



FORENSIC EVIDENCE IN CIVIL CASES

Presented By:

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The Hon'ble Supreme Court of India in the case of
Dharam Deo Yadav v. State of U.P.33

“Criminal Judicial System in this country is at cross-roads, many a times, reliable, trustworthy, credible witnesses to the crime seldom come forward to depose before the court

Investigating agency has, therefore, to look for other ways and means to improve the quality of investigation, which can only be through the collection of scientific evidence.

In this age of science, we have to build legal foundations that are sound in science as well as in law.

.....Emerging new types of crimes and their level of sophistication, the traditional methods and tools have become outdated, hence the necessity to strengthen the forensic science for crime detection.



Judiciary should also be equipped to understand and deal with such scientific materials.

Constant interaction of Judges with scientists, engineers would promote and widen their knowledge to deal with such scientific evidence and to effectively deal with criminal cases based on scientific evidence.

We are not advocating that, in all cases, the scientific evidence is the sure test, but only emphasizing the **necessity of promoting scientific evidence also to detect and prove crimes over and above the other evidence.**

FORENSIC SCIENCE



FORENSIC comes from the Latin word forensis, meaning “in open court”

FORENSIC SCIENCE - USE OF SCIENCE & TECHNOLOGY FOR LEGAL PURPOSE i.e Application of various Basic Sciences to provide scientific evidences to court of law

LOCARD'S PRINCIPLE OF EXCHANGE

1. “Whenever two objects come into contact, they always leave a trace on the other.”
 2. Every criminal can be connected to the crime by contact traces carried from or left at the crime scene
- &
3. Forensic science plays a **vital role** in the criminal justice system by providing **scientifically based information** through the analysis of **CIRCUMSTANTIAL EVIDENCE.**



Physical

Non-biological types of evidence like forms of fibers, paint chips, explosives

- Questioned Document Examination
- Forensic Chemistry
- Forensic Ballistics
- Forensics Psychology
- Digital or Computer forensics

Biological

Biological evidences include blood, semen, saliva, faecal material, urine, hair and bone.

- Fingerprint Analysis
- Forensic Odontology
- Forensic Toxicology
- Forensic Anthropology
- Forensic Pathology
- Forensic DNA

FORENSIC EVIDENCE - Physical



QDE (Questioned Document Examination)

A "questioned" document is any signature, handwriting, typewriting, or other mark whose source or authenticity is in dispute.

- Handwriting analysis.
- Signatures and initial analysis.
- Alteration, Erasure, Obliteration and over-writings
- Sequence of strokes in handwritten/printed matter
- Digital written document analysis.
- Identify different types of paper, ink, water-marks, copy machines, printing technology, printer cartridges, stamp impressions etc.

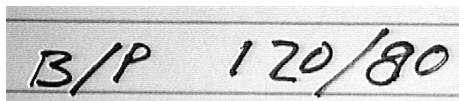


Figure 1 Viewed by the "naked eye"

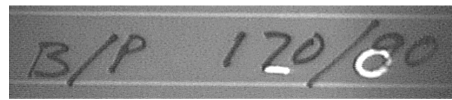
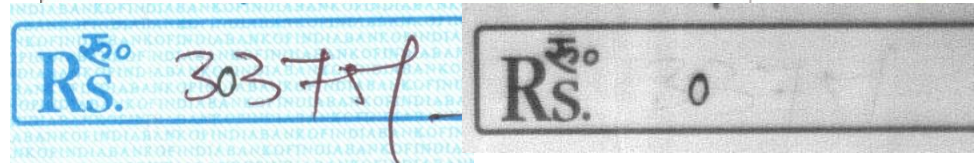
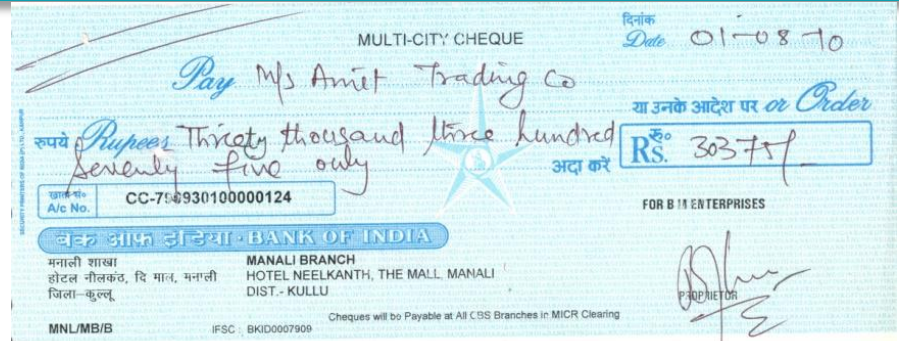


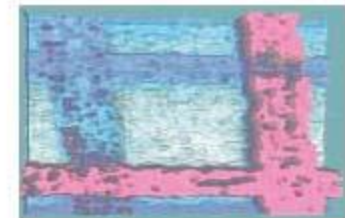
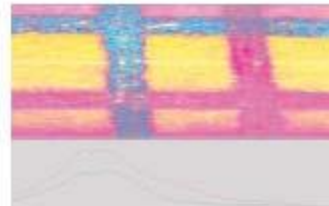
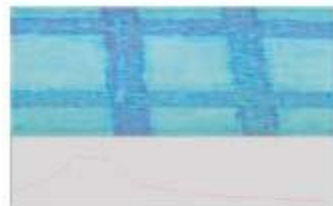
Figure 2 Viewed at 665 nanometers Infrared luminescence



Alteration



Revealing concealed or masked writing (Obliteration)



Stroke sequence determination using micro-hyperspectral measurements in intersecting areas

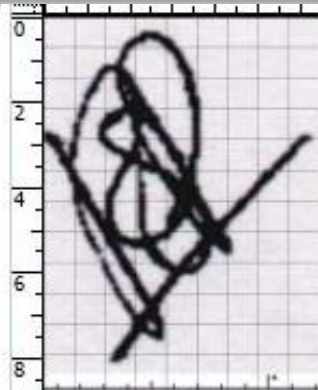
PRINCIPLES OF HANDWRITING

- Identification of forgery in a disputed handwriting, signature and at times author of disputed handwriting, and or signature in some cases
- Handwriting is “**BRAIN WRITING**” controlled by the signals sent by the nervous system through hand. Thus, it is unique to every individual.
- No two people have **IDENTICAL HANDWRITING**
- A person cannot produce in a mechanical manner exactly what has been written first. There must be some **NATURAL VARIATION** in the writing of the same person
- If two signatures are **PRECISELY ALIKE** then one of them must be a forged signature.

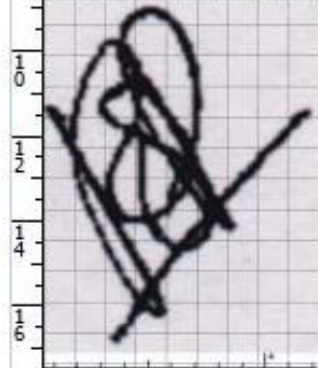
CASE STUDY



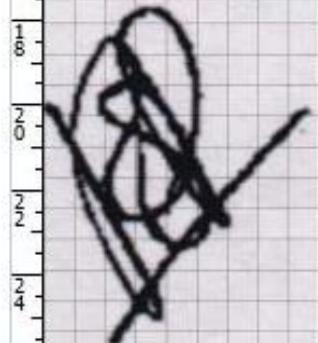
www.squareforensic.com



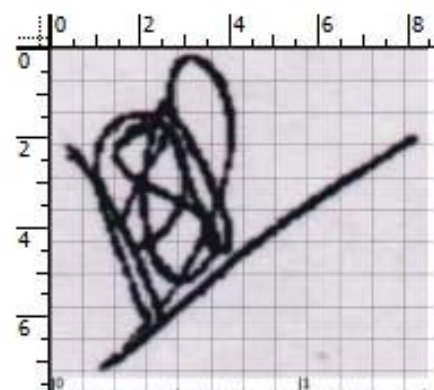
Q-1



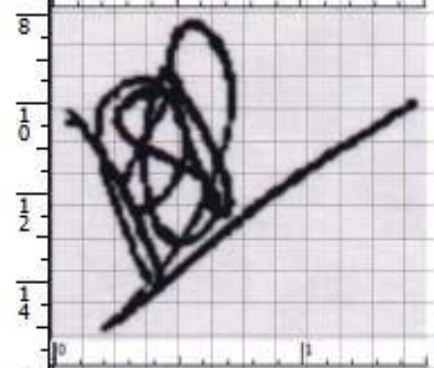
Q-3



Q-5



Q-2



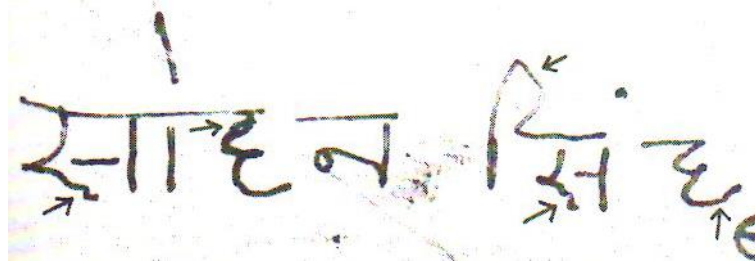
Q-4



Q-6

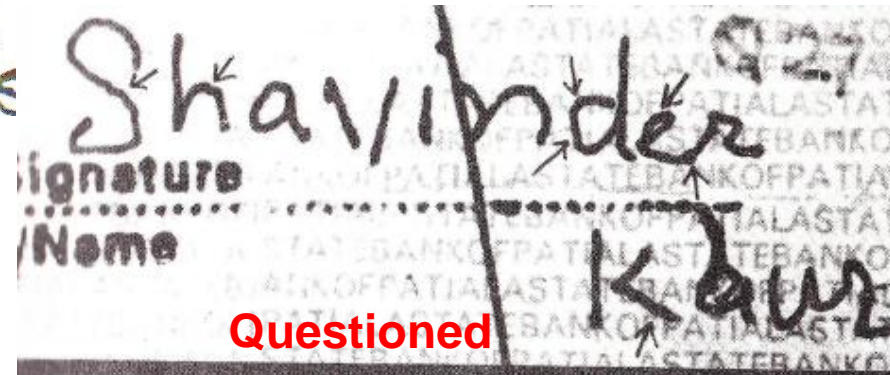
Identical Cut & Paste Signatures on photocopy of a legal document

FORGERY TYPES



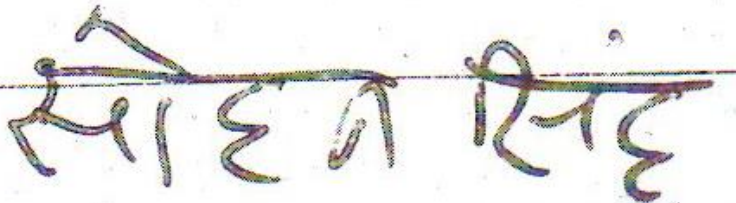
ਸ਼ਾਇਨ ਕੌਰ

Questioned



Signature
Name
Shavinder Kaur

Questioned

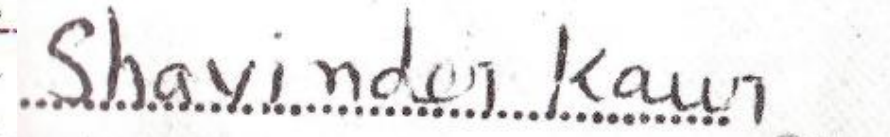


ਸ਼ਾਇਨ ਕੌਰ



ਸ਼ਾਇਨ ਕੌਰ

Admitted

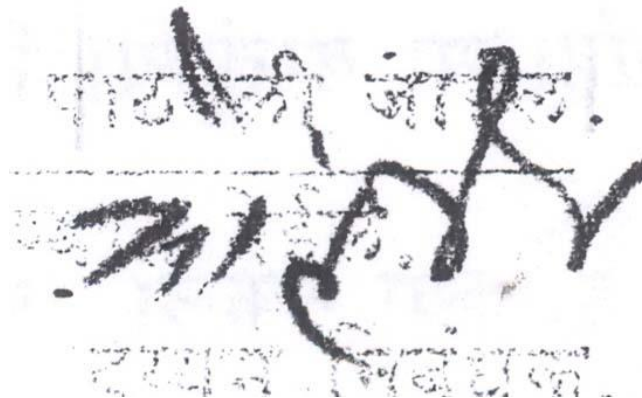


Shavinder Kaur

Admitted

Freehand, simulated or copied forgery

FORGERY TYPES



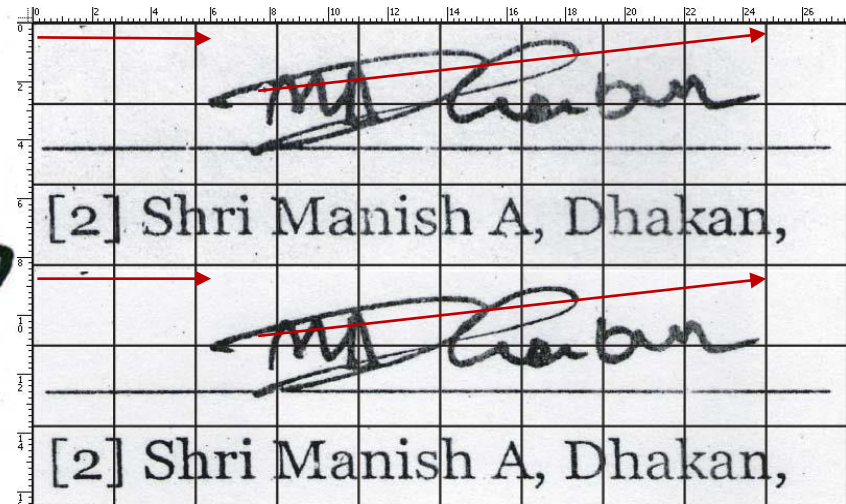
Admitted



Questioned



Traced forgery by use of Carbon



[2] Shri Manish A, Dhakan,

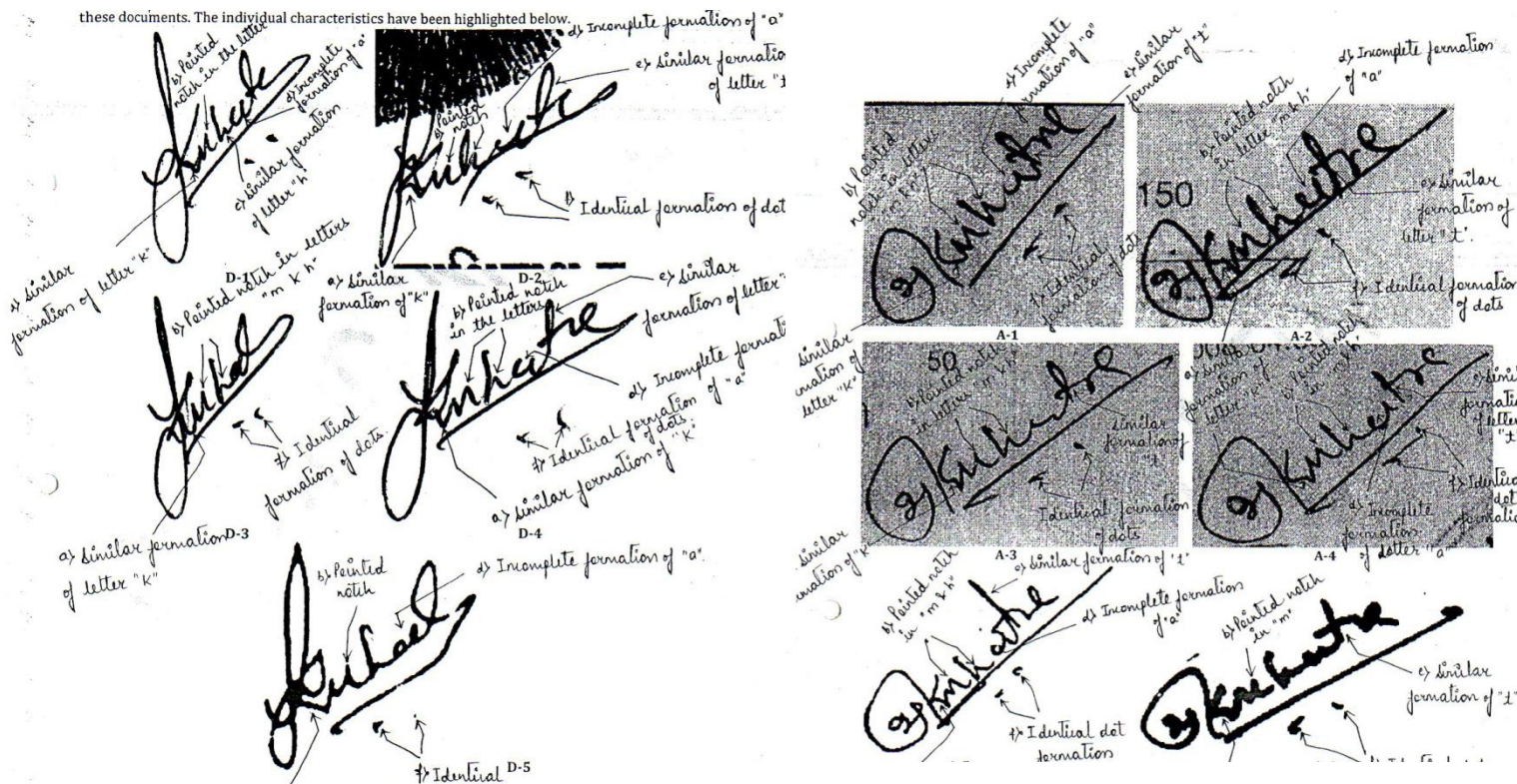
[2] Shri Manish A, Dhakan,

Copy Paste Forgery

- **Traced / Cut / Copy Paste Forgery**
- **Forged by memory**
- **Forgery without model/ Forgery by Impersonation**

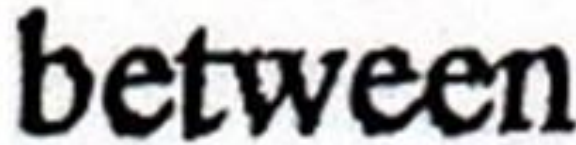
DISGUISE HANDWRITING

- A deliberate departure from the normal handwriting habits generally referred to as “Disguise”
- Even Disguised handwriting will exhibit some of the person’s Individual characteristics



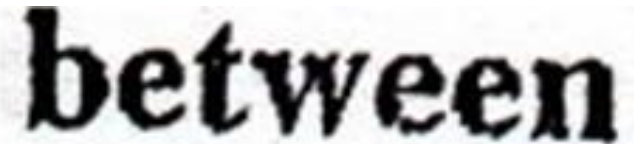
LATEST QDE TECHNOLOGY

- Mechanical devices result in wear & tear to the machine's moving parts and leave behind identifying features on a piece of paper.
- Examiners compare striations, transitory defect marks, headers, toner, toner application methods and mechanical and printing characteristics.



between

Exh-Q (11)



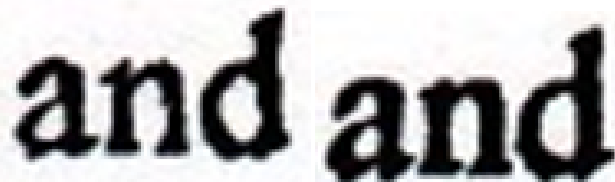
between

Exh-O (9)



and

Exh-Q (1)



and and

Exh-Q (11)



and and

Exh-Q (2)

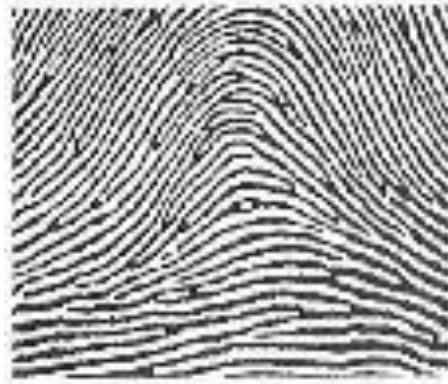
IMPORTANT POINTS

- Principle of Likes
- Determination of the authorship of a FORGERY
- Comparison of handwriting of any language
- Use of photocopies of the signature
- To determine whether a person is a left handed or right handed cannot be determined
- Graphologists vs Forensic Handwriting Experts
- Determination of absolute age of INK AND PAPER
 - Madras High Court in a judgment in 2010 (1) CTC 424 [R. Jagadeesan v. N. Ayyasamy and another], has opined that sending the documents for opinion in respect of the age of the writing on documents should not be resorted to hereinafter by the Courts unless, in future, due to scientific advancements, new methods are invented to find out the age of the writings.

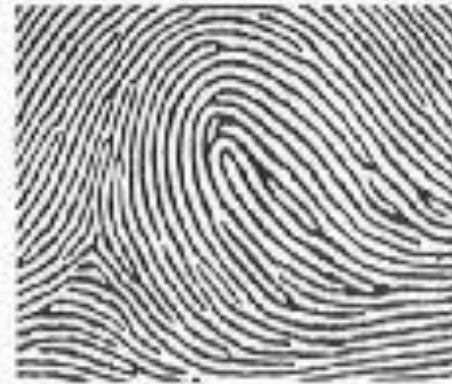
FINGERPRINT

1. Fingerprints are valuable means of identification of an individual because of uniqueness and they never change
2. Fingerprints are hereditary - they form before you are born (by about 4 months)
3. A fingerprint is made of number of ridges and furrows on the surface of the finger.
4. The uniqueness of a fingerprint can be determined by the pattern of ridges and furrows as well as the minutiae points.
5. Fingerprint patterns: Arch, Tented arch, Radial loop, Ulnar loop, Plain whorl, Central pocket loop, Double loop whorl, Accidental Whorl

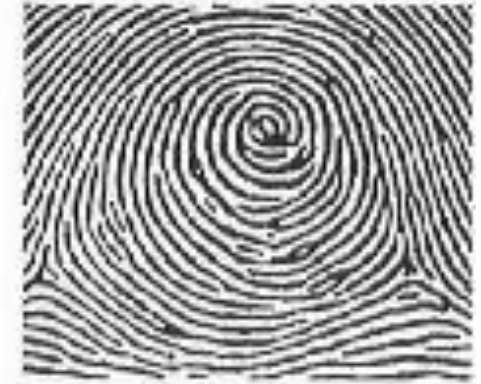
FINGERPRINT COMPARISON



Arch

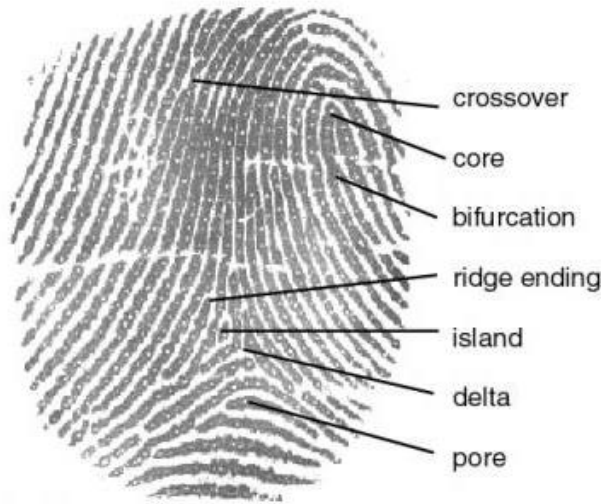


Loop

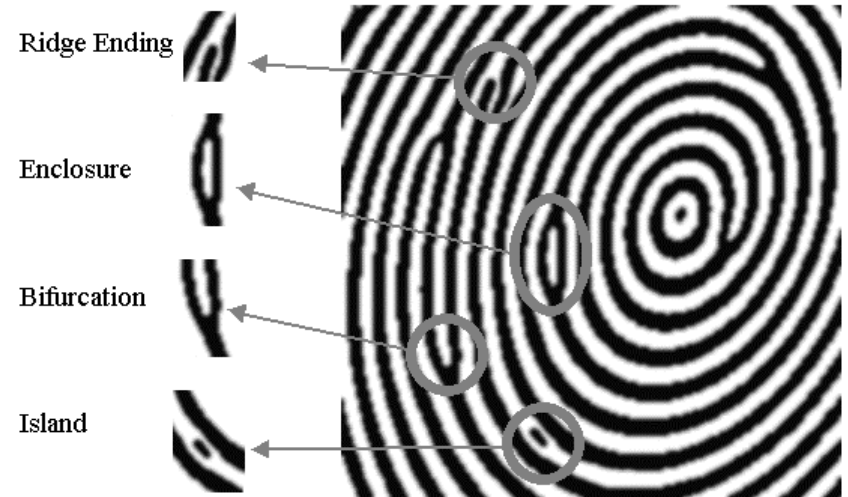


Whorl

Basic Patterns and Sub Patterns



June 1



Ridge Characteristics and Minutae Details

CASE STUDY



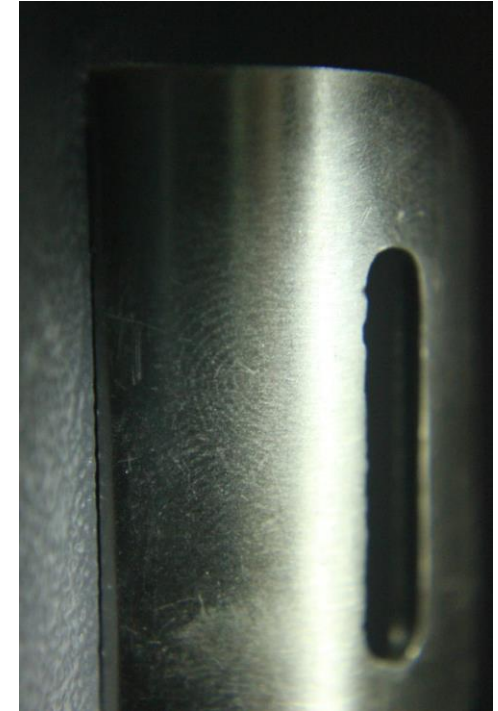
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Exhibit

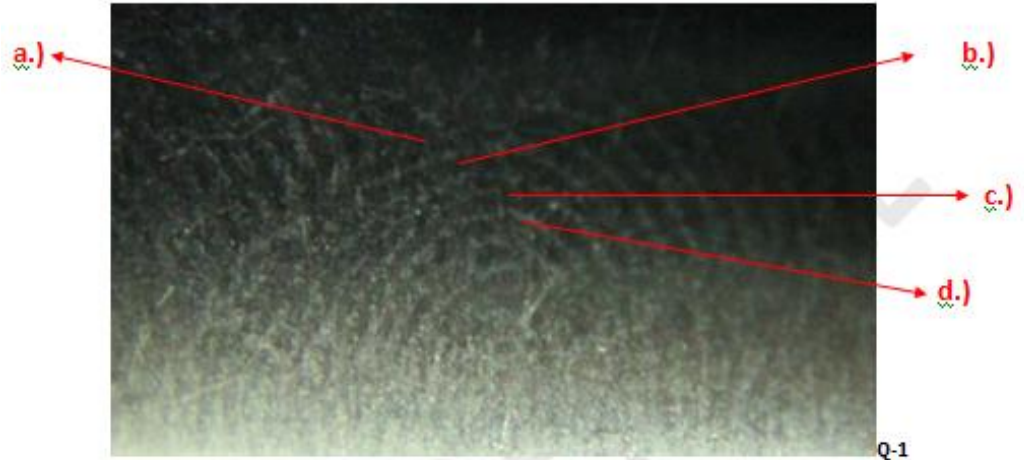


**Fingerprint
Development
Technique -
Powdering**



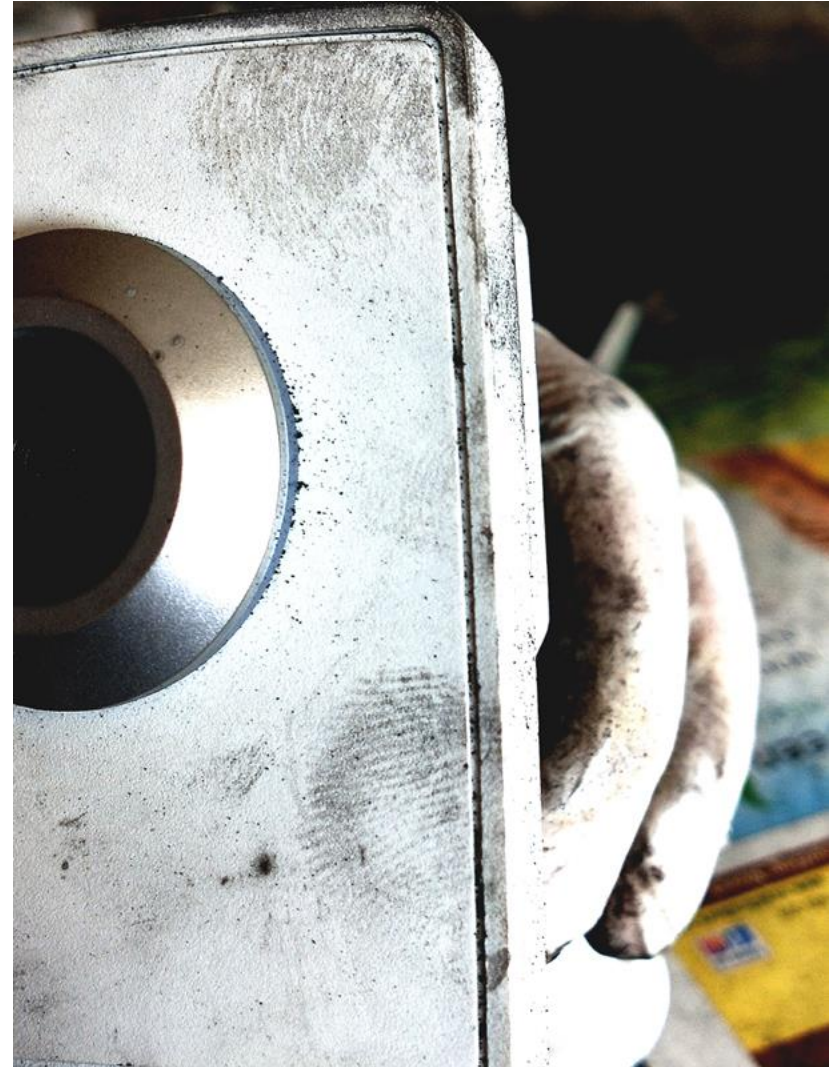
**Latent Impressions
developed by
Powdering
Technique**

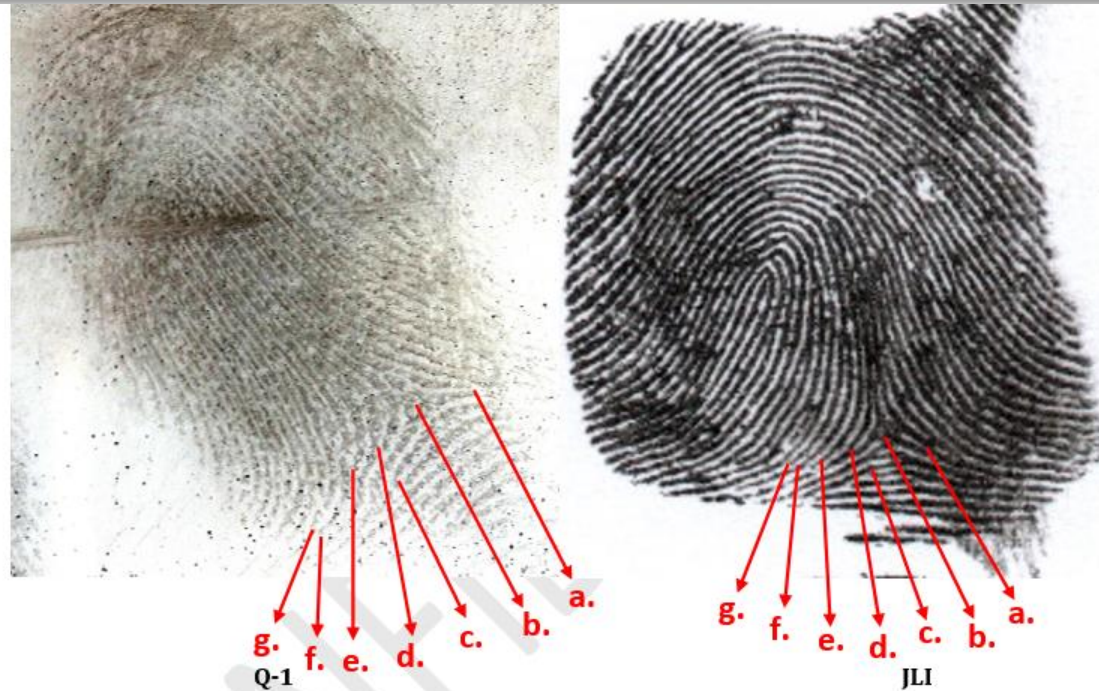
FINGERPRINT DEVELOPMENT & COMPARISON



- a. Bifurcation opening towards right
- b. Continuous ridge
- c. Bifurcation opening towards left
- d. Continuous ridge







- Q-1 is a partial Impression therefore comparison on the basis of basic pattern cannot be done with JLI (Jay's Left Hand Index Finger)
- Individual Ridge Characteristic / minutiae details of Q-1 were compared with JLI (Jay's Left Hand Index Finger) and showed identical Individual Ridge Characteristic / minutiae details
 - a. Bifurcation
 - b. Delta
 - c. Bifurcation
 - d. Bifurcation
 - e. Ridge Ending
 - f. Continuous Ridge
 - g. Ridge Ending

Finger print Science - Exact science



The science of comparison of finger print has developed to a **stage of exactitude.**

Govinda Reddy & others v. The state, A.I.R. 1957 Orissa 172.

The expert should, if he expects his opinion to be accepted **put before the court all the materials which induced him to come to his conclusion** so that the court, although not an expert, may form its own judgement on those materials.

Ajit Rai v. Vasumati, A.I.R 1969 Guj. 48

Mere assertion **without mentioning the data or basis in the evidence, even if it comes from an expert is no evidence;** expert opinion is admissible only when accompanied by the data and the basis and the reasoning tending to that inference.

State of Vindhya Pradesh v. Krishnanand, A.I.R 1953 Vindh. Pra. 21.



The **court can refuse** to place any reliance on the opinion of an **expert which is unsupported by any reasons.**

Haji Ekramul Haq.v. The State of W.B., A.I.R. 1959. S.C. 488

'Chance Fingerprints' Tallying With Theft Accused Not Reliable **When Spot & Manner Of Lifting Fingerprint Not Disclosed:** Karnataka HC Orders Acquittal

Thippeswamy @ Kunta Vs State by Challakere Police

IN THE HIGH COURT OF KARNATAKA AT BENGALURU
Thippeswamy @ Kunta Vs State by Challakere Police, BEFORE
Dr. JUSTICE H.B. PRABHAKARA SASTRY
DATED: 6TH DAY OF JULY, 2022

In the instant case neither PW-5 – I.O nor PW-6 - Fingerprint expert, has stated as to from which spot or from which article the 'Chance Fingerprint' was lifted, and by whom and in what manner. The person who is said to have lifted the Fingerprint was not examined by the prosecution for the reasons best known to it. The alleged 'Chance Fingerprint' and also the article from which it might have been lifted also have not been produced before the Court. In such a circumstance, it is not safe to rely upon the mere report of the Fingerprint expert that the 'Chance Fingerprint' given to him for examination was corresponding to the fingerprint of the accused and proceeding to convict the accused.

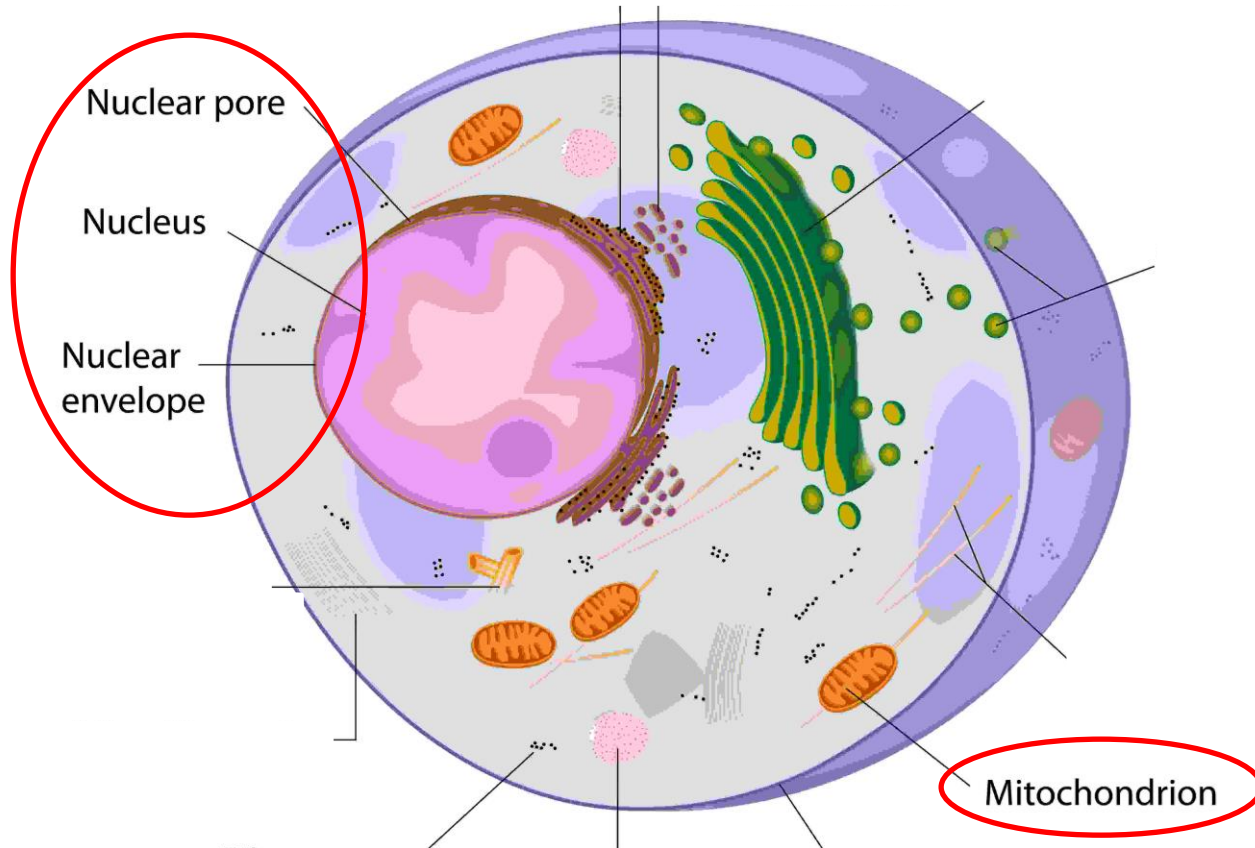


BIOLOGICAL FORENSIC EVIDENCE



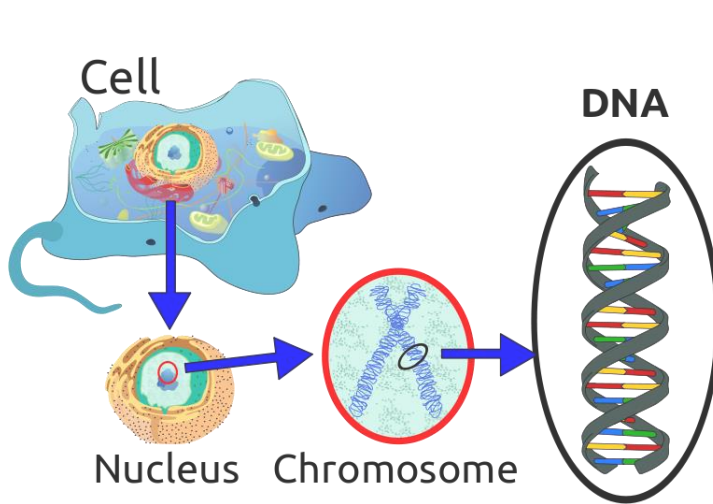
DNA (Deoxyribonucleic Acid)

CELL

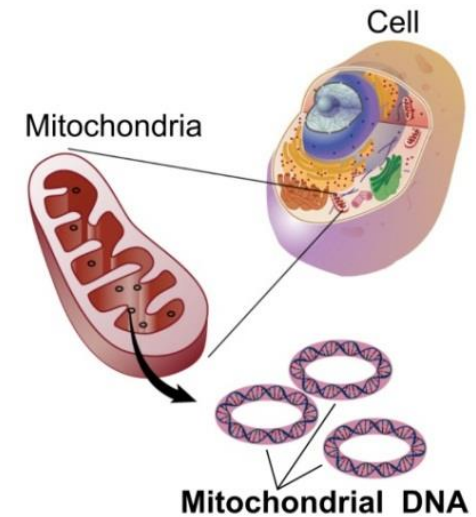


CHARACTERISTICS OF DNA

DNA is mainly of 2 Types: Nuclear DNA & Mitochondrial DNA



Nuclear DNA is inherited from parents (half from mother, half from father)

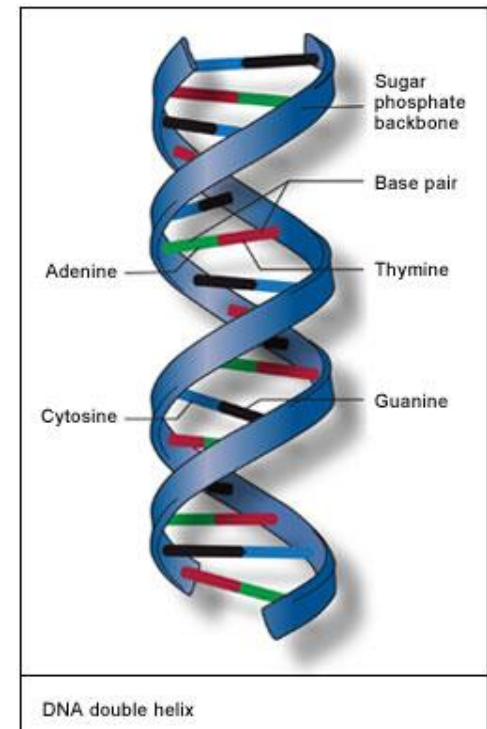


Mitochondrial DNA is inherited from the mother

All individuals same maternal lineage will be **indistinguishable** by mDNA analysis.

DNA

- DNA(Deoxyribonucleic acid) - **PERSONAL GENETIC BLUE PRINT** main constituent of chromosomes, found within the nucleus of cell in the form of a **double helix**
- These chromosomes controls visible characteristics including such as eye, hair, and skin color and also invisible characteristics like blood groups and inherited diseases.
- In an individual's body, the DNA is the same in all cells.
- The chances of two people having exactly the same DNA profile is 30,000 million to 1 (except for identical twins).
- DNA is highly precise and scientific in nature and is a part of admissible expert evidence

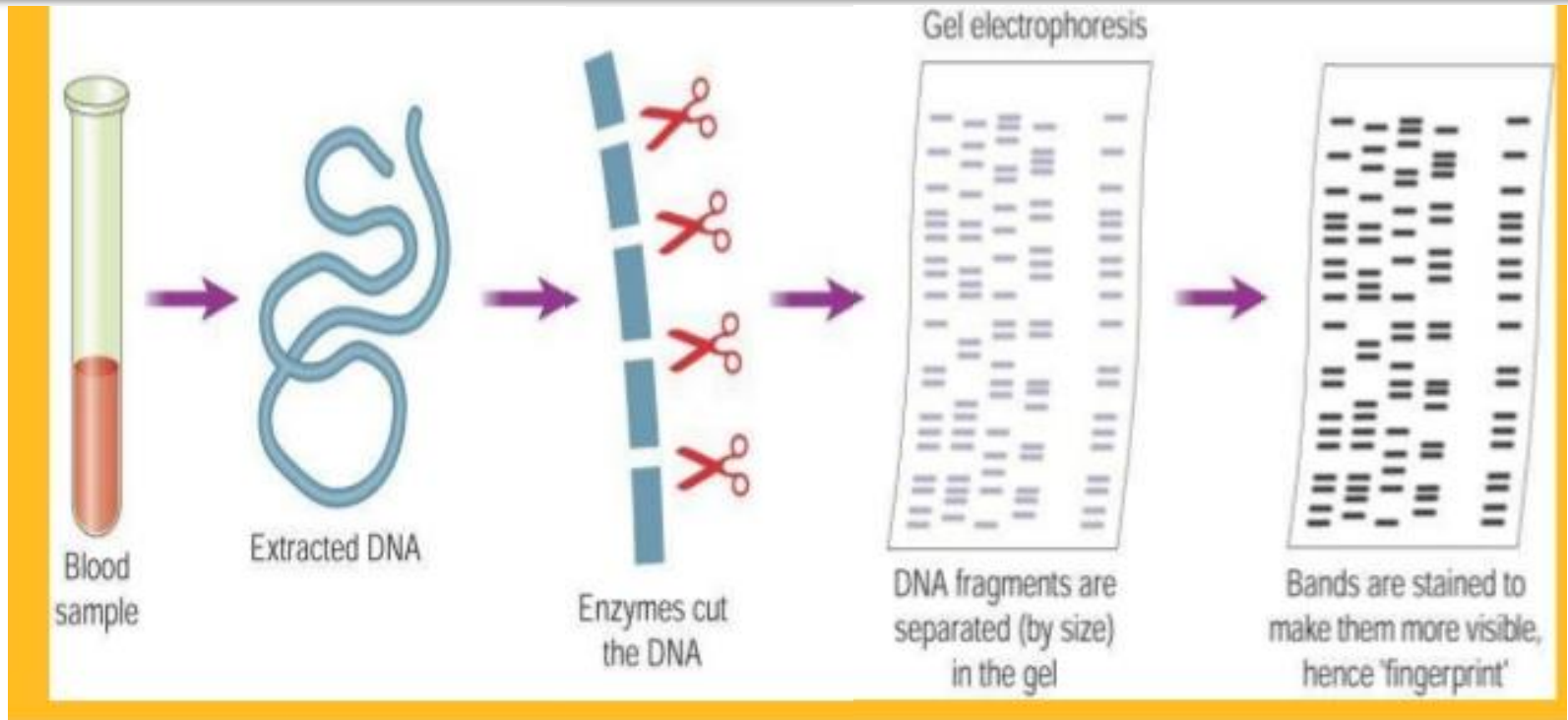


TYPES OF SAMPLES

- Seminal stains
- Blood stains
- Loose/ Plucked Pubic hair
- Loose/ Plucked scalp hair
- Saliva from bite marks
- Teeth
- Bone
- Nail scrapings
- Trace material from genital areas
- Anywhere nucleated cells are, we might find DNA.



STAGES OF DNA PROFILING



STAGE 1

Cells are broken down to release DNA.

STAGE 2

DNA is cut into fragments using restriction enzymes

STAGE 3

DNA Fragments are separated on the basis of size using Electric Current

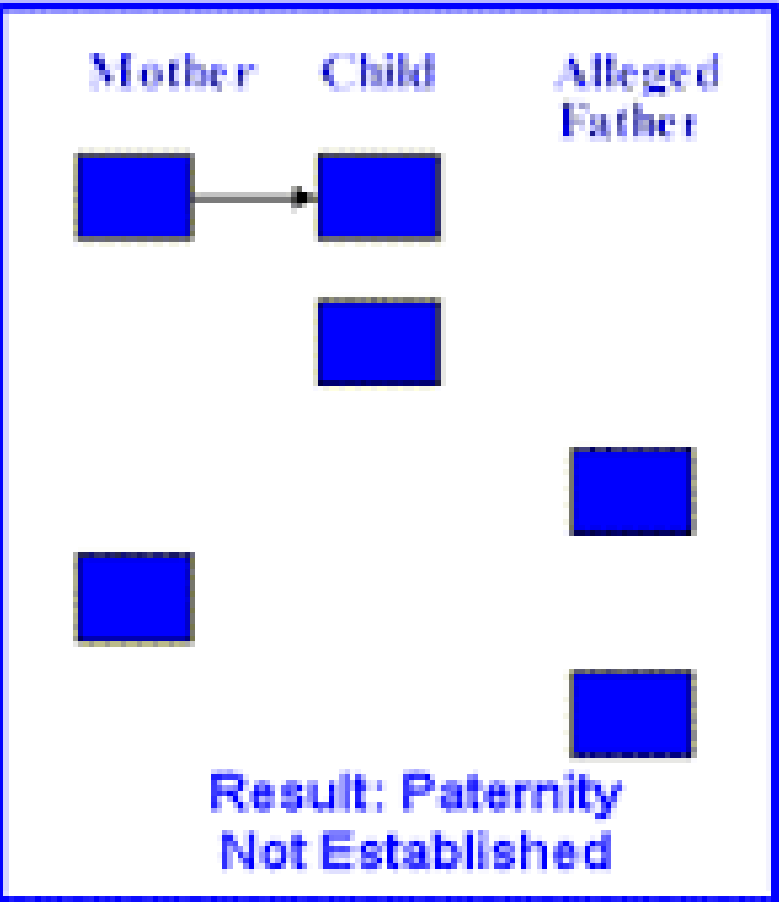
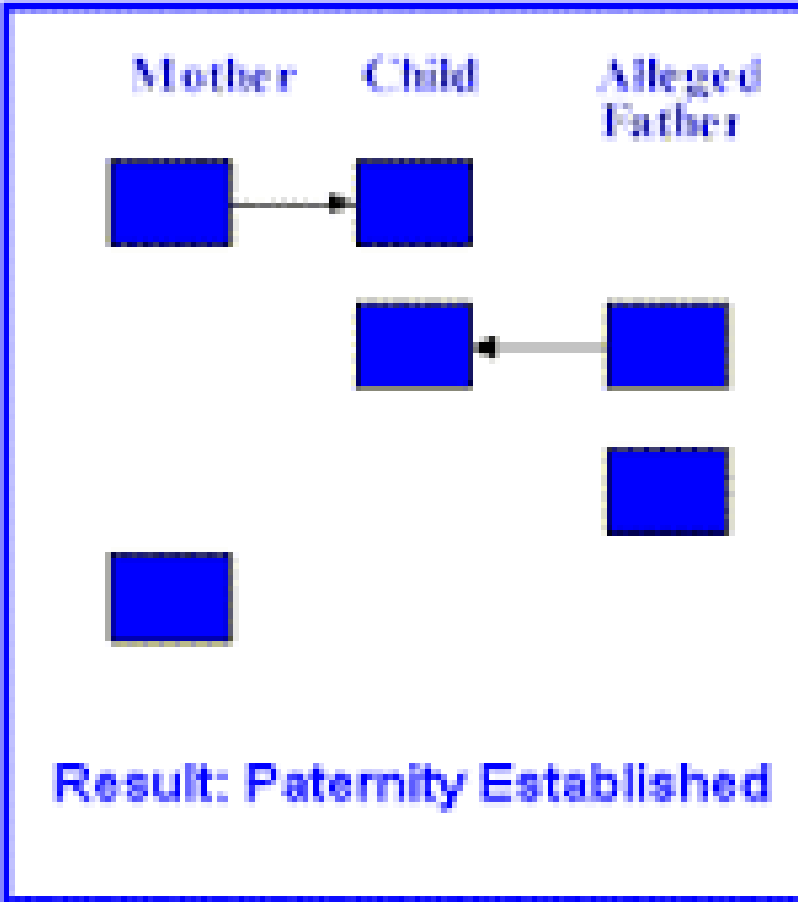
STAGE 4

Radioactive material is added to produce a fluorescent image

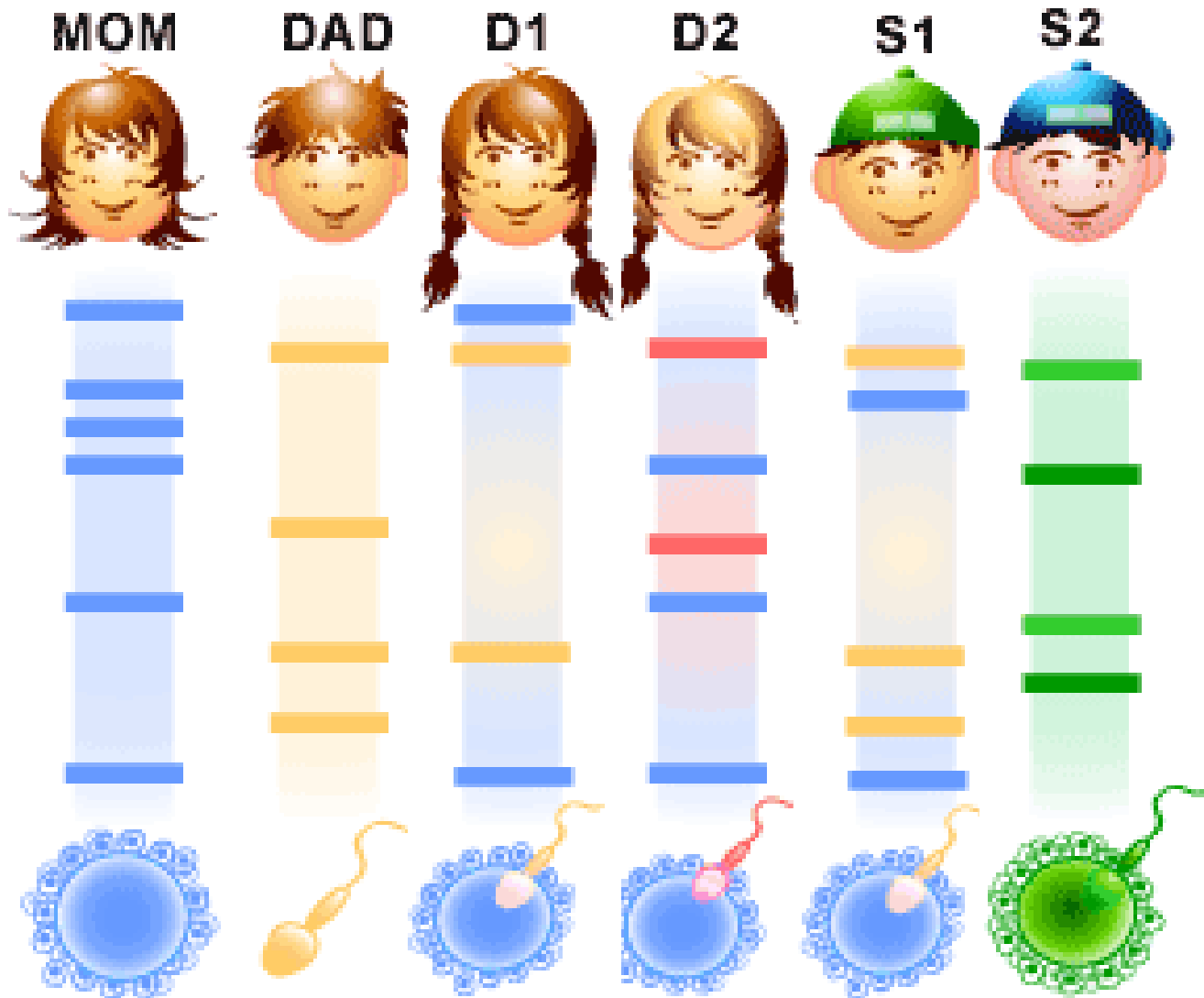
A photographic copy of the DNA bands is obtained.

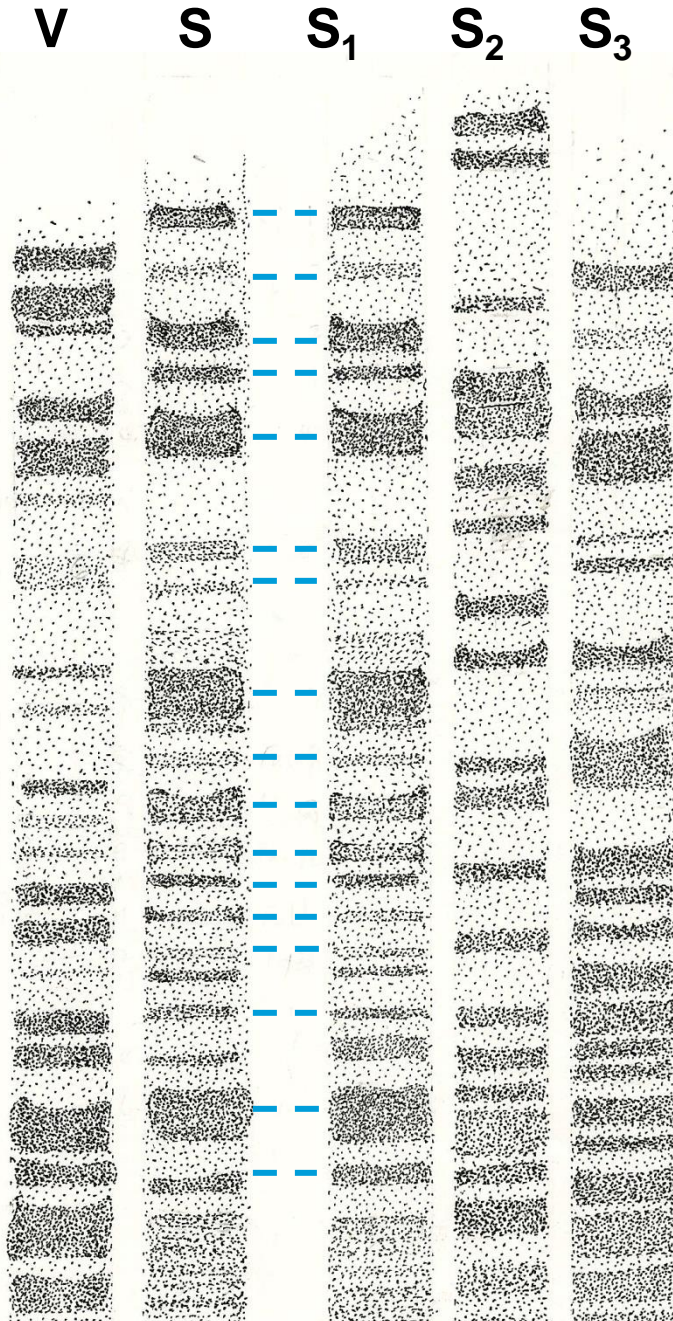


PATERNITY TEST



Example





V Victim

S Sample from crime scene

S₁ Suspect 1

S₂ Suspect 2

S₃ Suspect 3

Suspect 1 match those
taken from the crime scene

STR/DNA GENETIC MARKERS

- DNA Profiling is a complex process of analyses of some highly variable regions of DNA termed as Genetic Markers.
- The current genetic markers of choice for forensic purposes are Short Tandem Repeats (STRs).
- DNA has 15 universally specified Genetic markers or Short Tandem Repeats with specific combination of sizes.
- These markers are highly individualised
- D8S1179, D21S11, D7S820, CSF1PO, D3S11358, THO1, D13S317, D16S539, D2S1338, D19S433, VWA, TPOX, D18S51, D5S818, FGA
- The 16th marker is Amelogenin, which determines the sex of the sample
 - XX – Female
 - XY - Male



Case: 456789 Name		MOTHER Jane		CHILD Jenny		Alleged FATHER John	
Date Collected: Test No.		1/1/2010 456789-10		1/1/2010 456789-20		1/1/2010 456789-30	
Locus	PI	Allele Sizes		Allele Sizes		Allele Sizes	
D8S1179	1.55	10	14	13	14	11	13
D21S11	2.02	27	29	29	30	29	30
D7S820	1.17	8	10	8	10	10	11
CSF1PO	1.65	11	12	11	12	11	12
D3S1358	1.88	14	17	15	17	14	15
TH01	2.62	6	9.3	7	9.3	7	9
D13S317	3.43	13		11	13	11	
D16S539	3.32	9	12	11	12	11	
D2S1338	4.33	19	20	20	24	23	24
D19S433	2.23	13		13		13	14
vWA	3.62	14		14	17	17	
TPOX	1.86	11		8	11	8	
D18S51	3.06	15	17	14	17	13	14
D5S818	1.35	12	13	11	12	11	12
FGA	3.55	21	22	21	24	21	24
Amelogenin		X		X		X	Y

Interpretation:

RN: 76206

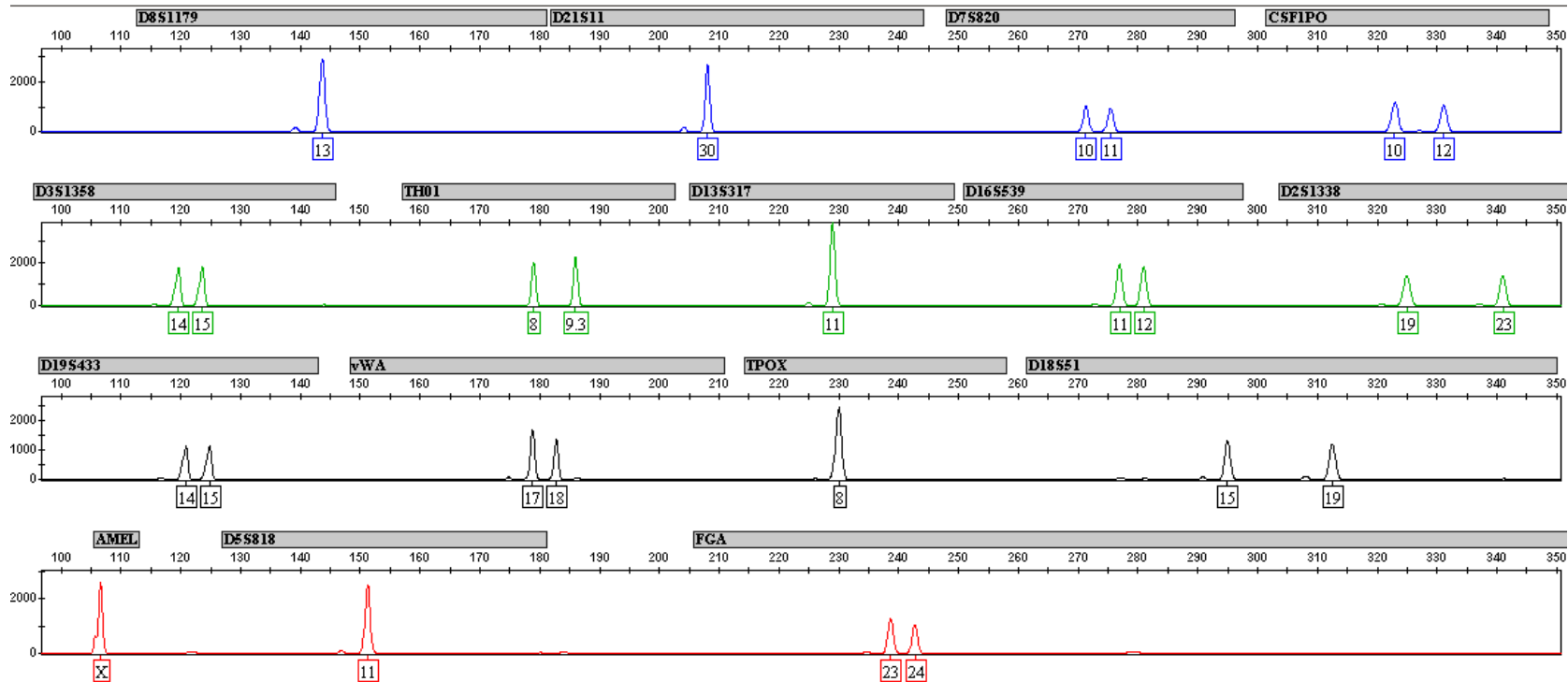
Combined Paternity Index: **323,769**

Probability of Paternity: **99.9996%**

The alleged father is not excluded as the biological father of the tested child. Based on testing results obtained from analyses of the DNA loci listed, the probability of paternity is 99.9996%. This probability of paternity is calculated by comparing to an untested, unrelated, random individual of the Caucasian population (assumes prior probability equals 0.50).

Full DNA Profile

Electropherogram data generated using Life Technologies® GeneMapper® software from Thermo Fisher Scientific Inc.





NEW EMERGING TECHNOLOGIES IN DNA PROFILING

M-Vac Technology

- Touch DNA, contact DNA or DNA material (usually epithelial cells) that has been deposited by the perpetrator by grabbing, touching or pressing up against an object, is an area where the M-Vac® System works well.
- When compared to swabbing or taping, it consistently collects more DNA material.
- The M-Vac® System's ability to collect from the top surface and in the cracks and crevices of the evidence helps retrieve trace amounts of DNA material.
- The M-Vac® "wet-vacuum" collection typically **retrieves more DNA material from the surface,**



www.squareforensic.com

**SO
LIDP**

RAPID DNA

- New rapid DNA profiling technologies address the challenges like time and expertise.
- This system automates DNA profiling from a simple cheek swab, generating results in about 90 minutes.
- The "swab in, profile out process" takes approx. 5 mins of hands-on time and performs all steps of DNA analysis without human intervention.



- Reagents in disposable cartridges are loaded onto the system with up to 7 buccal (cheek) swab samples.
- The system extracts DNA and software analysis to generate full human identification profiles.
- The findings are then used to search the linked DNA database or compared to swabs taken from suspects.
- This integration enables law enforcement agencies to reduce the time it takes to generate a DNA profile and make decisions while arrestees are in custody.



1) Collect sample



2) Enter Sample ID



3) Scan the swab



4) Insert the swab



5) Load the cassette



6) System runs samples

CASE STUDY 1

Tandoor Murder Case

- This is the first case in India where DNA fingerprinting was used for investigation.
- Former Congress worker Mrs. Naina Sahni was shot dead by her husband Sushil Sharma.
- The body was tried to burn in the Tandoor at Bagiya Restaurant New Delhi on 2nd July 1995, with the help of restaurant manager Keshar Kumar
- Charred remains of a body in the tandoor kitchen were seized
- DNA from muscle pieces attached to her charred bone were compared with that of her parents and sister.



CASE STUDY 2

Nirbhaya Rape

DNA, fingerprints, analysis of bite marks sealed Nirbhaya rapists' fate: SC

- DNA of blood stained clothes and body swabs linked all 5 men and a juvenile accused of the gang rape and murder of Nirbhaya
- DNA tests on bloodstains from undergarments worn by the main accused, Ram Singh, matched Nirbhaya's DNA
- A swab taken from Nirbhaya's body showed Ram Singh's DNA
- Bloodstains on clothes of all five accused, curtains and bus seats.
- Bloodstained dried leaves by the side of the highway where the pair said they were dumped.
- Bloodstains on the undergarments and flip-flops of Vinay Sharma
- Blood found on Vinay Sharma jacket matched with the woman's friend, who fought with the men before he was hit with iron rod.

CASE STUDY 3

Shradhha Walkar Case

On 18 May 2022, 28-year-old Aaftab Poonawala strangled his live-in partner Shradhha

Dismember her body into 35 pieces, allegedly charring her face to hide her identity.

A 300-litre fridge was used to store her body parts, which were individually disposed in the Chhatarpur forest over the next 18 days, at around 2 AM every night to avoid suspicion.

- Police have recovered more than 13 body parts
- Weapon used electric saw
- Mitochondrial DNA from bones and hair sample
- Traces of blood found in their flat, too, match with hers
- Lie Detector Test
- CCTV Footages

"Mitochondrial DNA report confirms hair and bone sample matching with Shradhha Walker.





EVIDENTIARY VALUE OF DNA PROFILING



Nirbhaya Case:

“The DNA profiling, which has been done after taking due care for quality, proves to the hilt the presence of the accused persons in the bus and their involvement in the crime”

The bench referred to the statement of Dr. B.K Mohapatra, one of the prosecution witnesses in the case, and said he has testified that once a **DNA profile was generated, its accuracy is 100 per cent.**


Pantangi Balarama Venkata Ganesh vs. State of A.P. (Cr LJ, 2003, 4508):

Court relied on an article by Dr. Lalji Singh & accepted DNA profile as conclusive evidence & observed “.....**the DNA test gives the perfect identity. It is a very advance science**”

ISSUES BEFORE THE COURT

Defence challenges the “**scientific procedure**” adopted in DNA probe.

- **Collection**
- **Packaging**
- **Storage**
- **Timeline**
- **CHAIN OF CUSTODY**
- **Whether the sample & testing procedure is reliable?**
- **Whether tests were performed properly?**
- **Whether the conclusion is acceptable?**

- 
1. DNA Technology is a **“Genetic Eyewitness”**
 2. DNA Profiling - complex scientific procedure whose success lies in the **skill and expertise of I.O.**, who is the 1st player to handle the “sample”
 3. To avoid contamination in DNA samples the I.O. must use:
 - Use clean hand with gloves & clean instruments to lift the sample
 - Avoid sneezing or coughing over evidence
 - Scene personnel can deposit their own tissues, hairs, fibers or trace material from their clothing
 - Wind can carry in contaminants

DNA profile, however, is consistently held to be valid & reliable, but of course, it depends on the quality control and quality assurance procedures in the laboratory.”- Dharam Deo Yadav v. State of UP⁴³

Rahul vs. The State of Delhi, Ministry of Home Affairs (2022)

In its recent judgments, the Supreme Court has been critical of admitting DNA report as clinching evidence in criminal cases.

Facts

The victim was abducted in a car, brutally gang raped and killed using a jack and spanner found in the car. The body was found 4 days after the incidence

Submissions made by the learned ASG - DNA profile generated from jack, hair found in the car matched with the vaginal swab of the victim, DNA profile of the semen extracted from the vaginal swab of victim matched with the other accused

Arguments of the Sr Adv. for the appellants argued - The forensic evidence collected against the accused during the course of investigation was not scientifically and legally proved and therefore could not be used as a circumstance against the appellants

In this regard a very pertinent observations made by this Court in case of **Manoj and Ors. Vs. State of Madhya Pradesh** deserve to be made.



SC Observations - The record shows that there was a delay of 11 days in sending the samples of the accused and deceased to CFSL

During this period, they remained in the Police Station. The possibility of tampering with the samples collected also could not be ruled out.

The Trial Court nor the High Court has examined the underlying basis of the findings in the DNA reports nor have they examined the fact whether the techniques were reliably applied by the expert.

In absence of such evidence on record, all the reports with regard to the DNA profiling become highly vulnerable, more particularly when the collection and sealing of the samples sent for examination were also not free from suspicion.

Based on this reason, despite the 'match' result of the DNA analysis, and other findings, the Court acquitted all the three persons who were accused of rape and murder.



DNA PROFILING IN CIVIL CASES



A legal DNA test can be used in the following civil cases:

- Marital disputes
- Paternity and maternity disputes
- Guardianship and child possession
- Organ transplant
- Visa application and immigration
- Property disputes
- Will disputes

A court admissible DNA test can help with the following:

- Proving paternity and maternity
- Establishing rights to child support payments
- Establishing rights to custody and/or visitation
- Asserting child's rights to government and other benefits

- DNA tests occupy a grey area in the **quest for justice**, wavering between **self-incrimination** and violation of **individual privacy** and the ‘eminent need’ to **unearth the truth**, in the form of evidence in a criminal case, a claim of marital infidelity or proving paternity
- Complainants seeking DNA tests are increasing by approx. 20% each year.
- One of the NABL DNA Labs says it tests around 300-400 samples/per month in both private requests and court-mandated.
- The numbers were only around 30-40 till five years ago.

ISSUES BEFORE THE COURT IN CIVIL MATTERS

1. Privacy and Ethical Issues

S.C. observation in Gautam Kundu vs State of West Bengal regarding legitimacy: *“The court must examine carefully the consequences of ordering the blood test; whether it will have **the effect of branding a child as bastard and the mother as an unchaste woman**”*

In a civil appeal between Aparna Ajinkya Firodia Vs Ajinkya Arun Firodia *“The SC has held that children cannot be mechanically subjected to DNA tests in each and every case between warring parents as a short-cut to establish proof of infidelity.” “Besides, mechanical orders allowing DNA tests would also harm the reputation and dignity of the mother”*

2. Chances of misuse of DNA profile

3. Chances of genetic discrimination in marriage, education, social relations etc.



THANK YOU

FOR ANY QUERIES

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