

What is DNA fingerprinting? Discuss its applications and challenges in the Indian context.

Fixing the "Who?"

DNA profiling/fingerprinting is a lab technique which fixes the identity of an individual based on his/her unique DNA characteristics.

It relies on deciphering the genome sequencing wherein the base pairs of nucleotides in the DNA repeats in a particular pattern which is unique to an individual, as is the fingerprint.

By comparing this repetition pattern using the biological samples, the identity of an individual is established. It thus serves as a tool for identification in the following areas.

APPLICATIONS

The most required and thus prevalent application of DNA fingerprinting is in criminal investigations. The technique serves as a promising instrument for identifying and convicting the offenders as well as releasing the innocent involved in a crime scene.

DNA profiling comes in aid, in instances of mass casualties like bomb blast, large scale natural calamities, etc. to identify the deceased persons and missing persons.

In civil litigations involving disputed maternal or paternal relationships, DNA fingerprinting helps in establishing the identity of the child.

Besides these, the technique is relevant in anthropological studies to trace the genealogy of human races, and also in plant and animal species to trace their biological roots. This helps in better conservation and protection.

CHALLENGES

Legal: In the Indian context, a lack of proper legislation, becomes a roadblock in effectively putting to use this modern technique. ~~Also~~ The DNA bill is pending passage. And the Indian Evidence Act and the Criminal Procedure Code are outdated to address the needs for utilising the new investigation mechanisms.

Implementational: The state police forces are not as updated for use of the technique as the CBI and the NIA. It poses challenges due to unprofessional handling of crime scene, samples, etc.

Technical: The forensic laboratories equipped to undertake DNA fingerprinting are very limited in number causing delays in investigations. Besides, the private laboratories that are equipped are unregulated, ~~pro~~ posing legal and procedural challenges.

Rights: Right to privacy and Right against self-incrimination are arguments against the use of DNA fingerprinting of individuals.

Training the investigation machineries, providing requisite infrastructure and legislating a proper law in this regard can help potential use of the techniques in many fields.