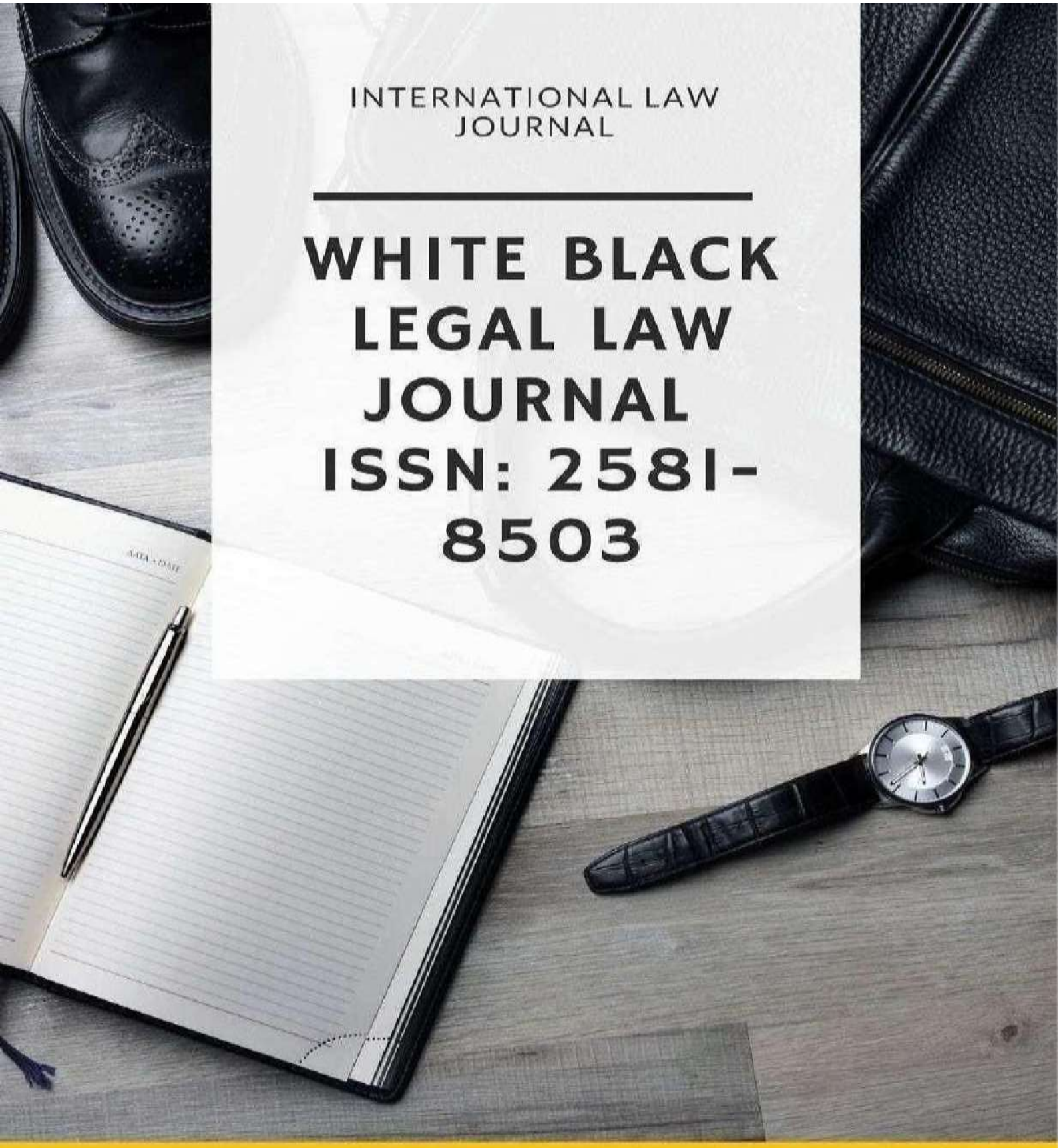

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WHITE BLACK LEGAL is an open access, peer-reviewed and refereed journal providededicated to express views on topical legal issues, thereby generating a cross current of ideas on emerging matters. This platform shall also ignite the initiative and desire of young law students to contribute in the field of law. The erudite response of legal luminaries shall be solicited to enable readers to explore challenges that lie before law makers, lawyers and the society at large, in the event of the ever changing social, economic and technological scenario.

With this thought, we hereby present to you

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FORENSIC DNA EVIDENCE IN INDIA: JUDICIAL PERSPECTIVES AND THE NEED FOR ROBUST REGULATION

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Introduction

DNA the blueprint of life has genetic information that is present only in each individual but the same in all tissues in the body, be it blood, saliva, or hair. Each individual requires only one biological sample to be profiled by DNA profiling, whether it is a cheek swab (which, for the record, is not why it became known officially as a DNA test) or a blood sample. A single sample was all that was necessary to create this revolution back in 1985 when Dr. Alec Jeffreys first introduced such an approach. Commonly referred to as DNA print, this process determines the identity of a person by examining the specific identifying DNA characteristics. By extraction, analysis and interpretation, laboratories transform an individual's genetic material into digital data, a string of numbers which can be uploaded and stored, with data on crime scene samples, in databases.

Even though DNA testing has made considerable leap in the world, India is dragging behind because there is no comprehensive statutory or regulatory framework. DNA fingerprinting is very accurate and aids in the justice process; however it also brings up privacy, illegal or unwanted collection, abuse, and databank security issues.

DNA Profiling or DNA Fingerprinting

DNA fingerprinting is the process by which portions of an individual's DNA are identified to distinguish that person from a different individual. Categories of DNA profiles are derived from laboratory analysis and are maintained in automated files linked to information that identifies the source. This technology is indispensable not only in criminal cases, but also in civil cases such as paternity cases and mass disaster victim identification.

But there's potential for abuse through fabricated DNA, DNA theft and DNA planting. And unlike standard IDs stolen DNA can't be replaced, heightening fears of genetic identity theft. Furthermore, scenarios such as secondary transfer in which DNA is mistakenly transferred to a crime scene, significantly add to the complexity in the interpretation of evidence[1].

Use of DNA Evidence

As a characteristic of modern forensic identifications, it has become possible to use DNA as a basis to compare all kinds of biological traces that have been left behind at crime scenes blood, saliva, semen with reference samples. In India, forensic DNA began in 1989 at the Centre for Cellular and Molecular Biology (CCMB)[2]. The foundation of the Centre for DNA Fingerprinting and Diagnostics (CDFD)[3] in 1998 provided further impetus which was directed at criminal as well as civil applications. Other testing centres such as the Central Forensic Science Laboratory (CFSL) in Kolkata and several State Forensic Science Laboratories (SFSLs) also do DNA analysis. Besides, the Wildlife Institute of India (WII) takes care of wild life related forensic cases.

DNA has played a key role in solving high-profile cases, from paternity disputes such as Kunhiraman v. Manoj[4] to decades old homicides and sexual assaults. However, the non-availability of standardized guidelines and dedicated legislation and the lack of awareness restrict its utilization in India.

DNA Databases in India: Developments

Internationally, countries like the USA, UK and Australia have developed advanced DNA databases to trace missing persons and unclaimed bodies. In India, the country's first National DNA Database and Identification Portal for unidentified bodies is being established by the Department of Forensic Medicine and Toxicology at AIIMS, New Delhi. Funded by Indian Council of Medical Research (ICMR), this project obtains biological samples during autopsies (with informed consent) and records the phenotypic profile.

[1] https://cis-india.org/internet-governance/blog/privacy/dna-profiling-bill
[2] Centre for Cellular and Molecular Biology (CCMB), Hyderabad website: https://www.ccmb.res.in accessed on 15.06.2025
[3] Centre for DNA Fingerprinting and Diagnostics (CDFD), Hyderabad: https://www.cdfd.org.in accessed on 15.06.2025
[4] (1991) DMC 499 (Ker)

As a result, India's DNA database landscape remains largely unregulated, with the aspirations of the DNA Technology (Use and Application) Regulation Bill, 2019, which aims to set up a National DNA Data Bank for forensic use, still hanging fire. Internationally, the Interpol Global DNA Profiling Survey (2019) found 89 of 194 member countries to have DNA profile databases with only 70 nations designated as DNA database countries[5]. Lack of facilities & standard protocols further compound the issue in rest of India where 1,700 medico-legal autopsies are conducted every year at AIIMS alone, with approximately 15% unidentified cases.

Identification Through DNA

Since DNA is found in all nucleated cells, biological samples including blood, semen, hair, and saliva have become a crucial tool for law enforcement testing. Assays: These are variable depending on the sample type (i.e. vegetative blood against dry blood), highly region specific and as India does not have specific DNA LD laws, country specific guidelines are lacking.

From a forensic point of view, the secure chain of custody is the most critical element to guarantee the integrity of DNA evidence. This is to contain full details of who collected, the receipts, who handled, photographs, who analysed and when with dates and case references. They develop DNA profiles from blood, hair, or buccal samples frequently without the consent of the individual if the matter is criminal to match suspects or victims to traces at a crime, verify previous contact or associate multiple offenses. On the other hand, a match is not a 100 percent guarantee, especially when "innocent" activities (e.g., consensual sex in a sexual assault case) are possible.

Existing Legislative Framework and Bills

1. **DNA Evidence in Indian Courts:** There is no separate statute in India which is specific to DNA testing. Instead, it depends on the more generalist statutes such as the Bhartiya Nagrika Suraksha Sanhita, 2023 (BNSS) and Bhartiya Sakshaya Adhiniyam, 2023, leaving little more than the general provisions. There is thus no question that the admissibility of DNA evidence in such cases is squarely within the realm of judicial discretion. Comparison accepted the scientific validity of DNA profiling but recognized

[5] Interpol, Global DNA Profiling Survey 2019, https://www.interpol.int accessed on 15.06.2025

that its acceptance was a matter of degree, invariably coloured by constitutional concerns.

2. **The DNA Technology Bills of 2018 and 2019**: Both the 2018 Bill that died and the 2019 Bill under consideration would create national and regional DNA data banks, accredit laboratories and protect privacy through informed consent, unless there is a criminal case. But concerns remain around misuse of DNA, how long it can be held and the lack of safeguards to reassure the public this will be collected only in a way that is directly relevant to the legal process.
3. **Reports of Malimath Committee and the Law Commission:** The Malimath Committee had recommended that DNA experts by designated as witnesses under Section 295(4) of the CrPC. In Ananth Kumar v. State of Andhra Pradesh[6], the court read "examination" in Section 54 of the CrPC to mean DNA testing, and in D.J. Vaghela v. Kantibai Jethabai[7], ordered collection of biological sample under Section 53 without violating Article 20(3).

   The 2017 Law Commission Report recommended establishment of a statutory body known as DNA Profiling Board which would also regulate the functioning of DNA laboratories and staff training and dealing with DNA Database. It stressed the use of DNA solely for the identification purpose and the need for national and regional DNA databases. A stand-alone statute was proposed to deal with privacy and integrity issues[8].

Judicial Approach to DNA Testing

DNA testing was introduced for the first time to prove paternity cases in India and was used extensively in high-profile criminal cases including the Priyadarshini Mattoo murder case, and the assassination cases of Beant Singh and Rajiv Gandhi. In State of Bombay v. Kathi Kalu Oghad[9], the court ruled that obtaining physical evidence, such as DNA, does not breach Article 20(3) as it is not testimonial. This position was reiterated in D.J. Vaghela vs. Kantibai Jethabai[10].

Further, in Selvi v. State of Karnataka[11], the Court made a distinction between physical like

[6] 1977CRILJ1797
[7] 1985 Crl. LJ. 974 (Guj)
[8] https://cdnbbsr.s3waas.gov.in/s3ca0daec69b5adc880fb464895726dbdf/uploads/2022/08/2022081616.pdf assessed on 18.06.2025
[9] 1962 SCR (3) 10
[10] Supra 5
[11] (2010) 7 SCC 263

DNA which is permissible without consent and testimonial which requires consent holding that methods such as narco-analysis needed express consent. Likewise, in Ritesh Sinha v. State of U.P.[12], voice spectrography was also upheld with a rider of having to have a proper legislative guidelines for DNA procedures.

Moreover, in Bhabani Prasad Jena v. Orissa State Commission for Women[13], the Supreme Court cautioned against routine DNA paternity tests framing privacy vis a vis interests of justice. DNA testing was found to be mandatory in cases of sexual offences after the amendment of 2006 CrPC: Krishan Kumar Malik v. State of Haryana[14]. The K.S. Puttaswamy[15] judgment acknowledging privacy as a fundamental right has brought into focus the DNA collection process.

Recent rulings such as Rahul v. State (NCT of Delhi) (2023) and Manoj v. State of Madhya Pradesh[16] underscore the need for an unbroken chain of custody, and the necessity to account for the stringency of DNA matches. The Priyadarshini Mattoo murder case also reiterates the fact that the mishandling of forensic evidence is a two-edged sword, one that needs to be bolstered by other evidence.

Limitations of DNA Profiling

The strength of a DNA case depends on the reliability and admissibility of DNA evidence and that in turn depends on highly restrictive standards for the collection, preservation, and documentation of DNA to meet the expected judicial scrutiny. “The court in Rajiv Singh v. State of Bihar[17] highlighted the probability of deficiencies in DNA analysis and recommended strict scrutiny of laboratory methods.

Added to that, the limited forensic infrastructure in India not many specialized laboratories such as the CDFD and lack of trained staff makes the task even more difficult.” The absence of a DNA database and international practices causes the backlog of cases and variance in sentencing. Therefore, courts generally accept DNA evidence as supportive but not conclusive,

[12] (2013) 2 SCC 357
[13] (2010) 8 SCC 633
[14] (2011) 7 SCC 130
[15] Justice K.S. Puttaswamy v Union of India (2017) 10 SCC 1
[16] 2023 INSC 705
[17] 2014 SCC OnLine Pat 3252

they tend to consider eyewitness evidence under the Indian Evidence Act, 1872 and the Cr.P.C., 1973. While the 2005 changes in sections 53A, 164A of the Cr.P.C. brought in DNA sampling in rape cases, there is a need for a more comprehensive regulatory framework around it.

Conclusion & Suggestions

DNA profiling is heralded as a new era in the search for justice, providing unprecedented accuracy for the identification of people and the crimes they commit. Yet its power is also limited by profound challenges to procedure, to privacy, and to undue deference to the technology that could drown out more critical evidence. Moreover, the lack of a standalone legislative regime in India compounds these problems, resulting in varied practices, lack of clarity on admissibility and lapses in safeguarding the rights of individuals.

Due to these intricacies, there's a need to establish a full-fledged legal and regulatory framework around the submission, analysis, storage, and eventually the use of DNA evidence. Such a regime would have to navigate that sweet spot between justice being done and the safeguarding of constitutional rights, premised on the natural inclination of ordinary reasonable people to not want to be able to do evil. Only then will DNA technology truly become a powerful tool in our criminal justice system & yet remain as an ethical tool in the hands of the Indian criminal administration of justice.

Suggestions

1. **Guarantee Privacy and Confidentiality**: Adopt definitive legal protections for individuals whose genetic code is sampled and store that information only for the purpose of law enforcement investigations, with no room for unauthorized sharing.
2. **Use DNA Evidence Responsibly**: Educate all parties including investigators, prosecutors, and courts to consider the limitations of DNA evidence, to not overly rely on it to the exclusion of other evidence that could also prove to be significant.
3. **Install Independent Oversight**: Establish independent regulatory entities that accredit, monitor and audit DNA laboratories so that they are transparent, accountable, and following uniform standards.
4. **Require Methodological Transparency**: Private labs should also be required to share testing methods and protocols with the defence, with no more hurdles like "trade secret" claims over fair trial rights.

5. **Adopt Peer-Reviewed Scientific Standards**: Guarantee that all assessments of DNA techniques are accorded strict, peer-reviewed standards in line with the world's biomedical research standards.
6. **Facilitate International Collaboration**: Connect with foreign forensic organizations for best practices and opportunities in capacity building and to standardize protocols.
7. **Context Appropriate Interpretation of DNA Evidence**: Urge courts to evaluate DNA matches in concert with other supporting evidence with awareness of the relevant statistical probabilities and alternative hypotheses.
8. **Sample categories need to be clearly defined**: Make a legislative distinction between intimate and non-intimate samples, taking best practice from models such as the UK's Police and Criminal Evidence (PACE) Act to guide what is lawful collection.
9. **Avoidance of Forensic Abuses**: Adopt rigorous practices that would reduce errors and abuses and shield expert witnesses from external or negligent influences.
10. **Limit the Scope of DNA use**: Narrow the use of DNA analysis so that it is used for identity only and does not include a consideration of genetic traits other than identification.
11. **Re-consider DNA Databases**: Create a critical perspective on the size and functioning of DNA databases in order to reduce risks to privacy and misuse of info rm at io n an d avoid mistakes.

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