



# Rashtriya Raksha University

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An Institution of National Importance

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# Forensic Evidence in Civil & Criminal Trials

Locard's Exchange Principle  
Appreciation of Forensic Evidence  
DNA Profiling



# Forensic Science Laboratories in India

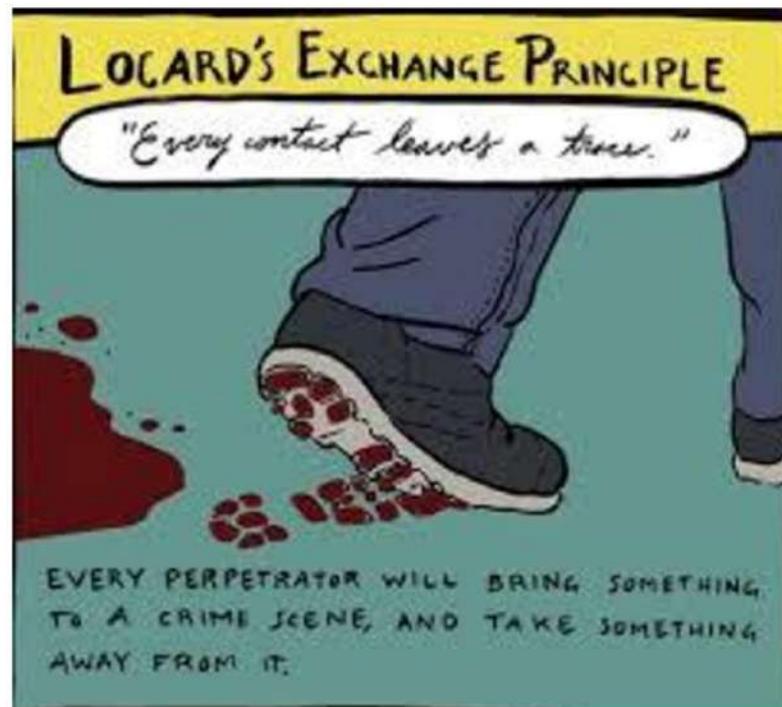
- For appreciation of Forensic Evidence in civil and criminal trials, it is relevant to know How Forensic Science Laboratories function in India?
- One needs to understand the difference between Forensic science, Behavioural science & forensic psychology in crime investigation
- Forensic science is the scientific analysis of crime scene evidence.
- The focus of all forensic science laboratories in India is collection of evidence from crime scene and analyzing the samples through physical, chemical, biological & digital sciences.
- Forensic science lab scientists conduct DNA analysis, Fingerprint examinations, Firearm and bullet identification, Handwriting analysis, viscera analysis, Examination of fibers, liquids, glass, and other materials including Digital evidence analysis
- These help the I.O to solve homicides, suicides, rape cases, and cybercrimes with unique efficiency. Specially DNA & fingerprint examination has enabled experts to uncover and understand crime scene evidence like never before with precision.
- Forensic Science can fill in gaps by determining cause of death (alcohol or drugs or poisons in their system or if sexually assaulted or a document is forged).



# Locard's: Forensic Science Principle

- Dr. Edmond Locard (1877–1966) was a pioneer who formulated the basic principle of forensic science as: "Every contact leaves a trace". It is generally understood as "with contact between two items, there will be an exchange".
- Paul L. Kirk[2] expressed the principle as follows: Wherever he steps, whatever he touches, whatever he leaves, even unconsciously, will serve as a silent witness against him.
- Not only his fingerprints or his footprints, but his hair, the fibers from his clothes, the glass he breaks, the tool mark he leaves, the paint he scratches, the blood or semen he drops or collects. They are mute witness against him.
- This evidence does not 'forget' as it is factual. This Physical evidence cannot be wrong, it cannot perjure itself, it cannot be wholly absent.
- Only the human failure to find, study and understand can diminish its value.
- Locard's Principle also holds for computer forensics. Committing cyber crime will result in a digital trace being left behind.

# Locard's Principle of Exchange



Where  
there is a  
**TOUCH**  
there is a  
Trace DNA





# What all samples can be forwarded to FSL for DNA fingerprinting??

## **Biological Evidence**

From Crime Scene:

- Blood – Dry/wet
- Blood stain on cloth
- Blood stain on weapon
- Semen
- Seminal stains on cloth
- Cigarette buds
- Hair

## **Reference sample**

For reference sample:

- Specimen blood
- Buccal swab
- Semen
- Hair

# Victim Identification

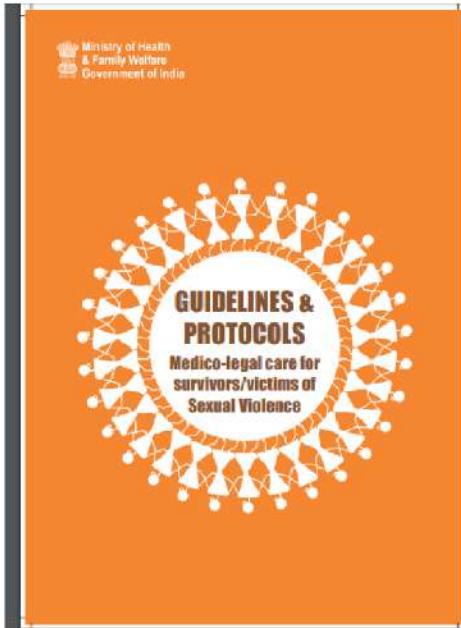
## VICTIM IDENTIFICATION – INDIAN SCENARIO

Compulsory capturing vital information and basic parameters during inquest and PM

- Biometric Parameters, Finger-prints
- DNA fingerprinting,
- Photograph/Close ups of the face,.
- The other parameters from the body which may help in zeroing down identity.



# Victim – Sample Collection



- General samples – Clothes
- Body Samples
  - Fingernail scrapings
  - Swabs from cheek and gum
  - Combed scalp hair
  - Combed pubic hair
  - Bite marks
- Genital samples
  - Vaginal swabs
  - Vaginal smear
- Specimen Blood

# Crime Scene & Medical Examination



Doctor collects samples from accused & victim.  
Forensic Expert aids to collect samples from Crime scene.

## Scene

What all samples can be collected?

How can it be collected?

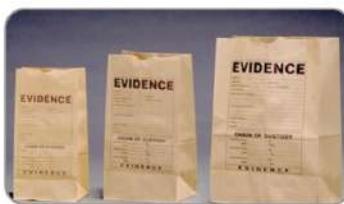
## Accused Medical Examination

- Swabs and smear from different region of penis
- Nail clippings
- Combed scalp hair
- Combed pubic hair
- Specimen blood

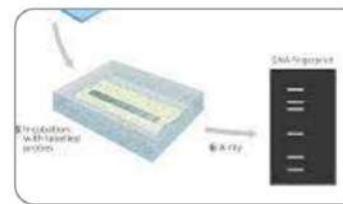
# Issues and challenges



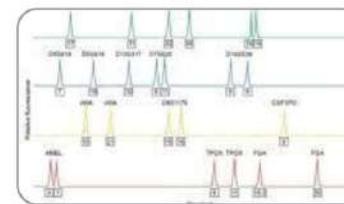
Collection of  
Biological  
Evidences



Forwarding the  
evidences



Processing for DNA  
profiling

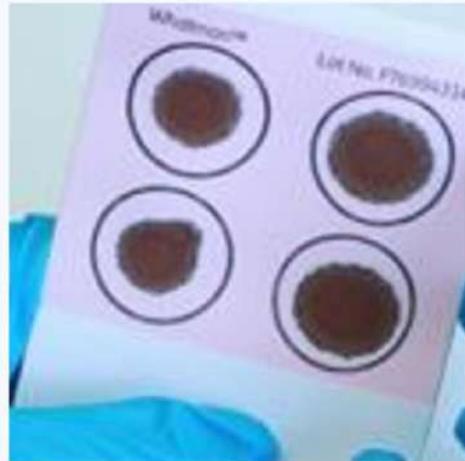


DNA report and  
Court testimony

# COLLECTION OF STANDARD SAMPLES



SPECIMEN BLOOD



FTA CARD



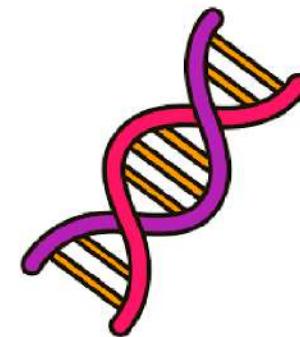
BUCCAL SWAB

# Blood: Origin & Groups

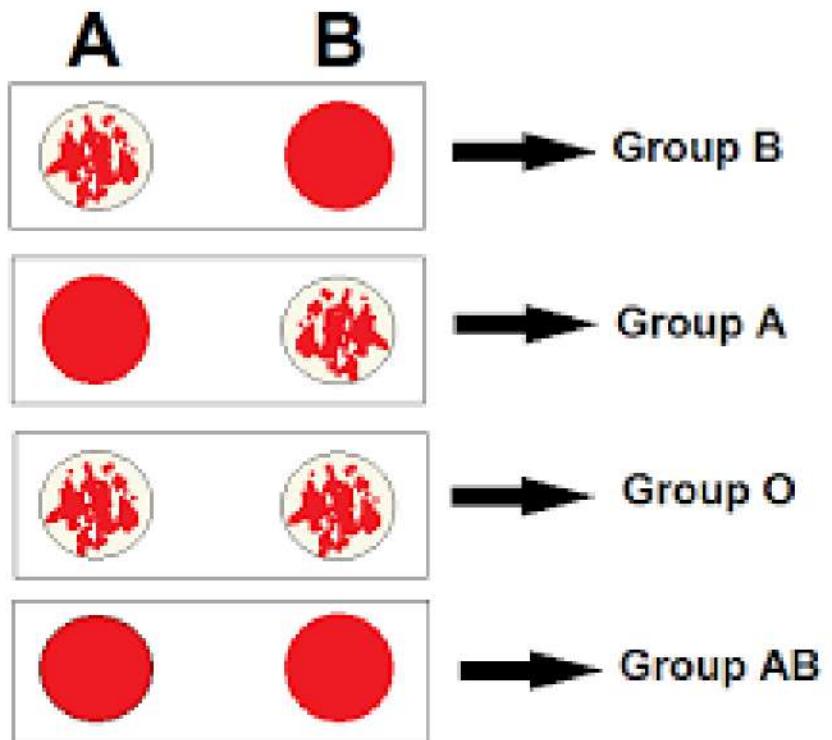
Blood Group



DNA



# Probability of Exclusion : Blood Grouping



**20 %** of the population

Exclusion via  
Blood Grouping  
Single genetic  
character with four  
variations

# Advent of Behavioural Technologies



- When advanced technology was not there, probably many were convicted based on faulty eyewitness accounts alone.
- However, the advanced Behavioural technologies like Suspect Detection System, Layered Voice Analysis, Eye Detector & Brain mapping (i Cognative or BEOS) could supplement the eyewitness testimony
- Forensic Psychologists could replace eye witness testimony scientifically with Behavioural Assessments as Expert witnesses.
- Crime Scene evidences deteriorate with passage of time if not collected & sent for analysis in time following SOPs. In such cases, the purpose gets lost. (Aarushi-Hemraj double murder).
- By revisiting these questionable cases with behavioural technologies, innocents can get their sentences overturned. Example Aarushi-Hemraj double murder, Malegaon blast 2006, Nitari serial killing.
- In such circumstances it is only Behavioural forensics that can help in connecting all dots either to prove the innocence or establish the role of the suspect/accused/witnesses in a particular crime (Ujjain serial Killing, Ajmer arms haul case, Dausa district, Rajasthan high court referral case)



# Locard's Exchange Principle in Behavioural Forensics

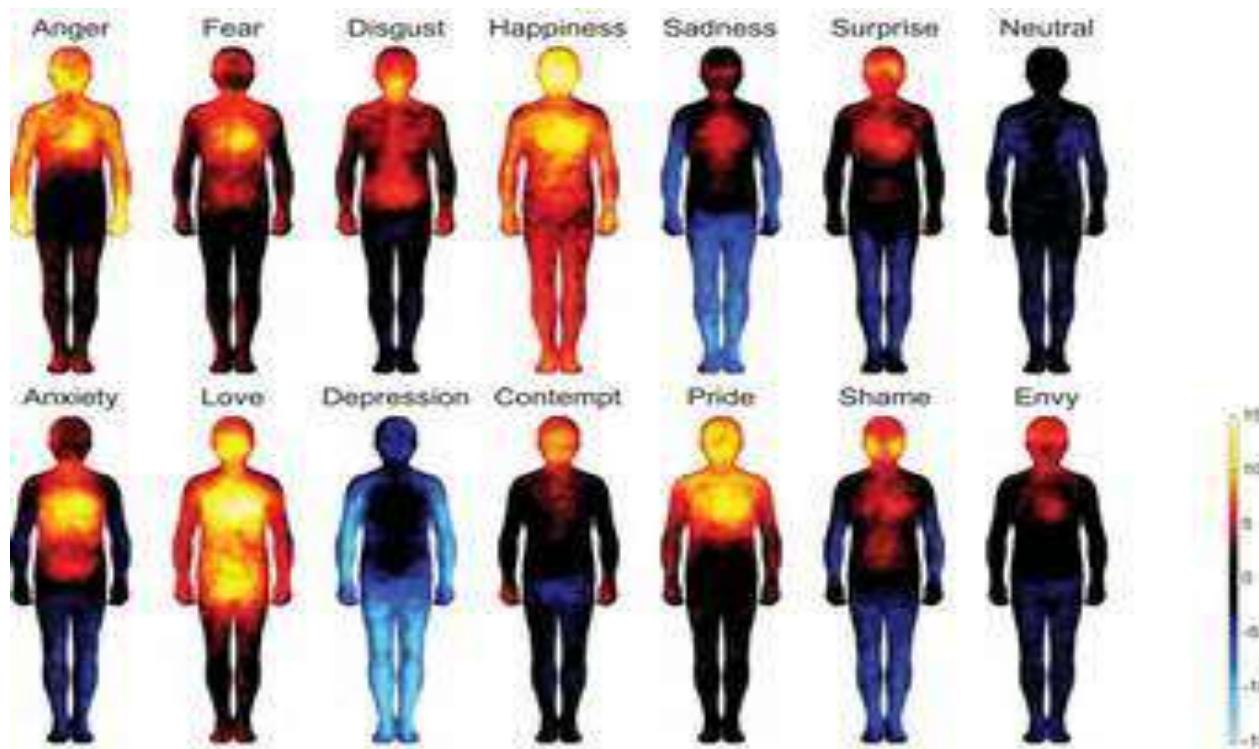
- Dr. Edmond Locard's basic principle of "Every contact leaves a trace" applies to Behavioural science as well
- Because of the contact between two items, there will be an exchange resulting in leaving the trace . Same principle applies in Cyber crimes and digital trace is left behind. According to Behavioural principles, brain and body interaction results in crime scene getting stored in the mind.
- Paul L. Kirk expressed the principle as follows:
- “Wherever he steps, whatever he touches, whatever he leaves, even unconsciously, will serve as a silent witness against him”.
- It is the experience of crime one does not forget. it cannot be wholly absent because it is a real experience. This experience gets stored as sensory-motor-mental imageries against him in his mind.
- Thus, mute or silent witness against ‘oneself’ denotes experience of crime stored in “Mind-Body” realm which is ‘Behavioural-Forensics’



Let's look  
for  
Behavioural  
Forensic  
Clues

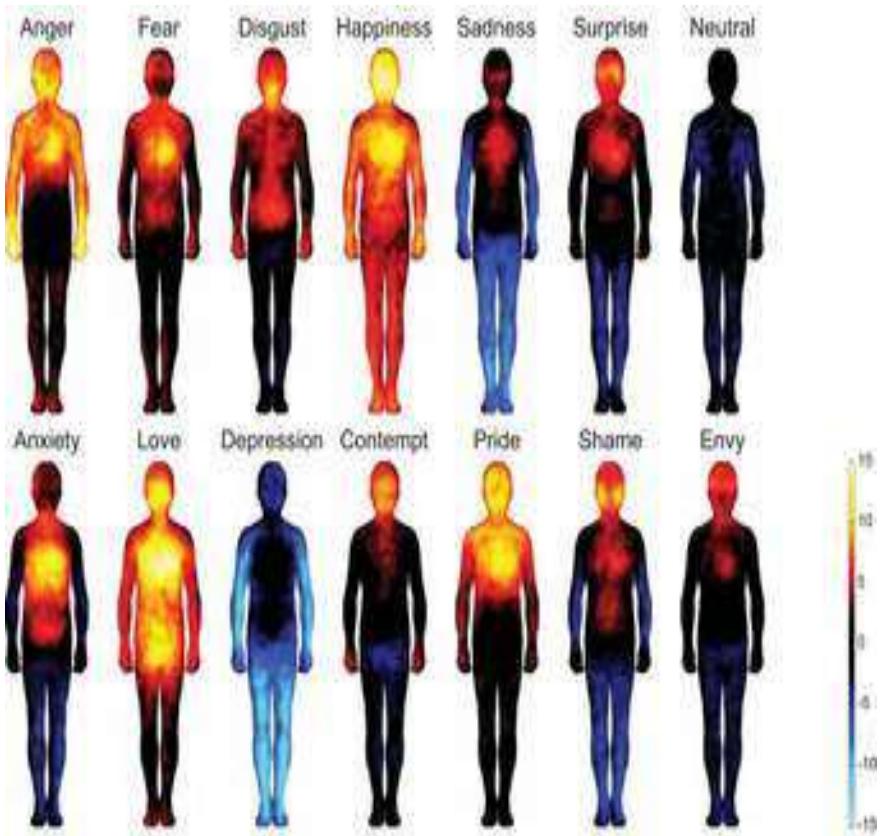


# Brain-body Laboratory: Store house of Crime Scene



# Natures's Own Signature

Mind: The Psychological GPS(sensation-feeling)  
Trace experience (Divine Notified Storage)



When any of the five sense organs  
are touched, there is a Trace.

Body: A Biological GPS  
DNA: (Divine Notified Adhar card)



When the sixth sense is touched,  
Trace/sensation is stored.

# Behavioural Forensic Analysis of victim-offender



- The recent flood of sexual violence cases against women & children & surge of Me-too Movement reflect that perpetrators often have mental health & psychosocial risk factors to often trigger, maintain and perpetuate crimes.
- When victims & offenders are not rehabilitated, it takes a toll on their mental health affecting their mental wellbeing.
- Offender's tendency for repeat offending in a deceitful manner increases leading to criminality or slowly transforms them to become deceptive predators exploiting the vulnerable victims till they come in conflict with law.
- Because human mind & body is the store house of experience. Crime Scene & samples may become contaminated, corrupt with passage of time. But perpetrator & victim share & store the experience of crime in exactly 360-degree angle in their mind-body realm permanently.



# How the criminal mind functions

- Based on years of Experience as a Clinical Psychologist and later forensic psychologist trying to understand why people commit crimes or react violently towards each other by studying their thoughts, emotions and behavior, gave a unique understanding of the Criminal Mind.
- This is where I learnt once a faulty thought occur and the blueprint is created, the plan of action becomes automatic;
- The person only waits for an opportunity to act willfully for an expected outcome.
- Example: **Sexual Predators**

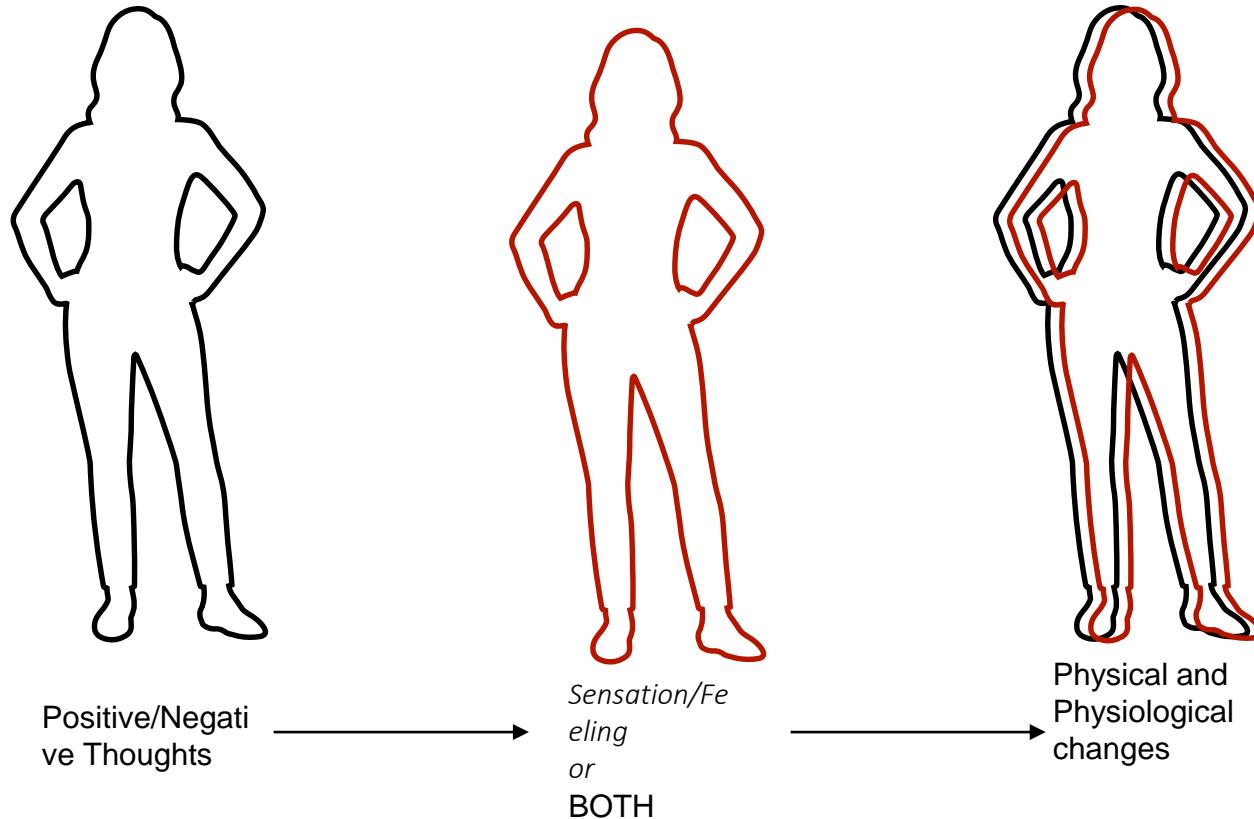


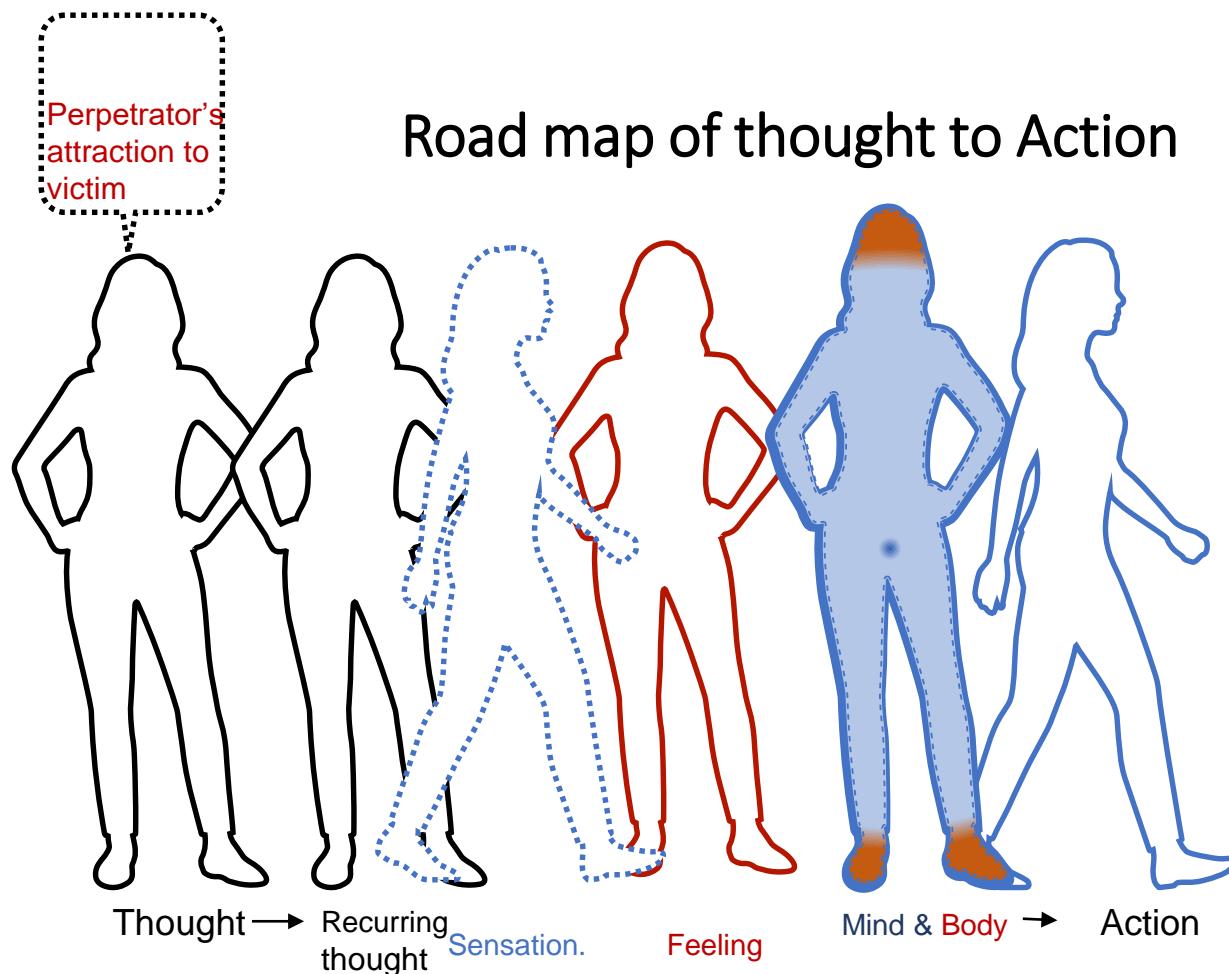
# How this happens? “Chitragupta & Yama”

- When a thought occurs, sensation occurring on the body gives rise to craving or avoidance depending on pleasant/unpleasant nature of sensation
- The pleasant sensation results in need state of wanting more giving rise to desire whereas unpleasant sensation results in need state of avoidance or dislike giving rise to hatred. These sensory –motor-mental imageries remain preserved as sensations at subconscious/preconscious level. They are like Chitragupta or auditor who keeps and maintains the record .
- They remain preserved as Blueprints in mind-body realm.(negative of a photograph of PDF file in your computer attachment in your emails)

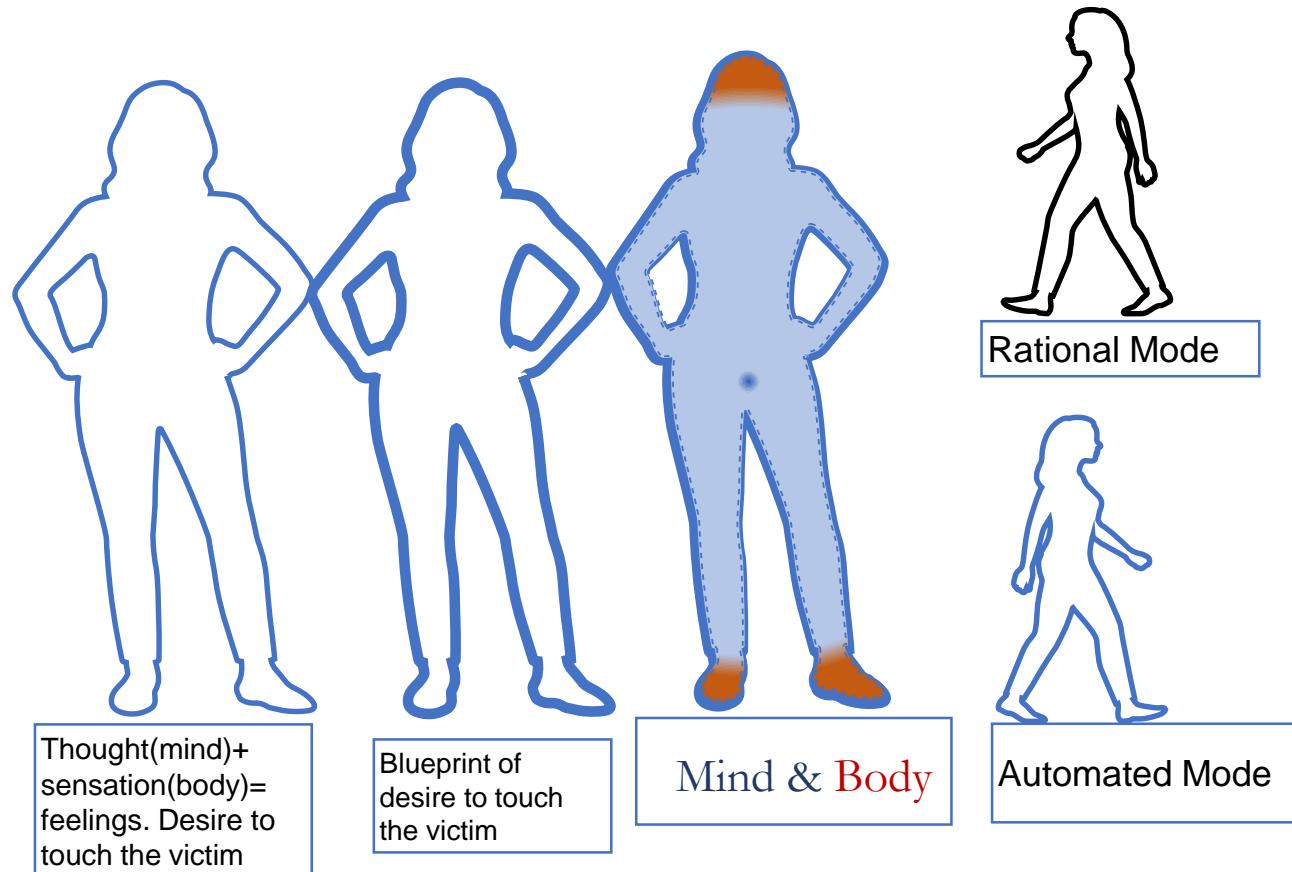


# Thoughts to Emotions





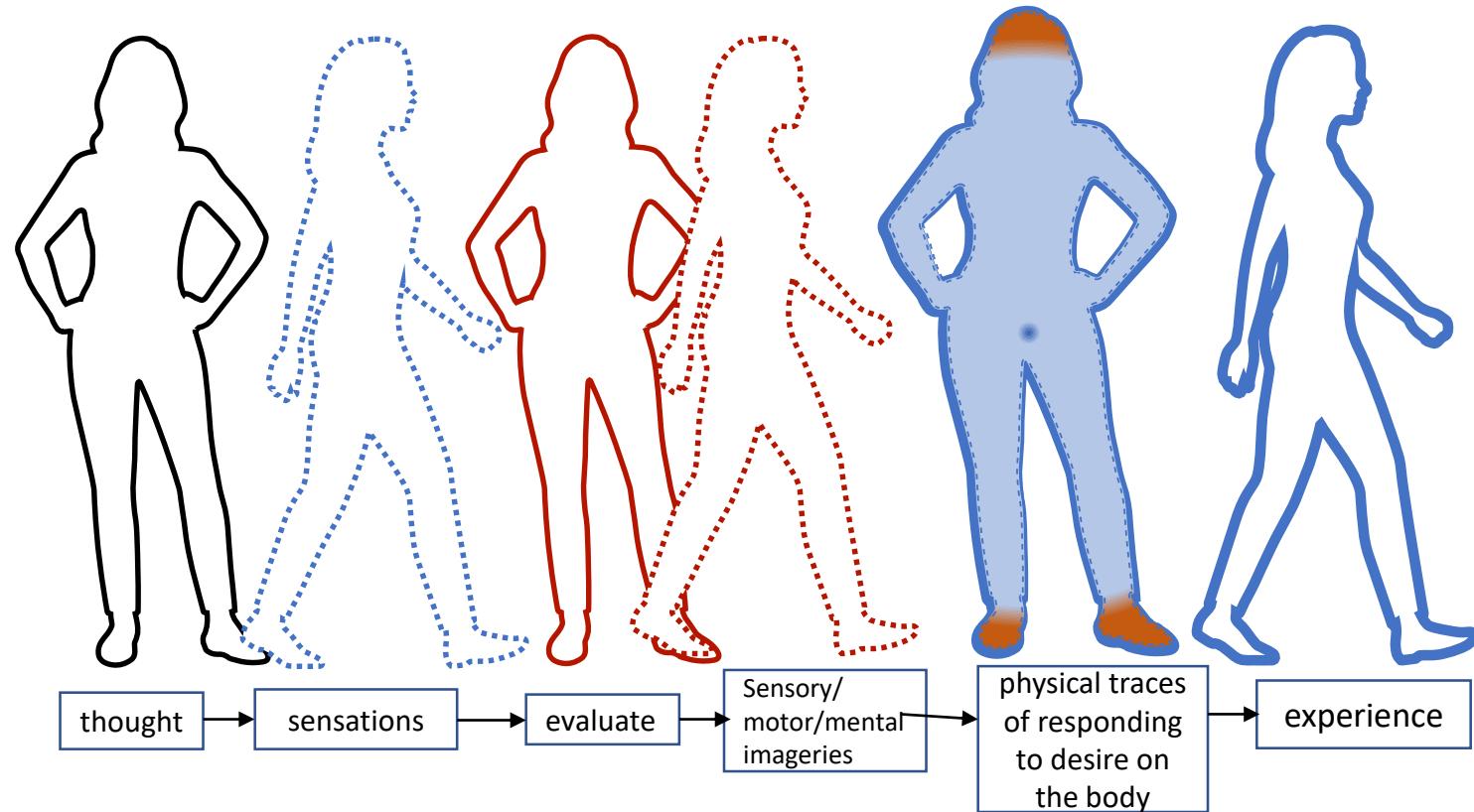
# The Blueprint of Intentions





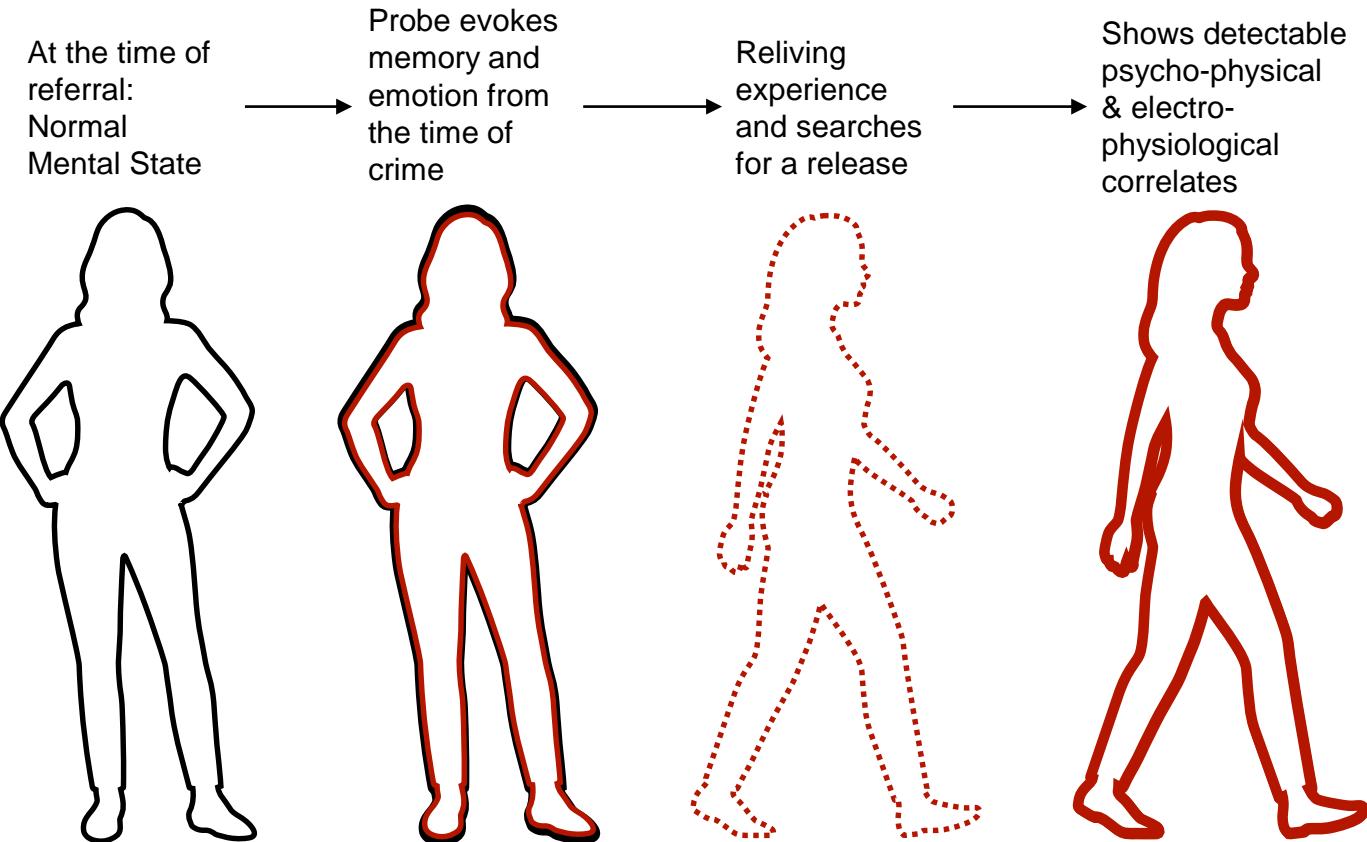
Can we retrieve this  
blueprint from  
memory by probing  
the mind?

# Experience stored in mind-body realm



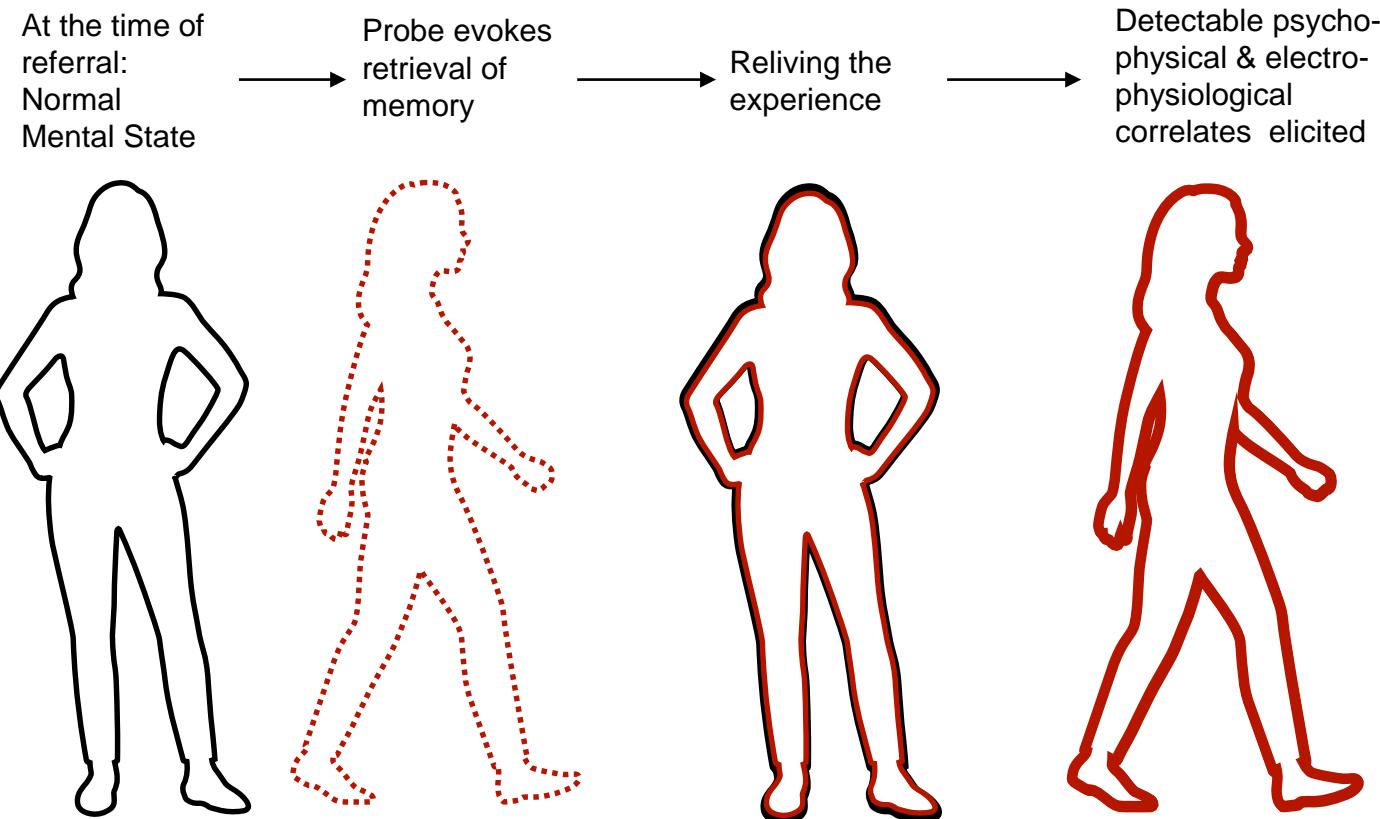
# Sensory-Mental-Motor imageries

## Evoked: Retrieval



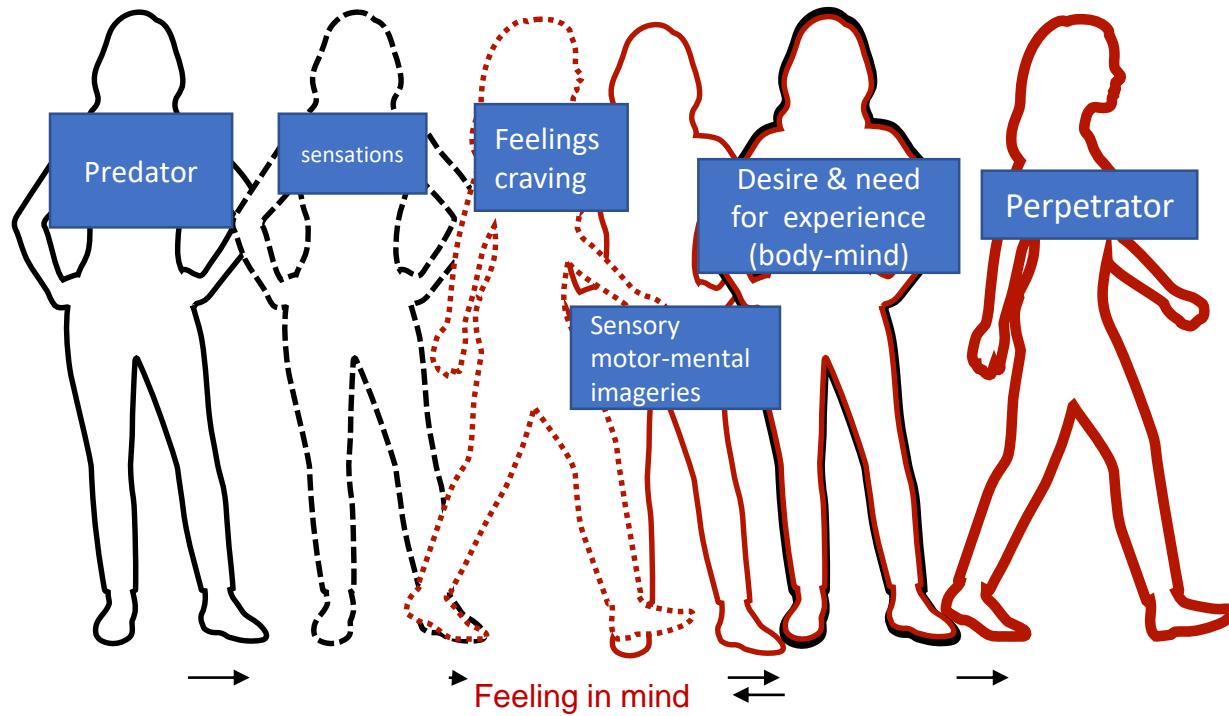
# Sensory-Mental-Motor imageries

## Evoked: Retrieval



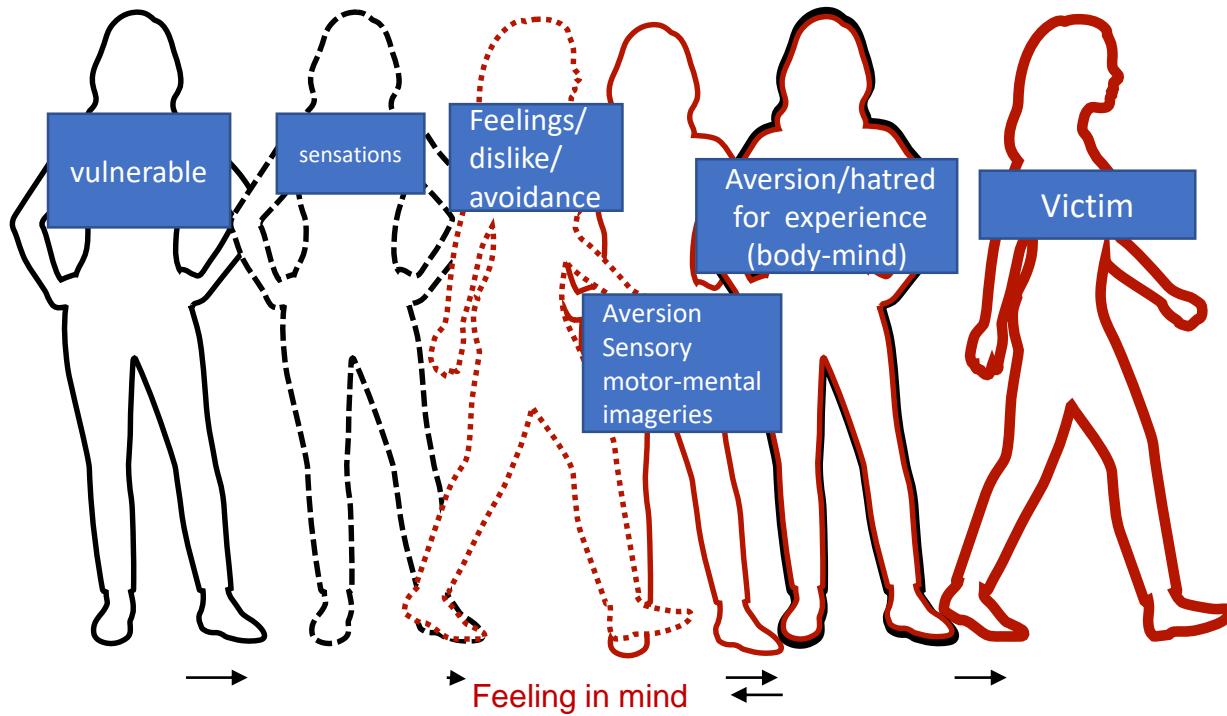


# Predator to perpetrator





# Experience of Victim



# What is Behavioral Forensics



- Behavioural Forensic Analysis (BFA) employs principles and techniques of standard behavioral assessment in deducing causal evidence from forensic interview and psychometric data.
- It is the application of behavioral principles for the assessment and analysis of criminal behavior by psychological evaluations for legal purposes
- It explains criminal motivation, risk behaviors, custody, criminal responsibility, and competence to stand trial.
- Behavioural Forensic Analysis in pre- and post-sentencing evaluations can help to determine how to control risk of criminal recidivism or competency.

# Behavioural Forensic Analysis to peer the Mind: Psychological Assessments for designing the probes



One important fact is even the most organized and complex of crimes are rehearse-led in the 'mind of the perpetrator'.

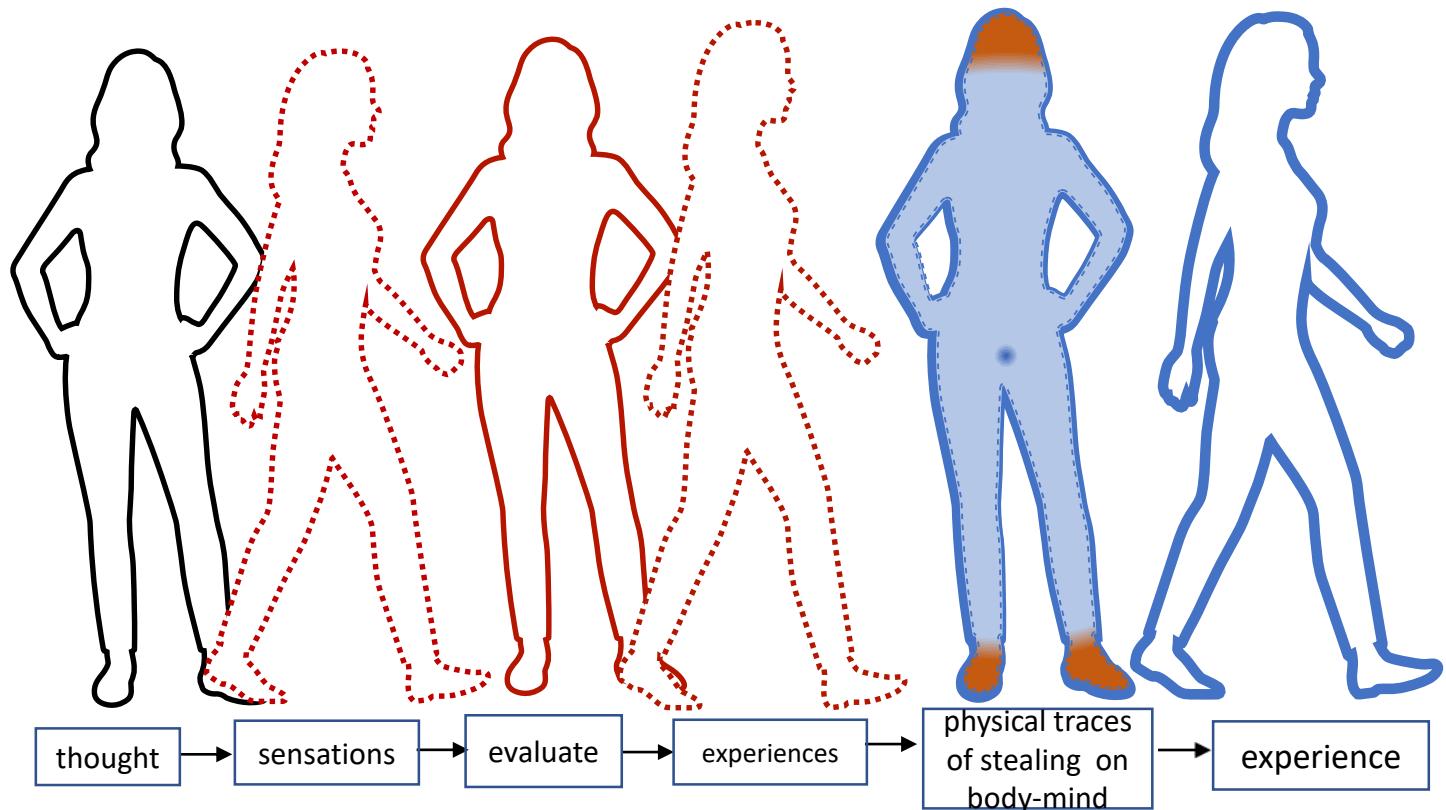
While physical evidence of crime scene may get lost in due course of time, experience of crime remains preserved in the mind-body realm of accused, victims, witnesses for lifetimes as a negative experience.

Forensic psychologists are left with no choice but to peer the mind by using forensic psychological assessments based on behavioral principles to understand thoughts, emotions and behaviour. Tools used for assessment and analysis of criminal behaviour are inventories, questionnaires, paper-pencil tests & projective techniques which are the gateways to open the mind. Psychometric data based on Behavioural clues is used in deducing causal evidence like a clinician.(Example, Anara Gupta case of J&K & Dausa District case referred by Rajasthan high court).

Behavioural Forensic Analysis of the crime scene evidence helps in understanding the mental status of the accused & the victim, their thought process, emotions & the resulting behaviour. This is the base for preparing probes for testing using technologies. It can explain intention, criminal motivation, risk behaviors, and competence to stand trial.

Mental health professionals tap the same store house of the victim for psychotherapy for healing purposes.

# Experience stored as Memory in mind-body realm





# Forensic Evidence: Scenario in India

- Sec. 73 of the Indian Evidence Act, directs that any person can be asked to give a fingerprint or DNA examination even if they are the accused. The Code for Criminal Procedure has several provisions enabling the analysis by an expert in order to examine certain cases.
- There have constantly been concerns that forensic evidence given in a court of law violates the fundamental provisions of the law. According to Article 20(3) of the Indian Constitution, any person accused of criminal conduct cannot be forced to testify against himself. Many people believed that using fingerprints and DNA analyses for verification violated Article 20. (3). They contended that requiring the accused to provide fingerprints is equivalent to the accused providing evidence against themselves.
- However, in the case of State of Bombay v. Kathi Kalu Oghad and Anr.[1961 AIR 1808], the Supreme Court ruled that ordering anybody to provide forensic evidence such as fingerprints, blood, or hair sperm did not violate the clause of Article 20(3).
- As a result, DNA profiling and some other forensic evidences are widely accepted in courts worldwide.
- Read more at: <https://www.lawyersclubindia.com/articles/relevance-of-forensic-science-in-criminal-and-civil-proceedings-15017.asp>



# Psychological Aids to Investigations

- The Hon'ble Supreme Court upheld the constitutionality of the use of narco-analysis and lie detectors in the case of Ramachandra Reddy and Ors. v. The State of Maharashtra[1 (2205) CCR 355 (DB)], in 2006, to filter down prospective suspects by evaluating a criminal's behaviors and features; based on psychological evaluations, if the objects are seized from a criminal there is a contribution to the building of a thorough social and psychological profile of the perpetrator.
- But recently in the case of Selvi and Ors. v. State of Karnataka and Anr. [(2010) 7 SCC 263] held that if the person providing statements in brain mapping or narco-analysis test is in a semi-conscious state they cannot be considered conclusive and thus it cannot be made a part of the compulsory investigation process.
- Read more at: <https://www.lawyersclubindia.com/articles/relevance-of-forensic-science-in-criminal-and-civil-proceedings-15017.asp>

# Psychology in the courtroom, with special reference to Section 84 IPC



- *16-year-old female suffering from tuberous sclerosis (rape victim, 2012: referral: (jurisdictional court)*
- *Behavioural clues connecting to LVA & confirmed by DNA.*
- *One important truth: even the most organized and complex of crimes are rehearsed in the ‘mind of the perpetrator’.*
- *Forensic psychologists try to tap this storehouse for detecting deceptions using advanced technologies like LVA, SDS, Eye Detect, iCognitive & BEOS*
- *These Behavioural clues gathered like clinicians are supplemented by Psycho-physiology/ electrophysiology-based correlates as evidence.*



Gomtipure judgement.pdf



Order 1.pdf



order 2.pdf

04/04/2022

## Dead girl's trauma finds voice

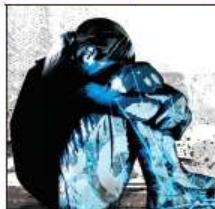
Psychologist Tells Court About Rape Victim's Harrowing Account

TIME NEWS NETWORK

Ahmedabad: After the death of the minor rape victim, her psychoanalysis is now being used to deliver justice and to nail the accused persons whose names the mentally-challenged victim could not even give to police.

After the girl, who was allegedly raped by at least nine persons, the court had sought psychologist's assistance in understanding and documenting details of multiple rapes and her trauma. The girl committed suicide a year later leaving behind a small child. In the on going court case in the city sessions court, former director of Institute of Behavioural Science at Gujarat Forensic University — S L Vaya has given her testimony giving a voice to the dead girl's trauma.

Following the victim's death, there is no witness to take names of the accused before the court. But Vaya deposed before the court and narrated what the victim had told her during her seven-day long sessions to extract information



from her as requested by the court and police.

After the victim's demise, Vaya's testimony before a city sessions court has come as only corroborative evidence to what the victim had revealed during the investigation. And the description and revelation of facts have been quite similar. Vaya revealed before the court how the victim gave nine names including the three that have been arraigned in

this case - Raeesahmed Jamilahmed Ansari, Ranwar-ul-Hay alias Tutar and Mohammed Ali.

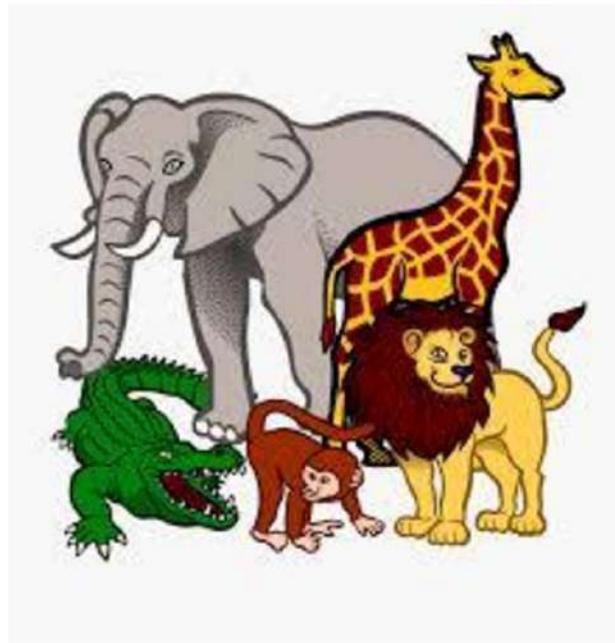
The expert witness said to the prosecutor M G Kepadia during the examination-in-chief that the victim described how the three friends used to rape her by giving her money particularly when their wives were away. The victim's description of crime scenes matched with the description of research scholars who later visited the place. The victim had told Vaya about the places where she was raped. These places included a stationed train.

The FIR was lodged when the minor girl became pregnant. On her description Ansari was arrested. After the birth of a daughter in September 2012, DNA test was conducted on the baby and the accused but it did not match.

However, other accused person Tutar was arrested and put to DNA test. This established that he is the biological father of the child and is being tried along with Ansari.



# WILDLIFE CRIME & DNA



Gir Sanctuary Asiatic Lion Poaching  
Case : 2007

38 Poachers  
convicted

# Why DNA Fingerprinting



## Species Identification

Protein or DNA based analysis to determine the **species origin** of a sample (e.g. of samples collected from a suspected poaching operation).

# Why DNA Fingerprinting



## Individual Identification

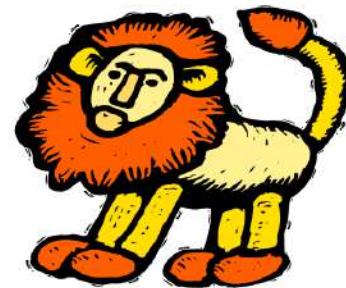
DNA based analysis to determine the unique DNA fingerprint of an individual.

This analysis can be used to determine whether two samples (e.g. blood on a knife and meat in a freezer) are from the same animal.



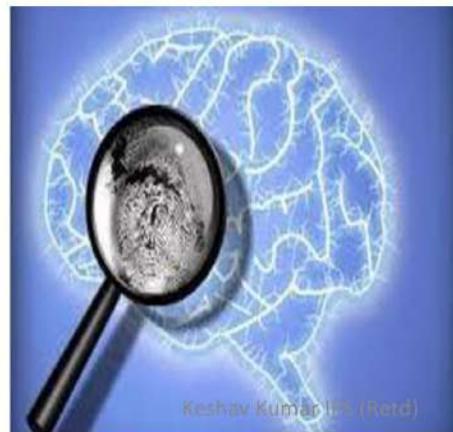
# Why DNA Fingerprinting

- Census
- Habitat area
- Family of the animal
- Connect accused with the specific animal



Keshav Kumar IPS (Retd)

# TERRORISM



# FORENSIC





גבעה צרפתית



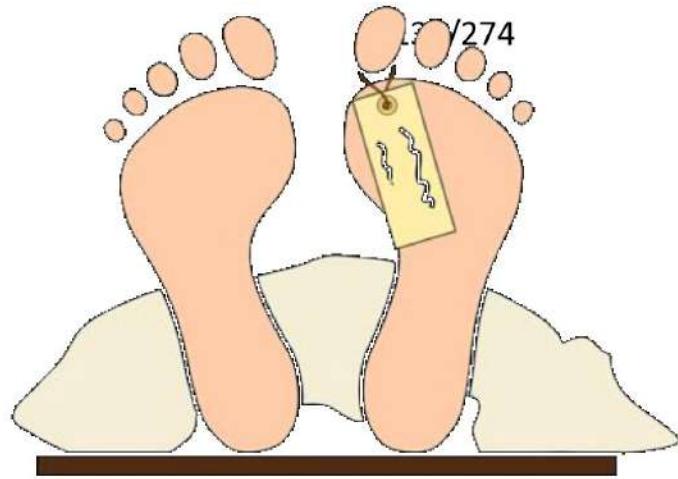
נווה שאנן

## Suicide Bombers



הריה יובל

# Unidentified Dead Bodies





Keshav Kumar IPS (Retd)

# Unclaimed Dead Bodies

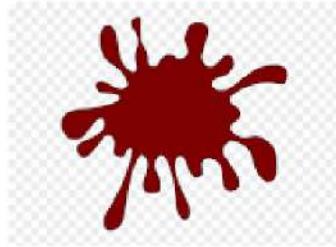


Keshav Kumar IPS (Retd)



## Body Fluids at the SOC

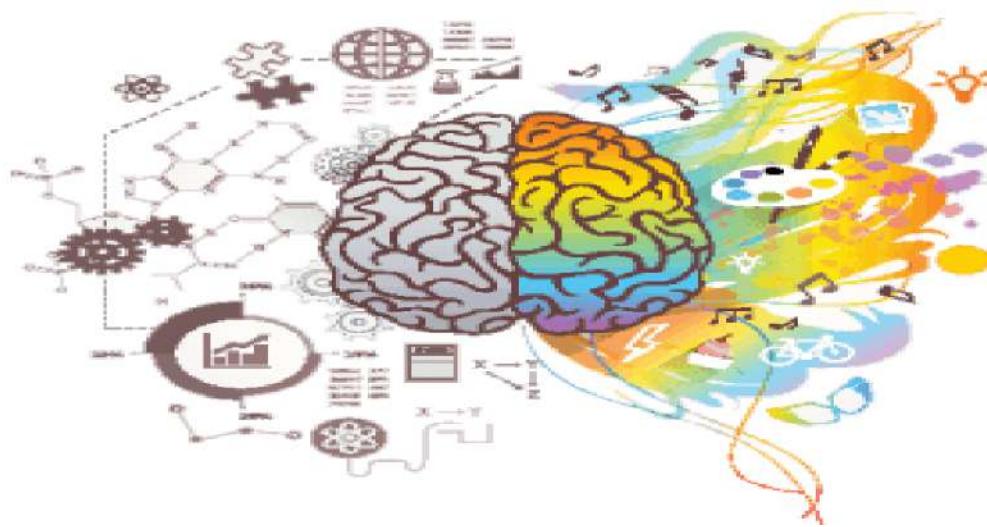
- Blood
- Sweat
- Spit
- Nasal fluid
- Saliva
- Urine



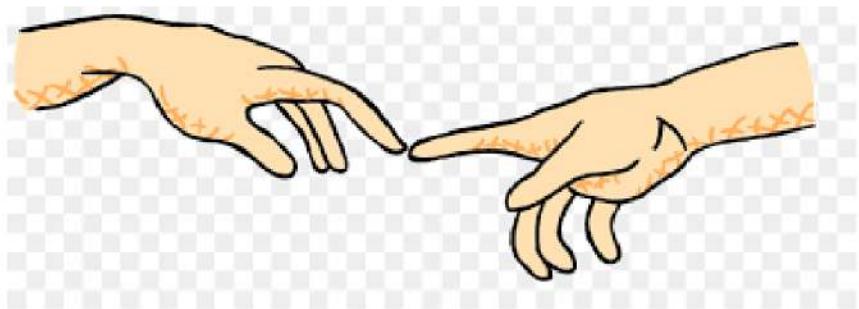


- Fingerprints
- Saliva
- Blood traces
- Body cells
- Perspiration

# Creative & Innovative Forensics



Where  
there is a  
**TOUCH**  
there is a  
Trace DNA



# DNA & Anti Corruption



# DNA Finger Printing in a Trap case by Anti-Corruption Bureau, Gujarat

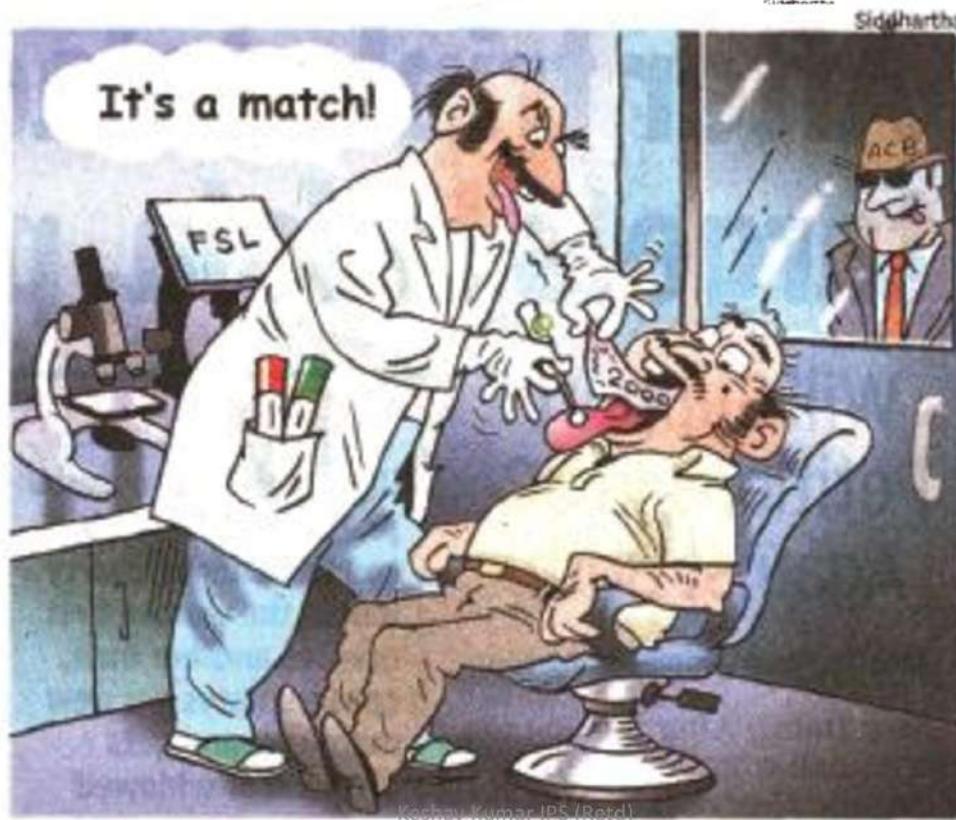


# DNA in Anti-Corruption Case (Trap )



THE TIMES OF INDIA, AHMEDABAD  
SATURDAY, JUNE 30, 2018

## DNA tests for corruption return positive



# Saliva Soiled Currency Notes



**TIMES CITY**

SUNDAY TIMES OF INDIA, AHMEDABAD  
MARCH 18, 2018

# ACB recovers money swallowed by vet



# Fingerprints on Notes & Papers



# Fingerprints & Body fluids : Digital Devices

DNA Test Blood Saliva Hair Skin Cell



shutterstock.com • 3600936861



DNA  
Data  
Bases  
are the  
Future



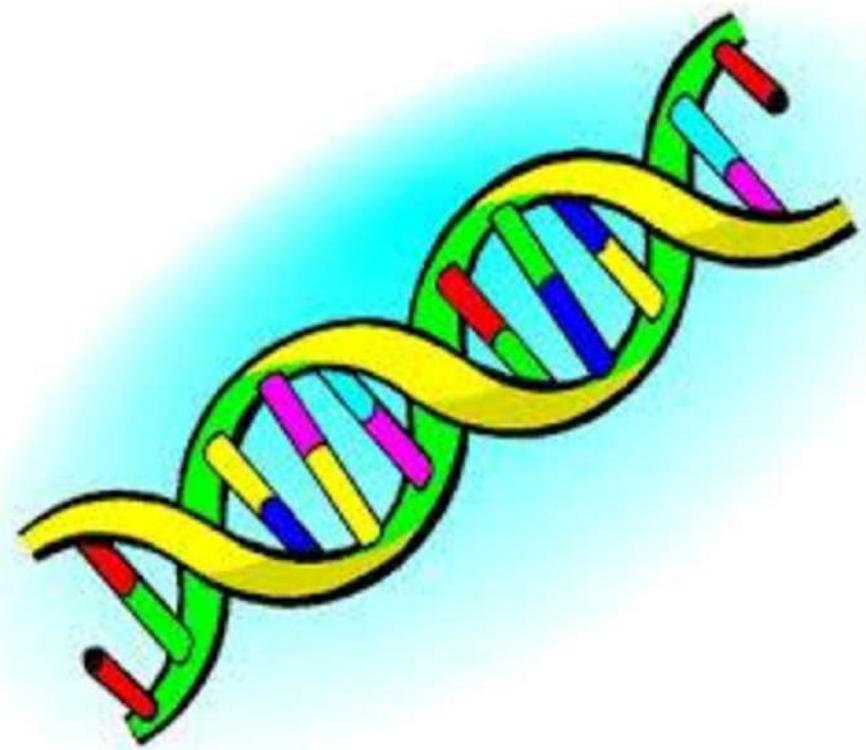
# Data Banks : FP.



# Data Banks : DNA



# Matching : FP & DNA



# How Long Does DNA Last?

DNA degrades **over time**,

How long it lasts depends on **how well it's preserved**.

▪ **Factors** such as :

- Exposure to heat
- Water
- Sunlight

can cause the molecule to degrade faster



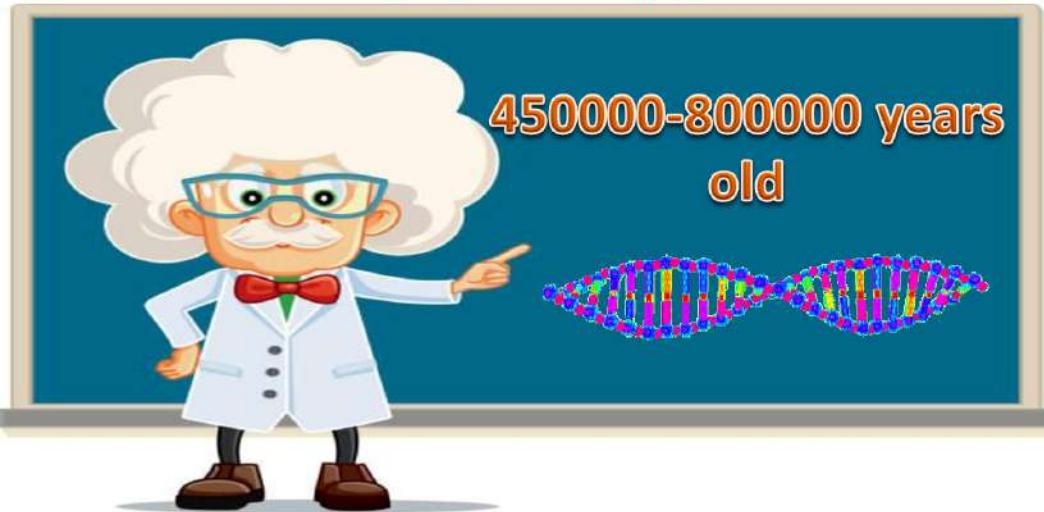
# How Long Does DNA Last?

- Half-life of DNA — the point at which half the bonds in a DNA molecule backbone would be broken — is **521 years**.
- Under ideal conditions, DNA would last about **6.8 million years**, after which all the bonds would be broken.
- But DNA would not be readable after about **1.5 million years**.

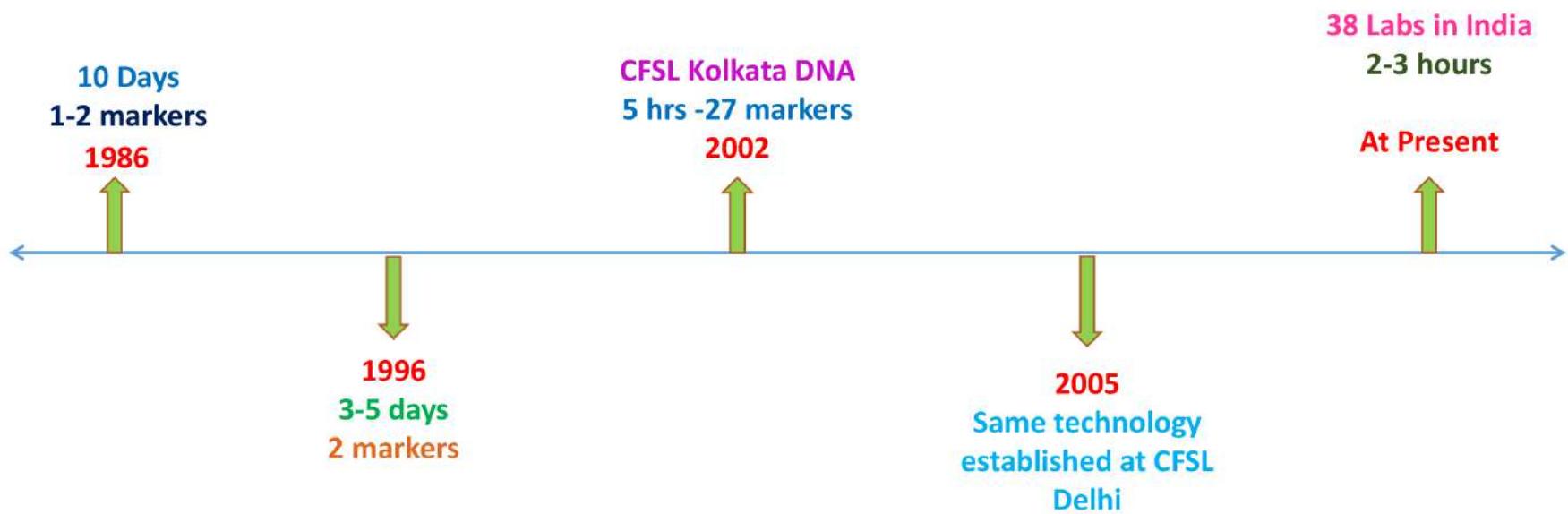


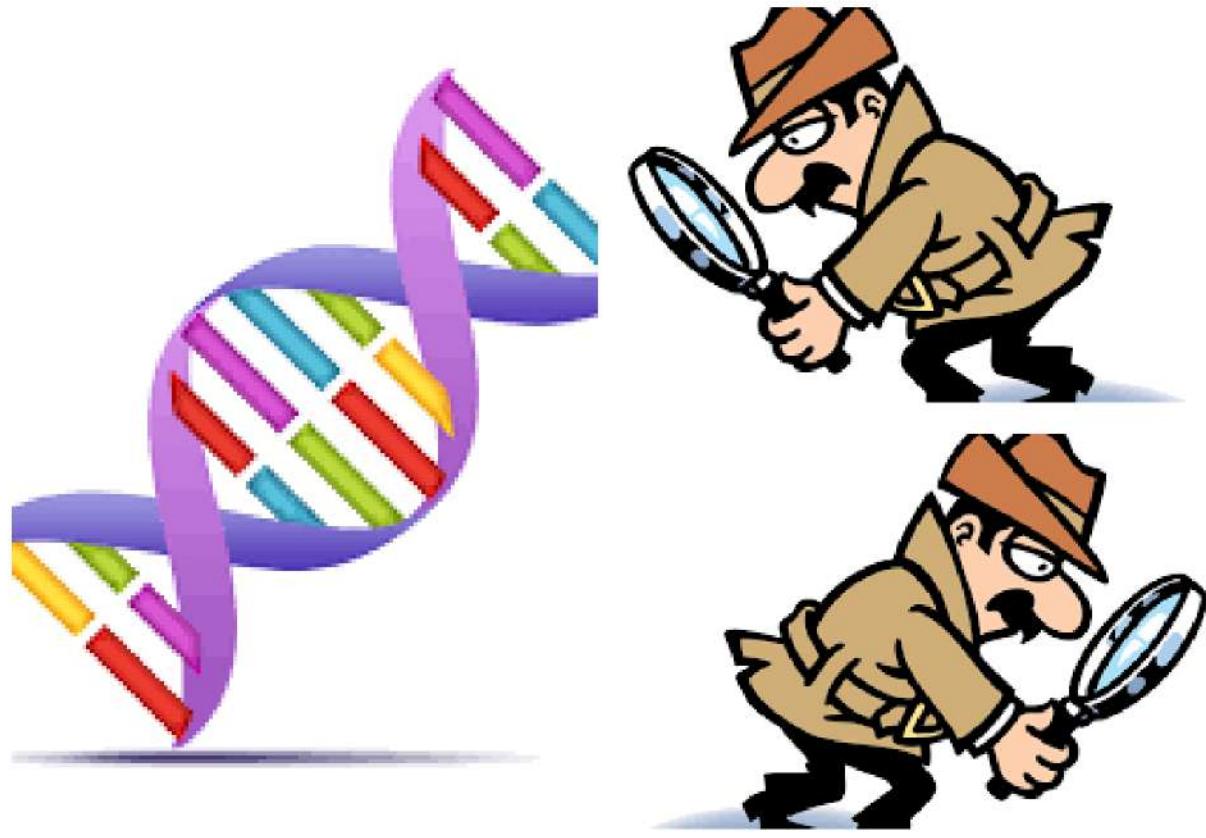
# Oldest DNA ever Found

- Greenland ice
- Estimated to be between 450,000( four lakh fifty thousand) and 800,000 ( eight lakh ) years old.



# Trends in Time taken for DNA Sequencing in INDIA

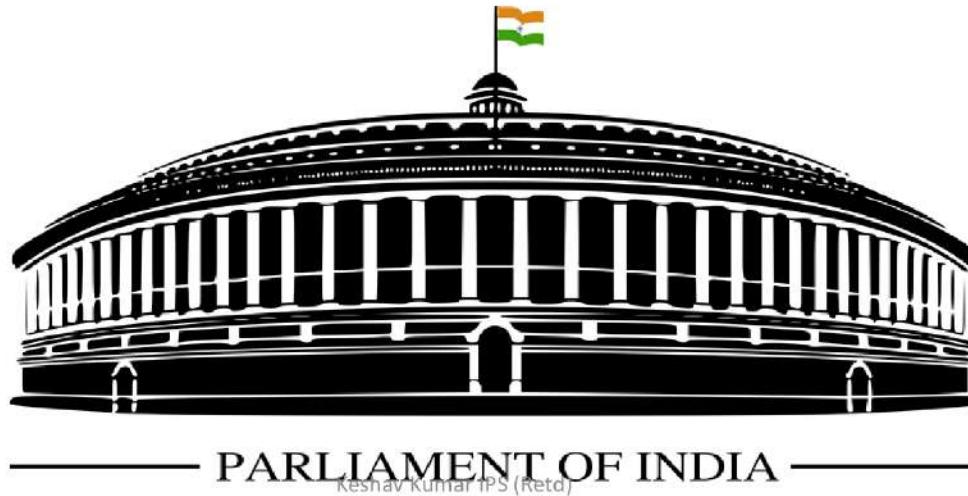




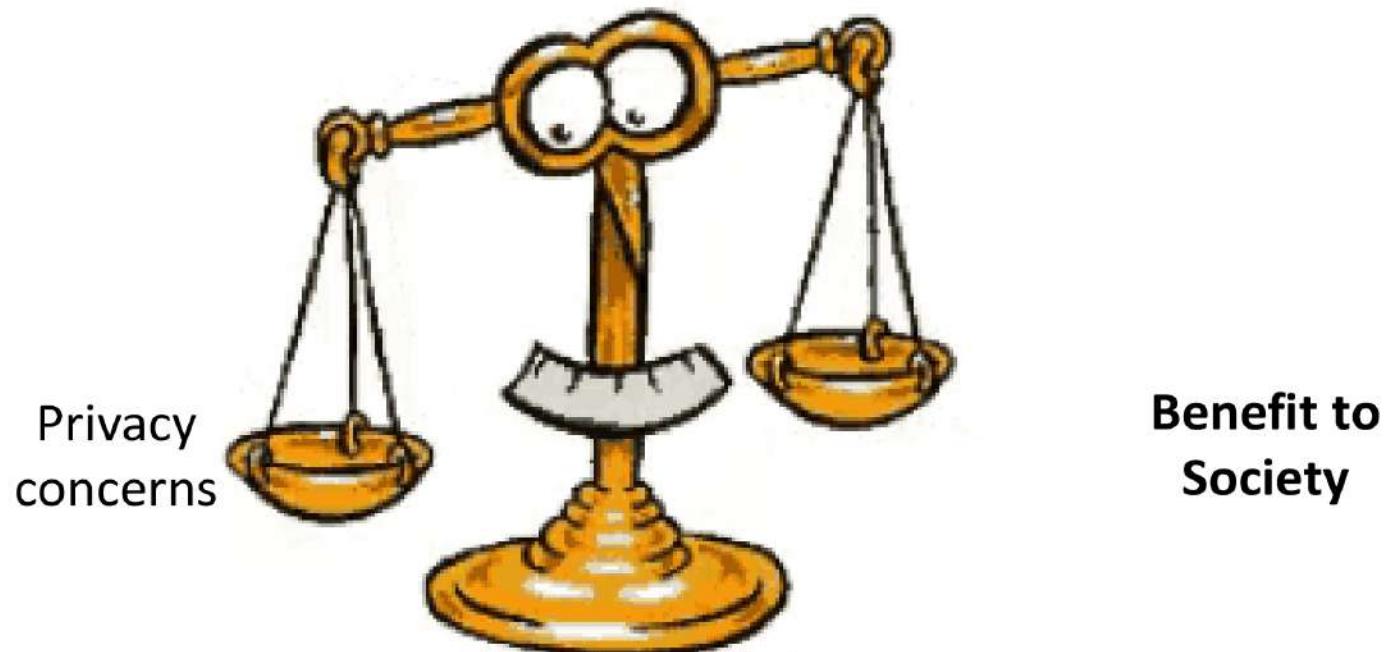
Detective  
DNA

# The DNA Technology (Use and Application) Regulation Bill, 2019

- The DNA Technology (Use and Application) Regulation Bill, 2019 was introduced in Lok Sabha on July 8, 2019.
- The Bill provides for the regulation of use of DNA technology for establishing the identity of certain persons.



## The Balancing Test of DNA Database Legislation



# Objectives of the DNA Technology (Use and Application) Regulation Bill, 2019



# **DNA's Revolutionary Role in Freeing the Innocent**

Celebrating World DNA Day: The History of DNA and its Unique  
Role in Proving Innocence

USA Innocence Project



**INNOCENCE  
PROJECT**

# 45%

of DNA cases involved the  
misapplication of forensic science

Source: Innocence Project



**70%**  
of cases involved  
eyewitness misidentification

Source: Innocence Project

About 70% of all  
wrongful convictions  
are because of a  
wrongful eye witness

# 29%

of DNA exonerations  
involved false confessions

Source: Innocence Project



# 153

True suspects and/or perpetrators  
identified by post-conviction DNA testing



Source: Innocence Project

# India's Innocence Project

22-March 2022

## India may soon have an 'innocence network'

The network aims to provide legal support to wrongly-sentenced convicts for proving their innocence

HT Correspondent  
[letters@htlive.com](mailto:letters@htlive.com)

**LUCKNOW :** India may soon have an 'innocence network' that aims to provide legal support to wrongly-sentenced convicts for proving their innocence.

As of now, 12 countries have 'innocence network' or 'project innocence'.

UP anti-terrorism squad (ATS) chief Dr GK Goswamy has been allowed by the UP government to be a part of the US-launched 'project innocence' in order to understand its implementation modalities.

Goswamy is perhaps, the country's first person to become a part of the project.

"I am thankful to government for allowing me to go for the Fullbright-Nehru Academics and Professional Excellence Fellowship under which I have opted for research on 'Project innocence' which, in all likelihood, would soon be introduced in India also soon," said Goswamy.

He said he always wanted to go for the fellowship programme and in 2019 applied for it.

"I am happy to say that in the law segment of this programme, I was awarded the highest grades under which I can visit any of the US universities twice in two years to do my research on 'project innocence', " said Goswamy. "Since foreign scholars were not allowed for the programme in 2020 and 2021 due to the pandemic so I was asked to complete my research work by December 2023. I am leaving on April 1," he added.

### Project Innocence

"It originated in US," he said and added that it would be a revolutionary move if replicated



There can be many causes for a wrong conviction. When wrong conviction is possible in developed nations, the same is quite possible in India too.

**GK GOSWAMY, UP ATS chief**

in our country. In February this year, Reynaldo Munoz became the 3000th exonerated in US as notified by the National Registry of Exonerations." Goswamy said.

At the age of 17, Munoz was arrested for a murder in 1985 in Chicago that he had never committed, but was wrongly convicted in 1986 with 60 years imprisonment, he added.

According to him, if 'Project Innocence' was implemented in India, it would help in dealing with wrongful convictions here, too. The project, when implemented, would be taken care of by a team of legal experts, who would help in getting wrongly convicted people out of prison frequently.

"There can be many causes for a wrong conviction. It could be mistaken eyewitness identification, false confessions, tunnel vision, defective informant testimony, plea bargaining, police and prosecutorial misconduct, inadequate defence representation or forensic imperfections and expert misconduct, including forensic frauds," he said.

When wrong conviction is possible in developed nations, the same is quite possible in India too, he added.

However, he said that replicating the same system would not be an easy task. "There are certain questions like: How the project will be replicated in India? What kind of cases would be taken under this project? On what basis the cases would be categorized? These and other implementation modalities would be cleared only after the completion of my research work on 'Project Innocence', " he further said.

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# Limitations & Problems In DNA Testing



# What are the limitations of DNA testing?

## No-suspect Cases:

- A full DNA profile is powerful evidence,
- but it's not always going to lead investigators to the perpetrator.
- There must be a matching profile available to compare it to—either in a database or from a known sample.
- There is no master database that contains everyone's DNA information.

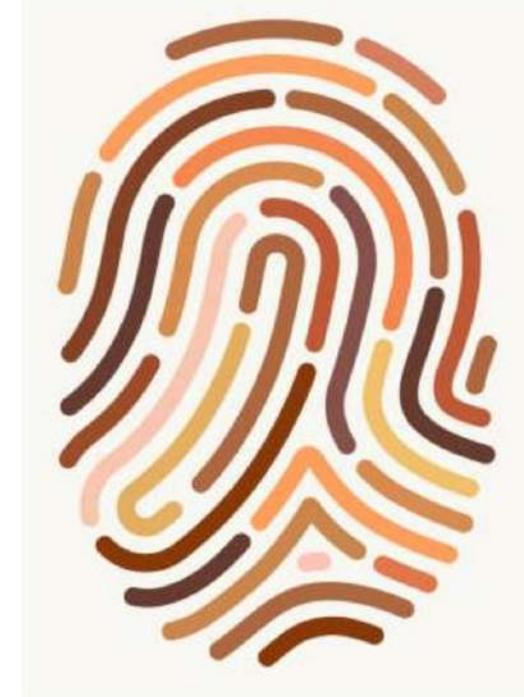


# What are the limitations of DNA testing?

**Partial Profiles:** In cases where samples have very low quantities of DNA, are exposed to extreme environmental conditions or are not properly preserved, it may be difficult to obtain a full DNA profile and the test may only yield a partial profile. However, partial profiles may still be helpful in determining if an individual could be included or excluded in the investigation.



# Do Twins share same FINGERPRINTS ?



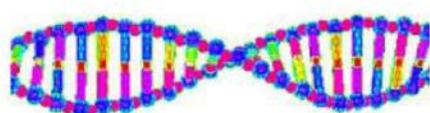


Identical twins share a lot of similarities in both their :

- # Genetic makeup and their
- # Physical appearances.

But,

**identical twins all have  
unique fingerprints.**



## REPRESENTATIVE DNA EVIDENCE BASED CASES INVESTIGATED DETECTED CONVICTED



# 1991, Rajiv Gandhi Assassination Case

This was the first case in which DNA fingerprinting was used to :

- Identify victims.
- The attacker.



**INDIAN EXPRESS**  
Madras: Wednesday, May 22, 1991

**RAJIV GANDHI ASSASSINATED**

Blood-stained politics

The Indian political landscape has been forever changed by the assassination of Prime Minister Rajiv Gandhi. The country is reeling from the loss of its most popular leader, who had just completed his second term in office. The killing has sent shock waves through the political system, with many fearing a return to the days of political instability and violence. The Indian Express is reporting on the aftermath of the tragedy, with exclusive interviews and analysis from leading political figures. The paper is also providing coverage of the investigation into the assassination, which is still ongoing. The Indian Express is committed to bringing you the latest news and updates on this momentous event.

His last press meet  
**'I will form the govt'**

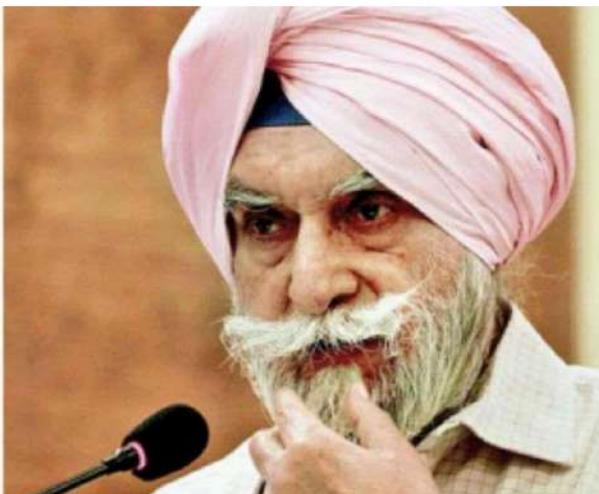
Killed in bomb blast at Sriperumbudur  
2 securitymen among 11 others dead





# 1995, Beant Singh Assassination Case

When then Punjab DGP KPS Gill suggested that the assassin could be a “human bomb”, it was initially not taken seriously. However, **DNA fingerprinting of the victims** showed one of them to be Babbar Khalsa operative Dilawar Singh.



Keshav Kumar IPS (Retd)



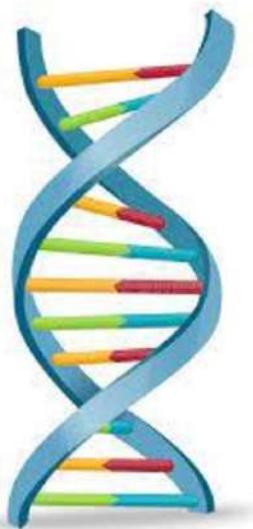


# BIJAL JOSHI GANG RAPE

Keshav Kumar IPS (Retd)



# JUDGMENT HIGHLIGHTS



**“Merits of DNA  
report”**



## 2012, Nirbhaya Gangrape Case

All the accused  
were  
sentenced to  
death based on  
the dying  
declaration of  
the victim and  
**DNA evidence.**

The four convicts in Delhi gang-rape





## 2013, Hyderabad Blasts Case

DNA samples  
from the  
**house** helped  
NIA secure  
convictions



## ND Tiwari : Paternity case





# Internationally acclaimed case : Saddam Hussein of Iraq Identification





# DNA Test confirmed Identification

<https://www.newscientist.com/article/dn4481-fast-track-dna-tests-confirm-saddams-identity/>

- Fast Track DNA Tests
- Saliva
- Swab
- Two sons killed
- Iraqi Military had DNA Profile stored



A large, faint watermark of a fingerprint is visible on the left side of the image. A magnifying glass is positioned over the center of the fingerprint, focusing on the ridges and valleys to symbolize investigation and identification.

# CRIMINAL PROCEDURE (IDENTIFICATION) BILL 2022



# Old Act 1920 & New Act 2022

**The Criminal Procedure Identification Act 2022**



# 1920 Act

- Fingerprints
- Footprints
- Photographs



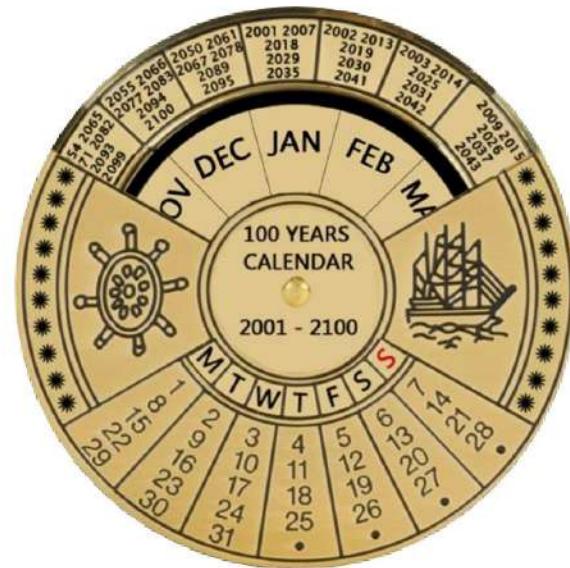


# New Act 2022

- **Biological samples & its analysis**
- **Behavioural attributes : Signature & Handwriting**
- **Examination under Section 53 & 53A of CrPC**
  - Blood , Semen , Hair , swabs and DNA Analysis



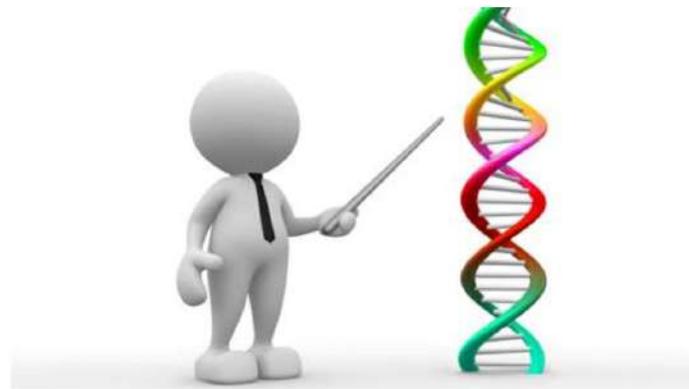
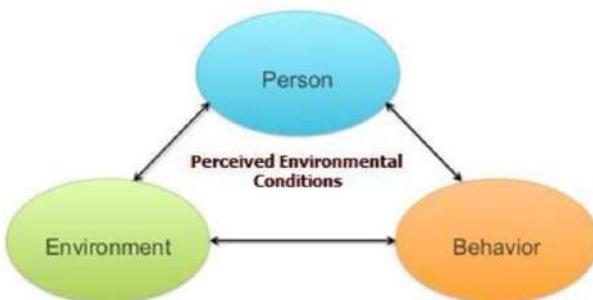
# Forensic Epigenetic Analysis: The Path Ahead





# Epigenetics

Epigenetics is **the study of how your behaviors and environment can cause changes that affect the way your genes work**. Unlike genetic changes, epigenetic changes are reversible and do not change your DNA sequence, but they can change how your body reads a DNA sequence.





# Behavioural Forensics with the Digital trace analysis is the future of crime investigation



# Thank you



Dr.S.L.Vaya, Chief Mentor, SCBS, RRU, Gandhinagar, Gujarat,  
India