DNA FINGERPRINTING

→ DNA fingerfrinting is also called Crenetic fingerprinting

→ This technique was developed by Prof Allec Jeffreys

→ This technique is also called DNA Profiling.

→ DNA fingerprinting was first used in Britain to verify Parental Test of an immigrant who want to return back.

→ Crenetically all individuals are unique.

→ Crenetic variation occur in individual and this is used to identify individual as this technique is similar to Finger print which is also unique So the name is given **DNA Fingerprinting**

→ There are sequence of nucleotide which are repeated at a interval on the chromosome - these sequences

are composed of about 15 nucleotide segments called repetetive DNA or minisatellites or VNTR [variable number of Tandem repeats].

→ The location and number of repeats of any VNTR or Minisatellite are so highly variable that no two people are alike.

RFLP [Restriction Fragment length Polymorphism]

Polymorphism means presence of varieties of any structure.

→ Polymorphism in DNA is due to variation in repetetive nucleotide.

→ RFLP are distributed throughout human genomes and are used for gene mapping and DNA Fingerprinting

Eg:

ATCGATCCTA CTAG ATCG ATCGATCCTA

ATCGATCCTA

Technique of DNA Finger printing

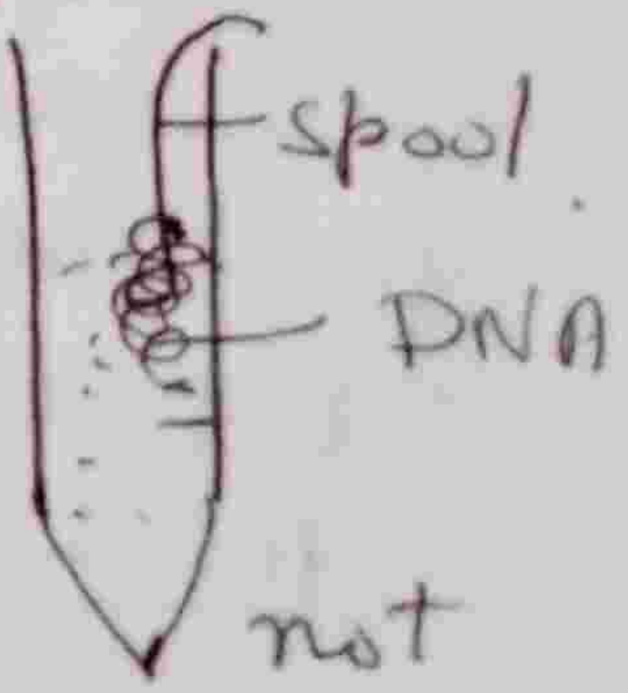
→ DNA finger printing can be done by using only small amount of tissues like blood or semen or skin cells or the hair root follicle is needed.

→ DNA content of about 100,000 cells or about 1 Microgram is sufficient.

→ steps of DNA Fingerprinting

1] DNA molecules are isolated from a Sample of Blood semen or other body fluid or tissue by used high speed refrigerated centrifuge detergent

2] DNA is isolated by Method called spooling.

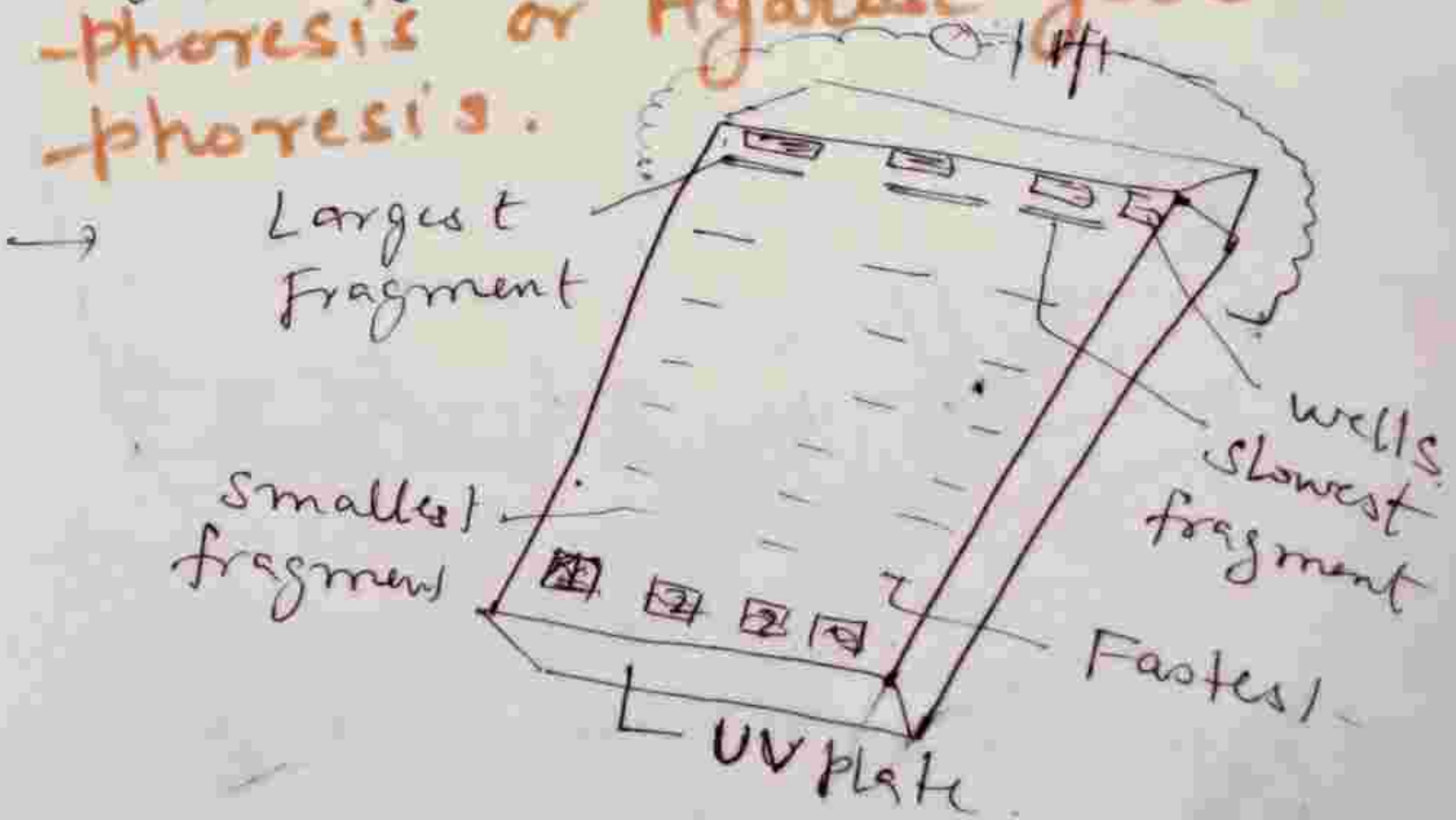


3] If quantity of DNA is not sufficient then quantity is increased or amplification is done by

· process called PCR [Polymerase chain reaction] No of copies of DNA are increased.

→ DNA is cut into fragment at specific site with the help of site recog- & Restriction endonuclease for the purpose of restriction fragment length analysis. The DNA fragment contains VNTR.

→ The fragments are then Sorted out according to their length on an agarose gel slab by using technique called Electro-phoresis or Agarose gel Electro-phoresis.

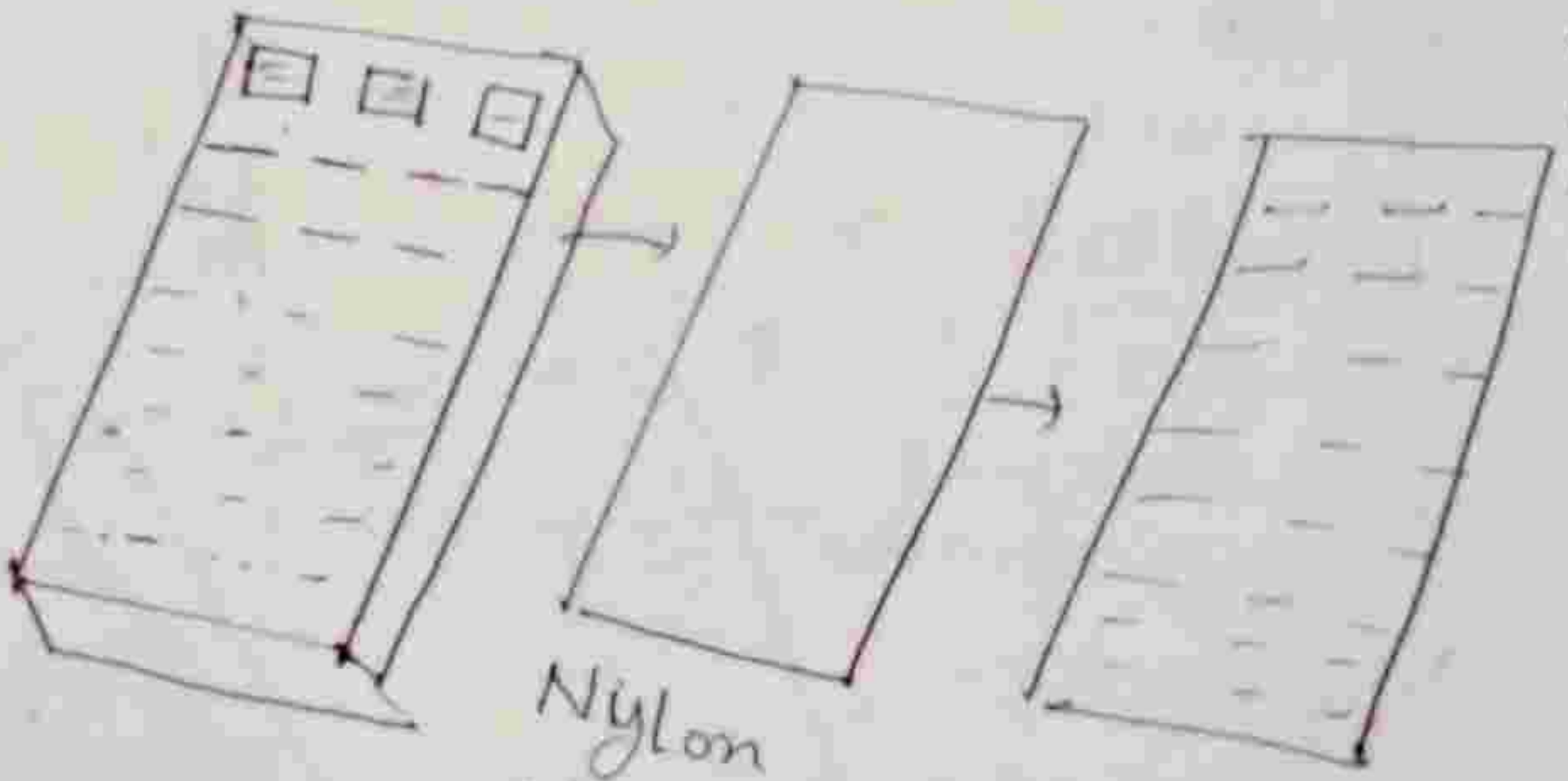


→ Ethidium bromide stain is used which provide visibility to DNA fragment in UV rays.

→ Double stranded DNA are converted to Single stranded DNA by use of Alkaline chemicals

→ The isolated DNA fragments are absorbed on Nylon Nitrocellulose Sheet by use of **Southern blotting**, after the name of Scientist **E.M. Southern**.

→



→ Nylon sheet is immersed in a in the water bath where Probes or Markers are present.

→ Probes are Radioactive synthetic DNA segments of known sequence Probe target a specific nucleotide sequence which is complementary to VNTR sequence and hybridise them i.e at complementary places the Single stranded DNA is converted to double stranded DNA.

→ An X ray Film is exposed to the Nylon sheet to mark the places where the radioactive DNA probe have bounded to the DNA fragment. These places are marked as Dark bands when X-ray film is developed. This process is called Autoradiography.

→ The dark bands on X-ray film, represent the DNA fingerprint or the DNA profiles.

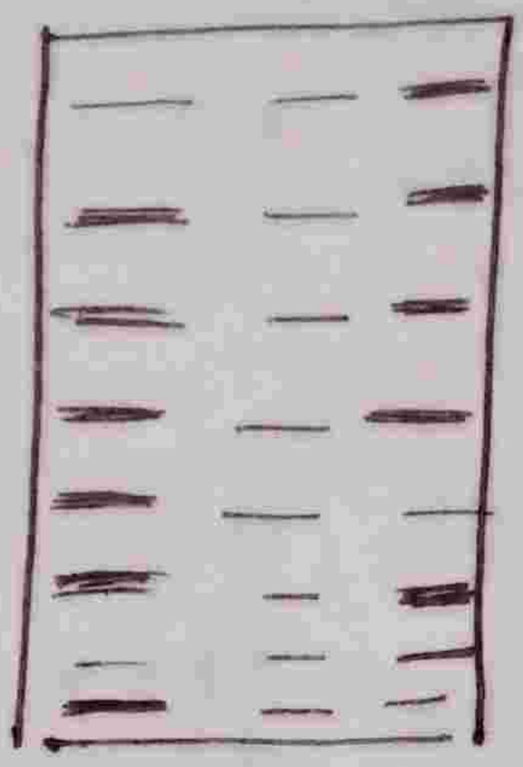
→ This DNA fingerprint is used to identify the items.

i.e. a] To identify criminals in Forensic laboratories

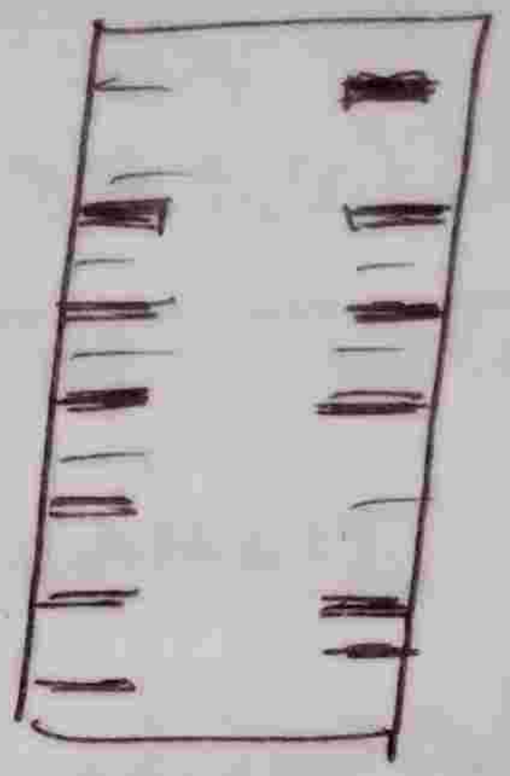
b] For Patternity Test

c] verify immigrants

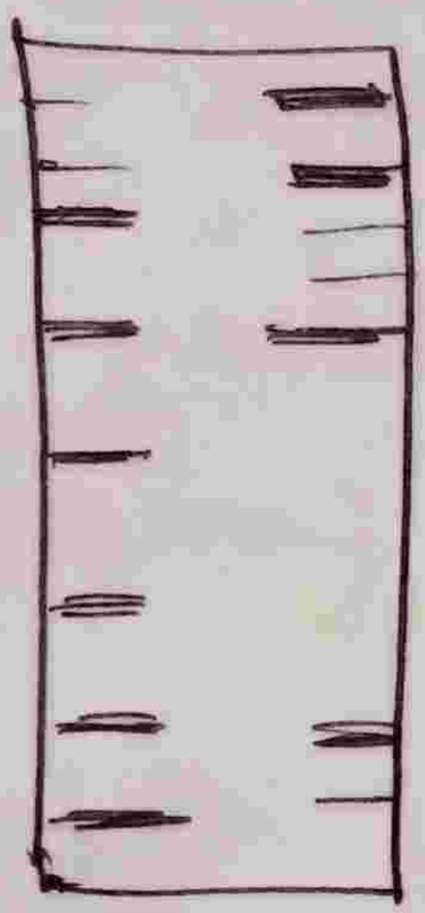
d] To study Biological evolution



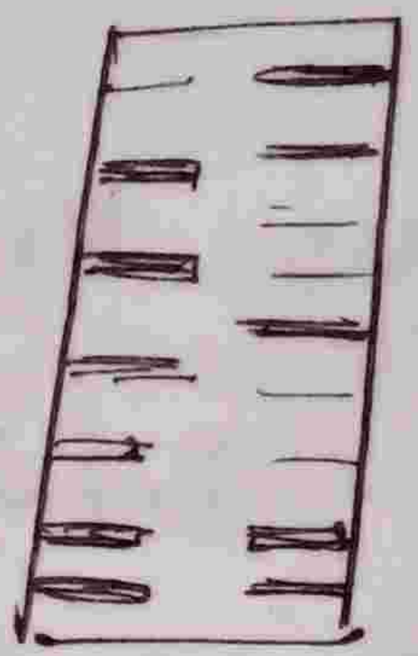
X ray plate



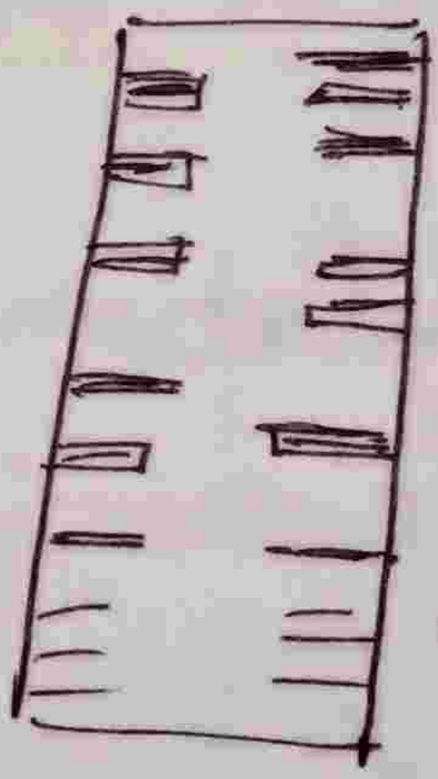
DNA Fingerprint



DNA Fingerprint to be match



culprit A



culprit B

Matching found with culprit A.