

Introduction to Molecular Diagnostic Techniques

Welcome to the world of molecular diagnostics! Join us as we explore the fascinating realm of DNA and RNA analysis, and how it revolutionizes healthcare and research.

 by Ms Valina Jenisha DAlmeida

Presented by: Valina D'Almeida

Valina D'Almeida brings a wealth of experience in molecular diagnostics, combining academic research and industry applications.



Made with Gamma



What You Will Learn

1 Introduction

We'll discuss the foundations of molecular diagnostics and its growing importance in healthcare and research.

2 Techniques & Technologies

We'll delve into the key techniques like PCR, RT-PCR, NGS, and microarrays.

3 Applications

We'll explore how molecular diagnostics are transforming disease detection, genetic testing, oncology, infectious diseases, and personalized medicine.

Overview of Molecular Diagnostics and its Importance

What is it?

Molecular diagnostics utilizes the analysis of DNA and RNA to diagnose, monitor, and predict diseases. It's a powerful tool for personalized healthcare.

Why is it important?

Molecular diagnostics provide a highly sensitive and specific way to identify diseases at an early stage, aiding in early intervention and tailored treatment plans.

Made with Gamma

Molecular Diagnostic Techniques: PCR, RT-PCR, NGS, Microarrays

PCR

Polymerase Chain Reaction (PCR) is a technique that amplifies specific DNA segments, enabling analysis even from trace amounts of DNA.

RT-PCR

Reverse Transcriptase PCR (RT-PCR) is a variant that allows the amplification of RNA, which can be converted into cDNA for analysis.

NGS

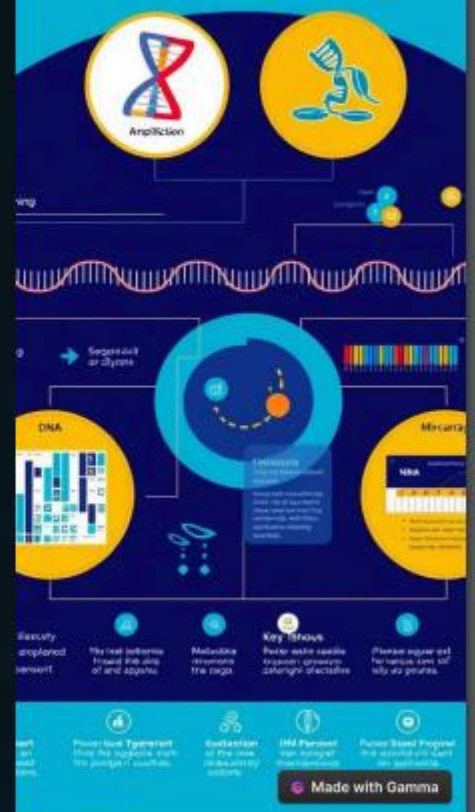
Next-Generation Sequencing (NGS) is a high-throughput technology that allows sequencing millions of DNA fragments simultaneously, providing comprehensive genetic information.

Microarrays

Microarrays are small chips containing thousands of DNA or RNA probes, which bind to complementary sequences in a sample for gene expression analysis.

Molecular Diagnostic Techniques: PCR, RT-PCR, NGS, Microarrays

Locamentos in the molecular diagnostic



Applications of Molecular Diagnostics



Disease Detection

Molecular diagnostics help identify pathogens, diagnose infectious diseases, and determine the appropriate treatments.



Genetic Testing

Genetic testing screens for genetic mutations that increase the risk of certain diseases, aiding in early interventions and preventive measures.



Oncology

Molecular diagnostics play a crucial role in cancer diagnosis, prognosis, and personalized treatment plans based on specific cancer mutations.



Infectious Diseases

Molecular diagnostics enable rapid identification of infectious agents, aiding in the diagnosis, treatment, and prevention of outbreaks.

Made with Gamma

Disease Detection, Genetic Testing, Oncology, Infectious Diseases, Personalized Medicine



Made with Gamma

1. DNA AMPLIFICATION, MOLECULAR MARKERS & MARKER ASSISTED SELECTION

PCR & RT PCR (reverse transcription PCR) RACE (rapid amplification of cDNA Ends) , PCR based molecular markers (RFLP, RAPD, SSR, AFLP, SCAR). RNAi , antisense RNA technology.

2. GENE SCREENING, ANALYSIS & EXPRESSION

Blotting techniques- Southern, Northern and Western, Differential display. Gene sequencing- Chemical, enzymatic, pyrosequencing, next generation sequencing,

Immunological screening and colony and plaque hybridization, dot blot hybridization, FISH, RACE, Chromosome walking. CRISPR/Cas9 and Targeted Genome Editing. RNA interference and gene silencing.

3. Immunological techniques

ELISA, radio immunoassay, immunofluorescence, immunoelectrophoresis (classical, crossed & rocket) immunoprecipitation (Direct capture method, indirect capture method, Co-immunoprecipitation, chromatin immuno precipitation & RNA immunoprecipitation).