DNA PROFILING AND HUMAN RIGHT: ISSUE AND CHALLENGES FOR APPLICATION IN ADMINISTRATION OF CRIMINAL JUSTICE

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ABSTRACT

The emerging sciences and technology have drastically changed human life in our society. The criminal justice administration now depends on scientific evidence in almost all modern judicial systems. DNA profiling is one of the most reliable and authentic tools of forensic science, which is being used for the identification of criminals, victim of offences and unidentified human bodies from natural and other disasters. It is like a two-edged sword against crime; it identifies the actual wrongdoer on one hand and prevents punishing the innocent on other hand as well. This paper focuses on the analysis of DNA technology, its use and admissibility and gives some suggestions for the effective implementation of the DNA technology, like; the state is required to have sufficient laws, along with forensic science experts, investigation wings, laboratories, DNA bank and an efficient, transparent, and accountable mechanism of collection, retention, and removal of DNA sample.

Keywords: *Human rights, DNA profiling, Criminal Investigation, Privacy of individuals, DNA data bank, forensic Science, Scientific Innovation.*

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I. Introduction

THE ENCYCLOPEDIA of Britannica defined the term DNA Profiling as a Method of isolation and identification of variable elements within the base-pair sequence of 'deoxyribonucleic acid'. In the modern criminal investigation system, the most crucial and supportive stream of knowledge is forensic science. It is the application of science in investigation be it criminal law or civil law. The Collection, preservation, and analysis of crime scene evidence collected during investigation is the main responsibility of forensic science and forensic scientists.[1] Toxicology as a new forensic term was first explained by Mathieu in about 1787, for criminal investigation. The Bresler Indicated that it was Brussels who took the first-ever photograph of a criminal during the Brussel war in about 1843. In France, it was Alphonse Bertillon, who was designated to process the documentation of criminals along with the photographs in the city of Paris he devised the very first technique of scientific identification by several body measurements of criminals.[2] Thereafter the technique of fingerprinting was invented at about 1900 A.D. the efforts by Alphonse Bertillon in the field of criminal investigation was so valuable because people called him the father of Criminal identification.[3] Sir William Herschel, a Civil Servant in India from the UK and Hennery Faulds are credited for the development of Early investigation during the end of 1900 AD.[4]

The definitive fingerprint study method was first developed by Francis Galton, who wrote a book titled "Fingerprints". This book is famous for its uniqueness in the method of identification of individuals, supported by statistical data proof. Till the end of the 19th Century, there was no method or technique to decipher the identity of bloodstains whether it is of human beings or animals. The classification of blood was first done by Dr Karl Landsteiner in subgroups e.g. A, B, AB, and O. Thereafter it came to know that groups of blood can be used to identify criminals.[5]

[1] Patricia E.J. Wiltshire, *Crime Scene to Court: The Essentials of Forensic Science*54 (Peter White (Ed): RSC Publishing, 3rdedn., 2010).
[2] M. Sharma and R. K. Singh, "Evolution of Criminal investigation with time and New Technology" *Research Journal of Forensic Science* (2015).
[3] *Ibid*.
[4] *Supra* note 2.
[5] R Saferstein, *Criminalistics: An introduction to forensic science*, (Person Education Ltd, New Jersey, 2007).

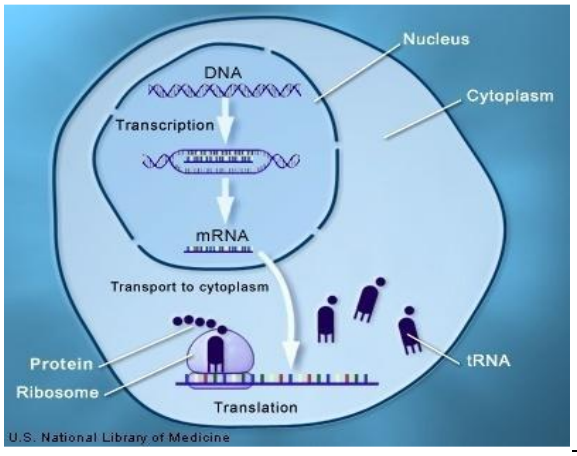
In the modern era of criminal justice administration, wherein scientific techniques and innovation is contributing immensely while detecting the actual wrongdoer, the judicial institution depends on the scientific evidence in almost all healthy judicial systems of the world. There are certain scientific techniques and methods which were developed to use the technique and method for extracting the truth and capturing the real criminal. These scientific techniques and methods are Narco-analysis, Brain Mapping and P300. These scientific techniques are being developed to obtain rationally trustworthy evidence for criminal investigation. DNA profiling is a kind of the most trustworthy scientific innovative technique used to gather scientifically reliable evidence to find the real culprit. Sir Alec Jeffery coined the term 'DNA fingerprinting' in the year 1984. When he was at the University of Leinster which is later known as DNA profiling DNA fingerprinting was developed by two different biotechnologists Karl Mullis from the U.S.A invented Polymer Chain Reaction (PCR).[6] Alien Jaffrey from the UK discovered the DNA fingerprinting. At the University of Lancaster, Further, in 1984 use of DNA fingerprinting was developed by Alec Jeffrey Jeffery to identify and distinguish an individual from another.[7]

II. Deoxyribose Nucleic Acid (DNA)

In The Encyclopaedia of Britannica, the term DNA Profiling is defined as a Method of isolation and identification of variable elements within the base-pair sequence of 'deoxyribonucleic acid' in common language, it is referred to as DNA, which represents the genetic material of living to be it animal or plant. DNA is known as the 'building block of inheritance'. As the body of a living being is made of numerable cells[8], each cell has a perfect set of chromosomes.[9] These chromosomes contain DNA molecules, protein, ribosome, and Golgi bodies as well.[10] The genetic information in DNA is stored in the form of code which is made up of chemical bases namely adenine, guanine, cytosine, and thymine. The human DNA consists of about 3 billion

[6] Mark A. Jobling and Peter Gill, "Encoded Evidence: DNA in Forensic Analysis" 5 *Nature Review Genetics*, (2004) *available at:* https://www.researchgate.net/publication/8207392_Encoded_Evidence_DNA_in_Forensic_Analysis (last visited on Dec. 1, 2019).
[7] Yashpal Singh and Muhammad Zaidi, *DNA Test in Criminal Investigation: Trial and Paternity Disputes* 95 (Alia Law Agency, Allahabad, 2006)
[8] U.S National Library of Medicine, *available at*: https://ghr.nlm.nih.gov/primer/basics/cell (last visited on Dec. 1, 2019).
[9] *Ibid.*
[10] *Ibid.*

bases wherein 99% of the bases are the same in all human beings, and only about 1 percent DNA bases are unique. This 1 percent bases of DNA are called DNA coding and the other 99 percent DNA is called non-coding DNA. DNA information is certainly unique in each human being, the information is stored in genes called polymorphic genes located in a DNA molecule known as the polymorphic site.[11]



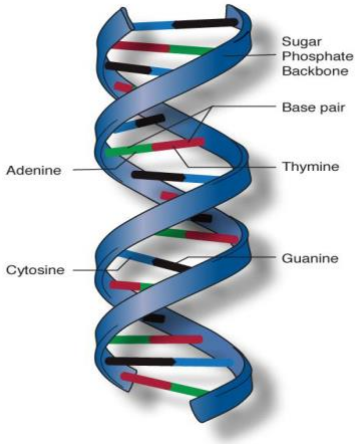


Figure-1. Structure/of/Human/Cell[12] Figure-2. Structure of double Helix[13]

By following the process of isolation of DNA molecules contained in a biological sample like semen stains, hair, skin, saliva etc.[14] It can be identified which individual the source of the DNA is found in the biological sample. The DNA code is Identical in each cell of the human body and the human body is made up of numerous cells.

III. History of DNA Profiling in Criminal Investigation

DNA was first used in the UK in the case of *R* v. *Colin Pitchfork*[15] who raped and killed a girl aged 15 years. The court awarded a life sentence in 1988 after mass screening using the

[11] Subhash Chandra Singh "DNA Profiling and Forensic use of DNA evidence in Criminal Proceedings" 53 *Journal of Indian Law Institute* 195 (2011).
[12] *Supra* note 9 at 4.
[13] *Ibid.*
[14] Fact sheet, National Human Genome Research Institute *available at*: https://www.genome.gov/about-genomics/fact-sheets/Deoxyribonucleic-Acid-Fact-Sheet. (last visited on Dec. 3, 2019).
[15] (2009) EWCA Crim 963.

pioneer DNA profiling. It was the Multi Locus Probe (MLP) technique that was being used at that time, wherein the result was visualized through a set of two parallel bonds in the photographic plate.

In *Andrew* v. *State of Florida*[16] DNA evidence was admitted as the strong evidence, which was accompanied by the fingerprint of the accused indulged in the crime in 1988. Further in the matter of *People of the State of New York* v. *Joseph Castro*[17] the court developed the three tests to decide whether DNA evidence is admissible or not these are:

I. Is there a generally accepted theory amongst the scientific community that supports the conclusion that DNA forensic testing can produce a reliable result?
II. Is there a technique or experiment, which can produce a reliable result in DNA identification and which is generally accepted in the scientific community?
III. Did the testing laboratory followed the accepted scientific technique in analysing the forensic sample in this case?

It is a technique used by forensic scientists for the identification of individuals through their respective DNA profiles.[18] Despite challenges, DNA profiling has been proven as a powerful technique for criminal investigation. The use of this technique is not free from challenges and conflicts. Privacy, confidentiality, and surveillances are the main threats to the procedure. Privacy and dignity of individuals have been regarded as the foundation of Human rights not only in the Universal Declaration of Human Rights[19] but also in the Indian Constitution and many more international conventions.[20] DNA Profiling is the most objective, unbiased, and practically accurate technique in comparison to other techniques of examination in the criminal investigation.[21]

[16]Law Commission of India, 271st Report on Human DNA Profiling; a draft Bill for the use and Regulation of DNA based Technology (July 2017).
[17]*Ibid.*
[18] Jothirmoy Adikan, *DNA Technology in the administration of Justice*, 24 (Lexis Nexis Butterworth's, 2007)
[19] The United Nations Declaration on Human Rights 1948, art. 1.
[20] Dr. A.K. Srivastava, "DNA Testing and Human Rights Implications in Civil and Criminal Investigation" 6 *Criminal Law Journal* 81 (2007).
[21] Wilson Wall, *Genetic and DNA Technology: Legal aspect* 9 (Cavendish Publishing, London, 2002).

DNA profiling is an accurate and reliable technique which enables distinguishing every human being from another human being by comparing and analysing the genetic material taken. The technique of DNA profiling is unable to identify the DNA pattern of identical twins or clones separately.[22] This is because DNA is found in 46 chromosomes having 23 pairs, each pair comprises one chromosome from the mother and other from the father. Thus, except in identical twins DNA patterns used to be unique in every human being.

IV. DNA Profiling and Human Rights

The right that a man or woman has for being a human being is necessarily called Human rights. The Universal Declaration on Human Rights, the international convention on civil and political rights, and the international convention on Social and Economic Rights are the basic international conventions which give the blurry shape to the concept of Human rights. The great destructive incident called the first and Second World Wars in the development of human civilization forced the human conscience to emphasise justice, equality, and liberty at the international, national, and individual levels. The constitution of India incorporates civil and political rights as fundamental rights in part three of the Constitution and socio-economic rights as directive principles which are not enforceable but as a role model for governance.[23]

Privacy as a human right is the first-generation Human Right. The French Jurist *Karel Vasak*[24] was inspired by the three themes of human rights during the French revolution which were liberated (civil and political rights) egalite (socio-economic and cultural rights) and third is fraternite (group or solidarity right) these are called the three generations of human rights respectively. The first generation human right is civil and political in nature, which imposes the negative obligation only on the state and its agencies.[25] Universal Declaration of Human Rights provides that no one shall be subjected to arbitrary interference with his privacy, family, home,

[22] Karl Jammer, One Twin Committed the Crime –but which one? A new DNA test can finger the culprit, *The New York Times*, 1st March ,2019, *available at:* https://www.nytimes.com/2019/03/01/science/twins-dna-crime-paternity.html. (last visited on Jan. 22, 2021).
[23] The Constitution of India, 1950, arts. 14 to 32 and arts. 36 to 51.
[24] Spasimir Domaradzki, Margaryta Khvostova and David Pupovac, "Karel Vasak's Generations of Rights and the Contemporary Human Right Discourse" *Human Rights Review* (2019) *available at*: https://link.springer.com/content/pdf/10.1007/s12142-019-00565-x.pdf (last visited on 22nd January 2021).
[25] *Ibid.*

or correspondence.[26] Article 17 of the International Convention on Civil and Political Rights protects subjection to arbitrary interference with his privacy, family or correspondence.[27] Human rights as defined in section 2 (d) of the Protection of Human Rights Act 1993 means the right relating to life, liberty, equality and dignity of individuals guaranteed by the Constitution or embodied in any international covenant or convention and enforceable by the court in India.[28]

Evidentiary Value of DNA Profiling

DNA profiling is a scientific process and the person reporting it before the court, of course, is called an expert witnessing both civil and criminal proceedings.[29] DNA profiling is a dependable tool in criminal investigation, the DNA Evidence requires corroboration from another side in a strict conventional forensic form. The court must correct any disproportion which may be appeared. DNA evidence helps the investigating officer to prove the fact that the accused was a present at the crime scene which would give raise an assumption by the court that the accused was involved in the commission of the crime in question, whereas the accused is free to challenge it through a *plea of alibi*, which would be if proved in satisfaction of the court, sufficient to evade the possibility of conviction despite matching of DNA profiling. Nevertheless, it would be wrong to assume that DNA evidence is only a kind of another circumstantial evidence puzzle because the compelling nature of Scientific DNA evidence gives it special relevance for circumstantial cases.[30]

Admissibility of DNA Profiling in the USA

In the United State of America, two rules are being followed in the practice of admitting the novel DNA profiling as evidence for determining the guilty or innocent of the accused person of any crime. The two tests are -

a. Frye Test, which was propounded in the matter of *Frye* v. *the United States*[31] and

[26] The Universal Declaration of Human Rights, 1948, art. 12.
[27] The International Convention on Civil and Political Rights, 1976, art. 17.
[28] The Protection of Human Rights Act, 1993, s. 2 (d).
[29] *Supra* note 9 at 4.
[30]Findlay Mark and Julia Grix "Challenge Forensic Evidence? Observations on the use of DNA in certain criminal trial" 14 *Current Issues in Criminal Justice* 269 (2003).
[31] 293 F. 1013 (D.C. Cir 1923).

b. Daubert Standard or Federal Rule of Standard That was propounded in *the Daubert* v. *Merrell Dow Pharmaceuticals Inc.*[32]

The Frye Rule of Standard

It is the rule acceptable in the United State of America in deciding the admissibility of any novel scientific evidence since 1923. As per this rule of standard, any expert opinion on any innovative scientific technique is not acceptable as evidence in law before the court of law unless the technology has proven to be reliable authentic and scientifically approved generally and not specifically. Further, the technique is commonly accepted as trustworthy in the relevant scientific community.

In the Frye test, the issue was whether expert opinion based on the test of *systolic blood pressure deception* can be admissible in a legal trial in determining the guilt of the accused person? The court ruled to test the reliability and authenticity of the technique in the relevant community of scientists.[33]

In implementing the Frye standard of admissibility of expert opinion as evidence, the scientific evidence must be clarified by the interpreting court as a "Generally accepted" technique by a significant number of scientists of the relevant community and when it is approved only then the scientific evidence would be admissible as evidence to prove guilty or innocent of the accused in question. Thus, as per the Frye standard of admissibility the prosecution or accused giving novel scientific evidence must produce a plural number of expert opinions to make the evidence admissible.[34]

Daubert Standard or Federal Rule of Standard

The Daubert or Federal rule of the standard is the rule of procedural law in evidence. In the Daubert standard, there has been given certain relaxation against the Frye standard. Unlike the

[32] 509 U.S. 579 (1993).
[33] *Ibid.*
[34] Leica Kwong, "Scientific Evidence Admissibility: Improving Judicial Proceedings to Decrease Erroneous Outcome" 7 *Themis Research Journal of Justice Studies and Forensic Science* (2019) *available at:* https://scholarworks.sjsu.edu/cgi/viewcontent.cgi?article=1076&context=themis (last visited on Nov. 09, 2021).

Frye standard, the Federal standard applies to all expert testimony.[35] This standard is required answer to the question, of whether the preferred method is based on a reliable methodology. The Daubert rule of the standard is the trilogy of three cases of the US Supreme Court. The combined force of the three judgements constitutes the Daubert Standard. These cases are –

I. In *Daubert* v. *Merrell Dow Pharmaceuticals Inc.*[36], the US Supreme Court held that the Federal Rules of Evidence's Rule no. 702 gives inclusion to the flexible reliability benchmark. On the other hand, it does not exclude the Frye standard for establishing the standard of accepting the expert's testimony in evidence. The bench agreed that-
    i. Judges are the gatekeeper, and they are to ensure that the expert's testimony proceeds from the true scientific expertise.
    ii. Relevance and reliability criteria the trial court to test that the expert's testimony is relevant to the purpose at hand, and it stands on a reliable foundation.
    iii. The trial court to determine whether the testimony is the consequence or result of the scientific method.
    iv. Illustrative factors to be checked e.g., whether the method applied by the expert is generally accepted by the scientific community, whether it has been peer-reviewed, whether the method can be tested or has been tested, and whether the potential rate of error is tolerable.[37]

II. In *General, Electric Co.* v. *Joiner*[38], it was held that the trial court shall have the discretion to exclude the testimony of an expert from admitting in evidence if there is any inconsistency between the facts relied on by an expert and his conclusion. Further, the appellate court shall have the power to review the abuse of the discretion standard used by the trial court and to decide whether the expert's testimony is admissible or not.

[35] David E. Bernstein and Jeffrey D. Jackson. "The Daubert Trilogy in The States." 44 *American Bar Association* 3351-66 (2004).
[36] *Supra* note 33
[37] *Daubert* v. *Merrell Dow Pharmaceuticals, Inc.* (1993) 509 U.S 579, 589.
[38] 522 U.S 136 (1997).

III. In *Kumho Tire Co.* v. *Carmichael*[39], it was held that the gatekeeping role of Judges as ruled in Daubert standard would apply to all kinds of expert's testimony whether be it scientific or non-scientific and novel or traditional.[40]

It was the Frye Test that was laid down in *Frye* v. *United States*[41] decided by the Columbia Circuit court of the US, which requires fulfilling two tests. First, unless a scientific technique has been accepted by the scientific community, in general, it cannot be admitted in court as evidence. Second, it should comply with the relevancy standard incorporated in the federal rule of evidence. The US Supreme Court in *Daubert* v. *Merrell Dow Pharmaceuticals*[42], held that the Frye Test is being replaced by the Federal Rule of Evidence which requires a judge to ensure the admitted scientific evidence is not only relevant but reliable and trustworthy and in doing so it must examine the scientific validity of the testimony.

In the matter of *R* v. *Dohemy & Adams*[43] the court has recognized the importance of forensic DNA evidence in criminal cases, especially, where the case of the prosecution is based on an aggregation of circumstantial evidence. US National Research Council in its report recommended that the method for estimating frequencies and technology of profiling has gone to the stage where there remained no scope of doubt to the admissibility of DNA data in the court of law.[44] In furtherance of bringing clarity and certainty to the admissibility of expert evidence, the Law Commission in England critically examined the admissibility criteria of expert evidence in criminal proceedings. The commission views that the expert evidence must ensure the least evidentiary reliability criteria.[45] The Wisconsin Supreme Court has laid down the standard of relevancy and admissibility of expert evidence in the case of *State* v. *Westland*[46] which were

[39]526 U.S 137 (1999).
[40] 526 U.S. 137(1999).
[41] 293F, 1013, 1014 (D.C. Cri.1923).
[42] 509 US 579, 113 S. Ct. 2786 (1993).
[43] Adams: CACD 31st July 1996.
[44]Norman Grossblat (ed.) *The evolution of Forensic DNA Evidence 214 (*National Research Council, National Academy of Science, National Academies Press, Washington DC, 1996).
[45]Law Commission Consultation No 190, the admissibility of Expert Evidence in Criminal Proceedings in England and Wales 2009. *available at*:
http://www.lawcom.gov.uk/app/uploads/2015/03/cp190_Expert_Evidence_Consultation.pdf (last visited on Feb. 21, 2021).
[46]119 Wis2nd483,351N. W2nd 469 (1984).

codified in sec. 907.02 to decide the admissibility of an expert witness. The *State* v. *Woodall*[47] was the first case to rule on the admissibility of DNA evidence which was decided by the Virginia High Court wherein the court found through DNA profiling that the accused, who was convicted for committing robbery, kidnapping, rape, and murder found wrong consequently the court struck down the conviction and ordered his release.

Admissibility of DNA Profiling in Australia

There are strong legislative measures in Australia like USA and United Kingdom. For effective, responsive, and accountable criminal justice administration, the Australian government has enacted the laws to confer sufficient power on police personnel so that they can perform their duties properly. The DNA paternity test is conducted as per the law provided under Family Law Act,1975. [48] This Act provides that:

1. The laboratories accredited by National Australian Authority can only perform the DNA analysis.
2. The paternity test can be done with the mutual consent of both the parties on the affidavit
3. The biological sample for DNA profiling must be collected in a controlled situation by a medical professional. The medical professional must sign a declaration that the sample was collected in a controlled environment.
4. The statement for custody must be mentioned for the DNA sample.[49]

There is a law in Australia called The Crime (Forensic Procedure) Act, 2000. This statute provides in detail the procedure to be followed in applying forensic science in a criminal investigation. This law lay down the standard of qualification for police officers' forensic scientists, forensic technicians and other stakeholders involved in forensic investigation.[50]

[47] 100 Wn.2d 74, 76-78, 666 P.2d 364 (1983).

[48] Richard Hindmarsh and Barbara Prainsack (Ed.), *Genetic Suspects: Global Governance of Forensic DNA Profiling and Databasing* 157 (Cambridge University Press, United Kingdom, 2010).

[49] *Ibid*.

[50] The Crime (Forensic Procedure) Act, 2000, s. 13.

The Australian courts follow and utilize forensic DNA profiling as per the need of the hour. The Court within the jurisdiction of the Australian Capital Territory decided on *Desmond Applebee's* case for the very first time in the History of the Australian criminal justice system. In this case, the accused was charged with the crime of sexual assault. The accused denied the accusation, but when DNA evidence was admitted as part of the crown case, he changed his statement by consensual sexual intercourse with the lady. Later he was convicted of the same crime of sexual assault.[51]

The principle[52], which is being followed by courts in Australia whilst considering forensic DNA evidence in criminal investigation, can be summarized in the following points: -

1) That DNA evidence is admissible in Australian courts. It must be relevant to the fact issue at hand before the court of law.
2) The DNA evidence must be presented by a qualified person in forensic science as prescribed by the National Australian Authority.
3) The DNA evidence must be presented in the court as per the manner duly prescribed by law.
4) The expert opinion on scientific evidence like DNA profiling is acceptable only when it is given by a person, who has specialized knowledge based on experience, training, and study.
5) Statistical evidence to explain the probability factor relating to any suspects other than the accused is permitted provided the utmost care should be taken while explaining the basis on which the calculation of probability is given.[53]

Admissibility of DNA Profiling in the European Union

In the modern era of globalization, the extra-territorial movement of people and facilities of communication through computer and information technology has its negative outcome, which drastically affects the lives of peace-loving habitants. This is because the criminal uses these technologies to facilitate the planning and commission of criminal activities and thereafter

[51]Germy Gans and Gregor Urbas, "DNA identification in Criminal Justice Administration" *Australian Institute of Criminology: Trends and Issues* (2002).
[52]I. Freckle ton and H Selby (eds), *Expert Evidence*, Loose-leaf (Lawbook Co., Sydney, 2002)
[53]*Ibid.*

managed to escape from justice. The idea of cross-border collection and analysis of DNA profiling for criminal investigation would have the capability.[54] The worldwide practice of DNA profiling revealed the fact that DNA analysis is useful in organized crime as well. According to INTERPOL, the DNA sample collected from different country's crime scenes revealed the commission of an organized crime by a gang called '*Pink Panther*'.[55]

Utilizing the cross-border scientific innovation, the Council of Europe on 1997 has adopted a resolution called "Resolution on Exchange of DNA analysis.[56] The council called the member state of the European Union to create a 'national DNA database' at the country level. The national database would be exchanging the non-coding part of the DNA molecule. In 2001 the European Council passed the resolution for the exchange of DNA results among the state member[57] and the same was amended in the year 2009.[58]

The 'Prum Treaty' was signed by many European countries e.g., Netherlands, Austria Luxemburg, Hungry, France, and Germany. The purpose of Prum Treaty was to cooperate in the fight against cross-border terrorism, and crime and prevention illegal migration. Under the treaty, the member agreed to share or exchange the DNA database and other information.[59]

Many provisions of Prum Treaty were subsequently approved by the Council of the European Union after another member of the EU joined the treaty in 2007. This decision of the Council became the instrument of *acquis Communautaire*. This treaty was believed to fight against cross-border crime very effectively. The European Council's decision 2008/615/HA imposes the legal obligation on the member state to establish a national DNA database and allow the competent

[54] Helena Soleto and Anna Fiodorova, "DNA and Law Enforcement in the European Union: Tools and Human Right Protection" Vol. 10 *Utrecht Law Review* (2014) *available at:* http://www.utrechtlawreview.org/ (last visited on Nov. 10, 2021).
[55] INTERPOL *available at:* https://www.interpol.int/How-we-work/Forensics/DNA (last visited on Nov. 10, 2021).
[56] Council Resolution 97/C 193/2, OJ C 193, 24.6.1997, p. 2.
[57]Council Resolution 2001/C 187/01, OJ C 187, 3.7.2001, p. 1.
[58]Council Resolution 2009/C 296/1, OJ C 296, 5.12.2009, p. 1.
[59]R. Bellanova, "The Prum Process: The way Forward for EU Police Cooperation and Data Exchange" cited in E. Guild & F. Geyer (eds), *Security versus Justice? Police and Judicial Cooperation in European Union,* 2008 p. 204.

authority of another country member of the European Union to access and search the database in their country.[60]

Fundamental Rights and DNA test in the EU

Obtaining the samples for DNA analysis from accused or suspects of crime *prima-facie* shows the possibility of violation of the basic rights of the person. Although, collection of samples for DNA analysis can be logically said to be a kind of external bodily search causing physical intervention. So, the collection process of DNA samples causes possible threats to some fundamental rights e.g., the right to physical integrity, right against degrading treatment, right to moral integrity, right to privacy and the right against self-incrimination.

The collection of hair and saliva as a sample for DNA analysis does not cause an infringement of physical integrity. It's simple and nothing more than a common form of sample. The question as to right against degrading treatment can be solved by providing the provision of respect for citizens in the legal framework prescribing procedure of implementation of forensic DNA in the criminal investigation.

The question of the right against self-incrimination in DNA analysis is not an issue because DNA analysis is a simple examination like alcohol measurement in blood and blood test analysis. Such tests and analyses are not considered violative of the fundamental right against self-incrimination either in national or international jurisprudence. The European Commission on Human Rights in the case of *X* v. *Netherlands*[61] ruled that "submission of a person for blood test cannot be said a presumption of guilt of the individual submitting which is violative of the right enshrined under article 6 clause (2).[62] of the European Convention on Human Rights. DNA tests do not constitute a violation of rights against self-incrimination because the result may be positive or negative. So, the method of identification is contingence which may be advantageous or disadvantageous to the person from whose sample is collected for analysis.

[60]*Supra* note 54.
[61][1978] ECHR (D.R. 15), p. 5.
[62]European Convention on Human Rights, 1950, art. 6.

Admissibility of DNA Profiling in India:

India does not have any specific law regulating the use of DNA profiling for the identification of the criminal. There is a little bit of effort has been made by law-making agencies to enable criminal justice administration to act compatibly with the development of forensic science and new scientific techniques in criminal administration.

Constitutional Aspects of DNA Profiling:

The existence of innovative techniques of investigation in the field of law, popularly known as forensic DNA profiling, which is the most dependable, accurate and scientific tool in the field of law. The use and dependency of forensic science in a variety of fields including scientific analysis of material evidence in criminal justice administration of the advanced countries have been well established.[63] There is an effort made in the constitution to uplift the genetic science through its provisions e.g., article 20(3), article 51A clause (h) clause (g). The development of science and technology has been taken care of by the framers of the Indian Constitution. The framers of the constitution has provided a proper scale for the purpose of balancing private rights and public justice.

Article 51A clause (h), the fundamental duty of every citizen of India that "it shall be the duty of every citizen of India to develop the scientific temper, humanism and the spirit of enquiry and reform". Thus, the possibility of scientific development in forensic DNA analysis is created by the framers of the constitution by imposing the fundamental duty on its citizen to develop scientific temper and spirit of enquiry and reform.[64] Under the Union List entry 64 makes the provision that the parliament shall declare that all institutions of scientific and technical education financed by the government of India, be the institutions of national importance.[65] Entry 65 of the union list prescribes that the parliament or central government shall have the power to make law for special studies and research, professional, vocational, or training to police officers and scientific or technical assistance in the investigation of crime.[66]

[63]Paramjit Kaur, "DNA Fingerprinting and its evidentiary value" *Criminal Law Journal* (2006).
[64]The Constitution of India 1950, art. 51 A (h).
[65]The Constitution of India 1950, seventh schedule, union list, entry. 64.
[66]The Constitution of India 1950, seventh schedule, union list, entry. 65.

Article 20(3) guarantees the fundamental right accused against self-incrimination that is the accused shall be presumed to be innocent. It is the duty of the prosecution to establish the guilt of the accused. The accused is not bound to make any such statement which may reveal his guilt. The accused is not bound to make or give any evidence against his will or against himself. Admissibility of DNA profiling in Indian courts in accordance with the definition of Evidence under the Indian Evidence Act, 1872.[67] We find that the evidence of forensic DNA Profiling is a documentary as well as oral evidence because when any oral statement as to DNA profiling, made by an expert, which is required or permitted by the court or any document as to DNA profiling is produced for the inspection of the court shall be admissible as evidence. The Evidence Act provides the fact which are necessary to introduce, explain fact in issue or relevant fact, or which support or rebut any inference suggested by the fact in issue or relevant fact[68]. The science of DNA profiling is the best proof of establishing the identity of an individual without any doubt.

Further section 45 of the Evidence Act, 1872 provided for the relevancy of expert opinion on the point of foreign law, of science, art, in question as to the identity of handwriting or finger impression and the opinion upon such point of the person especially skilled on the point shall be relevant and such person shall be called an expert.[69] There is a need to insert evidence of DNA

[67] The India Evidence Act, 1872. s. 3(6).
Evidence" means and includes —
(1) all statements that the Court permits or requires to be made before it by witnesses, in relation to matters of fact under inquiry; such statements are called oral evidence.
(2) all documents including electronic records produced for the inspection of the Court;
such documents are called documentary evidence.

[68] The Indian Evidence Act,1872, s. 9.

[69] When the Court has to form an opinion upon a point of foreign law or of science or art, or as to the identity of handwriting, or finger impressions, the opinions upon that point of persons specially skilled in such foreign law, science or art, or in questions as to the identity of handwriting [1] or finger impressions are relevant facts. Such persons are called experts.

Illustrations

(a) The question is, whether the death of A was caused by poison.
The opinions of experts as to the symptoms produced by the poison by which A is supposed to have died are relevant.

(b) The question is, whether A, at the time of doing a certain act, was, by reason of unsoundness of mind, incapable of knowing the nature of the act, or that he was doing what was either wrong or contrary to law.
The opinions of experts upon the question of whether the symptoms exhibited by A common show unsoundness of mind, and whether such unsoundness of mind usually renders persons incapable of

profiling specifically relevant as expert opinion though the Court through its judicial decision has made DNA profiling relevant as expert opinion. Dr V.S. Malimath strongly recommended for insertion of an amendment in the Evidence Act to make DNA profiling a conclusive piece of Evidence.[70]

In the case of *Kantidevi* v. *Poshiram*[71], the Apex court observed that though the conclusiveness of the DNA profiling is far from controversial and scientifically genuine and accurate but despite we cannot escape from the conclusiveness of law laid down in section 112 of the Evidence Act as to the paternity of a child born within 280 days from the dissolution of marriage.

The Apex Court of India in the matter of *Nandlal Wasudev Badwaik* v. *Lata Nandlal Badwaik*[72] held that the test of DNA profiling shall prevail over the conclusive legal presumption which the court is bound to follow under section 112 of the Indian Evidence Act. Whilst delivering judgement, Chandramauli Kr. Prasad, J. observed that the scientific technique of DNA profiling was not in existence, and the accuracy of the result was not even in the contemplation of the legislature. The conclusive presumption raised in section 112 is conditional which is rebuttable[73] with the fact only that the parties to the marriage had no access to each other at any time when the child could have been begotten. But, if there is any conflict between the conclusive presumption under section 112 and any scientifically accurate evidence having been accepted by the community worldwide, in such a situation the latter would prevail.[74] In *Kamal Nath* v. *State of Tamil Nadu*[75] the Supreme Court of India has considered the admissibility and reliability aspect of DNA profiling after a brief analysis of the experience and qualification of the DNA

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knowing the nature of the acts which they do, or of knowing that what they do is either wrong or contrary to law, are relevant.

(c) The question is, whether a certain document was written by A. Another document is produced which is proved or admitted to having been written by A.

The opinions of experts on the question of whether the two documents were written by the same person or by different persons are relevant.

[70] Law Commission of India Report, 185th Report on Reform of Criminal Justice System, Government of India, Ministry of Home Affairs (2003).

[71](2001) 5 SSC 311.

[72] AIR 2014 SC 932.

[73] The Indian Evidence Act, 1872, s. 112

Birth during the marriage, conclusive proof of legitimacy: - the fact that any person was born during the continuance of a valid marriage between his mother and any man, or within two hundred and eighty days after its dissolution, the mother remaining unmarried, shall be conclusive proof that he is the legitimate son of that man unless it can be shown that the parties to the marriage had no access to each other at any time when he could have been begotten.

[74]*Ibid.*

[75] 5 SCC 194 (2005).

expert explaining it. There is no special law compelling the accused or suspect of a crime to provide genetic material for a DNA test. The court may make an adverse presumption in this regard under section 114(g) of the Indian Evidence Act 1872 if the accused or suspect does not produce evidence in his power or possession. The courts have the inherent power to issue an order to accused or suspect of crime to provide genetic material for undergoing DNA test. But this power is completely dependent on the discretion of the court which is rarely being used because of the privacy and relevant constitutional rights issues. In the matter of *Mr X* v. *Hospital Z*[76] Delhi High Court ruled the doubt that DNA profiling infringes the right to privacy.

Section 53 of the Criminal Procedure Code, 1973 provides scope to investigation agencies to have a medical examination of the accused person for investigating the crime instituted on the police report. Further section 53A and 164A were inserted by the Criminal Law Amendment Act, 2005. Section 53A provides for medical examination of a person accused of rape or attempt to commit rape through a registered medical practitioner. The medical examination of the women victim of rape or against whom a rape attempt has been committed has been provided under section 164A of the code of criminal procedure. The provisions provided for the application of DNA technology in the criminal justice system in the Code of Criminal Procedure are not sufficient to meet the requirement of the time. It is specially provided that the crime of rape requires expert investigation wings in forensic science. [77]

DNA Profiling has been accepted as evidence by courts in India in various cases and it has been made the decisive in final deposal of the cases. In *Chandradevi* v. *State of Tamil Nadu*[78], the accused person was sentenced solely based on the evidence of DNA Fingerprinting. Further in *M.V Mahesh* v. *State of Karnataka*[79], the accused was granted acquittal based on a mismatch of the DNA profile with evidence found on the crime scene. The Delhi High Court has examined the reliability of the DNA evidence in the matter of *State* v. *Santosh Kumar*[80] and it was ruled that the reliability of DNA evidence can form the basis of judgment along with other evidence also.

[76] AIR Delhi 217 (2002).
[77] Code of Criminal Procedure, 1973, explanation 1 of s. 53 and s. 164A
[78]Cr. L. J, 280 (J) (2003).
[79]Cr. L.J. (Kant) (1996).
[80]Cr. L. J. 964, (2007).

V. DNA Profiling and Right to Privacy

In the United State of America, the law of search and seizure in the Fourth Amendment specifically protects every individual from unreasonable search and seizure of a person, his house, and papers[81]. The US Supreme court in *Wolf* v. *Colorado*[82] through Frankfurter J. observed that:

> Security of one's privacy against arbitrary intrusion by police is the basic to a free society as enshrined in the Fourth Amendment. Therefore, it is implicit in the concept of orderly liberty and as such enforceable against state power through the Due Process Clause. Thus, knocking at the door solely on the authority of police either day or night but without the authority of law did not need the commentary of recent history to be condemned as inconsistent with the conception of the human right enshrined in the history and the basic constitutional document of the English-speaking peoples. We are the state affirmatively to sanction such police intrusion into privacy. It would run counter to the fourteenth amendment.

The adoption of compulsive scientific technologies like DNA profiling has raised big concerns as to unbridled police power in the administration of criminal justice. This concern is very legitimate as the scientific technique directly attacks the right to be silent which is crucial as a protective clock for a guilty person. To reconstruct the notion of justice, there is a need for an analytical debate on the use of value-free scientific technologies in the erosion of civil liberty. Unless guilt is proved every person shall be considered innocent. The proving of guilt requires a fair trial and the opportunity to defend and challenges the method and technique of crime detection.

Some genetic material is required to be taken from the body of suspects for DNA profiling. When the biological material or sample is required to be taken with the due and informed consent of the targeted accused or suspects, then there is no issue, and such collection of DNA

[81]V.R Dinkar, *Justice in Genes; Evidential fact of Forensic DNA Fingerprinting*, 207 (Asia Law House, Hyderabad, 1st edn.,2008) cited in R. Kumudha, *DNA Technology under the Criminal Justice System in India - A Critical Analysis*, (2017) (Unpublished PhD thesis) Pondicherry University, Pondicherry, *available at*: http://shodhganga.inflibnet.ac.in/bitstream/10603/38033/10/09_chapter%203.pdf, (last visited on Feb. 2, 2021).
[82]338 US 25 (1948).

sample doesn't violate any right of the accused. The problem arises when the collection of biological samples is done by chance or without the informed consent of the targeted accused or suspected person. The reason for such conflict is that every individual has the right to decide how a single tissue of his body be used. This becomes the obligation of the state to protect his right to life and personal liberty. As per this idea of individual autonomy, DNA profiling is an unreasonable interference with the personal integrity of individuals. There is no issue where DNA profiling is done of genetic material obtained by a legal process where consent of the individual is crucial.[83]

The reference to European Convention on Human Rights is relevant, for example, article 3[84]and article 8[85] of the convention strictly provides that there shall be no interference with the physical and psychological integrity of the individual. The commission division in the matter of *X* v. *Netherland*[86] held that Evan a minimum physical or psychological interference of an individual will be sufficient to constitute a breach of article-8 of ECHR[87]. Lord Woolf, CJ. observed in his judgment in *Chief Constable of South Yorkshire*[88] case that it would be an incredible step in criminal justice administration if every individual in the country were required to submit a DNA sample in the data bank, there would be great value for data bank in preventing crime and detecting the wrongdoer in the investigation but taking and retention of DNA sample would dramatically cause harm to person's privacy who is suspect of having committed any offence but were not convicted for them.

In *Kruslin* v. *France*[89] the court observed that interference can be permitted only by law, for the prevention of crime and protection of another right. The procedure permitting the interference

[83]*Supra* note 12.
[84] Prohibition of torture, No one shall be subjected to torture or to inhuman or degrading treatment or punishment.
[85] Right to respect for private and family life
1. Everyone has the right to respect for his private and family life, his home and his correspondence.
2. There shall be no interference by a public authority with the exercise of this right except such as is in accordance with the law and is necessary in a democratic society in the interests of national security, public safety or the economic well-being of the country, for the prevention of disorder or crime, for the protection of health or morals, or for the protection of the rights and freedoms of others.
[86]Commissions Division, December 14, 1978, App. 8239/78.
[87] The European Convention on Human Rights, art. 8.
[88]All ER 148 at 155, (CA) (2003).
[89]12, EHRR,737(1990).

must be compatible with rule of law. In *R* v. *Chief Constable of South Yorkshire*[90], while deciding the issue of retention of fingerprint and DNA sample of the suspect of having committed crime in his past but could not get convicted for them. House of Lords in the matter of *Attorney General's Reference*[91], through Lord *Steny,* observed that privacy is not only a value to the stake. It must be the aim of the criminal law to allow every individual to feel in their daily life without any fear of harm to person and property. The Court must establish a rational balance between the three interests namely of the individual accused, the victim and their family and the interest of the public at large. The recommendation of the European Council does not impose any bar on using coercion for the collection of DNA samples for analysis, but it simply requires strictly respect and does not contravene the basic principle of individual dignity and integrity.[92]

The major issues related to DNA testing are forced DNA testing and un-consensual DNA testing. The Grand Chamber of the of European Court of Human Rights in *Marper* v. *the United Kingdom*[93] has given an undivided decision on the issue of conflict between the privacy of human being guaranteed under article 8 of the European Convention on Human Rights 1953[94] and use of genetic material for DNA profiling. The European Court held that use and retaining of fingerprint and DNA samples without informed consent is a gross violation of the right to privacy of individuals guaranteed under article 8 ECHR[95]. The House of Lords[96] and the European Court concluded that English Law has failed to strike a proper balance between conflicting rights that is the right to privacy and public interest[97].

[90]*Supra* note. 52 at 13.
[91]*Attorney-General's Reference (No. 3 of 1999)* [2000] 3 W.L.R. 116. *available at*: https://www.parliament.uk (last visited on Jan. 24, 2021).
[92] *X* v. *The Netherland*, (1978) ECHR (D.R. 15) at 5.
[93]30562/04 ECHR 1581(2008).
[94]The European Convention on Human Right 1953, art. 8.
available at: https://www.echr.coe.int/Documents/Convention_ENG.pdf. (last visited on Feb. 5, 2021).
[95] Bob Hopple, "The Right to Privacy and Criminal Detection*",* 68 *Cambridge Law Journal* (2009). *available at:* https://www.jstor.org/stable/40388789(last visited on Jan. 3, 2021).
[96] (2004) UKHL, 39, 2004 1 W.L.R.
[97]*Ibid*.

VI. DNA Profiling and Ethical Issues

Under DNA legislation, which provides for taking DNA from a person accused of an offence as soon as he or she is arrested. It would be a serious attack on the rights of human beings known as the right against self-incrimination. Further, it would have many wrong impacts on the public concerned which includes:

1. Revealing the personal information leading to DNA profiling of individuals.
2. The person whose DNA is taken will be treated as a criminal.
3. The technique will boost the "big brother image of the state" that would immensely increase the threat of misuse of the personal DNA data of the public by the government. It means government may track individuals, their family, or their groups.
4. There is the probability of DNA data being lost or misused by the state machinery like corrupt police, laboratories, and other service providers in the chain.
5. The technology will create criminal records existing throughout the life of the accused if it is not removed from records in the DNA bank. This will create hurdles through life in employment, treatment by police and visa-like government services.
6. There would always be a probability of being wrongfully accused of a crime of which he or she is not concerned at all.

The then prime minister of the United Kingdom, Tony Blair recommended a universal DNA databank for all persons be it citizens or tourists of the United Kingdom. This proposal sparked Social and political debate as it seems to be encroaching on various human and fundamental rights of individuals it was criticized on the following heads:

- That creating a universal DNA data bank would not be so effective to help the criminal justice administration to solve criminal cases in satisfactory numbers. This is because officially the provision for DNA data collection is limited to a selected category of crimes. This constitutes only about 1% of the total variety of crimes providing for the compulsory taking of biological sample from an individual for DNA profiling. That would probably criminalize the person refusing to provide a sample .
- There is the threat of Possible misuse of DNA data by police or investigation wings of the criminal justice system and the state or anyone who might penetrate the system.

- That there would be more risk of miscalculations and bogus matches with the crime scenes, suspects and DNA profiles because of the huge number of DNA databases in the universal DNA databank. [98]

In an annual conference of chief police officers held in June 2008. About 61% of police officers voted against the proposal of a universal DNA database.[99] In the same way, the Grand Chamber of the European Court of Human Rights in a leading judgement named *S and Marper* v. the *United Kingdom*[100], unanimously decided that the retention of an innocent person's biological DNA sample, fingerprints DNA profiling is a violation of the right guaranteed under article 8 of the European Convention of Human Rights, which grants right to privacy to individuals as a fundamental right.

VII. DNA Technology (Use and Application) Regulation Bill, 2019

The Indian criminal justice system has given great value to DNA evidence, but the legislature has not been successful to provide specific laws for the use and regulation of DNA profiling in criminal investigations. In the year 2003, the Department of Biotechnology constituted a committee known as the 'DNA profiling Advisory Committee' imposing the responsibility to make recommendations for the draft of the DNA profiling Bill 2006 later it was called DNA profiling Bill 2007 which was prepared by the Department of Biotechnology in collaboration with Centre for DNA Fingerprinting and Diagnostics (CDFD).[101] Unfortunately, the Bill was never introduced in parliament. Dr Harsh Vardhan, the Minister for Science and Technology introduced the DNA Technology (Use and Application) Regulation Bill, 2019[102] in the Lower House. The Bill was produced for providing specific laws regulating the use of DNA technology for the identification of certain persons. The Bill authorizes the government to use DNA examination only on specific matters scheduled in the last of the Bill. It provides the use of DNA testing for the identification of criminals accused of offences defined in the Indian Penal Code,

[98] H.M. Wallace, "Forensic DNA databases–Ethical and legal standards: A global review" 4 *Egyptian Journal of Forensic Sciences* (2014).
[99] *Ibid.*
[100] ECHR (2008) 1581.
[101] Elonnai Hickok, "Rethinking DNA Profiling in India"4 *Economics & Political Weekly* (2012)
[102] DNA Technology (Use and Application) Regulation Bill, 2019 a*vailable at:* https://pib.gov.in/PressReleseDetail.aspx?PRID=1559099# (last visited on Feb. 2, 2021).

paternity determination and establishing the identity of missing people.[103] The Bill provides that government shall obtain biological material for DNA profiling without the consent of the individual if the individual is accused of an offence punishable with up to seven years of imprisonment or less. The consent shall not be necessary for the collection of biological material if a person is accused of an offence punishable with imprisonment of seven years or death. The Bill directs that the standard for collection, entry, retention, and removal of DNA profiles shall be as per the regulation.

The Bill creates National and Regional DNA Data Bank[104], which are obliged to maintain crime scene indices, suspect's indices, offender's indices, missing person's indices, and unknown deceased person's indices. After the preparation of DNA data, the laboratories are required to submit it to the national or regional data bank. The DNA Regulatory Board[105] headed by the Secretary of Biotechnology shall supervise the National and Regional DNA Data Bank. The Secretary shall be assisted by experts in the field of biological science, the Director-General of the National Investigation Agency, and the Director of CBI (Central Bureau of Investigation).[106] The function of the board in addition to supervision of data banks includes: - (1) Advising the government on the establishment of DNA data banks and laboratories[107]; 2) Advising the government to grant the accreditation to DNA Laboratories; (3) Prescribing the standard for DNA data bank, laboratories, and experts ensuring proper confidentiality of DNA Profiles.[108]

The Bill provides imprisonment of up to three years and a fine of up to one lakh rupees for the breach of the obligation prescribed as an offence e.g., using DNA samples without permission, or breach of confidentiality of DNA profiling[109]. Though the bill has provided its best for use of the DNA technology in the criminal investigation there is an argument against the bill that it is very insensitive as to encroach on the right to privacy. In *Justice KS Puttaswamy* v. *Union of India*[110],

[103]*Ibid.*
[104]*Supra* note 70, s. 25.
[105]*Supra* note 70, s. 3 and 4.
[106]*Supra* note *70,* s. 12.
[107]*Supra* note *70,* s. 13.
[108]*Supra* note *70,* s. 32.
[109]*Supra* note *70,* s. 45 to 51.
[110] AIR SC 4161 (2017).

the constitutional bench of the Supreme Court of India has unanimously held that the right to privacy is the fundamental right of the individual. DNA profiling may reveal the physical or medical characteristics of the individual, which may directly affect his privacy. Further, the Bill provides the provision for the removal of DNA data from the Bank but remains silent on the removal of DNA data from laboratories. This may pose a serious DNA theft issue infringing the privacy of the individual.

Shashi Tharoor, the Congress leader while speaking in the parliamentary debate on the Bill said that the Bill infringes the privacy of individuals because it allows the state to retain the DNA profile of an individual.[111] The bill has failed to provide procedural safeguards.[112] "It will enable the creation of a big brother state. It is not a panacea, enacting this law before bringing in a robust data protection law will have a bearing on the right to privacy," Mr Tharoor said.[113] *Nandlal Wasudev Badwaik* v. *Lata Nandlal Badwaik*[114] held that the test of DNA profiling shall prevail over the conclusive legal presumption which the court is bound to follow under section 112 of the Indian Evidence Act. Whist delivering judgement Chandramauli Kr. Prasad, J. observed that the scientific technique of DNA profiling was not in existence, and the accuracy of the result was not even in the contemplation of the legislature. It's the need of the hour that the traditional method of evidence should be replaced with a scientifically accurate and acceptable method of evidence.

VIII. Conclusion and Suggestions

In the criminal justice administration, wherein new scientific techniques are contributing and continue to contribute immensely while detecting the actual wrongdoer; the judicial institution now depends on the scientific evidence in almost all modern judicial systems of the world. Narco-analysis, Brain Mapping and P300 are some modern scientific techniques being developed to obtain rationally trustworthy evidence for capturing the real criminal. DNA profiling is one of

[111]Shashi Tharoor, DNA Profiling Bill Introduced in Lok Sabha, *THE DECCEN HERALD*, Jul. 8, 2019, *available at*: https://www.deccanherald.com/national/national-politics/dna-technology-bill-introduced-in-ls-745765.html (last visited on Nov. 2, 2021).

[112] "Bill to allow use of DNA technology introduced in Lok Sabha" , *The Hindu,* Jan. 08, 2019, *available at:* https://www.thehindu.com/sci-tech/bill-to-allow-use-of-dna-technology-introduced-in-loksabha/article25939311.ece, (last visited on Feb. 7, 2021).

[113]*Ibid.*

[114] AIR 2014 SC 932.

the most trustworthy scientific technique which can be used to gather scientifically reliable evidence to find real culprits. It would not be wrong to say that there will be a great achievement in criminal justice administration if we implement the proper use of DNA profiling in criminal justice administration. The cases based on circumstantial evidence can be easily solved with the assistance of techniques of forensic science. The result of identification through DNA profiling is dependable, more accurate and scientific. The need is to create the required scientific, technical, and legal infrastructure ensuring protection against breaches of privacy and human right like leakage of genetic confidentiality hampering individual autonomy. The scientifically advanced nations have specific laws for the application of DNA technology in criminal justice administration. DNA profiling in a criminal investigation does not violate the right to privacy enshrined under article 21 of the Constitution of India.

DNA evidence is admissible in section 45 of the Indian Evidence Act as scientific expert opinion. The code of Criminal Procedure (Amendment Act, 2005) has also included DNA profiling in the examination of the accused of a criminal investigation under section 53 and 53A of the Code Criminal Procedure, 1973. But India does not have any specific legislation regulating the use of DNA profiling in criminal administration. Although the government of India has also prepared a DNA profiling Bill in line with Police and Criminal Evidence Act, 1984, DNA Identification Act. 1994 (US), Crime Forensic Procedure Act, 2000 (Australia), and DNA Identification Act, 2000 (Canada). The Bill has invested the power in the court to make an order for carrying out the forensic procedure of DNA evidence in a non-consenting matter of the accused. Thus, the Bill has major ambiguities that would be supportive of abusing the basic rights or fundamental rights of individuals by the state machinery involved in DNA technique implementation in the criminal justice system. Based on the above discussion the authors are submitting the following suggestions:

1. There should be specific legislation covering the regulation of DNA technology in criminal justice administration.
2. The admissibility of DNA evidence should be recognized as an expert opinion under the Evidence Act, 1872.
3. Right to privacy is a fundamental right under article 21 of the Constitution of India. While implementing the technique of DNA profiling in criminal justice administration it

must be ensured that the privacy right should not be compromised in the process of the collection as well as deletion of the biological samples and DNA profiling.

4. Proper and trained, scientifically equipped investigation authorities must be established at the district level.
5. To ensure transparency and to avoid the misuse of DNA-related data proper monitoring agency must be established for the collection, preservation, analysis, and removal of DNA data.
6. For proper utilization of DNA technology in criminal justice administration, the proposed law should incorporate the constitution of a forensic science expert, investigative wings, laboratories, DNA bank and an efficient, transparent, and accountable mechanism of collection, retention, and removal of DNA sample.