FACULTY OF ENGINEERING &TECHNOLOGY
DEPARTMENT OF BIOTECHNOLOGY

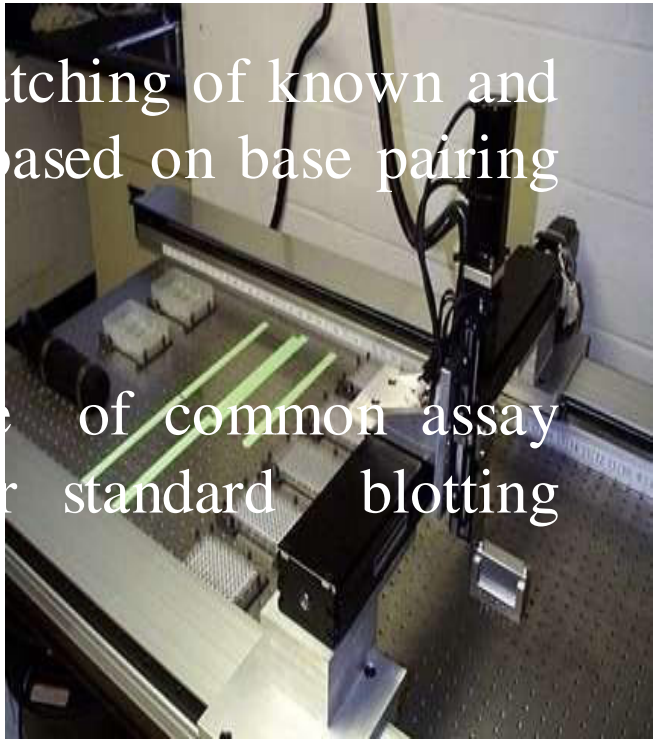
Contents:

INTRODUCTION

- The large-scale genome sequencing effort and the ability to immobilize thousands of DNA fragments on coated glass slide or membrane, have led to the development of microarray technology.
- A microarray is a pattern of ssDNA probes which are immobilized on a surface called a chip or a slide.
- Microarrays use hybridization to detect a specific DNA or RNA in a sample.
- DNA microarray uses a million different probes, fixed on a solid surface.

WHAT IS AN ARRAY

- An array is an orderly

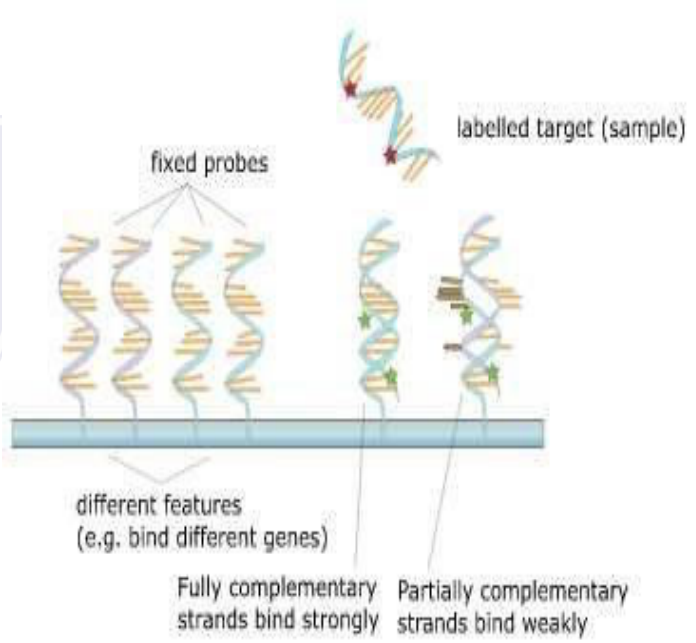


HISTORY

- Microarray technology evolved from Southern blotting.
- The concept of microarrays was first proposed in the late 1980s by Augenlicht and his colleagues.
- They spotted 4000 cDNA sequences on nitrocellulose membrane and used radioactive labeling to analyze differences in gene expression patterns among different types of colon tumors in various stages of malignancy.

PRINCIPLE

- The core principle behind



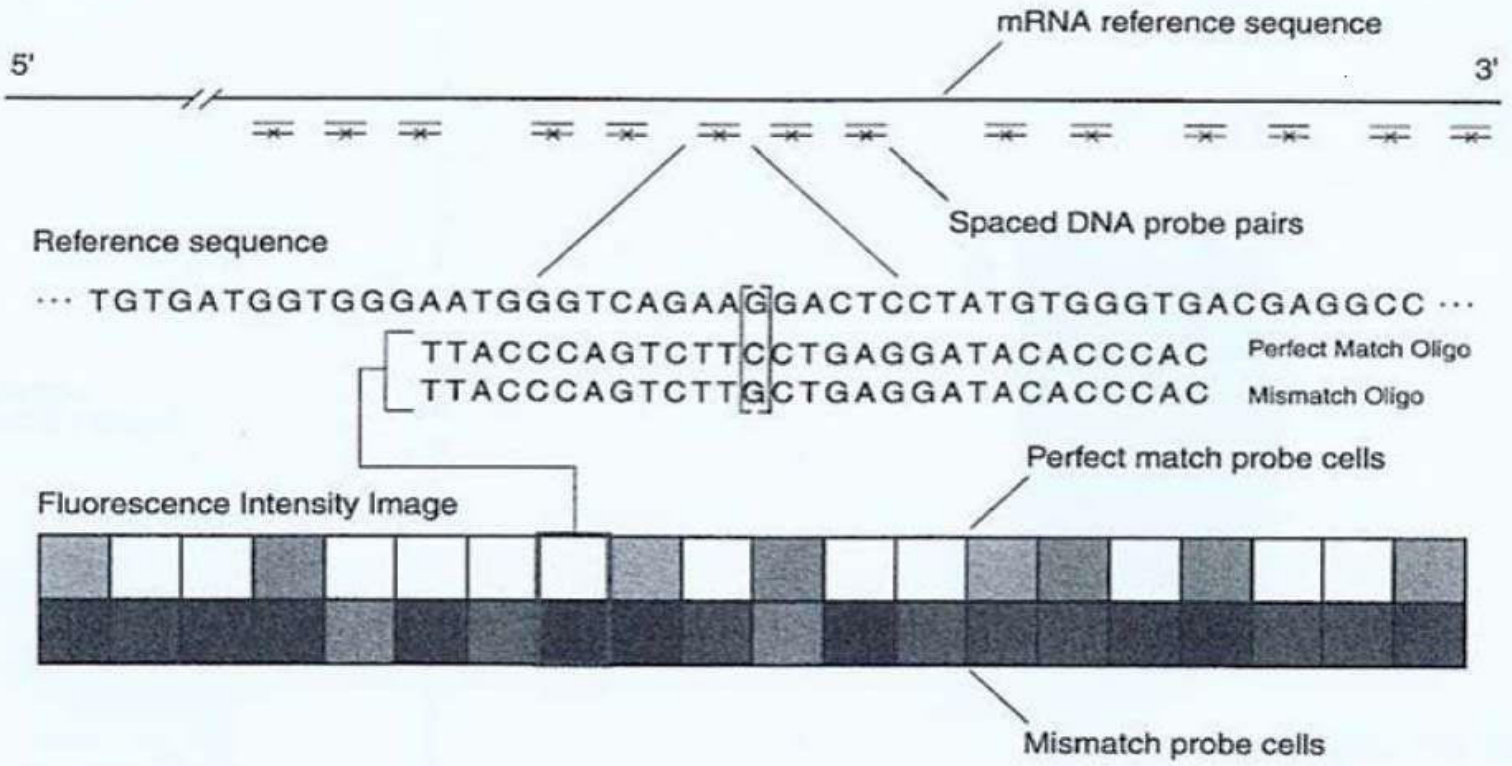
DNA Micro Array Technology

- DNA microarray technology may be defined as a high-throughput and versatile technology used for parallel gene expression analysis for thousands of genes of known and unknown functions.
- Used for detection of polymorphisms and mutations in genomic DNA
- A DNA microarray is a collection of microscopic DNA spots on solid surface. Each spot contains picomoles of a specific DNA sequence, known as probes or reporters.

- Each identified sequenced gene on the glass, silicon chips or nylon membrane corresponds to a fragment of genomic DNA, cDNAs, PCR products or chemically synthesized oligonucleotides of up to 70mers and represents a single gene.

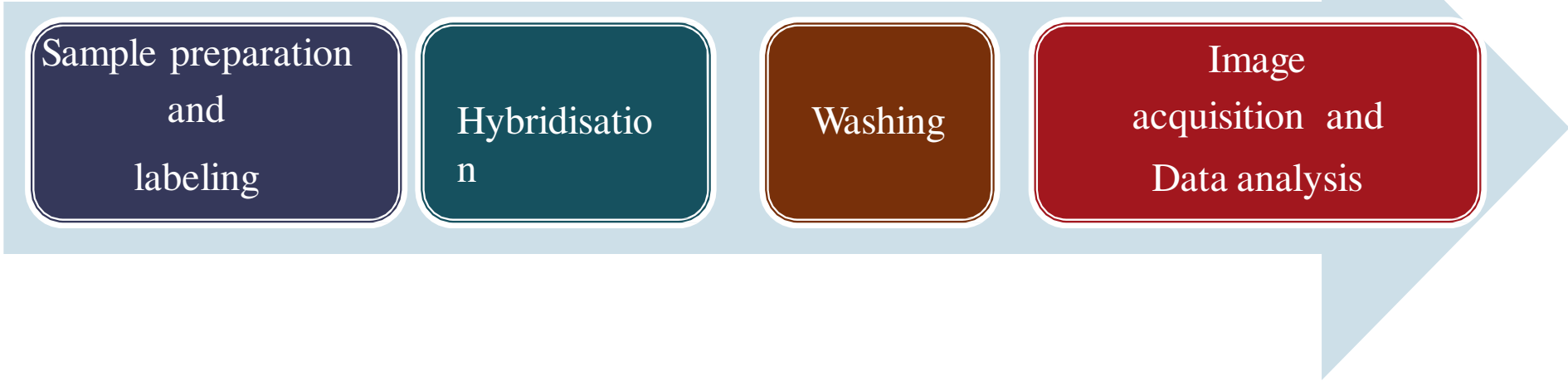
- Probe-target hybridization is usually detected and quantified by detection of fluorophore, silver, or chemiluminescence labeled targets to determine relative abundance of nucleic acid sequences in the target.

GeneChip® Expression Array Design



PRINCIPLE OF DNA MICRO ARRAY TECHNOLOGY

- The principle of DNA microarray technology is based on the fact that complementary sequences of DNA can be used to hybridise, immobilised DNA molecules.
- There are four major steps in performing a typical microarray experiment.



CONCLUSION

- Microarray is a recently developed functional genomics technology that has powerful applications in a wide array of biological medical sciences, agriculture, biotechnology and environmental studies. Since many universities research institutions and industries have established microarray based core facilities and services, microarrays have become a readily accessible, widely used technology for investigating biological systems.