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### DNA DATABANK

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#### INTRODUCTION

DNA profiles entail databases like DNA database or DNA databank which is used in the investigation of genetic diseases, genetic fingerprinting in the field of criminology, or genetic genealogy. DNA technology has shown to be a worthy investigative tool for freeing innocent citizens and bringing forth the person who is responsible for any serious crimes. The Federal Bureau of Investigation (FBI) in the US has planned to add more autosomal short tandem repeat (STR) loci to its current core set of loci.<sup>1</sup> The continuous progress in the size of forensic DNA databases upsurges issues on the standards of enclosure and conservation and uncertainties on the effectiveness, commensurability, and contravention of secrecy of such large personal data collections. People have problems that spill beyond the level of simple privacy and concealment issues. The inventiveness to draft a

bill legalizing the utilization of DNA samples for crime-related details began in 2003 when the Department of Biotechnology (DoB) acclaimed a committee that is known as the DNA Profiling Advisory Committee to assortment approvals for the drafting of the DNA Profiling Bill 2006, which ultimately became the Human DNA Profiling Bill 2007.<sup>2</sup> The 2007 draft Bill was equipped by the DoB conveyed by the Centre for DNA Fingerprinting and Diagnostics (CDFD). The CDFD is an independent institution supported by the DoB. In accretion to the CDFD, there are numerous Central Forensic Science Laboratories in India that controlled the Ministry of Home Affairs and the Central Bureau of Investigation, accompanied by several private laboratories that examine DNA samples for crime-related purposes.<sup>3</sup>

<sup>1</sup> National Academy of Sciences, DNA Technology in Forensic Science, The National Center for Biotechnology Information, <https://www.ncbi.nlm.nih.gov/books/NBK234540/>.

<sup>2</sup> Report No. 271: Human DNA Profiling- A draft Bill for the Use and Regulation of DNA-Based Technology, Law

Commission of India, July 2017, <http://lawcommissionofindia.nic.in/reports/Report271.pdf>.

<sup>3</sup> DNA Technology in Forensic Science”, Committee on DNA Technology in Forensic Science, United States of America, 1992.



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### CURRENT SCENARIO OF DNA DATABANK IN INDIA

In India, there is an enormous requirement for these types of databases which may assist in stopping different types of fraud like ration card fraud, voter identity card fraud, driving license fraud, etc. The database may help the police to distinguish criminals and non-criminals. The Central government is functioning on an innovative version of legislation that seeks out to set up a national DNA database of 'criminals', that permits for the collection and storage of DNA samples of those suspect in cases extending from homicide, sexual assault, and rape to unfluctuating violations under the Motor Vehicle Act. The first forensic DNA database in the world was established in 1995 and named the UK National DNA database. Even though the criminal DNA database was initially extensively supported by the public, a major extension of the database, which allowed a significant number of innocent people's records to be kept, became highly controversial.<sup>4</sup>

In the data, the Bill stated that it will also be used for the formation and conservation of population statistics and can be used for documentation, research, protocol development, or quality control. Strangely adequate, the penalty for "misuse" of the DNA profiles fascinates mild imprisonment of a few months or a fine of a measly Rs 50,000.<sup>5</sup>

Law implementation agencies like the Central Bureau of Investigation (CBI) have been strident by the government for the early enactment of the Bill. They have quoted the discoveries of a UK parliamentary report that was issued by its Office of Science and Technology in February 2006 that states that convictions in criminal cases went up radically after the government decided to sustain DNA profiling data in perpetuity. The report accounts that the detection of crime in the UK went up from 26% to a healthy 40% after DNA samples were encumbered into the national DNA database.<sup>6</sup>

<sup>4</sup> Forensic DNA Analysis of Challenging Samples, <https://www.thermofisher.com/in/en/home/industrial/forensics/human-identification/forensic-dna-analysis/dna-analysis.html>

<sup>5</sup> Long Title, DNA Technology (Use and Application) Regulation Bill, 2018,

<http://www.prindia.org/uploads/media/DNA/DNA%20Bill,%202018.pdf>

<sup>6</sup> Edward Scott, Forensic science and the criminal justice system, The House of Lords Library, 26<sup>th</sup> Apr, 2021, <https://lordslibrary.parliament.uk/forensic-science-and-the-criminal-justice-system/>

## TYPES

### ❖ *Forensic*

- A unified DNA database for storing DNA profiles of individuals that permits searching and comparing DNA samples that are collected from a crime scene against stored DNA profiles.
- The most substantial function of the forensic database is to produce competitions between the suspected individual and crime scene indication, then deliver evidence to support criminal investigations, and identify potential suspects in the criminal investigation. The bulk of the national DNA databases are utilized for forensic purposes.<sup>7</sup>
- In criminal investigations, the Interpol DNA database is used.<sup>8</sup>
- Interpol preserves a robotic DNA database called a DNA Gateway containing DNA profiles submitted by member countries collected from crime scenes, missing persons, and unidentified bodies.<sup>9</sup>
- In 2002, the DNA Gateway was established, and then after that in 2013, the DNA Gateway had more than 140,000 DNA profiles from 69 member countries in the world were recorded.<sup>10</sup>
- Contrasting other DNA databases, DNA Gateway is merely used for information allocation and evaluation, it doesn't relate a DNA profile to somebody, and therefore the physical or psychological conditions of a person are nowhere involved in the database.
- The insistent growth in the size of forensic DNA databases raises issues on the standards of supplement and preservation and doubts on the efficiency, commensurability, and infringement of privacy of such huge personal data collections. In disparity to the past, not only in serious crime but all crimes are subject to DNA analysis generating.

<sup>7</sup> S. Panneerchelvam and M.N. Norazmi, *Forensic DNA Profiling and Database, The National Center for Biotechnology Information*, Jul, 2003, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3561883>.

<sup>8</sup> *Recommendations for the Establishment of a National DNA Database*, Interpol, 1<sup>st</sup> Jan, 2015.

<sup>9</sup> *DNA can play a crucial role in convicting – or clearing – suspects of a crime, and can also be used to identify missing*

*persons*, Interpol, <https://www.interpol.int/en/How-we-work/Forensics/DNA>.

<sup>10</sup> Prüm Business and Implementation Case, Home Office, Nov, 22015, [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/480129/prum\\_business\\_and\\_implementation\\_case.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/480129/prum_business_and_implementation_case.pdf).



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#### ❖ *Genealogical*

- A national or forensic DNA database is only available for police purposes.
- DNA profiles can also practice for genealogical purposes so that a separate genetic genealogy database requirement to be shaped that stores DNA profiles of genealogical DNA test results.<sup>11</sup>
- GenBank is a communal genetic genealogy database that spares genome arrangements that are submitted by genetic genealogists.
- GenBank has delimited a large number of DNA sequences gained from more than 140,000 registered organizations and the same is updated every day to certify a uniform and inclusive collection of sequence information, this is happening till now.
- These databases are mostly attained from individual laboratories or large-scale sequencing plans.

#### ❖ *Medical*

- A medical DNA database is a DNA database that is medically relevant to genetic variations.
- It gathers a person's DNA that can replicate their medical records and lifestyle details.
- Concluded recording DNA profiles, scientists may find out the connections between the genetic environment and occurrence of certain diseases and thus, discovering some new drugs or actual treatments in controlling these diseases.<sup>12</sup>
- It often collaborates with the National Health Service.

#### ❖ *National*

- A national DNA database is a DNA database that is preserved by the government for keeping DNA profiles.
- Each DNA profile-based PCR and uses STR analysis.
- They are generally used for forensic purposes which include searching and matching DNA profiles of potential criminal suspects.

<sup>11</sup> John M. Butler, The future of forensic DNA analysis, The National Center for Biotechnology Information, 5<sup>th</sup> Aug, 2015, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4580997/>.

<sup>12</sup> LM Hernandez, Genes, Behavior, and the Social Environment: Moving Beyond the Nature/Nurture Debate, 2006, <https://www.ncbi.nlm.nih.gov/books/NBK19932/>.



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- In 2009, Interpol brought that there were 54 police national DNA databases in the world and 26 countries were planning to start the same.
- In Europe Interpol reported there have been 31 national DNA databases and 6 more planned.
- In 2014, The European Network of Forensic Science Institutes (ENFSI) DNA working division had made 33 recommendations for DNA database organization and provided certain guidelines for estimating DNA databases.<sup>13</sup>
- Other countries have adopted privately recognized DNA databases.

The criminal DNA database was initially extensively supported by the public, a major extension of the database, which allowed a significant number of innocent people's records to be kept, became highly controversial.<sup>14</sup>

The changed law is allowed more than a million innocent people's DNA profiles to be reserved on

what was earlier a criminal DNA database, overturning the assumption of innocence until proven guilty. Many were young children accused of minor offenses such as damaging trees or fences, and some were victims of crimes or people who had intervened to try to stop a fight, but who had been mistakenly suspected by their attacker. In a case, a grandmother had taken the DNA of a girl when she was arrested for suspected theft when she failed to return the football that some children had kicked into her garden.

As a UK- based civil society organization with a concern to check and have cooperation with the general public in debate about social implications of genetic technologies Gene Watch UK was vigorously involved within the debate approaching the National DNA Database expansion, as an example by delivering evidence to parliamentary committees and the European Court; publishing briefings and reports; stating to the media; replying to individuals anxieties about their DNA records or those of their families.

<sup>13</sup> ENFSI DNA Working Group, DNA DATABASE MANAGEMENT REVIEW AND RECOMMENDATIONS, ENFSI, Apr, 2017, <https://enfsi.eu/wp-content/uploads/2017/09/DNA-databasemanagement-review-and-recommendations-april-2017.pdf>.

<sup>14</sup> H.M. Wallacea, A.R.Jacksona, J.Gruberb, A.D.Thibedeaub, *Forensic DNA databases—Ethical and legal standards: A global review*, Egyptian Journal of Forensic Sciences, Sep, 2014, <https://www.sciencedirect.com/science/article/pii/S2090536X14000239#>.





## LIMITATIONS OF DNA FINGERPRINTING

- One of the foremost problems with the process of DNA fingerprinting is that the sample can be ruined easily.
- The least possible pieces of genetic junk can obscure DNA samples, causing them to be useless.
- Although DNA Fingerprinting requires a good sample to work with, this problem can be solved using the newer technique called PCR.<sup>15</sup>
- PCR can use enormously small samples of DNA and produce a much sooner result.
- But this also means the DNA samples that PCR uses are even more expected to be contaminated because of their size, as it is harder to find a small sample with hardly any contamination.
- The procedure is so complex and tough to read the DNA patterns, that sometimes

the juror finds the evidence approximately invisible.

Even though DNA Fingerprinting is an extremely innovative process, but then also some things are unable to do. For example, in Dog, a fingerprint does not make it possible to determine if the animal is the carter of a disease-causing allele.<sup>16</sup>

Also, a DNA fingerprint is incapable to show a crossbreed in animals. This is because second or third-generation crosses cannot be seen by working backward in a pedigree.

## CONCLUSION

The Union government is waged on a new version of legislation that pursues to set up a national DNA database of lawbreakers. DNA databases may also be public or private, the vastest ones being national DNA databases. When a match is finished from a national DNA database to link a crime scene to a person whose DNA profile is kept on a database, that link is often referred to as a cold hit.<sup>17</sup> A cold hit is of specific value in linking a specific person to a

<sup>15</sup> The Editors of Encyclopedia Britannica, Kara Rogers, DNA fingerprinting, Britannica, <https://www.britannica.com/science/DNA-fingerprinting>.

<sup>16</sup> What is a DNA fingerprinting, Your Genome, 2<sup>nd</sup> Jun, 2016, <https://www.yourgenome.org/facts/what-is-a-dna-fingerprint>.

<sup>17</sup> Volume 1, Aaron Opoku Amankwaa Carole Mc Cartney, The effectiveness of the UK national DNA database, ScienceDirect, 2019, <https://www.sciencedirect.com/science/article/pii/S2589871X19300713>.



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crime scene but is of less evidential value than a DNA match made without the use of a DNA database. Research shows that the DNA databases of criminal offenders reduce crime rates. The Modi government is on the interchange to set up its 'DNA bank' to store the genetic information of every individual. The argumentative DNA Technology Regulation Bill, 2019, was passed by the Lok Sabha in July, it has now been referred to the Parliamentary Standing Committee on Science & Technology, Environment & Forests.<sup>18</sup>



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<sup>18</sup> PTI, DNA Technology Regulation Bill referred to parliamentary standing committee, The Hindu, 1:41 IST, 20<sup>th</sup> Oct, 2019, <https://www.thehindu.com/news/national/>

[dna-technology-regulation-bill-referred-to-parliamentary-standing-committee/article29742461.ece#](https://www.thehindu.com/news/national/dna-technology-regulation-bill-referred-to-parliamentary-standing-committee/article29742461.ece#).