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Class 12th

Sub. Biology

Date:- 16.07.2020

Based on NCERT patterns

DNA fingerprinting is a technique that shows the genetic makeup of living things. It is a method of finding the difference between the satellite DNA regions in the genome.”

What is DNA Fingerprinting?

Satellite DNA regions are stretches of repetitive DNA which do not code for any specific protein. These non-coding sequences form a major chunk of the DNA profile of humans. They depict a high level of polymorphism and are the basis of DNA fingerprinting. These genes show a high level of polymorphism in all kind of tissues as a result of which they prove to be very useful in forensic studies.

Any piece of DNA sample found at a crime scene can be analysed for the level of polymorphism in the non-coding repetitive sequences. After the DNA profile is traced, it becomes easier to find the criminal by performing the DNA fingerprinting for the suspects.

Apart from crime scenes, Fingerprinting applications also prove useful in finding the parents of an unclaimed baby by conducting a paternity test on a DNA sample from the baby.

DNA Fingerprinting Steps

Alec Jeffreys developed this technique in which he used satellite DNAs also called **VNTRs** (Variable Number of Tandem Repeats) as a probe because it showed the high level of polymorphism.

Following are the steps involved in DNA fingerprinting:

Isolating the DNA.



Digesting the DNA with the help of restriction **endonuclease enzymes**.



Separating the digested fragments as per the fragment size by the process of **electrophoresis**.



Blotting the separated fragments onto synthetic membranes like nylon.



Hybridising the fragments using labelled **VNTR** probes.



Analysing the hybrid fragments using autoradiography.

DNA Fingerprinting Applications

As discussed earlier the technique of fingerprinting is used for DNA analysis in forensic tests and paternity tests. Apart from these two fields, it is also used in determining the frequency of a particular gene in a population which gives rise to diversity. In case of the change in **gene frequency** or **genetic drift**, Fingerprinting can be used to trace the role of this change in evolution.