



Department of Medical Laboratories Techniques  
Human genetic  
Lab.9: DNA analysis  
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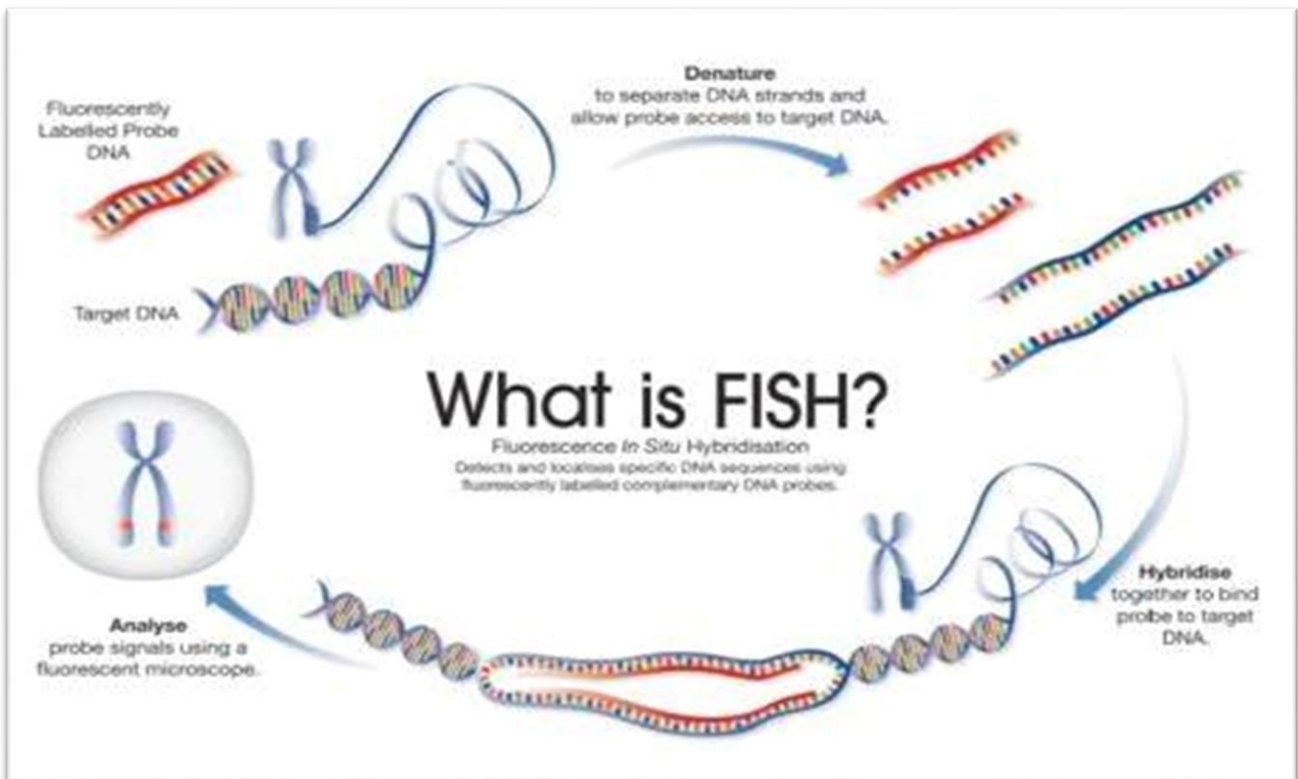


### DNA analysis

DNA analysis is the name given to the interpretation of genetic sequences and can be used for a wide variety of purposes. It can be used to identify a species but can also differentiate individuals within a species. ...Some advance Technique for DNA analysis:

#### 1- Fluorescence in situ hybridization (FISH)

Fluorescence in situ hybridization (FISH) is a laboratory technique for detecting and locating a specific DNA sequence on a chromosome. The technique relies on exposing chromosomes to a small DNA sequence called a probe that has a fluorescent molecule attached to it. The probe sequence binds to its corresponding sequence on the chromosome.



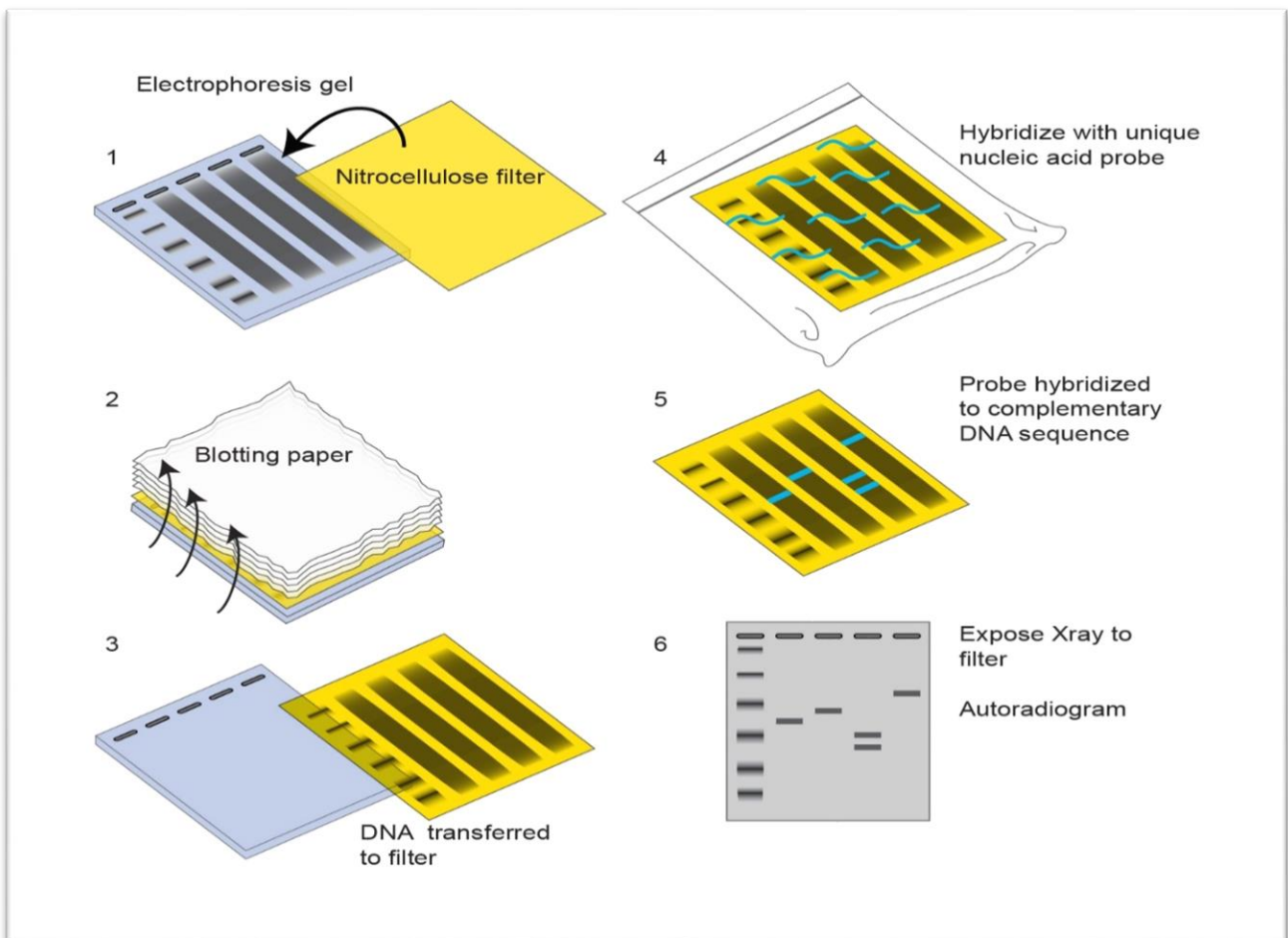


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## 2- Southern blot

Southern blotting is a laboratory technique used to detect **a specific DNA sequence** in a blood or tissue sample. A restriction enzyme is used to cut a sample of DNA into fragments that are separated using gel electrophoresis. The DNA fragments are transferred out of the gel to the surface of a membrane. The membrane is exposed to a DNA probe labeled with a radioactive or chemical tag. If the probe binds to the membrane, then the probe sequence is present in the sample.





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### 3- Northern blot

Northern blot is a laboratory technique used to detect a specific RNA sequence in a blood or tissue sample. The sample RNA molecules are separated by size using gel electrophoresis. The RNA fragments are transferred out of the gel to the surface of a membrane. The membrane is exposed to a DNA probe labeled with a radioactive or chemical tag. If the probe binds to the membrane, then the complementary RNA sequence is present in the sample.

### 4- Another blot “zoo blot” and “garden blot”

A **zoo blot** or garden blot is a type of Southern blot that demonstrates the similarity between specific, usually protein-coding, DNA sequences of different species. A zoo blot compares animal species while a **garden blot** compares plant species. The purpose of the zoo blot is to detect the conservation of the gene(s) of interest throughout the evolution of different species.

### 5- DNA sequencing

DNA sequencing is the process of determining the nucleic acid sequence – the order of nucleotides in DNA. It includes any method or technology that is used to determine the order of the four bases: adenine, guanine, cytosine, and thymine. The advent of rapid DNA sequencing methods has greatly accelerated biological and medical research and discovery.

There are two main type of DNA sequencing

- ❖ **Maxim-Gilbert sequencing** based on chemical modification of DNA and subsequent cleavage at specific bases. Also known as chemical sequencing, This method's use of radioactive labeling and its technical complexity discouraged extensive use after refinements in the Sanger methods had been made.
- ❖ **Sanger sequencing** is a method of DNA sequencing that involves electrophoresis and is based on the random incorporation of chain-terminating di-deoxynucleotides by DNA polymerase during in vitro DNA replication.

