scene can also be connected to other crime scenes, linking them to the same perpetrator or perpetrators.

This report provides an overview of how DNA is used to investigate crimes and exonerate innocent people of crimes they did not commit.<sup>5</sup>

### **The Science of DNA Identification**

Each person has a unique set of fingerprints. As with a person's fingerprint, no two individuals share the same genetic makeup. This genetic makeup, which is the hereditary blueprint imparted to us by our parents, is stored in the chemical deoxyribonucleic acid (DNA), the basic molecule of life. Examination of DNA from individuals other than identical twins has shown that variations exist and that a specific DNA pattern or profile could be associated with an individual. DNA is the biological material which contains all the genetic information within living organisms, including

<sup>3</sup> G. Dolf, *DNA Fingerprinting: Approaches and Applications* (Birkhäuser, 2013).

<sup>4</sup> Giardina, in *Brenner's Encyclopedia of Genetics* (2d ed., 2013).

human beings.<sup>6</sup> The ability of a cell of human body to replicate itself is due to the presence of the DNA "blueprint" in the chromosomes within the nucleus of each cell. Each human cell contains 23 pairs of chromosomes within its nucleus. One half of each pair of chromosomes is provided by each parent at the time of conception. Although most of the information stored in human DNA includes general information common to all humans, some of the information is unique to a particular individual.<sup>7</sup> Only identical twins have identical DNA. The DNA information unique to a particular individual is stored in genes known as polymorphic genes and their location on a DNA molecule is called a polymorphic site or locus. By isolating and identifying certain segments of the DNA molecule contained in human tissue samples {e.g. blood, skin, hair follicles or semen stains), it is possible to identify the individual who is the source of the DNA.<sup>8</sup> Like fingerprints, DNA evidence can be useful in criminal investigations and prosecutions. At the crime scene, DNA is found in blood, semen, skin cells, tissue, organs, muscle, brain cells, bone, teeth, hair, saliva, mucus, perspiration, fingernails, urine, faces, etc. From so many sources, the chance of finding traces of the perpetrator's DNA at a crime scene is very likely. Using modern techniques, every type of bodily fluid or tissue can potentially yield DNA for testing. Fortunately, that means, many criminals probably left enough evidence to link him/her to the crime scene.<sup>9</sup>

In today's age, hundreds of forensic laboratories in both the public and private sectors, alongside paternity as well as paternity testing laboratories utilize hundreds of thousands of DNA tests in North America alone. Computer databases with DNA profiles compiled from convicted offenders, biological samples swabbed from crime scenes, and individuals arrested for a crime, have tremendously aided law enforcement to solve crimes and assign sanctions to offenders for the specific crimes committed.<sup>10</sup>

Furthermore, forensic DNA testing has done more than just punishing the guilty for the crimes they have committed. The piece of evidence has also exonerated the innocents from crimes they did not commit. Wrongfully convicted prisoners from the result of other types of evidence or faulty witnesses were found guilty before the implementation of DNA typing methods.

Nevertheless, through the power of post-conviction DNA testing from specimens that were preserved for many years, more than 200 of these individuals that included death row inmates were exonerated. Through the successes of utilizing DNA as evidence in court to prosecute the guilty and exonerate the innocent for decades, DNA is repeatedly sought by judges, attorneys, and detectives as primary evidence from a crime scene.<sup>11</sup>

### **Admissibility of DNA Evidence in Criminal Cases in India**

<sup>6</sup> Anthony Mark Cutter, "To clear or to convict? The Role of Genomics in Criminal Justice," 2 *Genomics, Society and Policy* 1–15 (2006).

<sup>7</sup> Jeremy Gans, "DNA identification in the criminal justice system."

<sup>8</sup> Barbara Ann Hocking et al., "DNA, Human Rights and the Criminal Justice System" *Australian Journal of Human Rights* (1997).

<sup>10</sup> Natalie Ram, "Innovating Criminal Justice," 112 *Northwestern University Law Review* 659–724 (2017).

<sup>11</sup> Butler, J.M., 2009. Fundamentals of forensic DNA typing. Academic press.

Lawyers' and other professionals' demand for expert evidence by scientists has increased since the 1980's, reflecting growing recognition that scientists 'have a unique contribution to make to judicial proceedings.'<sup>12</sup> The terrain traversed is dotted with very significant developments in the courts' treatment of expert testimony by scientists in a broader range of areas. Without abandoning the old 'common knowledge and experience rule', the courts in England have opened the door to the scientific expert witnesses.<sup>13</sup> Careful examination of the relevant case law in Australia, Canada and India shows that in a number of recent cases, the courts in these countries have followed a more liberal approach to the interpretation of the common knowledge rule.<sup>14</sup>

The Constitution of India, by article 51A (h) and (j), commands that it shall be the fundamental duty of every citizen of India "to develop the scientific temper, humanism and the spirit of enquiry and reform" and "to strive towards excellence in all spheres of individual and collective activity so that the nation constantly rises to higher levels of endeavor and achievements".<sup>15</sup> Though there is no specific DNA legislation enacted in India, sections 53 and 54 of the Code of Criminal Procedure, 1973 (CrPC) provide for DNA tests implied and they are extensively used in determining complex criminal cases. Section 53 deals with examination of the accused by medical practitioner at the request of police officer if there are reasonable grounds to believe that an examination of his person will afford evidence as to the commission of the offence. Section 54 of the Cr PC further provides for the examination of the arrested person by the registered medical practitioner at the request of the arrested person.<sup>16</sup>

By the Amendment Act of 2005, the Cr PC was amended inter alia to add new section 53-A which mandates the examination of a person accused of rape by a medical practitioner. By this amendment, new explanation includes within its ambit examination of blood, blood stains, semen, sputum, swabs, sweat, hair samples and finger nails by the use of modern techniques in the case of sexual offences including DNA profiling and such other tests which is necessary in a particular case. Though section 53-A refers only to examination of the accused by medical practitioner at the request of the police officer, the court has wider power for the purpose of doing justice in criminal cases, by issuing direction to the police officer to collect blood samples from the accused and conduct DNA test for the purpose of further investigation under sections 173(8) and 293(4)(e) of the Cr PC.<sup>17</sup>

<sup>12</sup> Dr Kusum Chauhan, "Admissibility and Evidentiary Value of Scientific Evidence: Legislative and Judicial Approach in India," 8 (2023).

<sup>13</sup> J.K. Joseph, *My Fundamental Duties under the Constitution of India*.

<sup>14</sup> Ian Richard Freckelton and Hugh Selby, *Expert Evidence: Law, Practice, Procedure and Advocacy* (Thomson Reuters, 2009).

<sup>15</sup> "Justiciability of fundamental duties – Philosophical Foundations of Human Rights; Duties and Responsibilities," available at: <https://ebooks.inflibnet.ac.in/hrdp01/chapter/justiciability-of-fundamental-duties/> (last visited May 20, 2024).

<sup>16</sup> Julie A. Singer, Monica K. Miller and Meera Adya, "The Impact of DNA and Other Technology on the Criminal Justice System: Improvements and Complications," 17 *Albany Law Journal of Science & Technology* 87–126 (2007).

<sup>17</sup> David Lazer, *DNA and the Criminal Justice System: The Technology of Justice* (MIT Press, 2004).

Apart from these provisions, section 45 of the Indian Evidence Act, 1872 is more important so far as the admissibility of DNA evidence is concerned. Section 45 deals with the opinion of the expert. It states: "When the Court has to form an opinion upon a point of foreign law, or science or art, or as to identity of handwriting (or finger impressions), the opinion upon that point of persons especially skilled in such foreign law, science or art (or in question as to the identity of handwriting or finger impressions) are relevant facts." Section 293 of the Cr PC deals with reports of certain government scientific experts. Section 293(2) provides that the court may, if it thinks fit, summon and examine any such expert as to the subject-matter of his report.<sup>18</sup>

### Some Landmark Judgments

Several convictions have occurred in India where the scientific evidence (DNA) has been accepted under section 45 of the Indian Evidence Act. DNA testing has become an established part of criminal justice procedure and the admissibility of test results in court has become routine. India has adopted an adversarial system of justice administration and ordinarily medical evidence is admitted only when the expert gives oral evidence under oath in the courts of law except under special circumstances.<sup>19</sup> The Supreme Court-

*In Madan Gopal Kakkad v. Naval Dubey*<sup>20</sup> held that a medical witness called in as an expert and the evidence given by the medical officer is really an advisory character based on the symptoms found on examination. The expert witness is expected to put before the court all materials inclusive of the data which induced him to come to the conclusion and enlighten the court on the technical aspects of the case by explaining the terms of science so that the court although not an expert, may form its own judgment on those materials after giving due regard to the expert's opinion because once the expert's opinion is accepted it is not the opinion of the medical officer but that of the court.

*In Patangi Balarama Venkata Ganesh v. State of A. P.*<sup>21</sup> the Andhra Pradesh High Court held that the opinion of DNA expert is admissible in evidence as it is a perfect science. In this case, the DNA expert had deposed as under: "If the DNA fingerprint of a person matches with that of a sample, it means that the sample has come from that person only. The probability of two persons except identical twins having the same DNA fingerprint is around 1 in 30 billion world population." It means that DNA test gives the perfect identity. It is a very advanced science, the court observed.

*In Goutam Kundu v. State of West Bengal.*<sup>22</sup> the Supreme Court expressed the most reluctant attitude in the application of DNA evidence in resolving the paternity dispute arising out of maintenance proceeding. In this case, the father disputed the paternity and demanded blood

<sup>18</sup> ibid

<sup>19</sup> Nandini Sundar, "The rule of law and citizenship in central India: post-colonial dilemmas," 15 *Citizenship Studies* 419-32 (2011).

<sup>20</sup> (1992) 3 SCC 204 at 221-22.

<sup>21</sup> 2003 Cri LJ 4508.

<sup>22</sup> (1993) 3 SCC 418 at 428.

grouping test to determine parentage for the purpose of deciding whether a child is entitled to get maintenance under section 125 of the Cr PC from him. In this context, the Supreme Court held that: Where the purpose of the application was nothing more than to avoid payment of maintenance, without making out any ground whatever to have recourse to the test, the application for blood test couldn't be accepted. It was also held that no person be compelled to give sample of blood for analysis against his/her will and no adverse inference can be drawn against him/her for such refusal.

*In Thogorani Alias K. Damajanti v. State of Orissa*,<sup>23</sup> the Orissa High Court noted that the only restriction for issuing a direction to collect the blood sample of the accused for conducting DNA test would be that before passing such a direction, the court should balance the public interest vis-à-vis the rights under articles 20(3) and 21 of the Constitution of India in obtaining evidence tending to confirm or disprove that the accused committed the offence concerned. In balancing this interest, consideration of the following matters would be relevant:<sup>24</sup>

1. the extent to which the accused may have participated in the commission of the crime;
2. the gravity of the offence and the circumstances in which it is committed;
3. age, physical and mental health of the accused to the extent they are known;
4. whether there is less intrusive and practical way of collecting evidence tending to confirm or disprove the involvement of the accused in the crime;
5. the reason, if any, for the accused for refusing consent.

*In Sadashiv Mallikajun Kheradkar v. Smt. Nandini Sadashiv Kheradkar*,<sup>25</sup> The Bombay High Court held that the court has power to direct blood examination but it should not be done as a matter of course or to have a roving inquiry. The Bombay High Court even felt that there should be a suitable amendment by the legislature and after noting that nobody can be compelled to give blood sample, it was held that the court can give a direction but cannot compel giving blood sample. *In Raghuvir Desai v. State*, the Bombay High Court noted that "DNA testing is clinching piece of evidence - DNA testing can make a virtually positive identification when two samples match. It exonerates innocent and helps to convict the guilty."

*In Nandlal Wasudeo Badwaik v. Lata Badwaik*<sup>26</sup> Background- The petitioner filed a maintenance petition claiming maintenance for herself and her daughter. Her husband disputed the paternity of child and requested for DNA test. Observation- The Apex Court held that the DNA test is an accurate test. Section 112 of the Evidence Act was enacted at a time when the modern scientific advancement and DNA test were not even in contemplation of Legislature. When there is a conflict between a conclusive proof envisaged under law and a proof based on scientific advancement

<sup>23</sup> 2004 Cri LJ 4003.

<sup>24</sup> Singh, S.C., 2011. DNA profiling and the forensic use of DNA evidence in criminal proceedings. Journal of the Indian Law Institute, pp.195-226.

<sup>25</sup> 1995 Cri LJ 4090.

<sup>26</sup> (2014) 2 SCC 576.

accepted by the world community to be correct, the latter must prevail over the former. The husband's plea that he had no access to the wife when the child was begotten stands proved by the DNA test report and in the face of it, we cannot compel the appellant to bear the fatherhood of a child, when the scientific reports prove to the contrary. We are conscious that an innocent child may not be bastardized as the marriage between her mother and father was subsisting at the time of her birth, but in view of the DNA test reports and what we have observed above, we cannot forestall the consequence. It is denying the truth. Truth must triumph is the hallmark of justice.

*In Dipanwita Roy v. Ronobroto Roy*<sup>27</sup> Background-- In the present case, the husband has sought divorce from his wife due to alleged infidelity by her thereby making an application for DNA test to prove the paternity of the child. Observation-Supreme Court explained the importance of DNA test by stating that DNA testing is the most legitimate and scientifically perfect means, which the husband could use, to establish his assertion of infidelity. DNA test should also simultaneously be taken as the most authentic, rightful and correct means also with the wife, for her to rebut the assertions made by the husband. It was further held- the presumption of legitimacy as given under Section 112 of the Evidence Act, 1872 will not be disturbed and that if the direction to hold such a test can be avoided, it should be so avoided as the legitimacy of the child should not be put to peril. It was further observed that the wife shall be given the liberty to comply with or disregard the order of DNA test and in case, she declines to undergo the said test, the Court shall draw presumption as per Illustration (h) of Section 114 of the Evidence Act, 1872.

*In Raj Kumar v. State of U P*<sup>28</sup> Background-The present case relates to the rape and murder of young girl by her neighbor. The crime was witnessed by the younger brother. As per the post-mortem report, rape had been committed upon the deceased. The DNA report also confirmed the same and Supreme Court discussed about the importance of DNA. Observation—The Supreme Court observed that the DNA report played an important role to reveal the identity of the accused involving in the rape of a minor girl and affirmed the finding of facts recorded by the court below.

*In Anil Alias Anthony Arikswawy Joseph v. State of Maharashtra*<sup>29</sup> Background-The case is concerned with a gruesome murder of a minor boy aged 10 years. The blood sample of the accused, samples collected from the deceased during post-mortem and the clothes of the accused which contains semen stains were sent to Forensic Science Laboratory, Mumbai for DNA analysis. The DNA report matched. The Supreme Court discussed the importance of DNA analysis. Observation-- The Supreme Court before pronouncing its judgment analyzed the DNA report. In this case, the unnatural offence which was committed by the accused against the child had clearly been established by DNA evidence and medical evidence

*In Sandeep vs State of UP*<sup>30</sup> Background-In this case, the accused forced the girl to abort the fetus but she disagreed, thus, murdered. The fetus recovered from the deceased womb was sent for DNA

<sup>27</sup> (2015) 1 SCC 365.

<sup>28</sup> (2014) 5 SCC353.

<sup>29</sup> (2014) 4 SCC 69.

<sup>30</sup> (2012) 6 SCC 107.

analysis. The DNA analysis confirmed that the accused is the biological father. The Supreme Court discussed about the importance of DNA test. Observation- The Supreme Court relied upon the report of the DNA in having concluded that accused was the biological father of the recovered fetus. Here the DNA evidence plays an important role along with other evidences. Especially, it has been used to prove the motive for making such crime.

*In Goutham Kundu vs State of West Bengal*<sup>31</sup> Background - The father disputed paternity of child. the Supreme Court discussed the point of evidentiary value of blood group test in the case at hand and held the observation as under: Observation- Where the purpose of the maintenance application was nothing more than to avoid payment of maintenance without making out any ground whatever to have recourse to the test, the application for blood test could not be accepted. The Supreme Court further held-

- Courts in India cannot order blood test as a matter of course.
- Whenever applications are made for such prayers in order to have roving inquiry the prayer for blood test cannot be entertained.
- There must be a strong prima facie case in that the husband must establish non access in order to dispel the presumption arising under Section 112 of the Indian Evidence Act, 1872.
- The Court must carefully examine as to what would be the consequence of ordering the blood test. Whether it will have the effect of branding a child as a bastard and the mother as an unchaste woman.
- No one can be compelled to give sample of blood for analysis Blood group test-
- Evidentiary value of-When can be ordered- courts must examine consequence of ordering blood group test. Blood group test is a useful test to determine the question of disputed paternity.
- It can be relied upon by courts as circumstantial evidence which ultimately excludes a certain individual as a father of the child.

*In Sharda v. Dharampal*<sup>32</sup> Background---The Supreme Court dealt with the core question of whether a party to a divorce proceeding can be compelled to a medical examination and blood test? Wherein the court observes that a matrimonial court has the power to order a person to undergo a medical test. Passing of such an order by the court would not be in violation of the right to personal liberty or the right to privacy under Art.21 of the Constitution. It is significant to note that though no person can be compelled to give a sample of blood against him for this refusal, in case of divorce proceeding before a matrimonial court, the court can order an individual to submit himself to medical examination and in case of refusal, can draw an adverse inference from his refusal.

<sup>31</sup> AIR 1993 SC 2295.

<sup>32</sup> AIR 2003 SC3450.



*In Narayandutt Tiwari vs Rohit Shekher*<sup>33</sup> Background - The question of paternity of respondent was in issue before the court as the respondent claimed the petitioner as his biological father which was disputed. Thus, DNA test was ordered. It was observed by court as-

- The Court observed that the DNA profiling is a modern scientific method which has been accepted in all jurisdictions for the purposes of conclusively identifying parents. Given the accuracy and value attached to DNA profiling, this test may either confirm an identity or shatter it.
- It was further observed that the medical examination of blood, semen, sputum, sweat, hair samples, and finger nails by the use of modern scientific techniques in binding DNA profiling may be directed.

*In State of Tamil Nadu v. Nalini*<sup>34</sup> Background--This is famously known as Rajiv Gandhi Assassination case. Rajiv Gandhi, who was a former Prime Minister of India, was killed by a suicide bomber. The prime culprit was killed herself and consequently, most material evidences were destroyed in the massive explosion. Moreover, dead bodies of the victim as well as of the assassin were dismembered beyond recognition. DNA tests helped in matching dismembered parts of the bodies of the victim and assailant. Decision-In this case DNA evidence was used as one of the circumstantial pieces of evidence to link the criminal with a crime as well as to identify the victim and accused.

*In Santosh Kumar Singh v. State through CBI*<sup>35</sup> Background- Priyadarshini a law student, found raped and murdered in her house. During investigation, the post- mortem got conducted and the samples were also sent for DNA analysis. The post-mortem report ruled out rape. But, the DNA test confirms the rape on victim. Observation--Supreme Court observed that the DNA evidence plays a prominent role to convict the real culprit among other circumstantial evidences. In a rape and murder case if rape has been proved through DNA technology, the prosecution can easily prove the murder charge against the accused beyond any reasonable doubt.

*In Mohd Amir Kasab v. State of Maharashtra*<sup>36</sup> Background- On 29.11.2008 terrorists attacked Mumbai and killed one hundred. Terrorist Mohammed Amir Kasab was arrested. The articles seized from the boat which they used to land to Mumbai. Accused and his 5 accomplices were linked through DNA Profiling. Observation- The Supreme Court observed that the DNA evidence played an important role for the identification and for the involvement of the accused in the incidence of waging war against the government of India. The DNA evidence played as one of the circumstantial pieces of evidence to prove the case.

*In Sushil Kumar vs State (N.C.T of Delhi)*<sup>37</sup> Background- In this case Sushil Sharma murdered his wife Naina by firing bullets and thereafter attempted to burn her body in a tandoor. Police

<sup>33</sup> (2012) 12 SCC 554.

<sup>34</sup> (1999) 5 SCC 253.

<sup>35</sup> (2010) 9 SCC 747.

<sup>36</sup> (2012) 9 SCC 1.

<sup>37</sup> (2014) 4 SCC 317.

recovered revolver and blood-stained clothes and sent them to forensic test. The blood sample of parents was taken. The DNA report confirmed that the charred body was of their daughter Naina Sahni. Observation- This case is based on circumstantial evidence alone. Here, the DNA evidence plays an important role in identifying the charred body of the deceased Naina Sahni. The Supreme Court discussed the importance of forensic expert's report.

*In Surendra Koli vs State of U.P.*<sup>38</sup> Background- Known as Nithari case solved with the help of Forensic science. The forensic experts had to examine hundreds of bones and skeletal remains besides going for psycho-analysis tests to reconstruct the gory. In addition to DNA matching, Forensic experts conducted detailed psychoanalysis of accused Koli to understand his Necrophiliac, Pedophilia, and Paraphelic tendencies. Observation--The Supreme Court held that the killings by the appellant Surendra Koli were horrifying and barbaric and thus fell within the category of rarest of rare case. The appeal was thus dismissed and death sentence awarded to Surendra Koli was upheld.

*In State of Gujrat vs Kishanbhai*<sup>39</sup> Background— In the instant case of rape and murder of 6 years old child, the trial court, High Court and Supreme Court had to give benefit of doubt to the accused due to serious lapses on the part of the investigation. Observation- Supreme Court made observations regarding use of scientific investigation tools as there has now been a great advancement in scientific investigation and held that scientific investigation would have unquestionably determined whether or not the accused was linked with the crime. Additionally, DNA profiling of the blood found on the knife used in the commission of the crime (which the accused-respondent, Kishanbhai had allegedly stolen from Dinesh Karshanbhai Thakore PW6), would have uncontrovertibly determined, whether or not the said knife had been used for severing the legs of the victim Gomi, to remove her anklets.

In spite of so much advancement in the field of forensic science, the investigating agency seriously erred in carrying out an effective investigation to genuinely determine the culpability of the accused Kishanbhai.

{Note-Fairness in investigation is precursor to fair trial. Scientific aids, especially forensic tools enhance transparency, fidelity and accuracy to brace fairness in administration of justice. The aim of investigation is ultimately to search for truth and to bring offenders before law}.

### Conclusion

Although DNA testing has accomplished a great deal in opening up new sources of forensic evidence, its full potential to identify perpetrators and exonerate people falsely convicted has yet to be realized. For this to be done, further advances are required in testing technology and in systems to collect and process the DNA evidence. The development of forensic DNA testing has expanded the types of useful biological evidence. In addition to semen and blood, such substances as saliva, teeth and bones can be the sources of DNA. These sources are expanding still further.

<sup>38</sup> (2011) 4 SCC 80.

<sup>39</sup> (2014) 5 SCC 108.

Lawyers are wary of DNA profiling for a number of reasons, some good and some not. DNA profiling is the most powerful break yet to appear with the English common law tradition of the right against self- incrimination. Lawyers do not like 'machine' evidence, where a scientific technology in effect dominates a verdict; they believe that DNA profiling is not a foolproof and flawless investigative and probative tool. In the hands of the skilled operator, it provides incisive results. In the hands of a fool, it provides rubbish. Its major strength is that the rubbish is obvious, it will not produce a false positive result from a sample (a false positive is the conviction of an innocent party). However, the process is still only as reliable as the sample it receives, so if there is a careless or fraudulent collection of samples from the crime scene or suspect, the result would be wrong, independent of the accuracy of the science. If the sample is degraded, the odds ratio will have less probative value. The process involves a very large number of small steps, each of which has to be done correctly. The major source of error is in mixing up transfers of material from one step to the next. In addition, there are problems over quality assurance, interpretation of the test, independent scrutiny, and rights of the defense to gain access to the evidence. All these difficulties should at least generate accepted methods and standards of testing and quality controls. In England and Wales, the Royal Commission on Criminal Justice considered these issues and suggested a number of measures to ensure that such evidence is carefully obtained, tested and presented and that the rights of defense are preserved.<sup>40</sup>

Despite many challenges, the technique is unique in the way that it is the power of DNA profiling to exclude the innocent that is its greatest value to society. It also shows a quantum jump in its ability to convict the guilty. Justice demands a full understanding of the technology by the courts and the general public. The technique is also valuable in the sense that it has become commercially valuable property as current patent challenges testify. A recent survey of forensic experts revealed widespread frustration with the lack of scientific knowledge by lawyers. The lawyers and judges are briefed before trial about complex scientific information that may assist them in understanding the DNA profile and its evidentiary value in the administration of criminal Justice.

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