Hybridization techniques:

Refer to laboratory methods used to **detect and analyze the binding or hybridization of nucleic acids, such as DNA or RNA**. These techniques allow scientists to study and manipulate genetic material and provide valuable information about gene expression, genetic variations, and interactions between nucleic acids.

This is based on a well-known principle, which is adenine pairing with thymine, and guanine pairing with cytosine (A-T, C-G).

1. Southern Blotting (DNA-DNA Hybridization):

Southern Blotting: DNA fragments are separated by gel electrophoresis, transferred to a membrane, and then hybridized with a labeled DNA probe to detect specific sequences

- **Purpose**: Detection of specific DNA sequences.
- **Method**:
  - Genomic DNA is digested with restriction enzymes and separated by gel electrophoresis.
  - DNA fragments are transferred to a membrane (e.g., nitrocellulose or nylon).
  - A labeled DNA probe hybridizes with the target DNA.
  - Detection is achieved using radioactive .
- **Applications**: Gene mapping, mutation analysis, and DNA fingerprinting.

2. Northern Blotting (RNA Hybridization):

- **Purpose:** Detection and quantification of specific RNA sequences.
- **Method:**

- RNA is extracted and separated by electrophoresis.
- RNA is transferred to a membrane and hybridized with a labeled probe.
- Signals indicate the presence and quantity of specific RNA transcripts.

 Applications: Gene expression analysis, RNA processing studies.