Topic: – HUMAN DNA PROFILING AND ITS USE IN CRIMINAL TRIAL: BENEFITS AND RISKS

(Submitted to: Yugantar Legals)

(Date of Submission: 25-06-2021)

Submitted by:-

Ayush Amar Pandey

Chanakya National Law University, Patna

B.B.A. LL.B., 2nd Year

TABLE OF CONTENTS

1. ABSTRACT

The relevance of Human DNA Profiling as a tool of modern era in solving criminal cases is increasing day by day. The proper application and analysis of DNA technology has the ability to transform the criminal justice system, however, the risks involved in the use of such technology has the potential to outweigh the various benefits and act to the detriment of the society. The previous research on this aspect of criminal law has highlighted the major provision of the Human Profiling Bill proposed by the government in 2007, 2012 and 2016 before the Parliament, the shortcomings of the proposed bills and the recommendation by the various government appointed committees to make the bill foolproof. The present research adopts the doctrinal mode of research and presents a critical analysis of the various risks and benefits associated with the use and application of Human DNA Profiling in solving criminal cases. In light of these risks and benefits, it concludes whether the DNA Based Technology (Use and Regulation) Bill, 2017 should be enacted by the parliament or it needs further amendment to ensure its compliance with the rule of law. In spite of various amendments made in the DNA Based Technology (Use and Regulation) Bill, 2017 in accordance with the recommendation of the Government Committees, our findings indicate that some important provisions of the bill need to be critically aligned in accordance with the rule of law. The safeguards and restrictions required to prevent the misuse or misapplication of the DNA technology to meet evil ends needs to be made more stringent to prevent it from becoming prejudicial to the interests of members of the society and the DNA technology law

must follow the renowed judicial concept i.e. "Justice must not only be done, but must also be seen to be done".

2. INTRODUCTION – WHAT IS HUMAN DNA PROFILING?

Each human being has a specific DNA Pattern which can be obtained from a person's body tissue which can be used to identify an individual and thus establish the likelihood of his presence and involvement at the crime scene, this is done through DNA Profiling. DNA Profiling is the process where a specific DNA pattern (called a profile) is obtained from a person's body tissue which can be then used to identify the origin of a DNA Sample at a crime scene or test for parentage or to establish immigration eligibility.[1]

A DNA sample obtained from a crime scene can be compared with a DNA sample from a suspect. Where the two DNA profiles match, it can be ascertained that the evidence came from that suspect. On the contrary, where the two DNA profiles do not match, then the evidence cannot be ascertained to have come from the suspect. The first person to be convicted on the basis of DNA evidence in the UK was Robert Melias in 1987[2]. In the same year in the US, Tommy Lee Andrews was convicted in a rape case based on DNA evidence[3], in which his DNA profile was matched with that of semen traces recovered from the victim.

The problem related to Admissibility of DNA evidence in the court of law was critically challenged for the first time in the case of *People V. Castro*[4] in the New York Supreme Court in 1989. The accused name Jose Castro was charged with murdering a woman

[1] *Murphy, Erin, Forensic DNA Typing, Annual Review of Criminology 497–515.*
[2] *State V. Andrews, 533 So.2d 841 (Dist. Ct. App. 1989)*
[3] *National Research Council (US) Committee on DNA Forensic Science: An Update. The Evaluation of Forensic DNA Evidence. Washington (DC): National Academies Press (US); 1996. Available from: https://www.ncbi.nlm.nih.gov/books/NBK232610/ doi: 10.17226/5141*
[4] *People V. Castro, 1985, 38 Cal. 3d 301*

named Vimla Pence and her two year old daughter. A blood stain found on Castro's watch matched to the victim but thus evidence *by itself* was not strong enough to lead to his conviction. After Castro confessed his guilt he was convicted. In the instant case, the Life Code Corporation conducted a faulty DNA test having many procedural defects in an attempt to prove the conviction of the accused persons. Furthermore, the laboratory used contaminated probes and did not provide the other documents and reports relating to the testing. In the judgment, the court issued many directive guidelines with respect to the test procedures and maintenance of laboratory results and reports as well as explanations for probability calculations and recording of observed defects or laboratory errors. The need to identify and document chain of custody and allowing access to data, methodology and actual results for an independent expert to review were also instructed.[5]

The proper application of DNA evidence in criminal trials has been allowed by the court of law in many countries. DNA Profiling is an effective tool when performed in accordance with the strict guidelines propounded by the court of law which can be used to establish the guilt of the offender and exonerate the innocent individuals of their allegations.

3. LEGAL PROVISIONS RELATED TO HUMAN DNA PROFILING

The admissibility of DNA Evidence and its use in court of the law remains as a topic of dispute in the legal world. The ultimate discretion in this regard lies exclusively with the judges who must apply their legal mind and provide a solid and reasonable reasoning in allowing or disallowing the

[5] *S. Panneerchelvam and M.N. Norazmi, Forensic DNA Profiling and Database, The Malaysian Journal of Medical Sciences (2003), 20-26*

admissibility of DNA evidence which might be differ with respect to the facts and circumstance of each case. The legal provisions often argued to be in favour of the use of DNA Profiling in the court of law are as follows:

Section 53A of the Criminal Procedure Code, 1973 was recently added by the Cr.P.C. Amendment Act of 2005, it states that "when a person is arrested on a charge of committing an offence of rape or an attempt to commit rape and there are reasonable grounds for believing that an examination of his person will afford evidence as to the commission of such offence, it shall be lawful for a registered medical practitioner employed in a hospital run by the Government or by a local authority and in the absence of such a practitioner within the radius of sixteen kilometers from the place where the offence has been committed by any other registered medical practitioner, acting at the request of a police officer not below the rank of a sub-inspector, and for any person acting in good faith in his aid and under his direction, to make such an examination of the arrested person and to use such force as is reasonably necessary for that purpose."

Section 164A of the Criminal Procedure Code was recently added by the Cr.P.C. Amendment of 2005, it states that Where, during the stage when an offence of committing rape or attempt to commit rape is under investigation, it is proposed to get the person of the woman with whom rape is alleged or attempted to have been committed or attempted, examined by a medical expert, such examination shall be conducted by a registered medical practitioner employed in a hospital run by the Government or a local authority and in the absence of such a practitioner, by any other registered medical practitioner, with the consent of

such woman or of a person competent to give such consent on her behalf and such woman shall be sent to such registered medical practitioner within twenty-four hours from the time of receiving the information relating to the commission of such offence..

Similarly, **Section 27(1) of Prevention of Terrorism Act, 2002,** states that When a police officer investigating a case requests the Court of a Chief Judicial Magistrate or the Court of a Chief Metropolitan Magistrate in writing for obtaining samples of hand writing, finger-prints, foot-prints, photographs, blood, saliva, semen, hair, voice of any accused person, reasonably suspected to be involved in the commission of an offence under this Act, it shall be lawful for the Court of a Chief Judicial Magistrate or the Court of a Chief Metropolitan Magistrate to direct that such samples be given by the accused person to the police officer either through a medical practitioner or otherwise, as the case may be.

Section 45 of the Indian Evidence Act, 1872, lays down the provision for Opinions of experts and states that 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, the opinions upon that point of persons specially skilled in such foreign law, science or art, or in questions as to the identity of are relevant facts. Such persons are called experts.

Section 112 of the Indian Evidence Act 1872 lays down the provision of "Birth during marriage, conclusive proof of legitimacy" and states that 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.

The Court's power to order a person to take a DNA test can violate the **Right to privacy under Article 21** and **Right against Self-incrimination under Article 20(3) of the Indian constitution**, and this is the reason why Indian courts are very cautious and at time hesitant to take into consideration the evidence based on DNA profiling technology.

In regards to ***Govind Singh v. State of Madhya Pradesh***[6], the Supreme Court observed that assuming that the fundamental rights explicitly guaranteed to a citizen have penumbral zones and that the right to privacy is itself a fundamental right, that fundamental right must be subject to restriction on the basis of compelling public interest, it cannot be said that the fundamental right of, the petitioner under Article 21 has been violated by the provisions contained in it for, what is guaranteed under' that Article is that no person shall he deprived of his life or personal liberty except by the procedure established by 'law'. On this basis, numerous cases were decided by the Indian courts that authorized the use of DNA technology as evidence.

The constitutionality in taking a fingerprint was challenged in the case of ***State of Bombay v. Kathi Kalu Oghad***[7], The Supreme Court held that To be a witness" may be equivalent to "furnishing evidence" in the sense of making oral or written statements, but not in the larger sense of the expression so as

[6] *1975 AIR 1378*
[7] *A.I.R. 1961 S.C. 1808*

to include giving of thumb impression or impression of palm or foot or fingers or specimen writing or exposing a part of the body by an accused person for purpose of identification. "Furnishing evidence" in the latter sense could not have been within the contemplation of the Constitution-makers for the simple reason that-though they may have intended to protect an accused person from the hazards of self- incrimination, in the light of the English Law on the subject-they could not have intended to put obstacles in the way of efficient and effective investigation into crime and of bringing criminals to justice. The taking of impressions or parts of the body of an accused person very often becomes necessary to help the investigation of a crime. It is as much necessary to protect an accused person against being compelled to incriminate himself, as to arm the agents of law and the law courts with legitimate powers to bring offenders to justice.

In the case of ***Goutam Kundu v. State of W.B***[8], on the question arising from disputed paternity, the Court held that Blood grouping test is a useful test to determine the question of disputed paternity. It can be relied upon by courts as a circumstantial evidence which ultimately excludes a certain invididual as a father of the child. However, it requires to be carefully noted no person can be compelled to give sample of blood for analysis against her will and no adverse inference can be drawn against her for this refusal .

In the case of ***K. Venkataraman, J. Veeran v. Veeravarmalle***[9] is a suit by child for declaration that she is legitimate child born to her parents i.e., Petitioner and second respondent her

[8] *(1993) 3 S.C.C. 418*
[9] *A.I.R. 2009 Mad. 64.*

mother. The Court held that by directing the petitioner (father) herein to undergo D.N.A. Test to prove the paternity of the first respondent, cannot said to be affecting his fundamental rights and it is not in violation of his right to personal liberty enunciated under Article 21 of the Constitution of India As far as the second respondent is concerned, it is the definite case of the first respondent that she is the mother, but however, the second respondent has not chosen to appear before the Court below and she has remained exparte. Hence, the second respondent could not be directed to undergo D.N.A. Test by the Court below. The above analysis clearly shows that if the mother is not available, from the sample collected from the child and the alleged father, the paternity test can be conducted. Thus, if D.N.A. test is performed without the mother's sample, it requires additional analysis and it will take a few days longer to complete the same. However, the accuracy of the results will not be affected.

In ***Kanti Devi v. Poshi Ram***[10], the Supreme Court held that the result of a genuine DNA test is said to be scientifically accurate. But even that is not enough to escape from the conclusiveness of Section 112 of the Act, e.g. if a husband and wife were living together during the time of conception but the DNA test revealed that the child was not born to the husband, the conclusiveness in law would remain unrebuttable. This may look hard from the point of view of the husband who would be compelled to bear the fatherhood of a child of which he may be innocent. But even in such a case the law leans in favour of the innocent child from being bastardized if his mother and her spouse were living together during the time of conception. Hence

[10] *A.I.R. 2001 S.C. 2226.*

the question regarding the degree of proof of non-access for rebutting the conclusiveness must be answered in the light of what is meant by access or non-access as delineated above. The Supreme Court, by this decision, encouraged the law makers to strictly adhere to the conventional, unscientific, ineffective and biased system of justice.

Thus, on the basis of the above mentioned provisions and judgments of the Supreme Court, it can be said that the legal position of admissibility of the DNA Evidence in India is not clear and each decision passed by the court of law depends on the facts and circumstances of the case and the exclusive discretion of judge. An urgent need for a law specifying the use, method of application and limitations of DNA evidence in the court of law is observed in the public interest.

4. HOW CAN HUMAN DNA PROFILING BE USED FOR THE PURPOSE OF CRIMINAL TRIAL?

The Relevancy of DNA evidence in criminal cases has increased vastly and it is playing a larger role than ever before in solving criminal cases throughout the world. DNA evidence has contributed in dual parameters i.e. to prove the conviction of the offenders of law and to exonerate the persons wrongly accused or convicted. This increasing relevance places greater responsibility on the part of lawyers, jurists and forensic experts to recognize the potential significance of DNA evidence in criminal cases. In forensic science, the reports and researchers obtained after the analysis of DNA Samples continues to have a tremendous impact on the criminal justice system. For example, the modern developments in DNA technology make possible the analysis of smaller quantities and distinct varieties of

biological samples than was not possible earlier. The Human DNA can be used in the criminal trial in contemporary times for accomplishing the following purposes:-

a. Forensic Scientists can collect DNA found at the crime scene and compare it with DNA of the suspects to correctly identify the offender and rule out the innocent persons.
b. Elimination samples may be taken from anyone who had lawful access to the crime scene and may have left biological material and thus DNA evidence can be used to exonerate the innocent suspects or wrongfully convicted.
c. The DNA Data Banks can be useful in identifying the unknown persons who are major suspects of crime by comparing the DNA found at criminal scene with the DNA records of the DNA Data Bank.
d. The cases involving sexual offences can be precisely determined using DNA evidence.
e. The proper collection of DNA evidence along with the identification of its source in the investigation stage from the crime scene will make the case simpler to solve.
f. In the absence of any eye-witness at the crime scene or any direct evidence, the DNA evidence can be used as a link in the chain of circumstantial evidence to prove the guilt of the accused.
g. The DNA evidence can be used to establish the familial relationship of the suspect or accused and to solve the cases involving child trafficking, infanticide, concealed birth and abandoned children.
h. DNA evidence can be used to solve the cases involving maintenance and financial support claim from an estranged partner.

5. ESTABLISHMENT OF DNA DATA BANK – IS IT A THREAT TO RIGHT TO PRIVACY AND LEADS TO SELF INCRIMINATION?

A DNA Data Bank or DNA Database is an collection of DNA profiles and/or DNA samples (DNA Databank) which is organized and made easily accessible, manageable and updatable by the government and can be used by law enforcement agencies to identify suspects of crimes and to convict the offender. The first government database (the National DNA Database (NDNAD)) was set up by the United Kingdom in April 1995.[11] The increase in rates of public approval of DNA databanks has led to the creation and establishment of DNA Databanks in many states and regions around the globe. These databases are considered to be effective because of high recidivism rates in criminals i.e. a majority of crimes are committed by repeated offenders. Studies have shown that more than 60% of those offenders who are put in prison for committing violent offenses and subsequently released are rearrested for a similar offense in less than 3 years.[12] Here, the relevance of DNA database cannot be entirely negated, not only for the chance to catch recidivist criminals sooner, but also to prevent the commission of grievous offences, to secure the civil liberties of members of society, to exonerate the innocent wrongfully kept in suspicion and charged with an offences and finally to reduce the cost of getting justice in criminal cases.

The effectiveness and relevancy of DNA Data Bank in the modern criminal justice system cannot be ignored however, the question regarding infringement of Right to Privacy remains as one of the

---

[11] Martin PD, Schmitter H, Schneider PM. A brief history of the formation of DNA databases in forensic science within Europe. Forensic Sci Int. 2001 Jun 15;119(2):225-31. doi: 10.1016/s0379-0738(00)00436-9. PMID: 11376988.

[12] National Research Council (US) Committee on DNA Technology in Forensic Science. DNA Technology in Forensic Science. Washington (DC): National Academies Press (US); 1992. 5, Forensic DNA Databanks and Privacy of Information. (Jun. 24 2021, 08:13 P.M.) https://www.ncbi.nlm.nih.gov/books/NBK234540/

most relevant argument of critics of the DNA Data Bank Technology. The DNA of every individual contains the most vital information about his health, susceptibility to a disease, personal and behavioral traits and parental lineage of an individual. The collection and analysis of such highly confidential information by a third party can lead to a variety of dangerous risks for an individual. This issue has acted as deterrent for enactment of and also led to amendments in the law concerning DNA Profiling and creation of DNA Databank in many countries.[13]

The issues concerning the establishment and use of DNA Data Bank are not only concerned with the collection and analysis of DNA samples but also with its storage and sharing. The DNA samples could become the subject of experimentation and research by the government for new purposes[14] which would lead to infringement of fundamental right of people. With the increase in the hands authorized to access DNA Samples, the confidential information will be exposed to risk of leakage. Further, with the increase in cyber crimes, the stealing of such vital private information by the cyber criminals cannot be ignored. There is further requirement of strict laws related to the law enforcement agencies authorized to store, access and protect the confidential data in the DNA Data Bank, the methods and manner concerning it use, punishment and penalites for the violation of such law and causing leakage or misuse of DNA samples. In India, the Right to Privacy being declared recently as "a Fundamental Right"[15] under Article 21 of Constitution of India,

---

[13] "Protection of Freedoms Act 2012: DNA and fingerprint provisions". Protection of Freedoms Act 2012: how DNA and fingerprint evidence is protected in law. UK Government Home Office. 4 April 2014. Retrieved 11 October 2015.

[14] Roman-Santos, Candice (2010). "Concerns Associated with Expanding DNA Databases". Hastings Science and Technology Law Journal. 2: 267.

[15] Justice K.S. Puttaswamy vs. Union of India (2017) 10 SCC 1

the risks associated with the establishment of DNA Data Bank cannot be ignored and must be weighed properly along with its benefits, so that the establishment of DNA Data Bank does not become a bane rather than being a boon for the criminal justice system and the society.

6. ANALYSIS OF GOVERNMENT BILLS AND REPORTS

The Human DNA Profiling Bill was for the first time proposed by the Government of India in 2007. The Bill of 2007 was aimed at the establishment of a National DNA Data Bank and a DNA Profiling Board, and for using the Human DNA data to meet the various objectives specified in the Bill. The proposed DNA Profiling Board would have consisted of molecular biology, human genetics, population biology, bioethics, social sciences, law and criminal justice experts. The Board was to define standards and controls for DNA profiling. It was also to certify laboratories and handle access of data stored by law enforcement agencies. Similar bodies at State levels were also to be formed.[16]

The National DNA Data Bank, was supposed to collect data from offenders, suspects, missing persons, unidentified dead bodies and volunteers. It was to profile and store DNA data in criminal cases like homicide, sexual assault, adultery and other crimes.[17] The data was to be available also to the accused or the suspect for proving his noninvolvement in the crime or at least to establish that he was not present on the place of occurrence at the relevant time.

[16] *Law Commission of India, Report No.271, Human DNA Profiling – A draft Bill for the Use and Regulation of DNA-Based Technology*
[17] *Ibid.*

The draft 2007 DNA Profiling Bill failed to adequately regulate the collection, use, sharing, analysis and retention of DNA samples, profiles and data, whilst its various loopholes created a potential for abuse.[18] The bill was amended and proposed again in 2012 and 2016 however, the two amended bills were also dismissed and criticized for not addressing the concerns of privacy by a large number of organizations and public spirited persons on similar grounds and made various representations to the statutory authorities. The Bill did not make special provisions in respect of funding of the Board and how the required funds will be made available to the investigating agencies to collect proper reports of samples. Moreover, the Bill did not specifically provide as to on what stage the samples could be collected.[19]

The Government of India has again proposed the DNA Based Technology (Use and Regulation) Bill, 2017 or the Human DNA Profiling Bill before the Parliament for approval. The features of the proposed Bill of 2017 are as follows[20]:-

1. **Use of DNA Technology**: The Bill regulates the use of DNA technology for establishing the identity of persons in respect of civil and criminal matters. These include offences under the Indian Penal Code, 1860, parentage disputes, issues related to emigration or immigration, and black marketing of organs.
2. **Strict adherence to 13 CODIS loci**: The Bill of 2017 provides provisions intended to protect the right to privacy. The mechanism provided permits for processing of

[18] *Maria Xynou, Internet Governance, A Comparison of the Draft DNA Profiling Bill 2007 and the Draft Human DNA Profiling Bill 2012, (Jun. 25, 2021, 10:22 PM) https://cis-india.org/internet-governance/blog/comparison-of-draft-dna-profiling-bills*
[19] *Ibid. at 16*
[20] *Ibid. at 16*

DNA samples only for 13 CODIS loci which would not violate in any way the privacy of a person and as a result will never go beyond identification of a particular person. The strict adherence to 13 CODIS loci will eliminate the apprehension of revealing genetic traits.

3. **Establishment of National and Regional DNA Data Bank:** The Bill provides for the establishment of a National DNA Data Bank and Regional DNA Data Banks, for every state, or two or more states. DNA laboratories are required to share DNA data prepared by them with the National and Regional DNA Data Banks. Every Data Bank will be required to maintain indices for the following categories of data: (i) a crime scene index, (ii) a suspects' or undertrials' index, (iii) an offenders' index, (iv) a missing persons' index, and (v) an unknown deceased persons' index.
4. **Establishment of a DNA Regulatory Board:** The Bill provides for the establishment of a DNA Regulatory Board, which will supervise the DNA Data Banks and DNA laboratories. The Secretary, Department of Biotechnology, will be the ex officio Chairperson of the Board. The Board will comprise additional members including: (i) experts in the field of biological sciences, and (ii) Director General of the National Investigation Agency and the Director of the Central Bureau of Investigation.
5. **Functions of DNA Regulatory Board :** The functions of the Board include: (i) supervising DNA laboratories and DNA Data Banks, including quality control, (ii) granting accreditation to DNA laboratories, and (iii) developing modules for training manpower to deal with DNA related matters. Further, the Board will make recommendations to the central government on privacy protection in relation to the use and analysis of DNA samples.

6. **DNA laboratories:** Any laboratory undertaking DNA testing is required to obtain accreditation from the Board. The Board may revoke the accreditation for reasons including, failure to: (i) undertake DNA testing, or (ii) comply with the conditions attached to the accreditation. If the accreditation is revoked, an appeal will lie before the central government or any other authority notified by the central government. Further, every DNA laboratory is required to follow standards for quality assurance in collection, storing, and analysis of DNA samples. After depositing the DNA profile for criminal cases, the laboratory is required to return the biological sample to the investigating officer. In all other cases, the sample must be destroyed.
7. **Collection of DNA with and without consent:** While preparing a DNA profile, bodily substances of persons may be collected by the investigating authorities. Authorities are required to obtain consent for collection in certain situations. For arrested persons, authorities are required to obtain written consent if the offence carries a punishment of up to seven years. If the offence carries more than seven years of imprisonment or death, consent is not required. Further, if the person is a victim, or relative of a missing person, or a minor or disabled person, the authorities are required to obtain the written consent of such victim, or relative, or parent or guardian of the minor or disabled person. If consent is not given in these cases, the authorities can approach a Magistrate who may order the taking of bodily substances of such persons.
8. **Removal of DNA profiles:** The Bill states that the criteria for entry, retention, or removal of the DNA profile will be

specified by regulations. However, the Bill provides for removal of the DNA profiles of the following persons: (i) of a suspect if a police report is filed or court order given, (ii) of an undertrial if a court order is given, and (iii) on written request, for persons who are not a suspect, offender or undertrial, from the crime scene or missing persons' index.

9. **One-time keyboard search**: The Bill allows for a one-time keyboard search for any DNA sample collected in a criminal investigation. This means that the DNA sample can be compared with information in the index of the Data Bank, without the information from the sample being included in the index.
10. **Penalties**: The penalty for various offences such as: (i) unauthorised disclosure of information from the Data Bank, (ii) obtaining information from the Data Bank without authorisation, or (iii) using DNA sample without authorisation, is imprisonment up to three years and fine of up to one lakh rupees. Further, the penalty for intentional tampering or destruction of biological evidence is imprisonment up to five years as well as fine of up to two lakh rupees.

7. BENEFITS OF HUMAN DNA PROFILING

The various benefits associated with the Human DNA Profiling are as follows:-

a. Human DNA Profiling can be used to identify the individuals (suspects, victims, offenders, innocent persons etc) on the basis of the unique genetic makeup of DNA.
b. Human DNA Profiling can be used to exonerate the innocent persons falsely implication with many offences.

c. Human DNA Profiling is useful in solving decades old cases based on samples of DNA rich material.
d. DNA profiling advances have also enabled law enforcement to exonerate people who were wrongfully convicted of crimes they didn't commit.
e. DNA profiling also enhances the criminal system's accuracy. In high pressure situations, memory distortions can cast doubt on eyewitness testimony. By comparison, DNA is scientifically accurate and thus more difficult to dispute.
f. The cases involving sexual offences can be precisely determined using DNA evidence.
g. The proper collection of DNA evidence along with the identification of its source in the investigation stage from the crime scene will make the case simpler to solve.
h. In the absence of any eye-witness at the crime scene or any direct evidence, the DNA evidence can be used as a link in the chain of circumstantial evidence to prove the guilt of the accused.
i. The DNA evidence can be used to establish the familial relationship of the suspect or accused and to solve the cases involving child trafficking, infanticide, concealed birth and abandoned children.
j. DNA evidence can be used to solve the cases involving maintenance and financial support claim from an estranged partner

8. RISKS ASSOCIATED WITH HUMAN DNA PROFILING

The various risks associated with the Human DNA Profiling are as follows:-

a. The procedure adopted for Human DNA Profiling is not errorless and a partially analyzed DNA Profile may match with multiple persons and should not serve as conclusive evidence.
b. In many instances, public crime labs are overwhelmed by backlogs of unanalyzed DNA samples. In addition, these labs may be ill-equipped to handle the increasing influx of DNA samples and evidence. The problems of backlogs and lack of up-to-date technology result in significant delays in the administration of justice
c. The legality of practice of catching criminals based on searches of his family's DNA has been a matter of debate in the court of law.
d. DNA can also be abused, misused, or misunderstood, causing miscarriages of justice. In 2011, a careless lab error resulted in an innocent man being charged with rape because his DNA was erroneously found to match a sperm sample taken from the victim. It later became clear that the lab had mixed up its files. In short, DNA is just one piece of the criminal justice puzzle, and should not be relied on to the exclusion of other investigative and analytical tools.
e. The creation of DNA Data Banks could lead to discrimination between people on the basis of race or class ethnicity.
f. The DNA of every individual contains the most vital information about his health, susceptibility to a disease, personal and behavioral traits and parental lineage of an individual. The collection and analysis of such highly confidential information by a third party can lead to a variety of dangerous risks for an individual

g. The DNA samples could become the subject of experimentation and research by the government for new purposes[21] which would lead to infringement of fundamental right of people.
h. With the increase in the hands authorized to access DNA Samples, the confidential information will be exposed to risk of leakage.
i. with the increase in cyber crimes, the stealing of such vital private information by the cyber criminals cannot be ignored
j. The probability of misuse of DNA Data Banks by the officials authorized to store, maintain and protect DNA information and miscarriage of justice caused by it cannot be ignored.
k. The DNA information stored in the DNA Data Banks could be duplicated and used for fulfillment of evil purposes.
l. The DNA information can be misused by the officials in the law enforcing agencies to exculpate the innocent and free the offender.
m. The artificially created DNA samples of innocent individuals can be used to produce false evidence against innocent persons and convict them particularly in cases involving sexual offences.
n. The establishment of familial relationship with the help of DNA testing is not totally accurate and involves uncertainty.
o. Using a DNA database, it is possible to take information from a profile and manufacture DNA to match it, and that this can be done without access to any actual DNA from the person whose DNA they are duplicating and thus the DNA

[21] *Roman-Santos, Candice (2010). "Concerns Associated with Expanding DNA Databases". Hastings Science and Technology Law Journal. 2: 267.*

should not be used by the law enforcing agencies as the ultimate method of identification.

p. With the help of artificially created DNA, a crime scene can be engineered in the supervision of experts and could be used to influence the decision of the court of law and cause miscarriage of justice.
q. Police forces may collect suspect's DNA without his knowledge and use it as evidence or for investigation purposes.
r. Obtaining DNA from individuals without their consent can lead to violation of right to silence and lead to self-incrimination.
s. Cell free DNA is dubbed as template DNA. When the amount of DNA is less than 200 pico-gram then it's known as low template DNA. It leads to higher chances of contamination. Low template DNA are coming to court with inadequate capabilities for sound interpretation.
t. Humidity, temperature, bacterial contamination, moisture conditions, UV (ultraviolet) -rays, direct sunlight and dampness also shown a significant impact in the perception of DNA-typing. Under the influence of these types of environmental factors nicking of the whole DNA take place.
u. Lack of expertise among the so called "experts" in the field of DNA technology and forensics can lead to error in the identification of criminals and conviction of innocent persons
v. More touch DNA shreds of evidence submitted a more poor quality interpretation of results formed. Touch DNA contaminates pieces of evidence. Sometimes mixture of genome takes place which give rise to unreliable results due to contamination. Co-incidental matches or sometimes genetic identical persons such as "chimeras" excluded

incorrect consequences and shown the major drawback of this DNA typing technology.

9. CONCLUSION

The study and application of Human DNA Profiling to solve criminal cases has revolutionalized the criminal justice system and equipped it with tools of modern era to ensure the administration of justice. The positive side of this revolution is that it offers enhanced opportunities to convict the guilty and exonerate the innocent. The task of solving complex criminal cases specifically sexual offences can be met with much ease using the DNA technology. The establishment of DNA Data Bank goes a long way in ensuring the effectiveness and efficiency of development of Human DNA Profiling Technology however, the question regarding infringement of Right to Privacy remains as one of the most relevant argument of critics of the DNA Data Bank Technology. This issue has acted as deterrent for enactment of and also led to amendments in the law concerning DNA Profiling and creation of DNA Databank in many countries.

The existing codified laws have made way for the use of Human DNA Profiling Technology in the court of law however major concerns over its misuse, leakage, self incrimination and right to privacy asks for the enactment of a law which is efficient in regulating the storage, management and manner of use of the DNA technology and also to prevent its misapplication to the prejudice of any party in the court of law. The Human DNA Profiling Bill was earlier proposed by the Government of India in 2007, 2012 and 2016 these bills were dismissed and criticized for not addressing the concerns of privacy and technicalities of procedure by a large number of organization ns and public spirited persons on similar grounds and made various representations to the statutory authorities. The Government of India has again proposed the DNA Based Technology (Use and

Regulation) Bill, 2017 or the Human DNA Profiling Bill 2017 before the Parliament for approval.

Whether the DNA Based Technology (Use and Regulation) Bill, 2017 or the Human DNA Profiling Bill of 2017 fulfills all the essential requirements of protecting people's privacy, laying down an effective procedure for management and use of DNA Technology, creation of government departments to prevent the misuse and infringement of people's privacy and whether the inclusion of the recommendations provided by various government committees is a matter of debate and will require a detailed analysis of the proposed bill in the parliament. The use of Human DNA Profiling is a modern tool which can be used to solve both civil and criminal cases. However, the risk and benefits associated with the use of Human DNA Profiling must be weighed in golden scale before the enactment of any important law on this aspect by the parliament. The judiciary has to play an important role in ensuring that all the benefits of the DNA technology are preserved and utilized in accordance with the fundamental rights provided in the Constitution of India for the administration of justice and at the same time it has to ensure all the risks associated with its management and misapplication are vigilantly monitored and prevented.