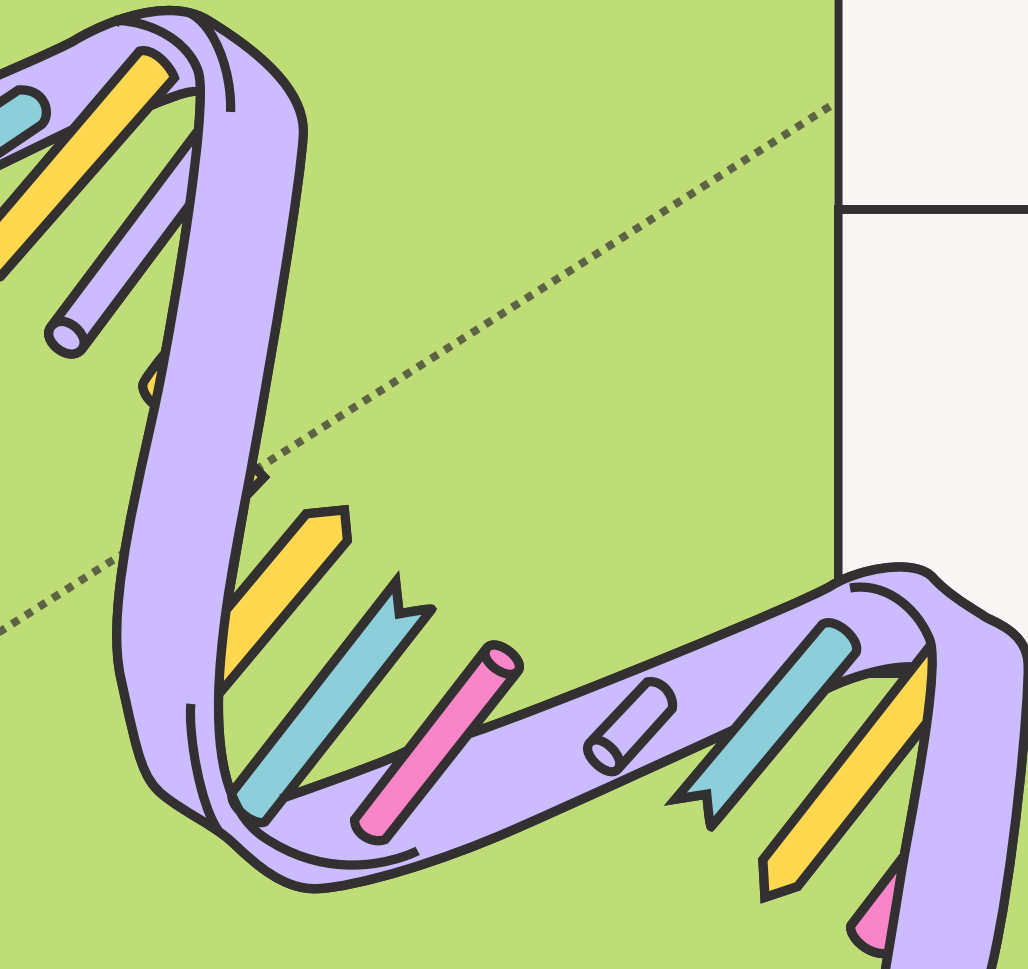
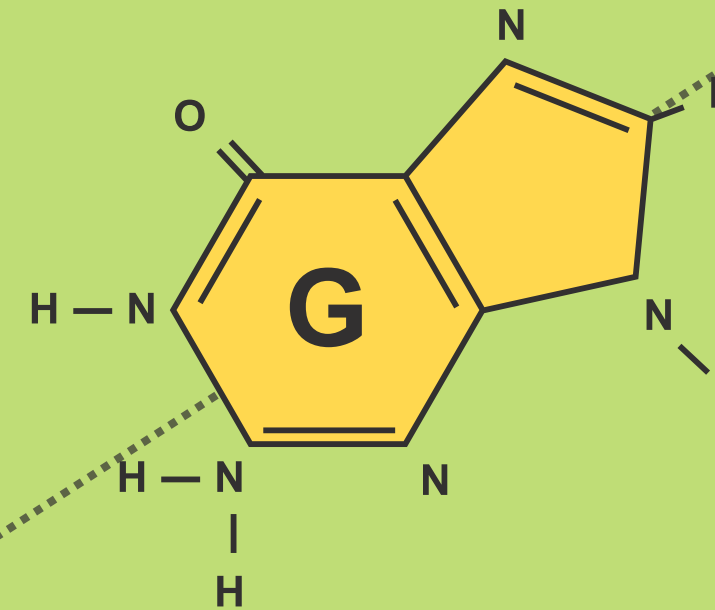
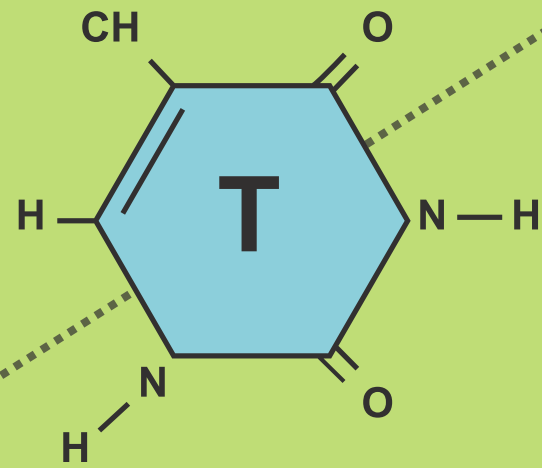
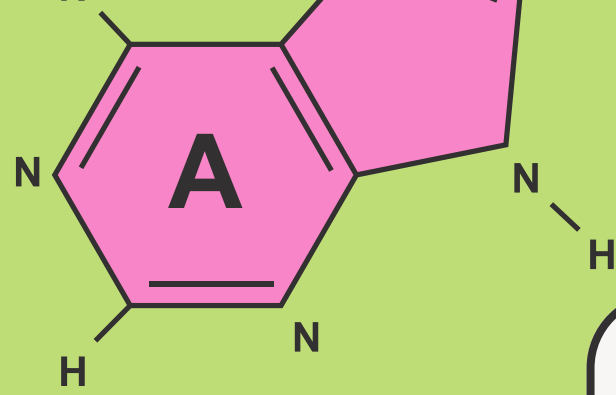


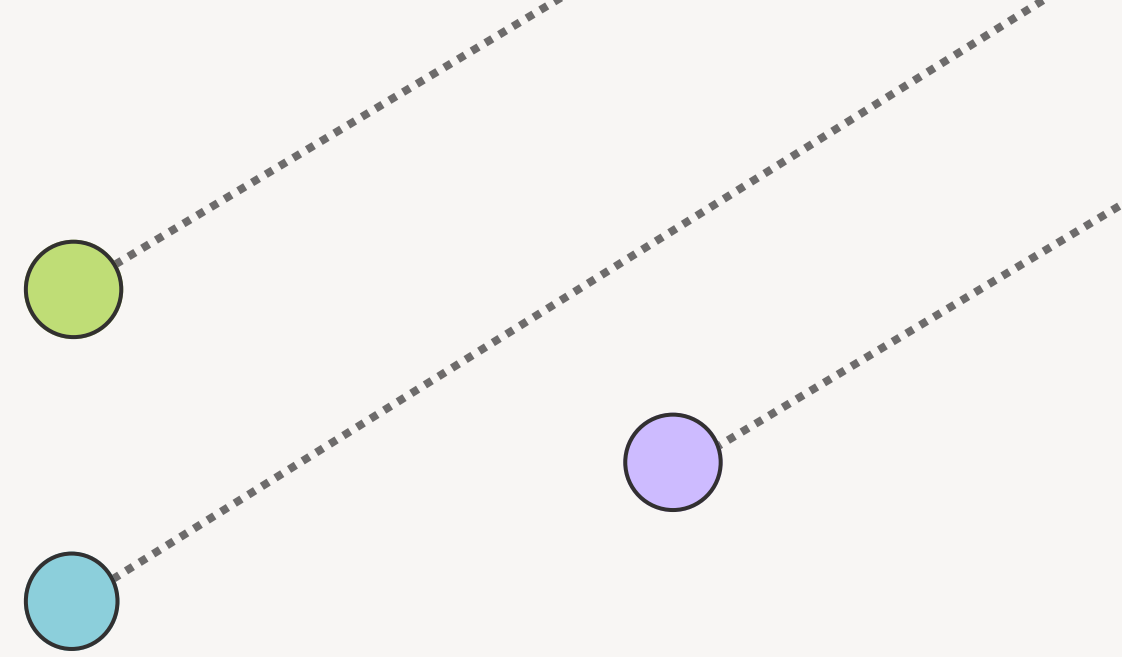
DNA CHIPS

Delivered By: Juveriya J. Mujawar
(246529007)



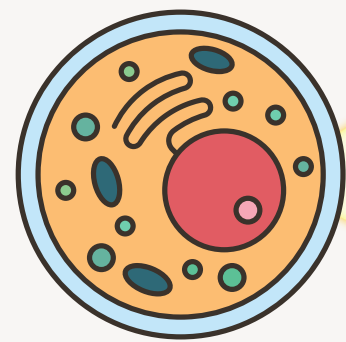
CONTENTS

- About DNA
- History and Development of DNA Chips
- Structure and Components of DNA Chips
- Working principal of DNA Chips
- Types of DNA Chips
- Application of DNA Chips
- Advantages of DNA Chips
- Challenges of DNA Chips
- Future Prospects
- Conclusion

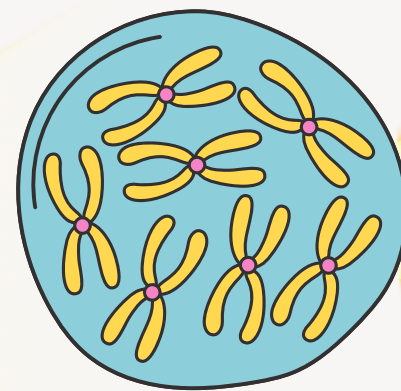


ABOUT DNA

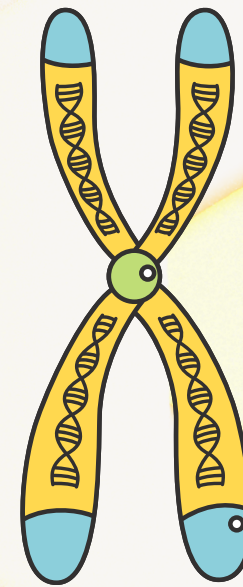
It stores and transmits genetic information (**genes**) essential for an organism's growth, development and reproduction.



Cell



Nucleus



Chromosome

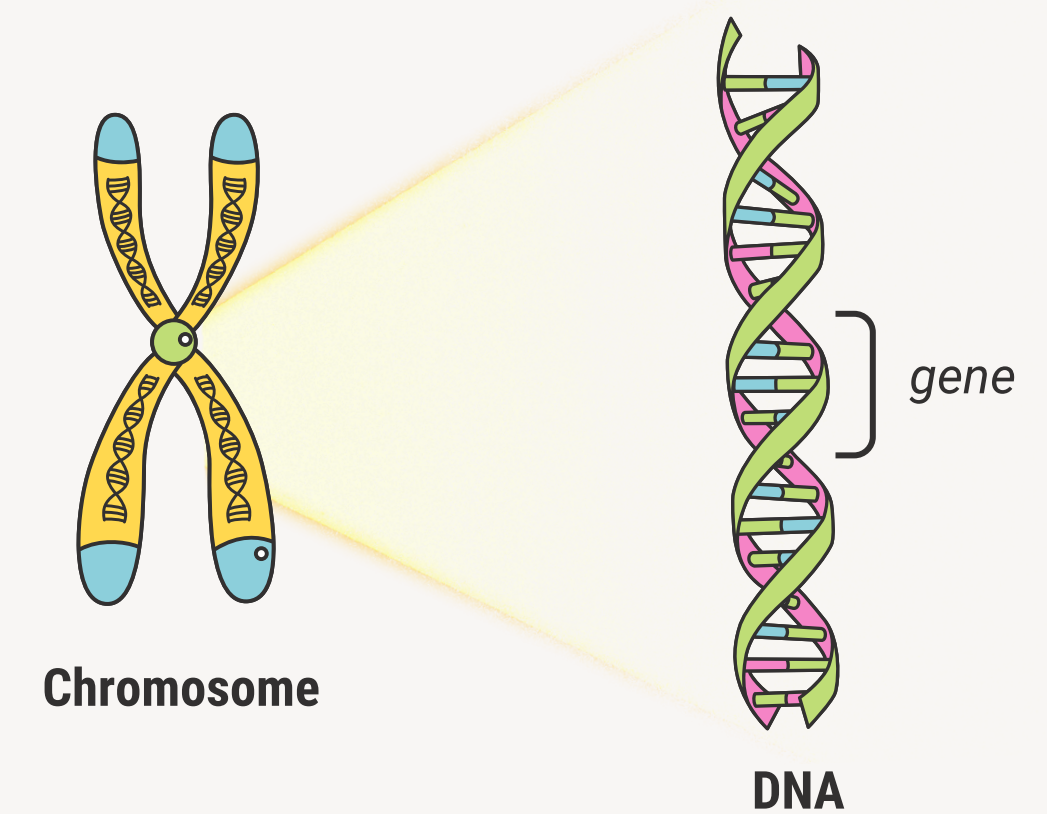


DNA

gene

WHAT ARE DNA CHIPS?

- Also known as DNA microarrays
- Laboratory tools used to detect gene expression and genetic variations across thousands of genes simultaneously.
- Compare normal and diseased cells at the genetic level.
- A crucial technology in genomics, biotechnology, and medical diagnostics.



HISTORY AND DEVELOPMENT

YEAR	DEVELOPMENT
1991	First use of DNA microarrays by Stephen Fodor & team.
1995	Patrick Brown develops the cDNA microarray.
2000s	Commercialization by Affymetrix, Agilent, and Illumina.
Present	DNA Chips integrated with AI and bioinformatics for precision medicine.

STRUCTURE AND COMPONENTS

- **Solid Surface:** Usually glass or silicon slide.
- **DNA Probes:** Short, synthetic DNA strands immobilized on the surface.
- **Hybridization Chamber:** Where the sample DNA binds to complementary probes.
- **Fluorescent Labeling:** Helps detect hybridization signals.



Fig: Sample DNA Chip

WORKING PRINCIPLE OF DNA CHIPS

The steps carried out to extract information from DNA Chips

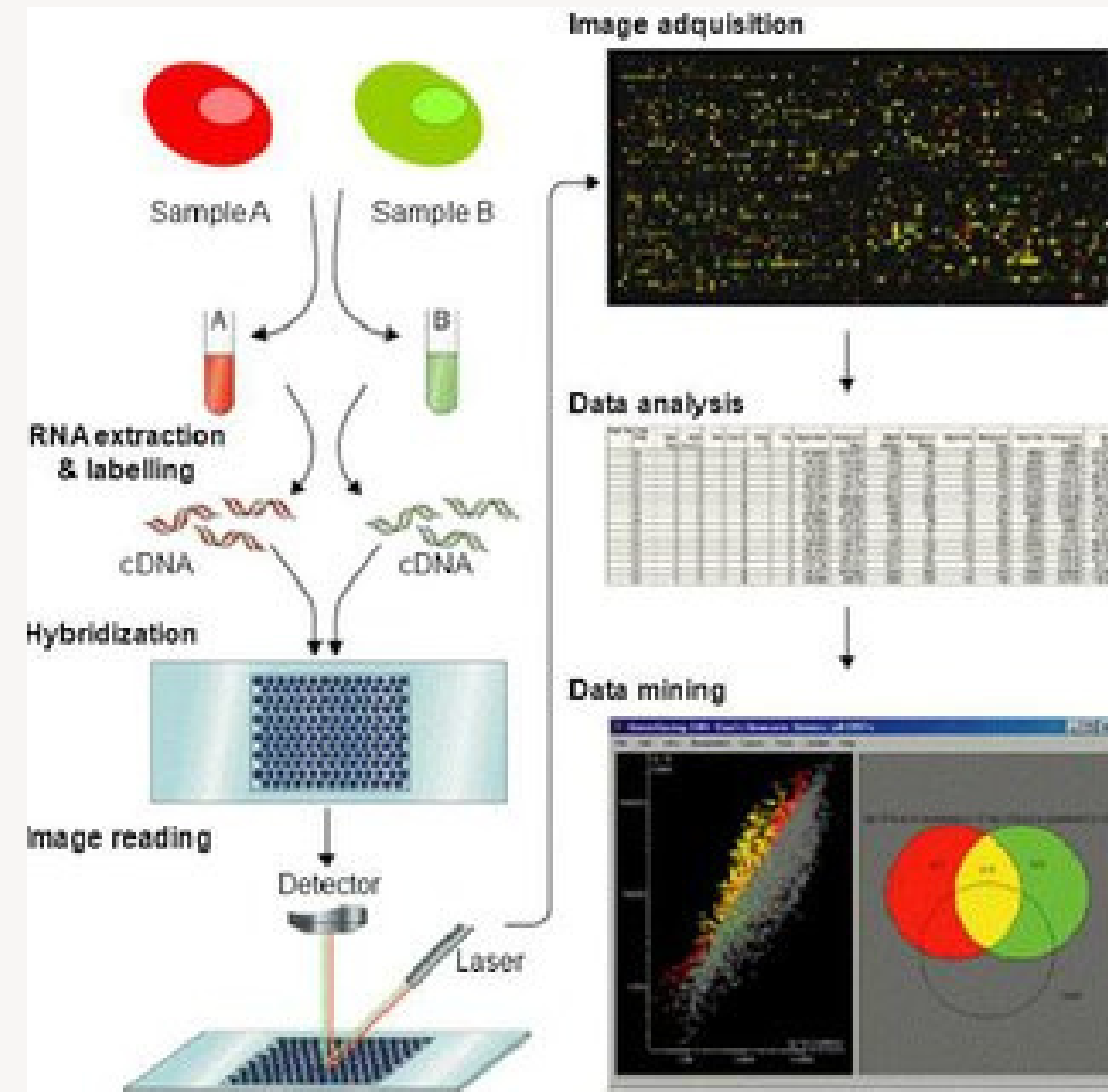
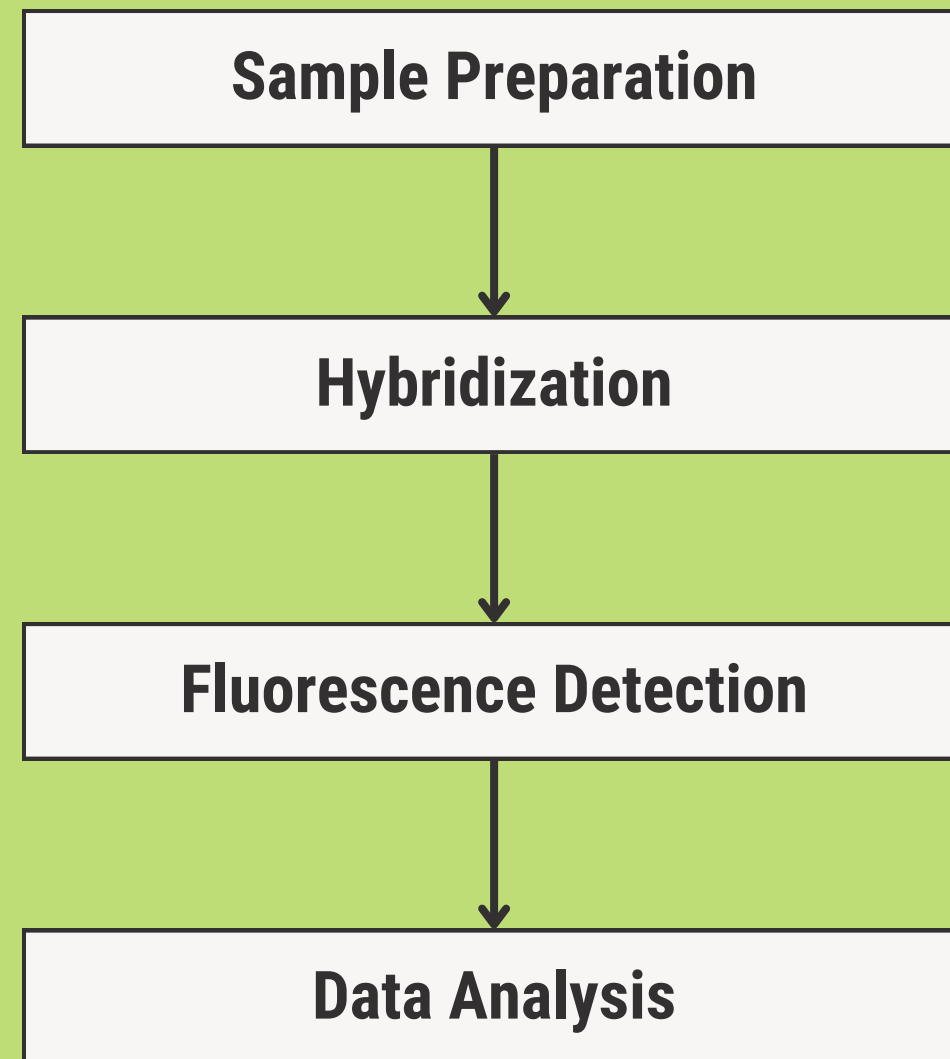


Fig: Process carried out in DNA Chips

TYPES OF DNA CHIPS

Types of DNA chips used for various purposes.

1

CDNA MICROARRAYS

2

**OLIGONUCLEOTIDE
MICROARRAYS**

3

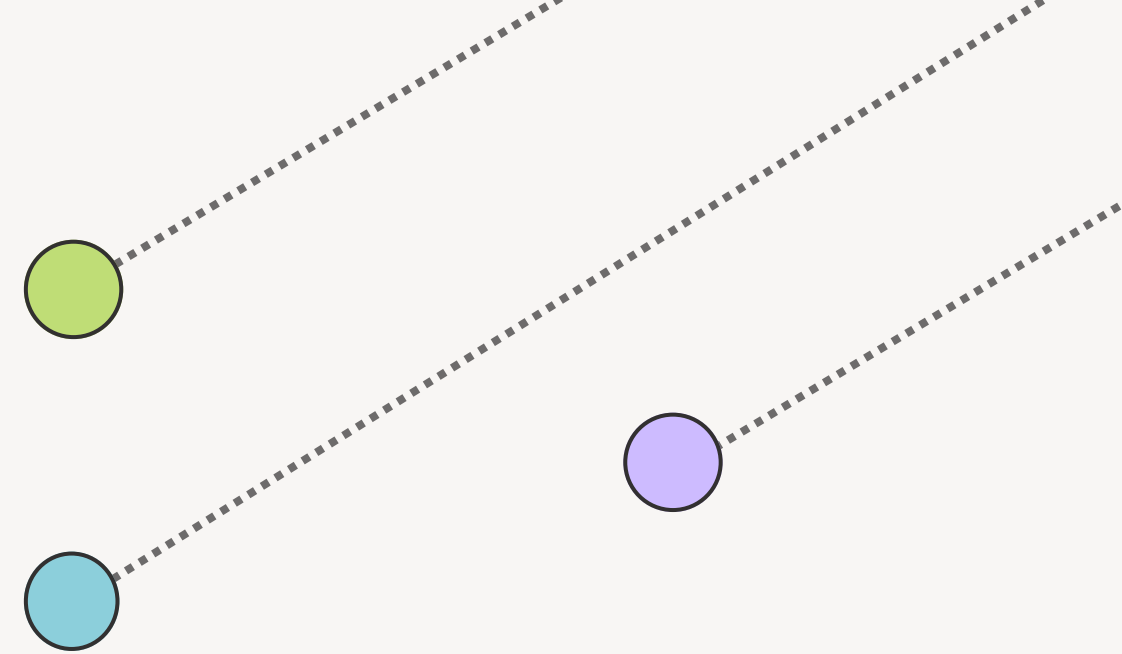
**SNP ARRAYS
(SINGLE NUCLEOTIDE
POLYMORPHISM ARRAYS)**

4

**PROTEIN & TISSUE
MICROARRAYS**

APPLICATIONS

- 1 Medical Diagnosis
- 2 Drug Discovery & Pharmacogenomics
- 3 Agriculture & Food Industry
- 4 Infectious Disease Research
- 5 Evolutionary & Comparative Genomics

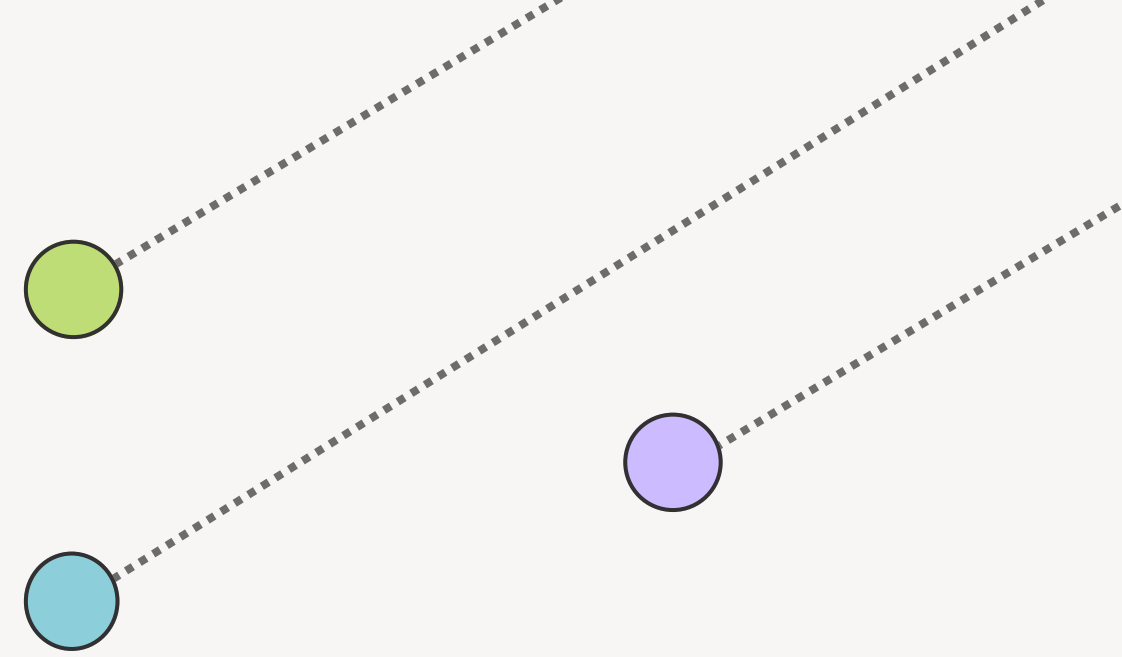


ADVANTAGES OF DNA CHIPS

Feature	Benefit
High-throughput	Analyzes thousands of genes in one experiment.
Time-efficient	Faster than traditional sequencing techniques.
Cost-effective	Reduces the need for multiple separate tests.
Sensitivity	Detects even low-abundance mRNA or DNA sequences.
Versatile	Used in medicine, research, agriculture, and forensics.

CHALLENGES

- 1 High Cost
- 2 Technical Expertise
- 3 Cross Hybridization
- 4 Bioinformatics Dependency



FUTURE PROSPECTS

What can we expect from
DNA Chips in future?

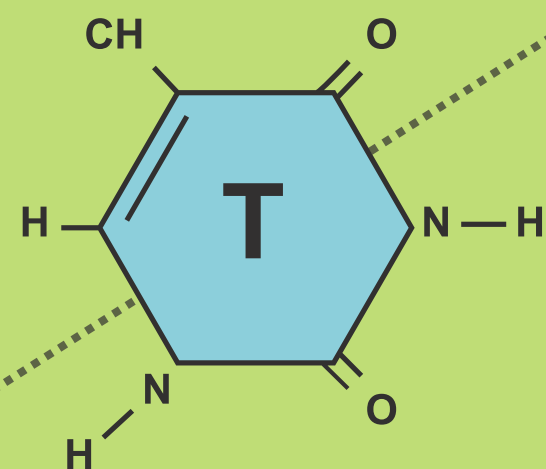
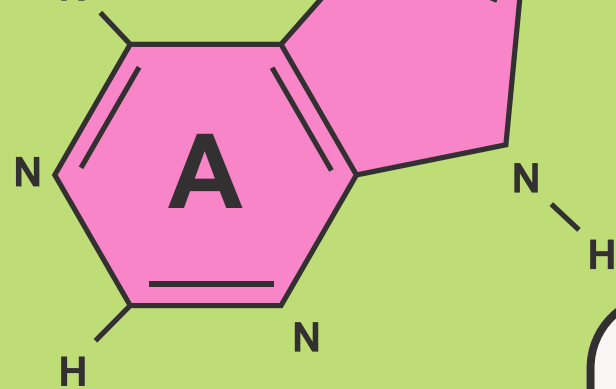
**Integration with
AI and Machine
Learning**

**Next Generation
Sequencing Vs.
Microarrays**

**Lab-on-a-chip &
Potable DNA
Chip**

CONCLUSION

- DNA Chips have revolutionized genomics by enabling rapid, high-throughput genetic analysis.
- They are widely used in medical diagnostics, drug discovery, agriculture, and infectious disease research.
- Future advancements will enhance accuracy and reduce costs, making DNA chips more accessible for clinical and research applications.



**THANK
YOU!**

