

DNA Fingerprinting / DNA Profiling -

It is the technique to determine the Nucleotide sequence of certain areas of DNA which is unique to each individual.

Alec Jeffreys → F M DNA FP (developed in 1984 & accepted in law court in 1986)
Lalji Singh → P. M. India

* 95% of Total DNA is Noncoding in Human

↳ 30-40% of it contain short sequence of bases which repeated many times (they are scattered or cluster = found together)
↳ Tandem Repeat

These repeated sequence are known as satellite and such DNA is called Satellite DNA / Repetitive DNA

* On the Basis of -

- 1) - Base composition
- 2) - Length
- 3) - No. of Repetitive unit

↳ forms small peak in density gradient centrifuge while bulk DNA forms major peak

- Satellite DNA is of several type e.g. Micro & Minisatellite

- VNTRs differs in family due to small Deletion, Insertion, & Mutation that is DNA Polymorphism.

↓
are hypervariable repeats of 11-60bp
↓
called VNTRs
(variable no. Tandem repeats)

Thus each individual has a particular combination of VNTRs / RFLP

That forms the basis of DNA Fingerprinting / DNA Profiling

The phenomenon of VNTRs is also called RFLP (Restriction fragment length polymorphism)

Procedure -

Finger Printing / DNA Profiling

Length Polymorphism

Procedure

- Isolation of DNA from source (Blood, Semen, Saliva, Skin, Hair cell)
- Amplification of DNA (PCR) if DNA is small
- DNA Fragmentation by R-E to obtain VNTRs
- Separation of DNA Fragment in Gel electrophoresis
- Blotting (Transfer) of fragment to Synthetic membrane
Nitrocellulose / Nylon (as Gel is fragile DNA will move out)
- Hybridization using labeled DNA probe (small R-A Synthetic DNA
~~segment~~ segment of known
sequence)
- Detection of hybridized DNA fragment by Autoradiography