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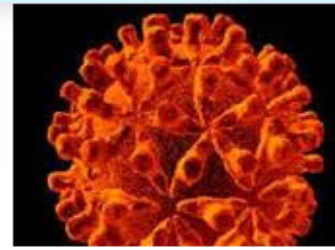
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Importance of Molecular Diagnostics in state of Maharashtra

Dr. Pravin D. Potdar. *M.Sc, Ph.D, DMLT, DHE, DMS*

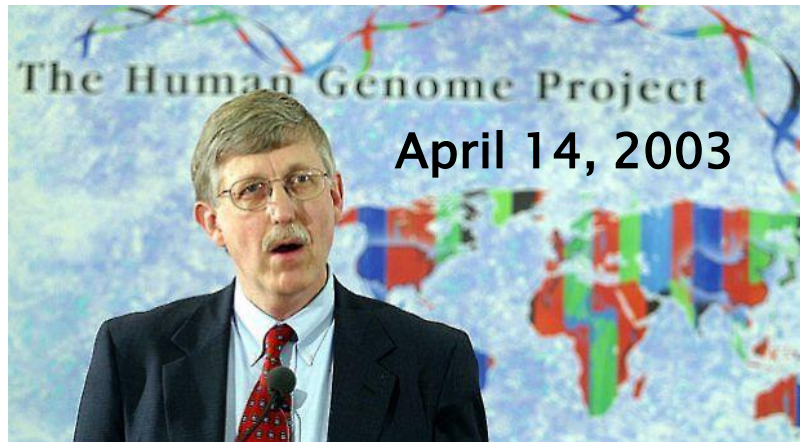


**Head,
Department of Molecular Medicine & Biology,
Jaslok Hospital & Research Centre, 15, Dr. G. Deshmukh Marg,
Mumbai-400 026., India.**



Molecular Diagnostics

NIH Director Francis Collins



Implementing New Discipline

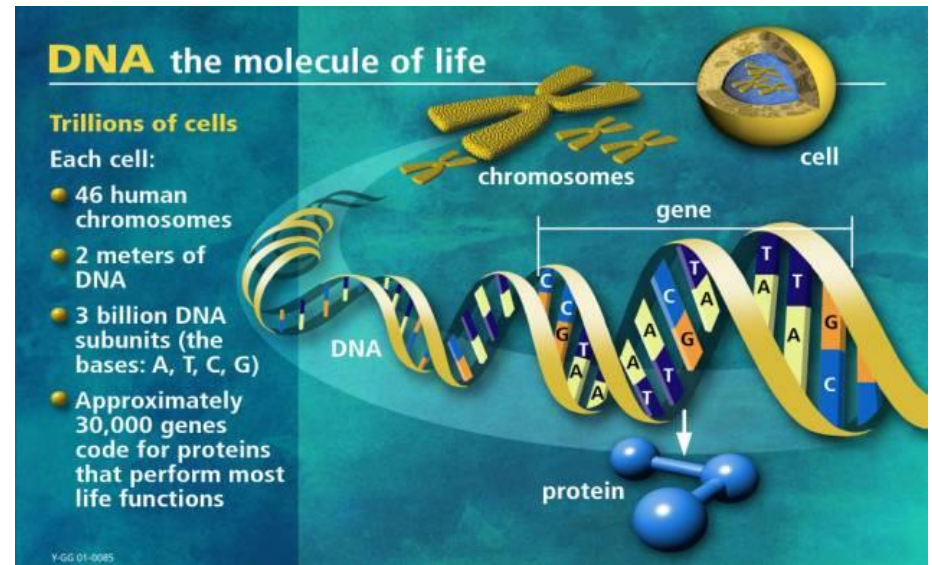


DNA the molecule of life

Trillions of cells

Each cell:

- 46 human chromosomes
- 2 meters of DNA
- 3 billion DNA subunits (the bases: A, T, C, G)
- Approximately 30,000 genes code for proteins that perform most life functions



cell

chromosomes

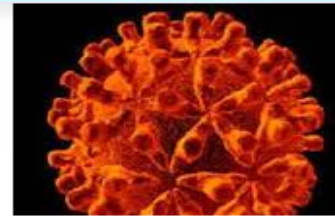
gene

DNA

protein

Y-GG 01-0085

NIH Director Francis Collins, then-director of the U.S. National Human Genome Research Institute, announces that a six-country consortium has successfully drawn up a complete map of the human genome, completing one of the most ambitious scientific projects ever and offering a major opportunity for medical advances, April 14, 2003, at a press conference at the National Institute of Health in Bethesda, Md.



National Institute of Environmental Health Sciences (NIEHS), NIH, USA (1995- 1996)



Short term Scientist Exchange
program Award from
National Cancer Institute (NCI),
USA



Dr. Paul Nettesheim M.D.
Research Director, NIEHS (NIH)

Differential Display study to identify Novel genes involved in mucocilliary differentiation of Rat & human Tracheobronchial epithelia cells

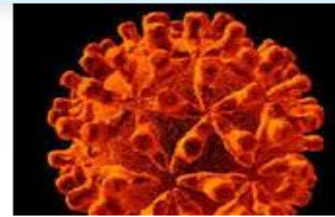


Global Molecular Diagnostic Market

The global molecular diagnostics market will reach \$7,956.9 million by 2018, forecast period (2013–2018).

Indian Molecular Diagnostic Market

Expansion of Corporate Hospitals to Drive the \$331.7-Million Indian In-Vitro Diagnostics Market to \$900.2 Million in 2016

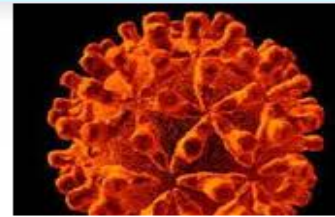


Department of Molecular Medicine & Biology JASLOK HOSPITAL & RESEARCH CENTRE, MUMBAI



Join in April 2005

JASLOK HOSPITAL & RESEARCH CENTRE – Multi Specialty hospital, with
350 beds and almost 300 consultants



Major Goals

To established well reputed and functional R&D Molecular Diagnostic Laboratory in India in following areas.

- Molecular Diagnostics for Cancers
- Molecular diagnostics for Infectious diseases
- Molecular Diagnostic for Neurological disorders
- Molecular Diagnostics for Genetic disorders
- Molecular Diagnostics for Hematological disorders.
- Molecular Diagnostics for Metabolic Syndromes
- Diabetic mellitus
- Hyper tension
- Cardiovascular diseases



Major Instruments required for Molecular Diagnostics



Latest Innovations

- Next Generation sequencing
- Microchip analysis

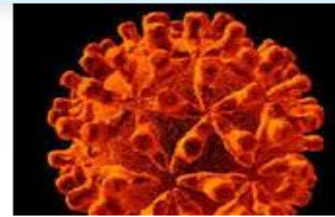


Major Types Molecular Diagnostic Tests

- **PCR** – For most of the genes
- **Real Time PCR** – Infectious diseases, Cancer etc
- **DNA Sequencing** – Mutational study, Drug resistant testing.
- **Micro array technology** – Microchip analysis to evaluate several genes in one test
- **Next Generation Sequencing** – useful in doing complete genome sequences useful in finding out hereditary disease, cancer & genetic & Neurological disorders



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Success stories in Molecular Diagnostics



JASLOK HOSPITAL
*Medicine can cure the disease...
...but Compassion can cure the patient*



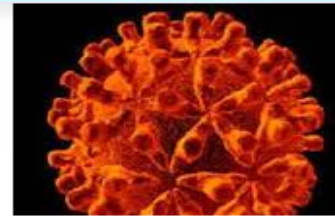
University of Texas, M. D. Anderson Cancer Centre, Houston Texas, USA (2002-2004)



THE UNIVERSITY OF TEXAS
MD ANDERSON
CANCER CENTER
Making Cancer History®

Research Scientist
(Faculty position)

Molecular Targeted therapy in prostate and pancreatic cancer



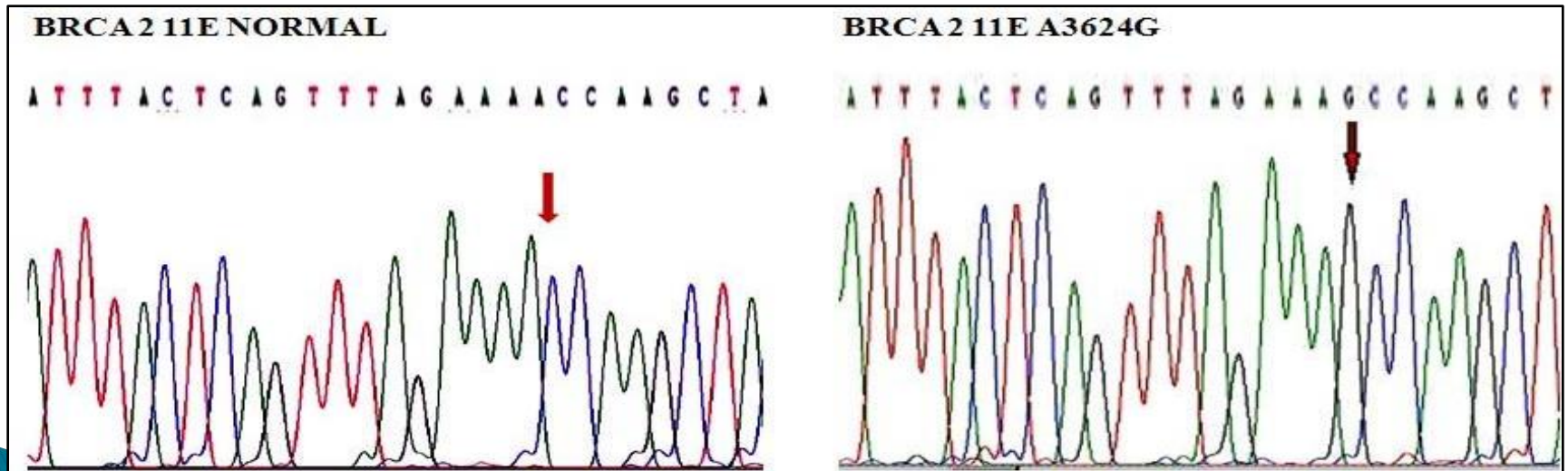
Hereditary Breast Cancer



Test for Familial Breast Cancer

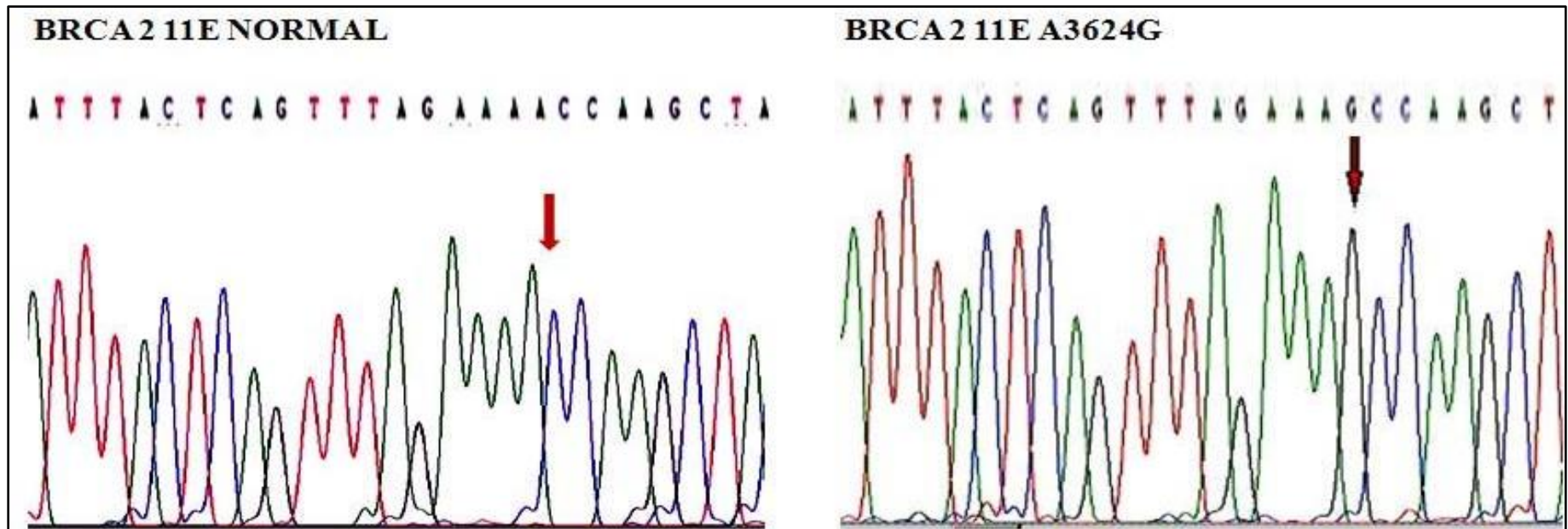
Complete Genome Sequence for BRCA1 & BRCA 2

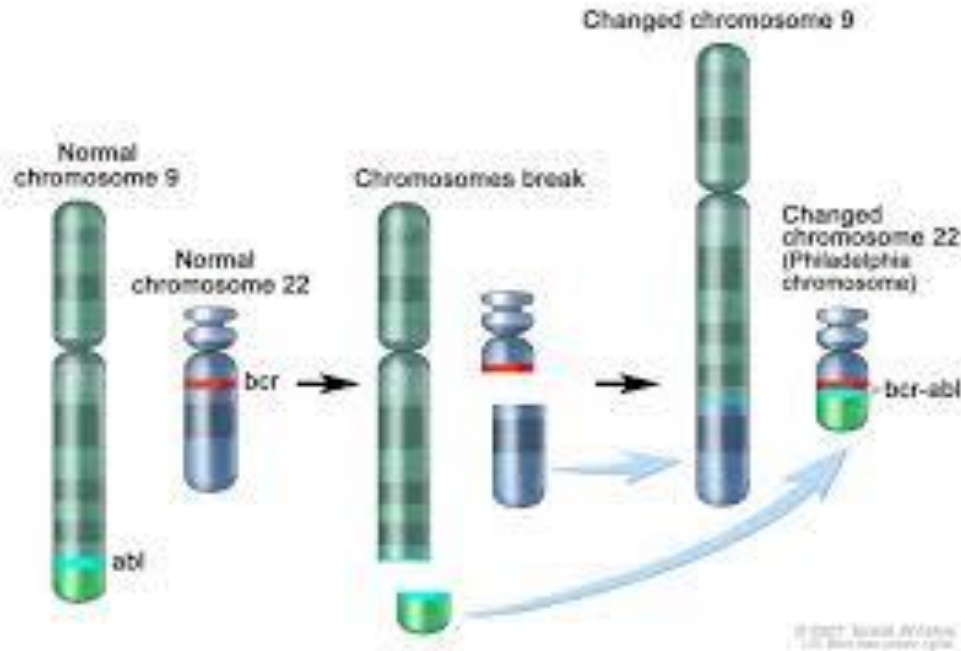
BRCA 211E Electropherograms of Normal and Breast cancer patient



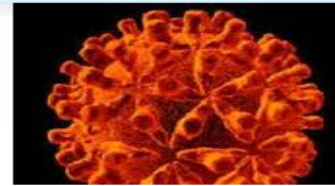


BRCA 211E Electropherograms of Normal and Breast cancer patient





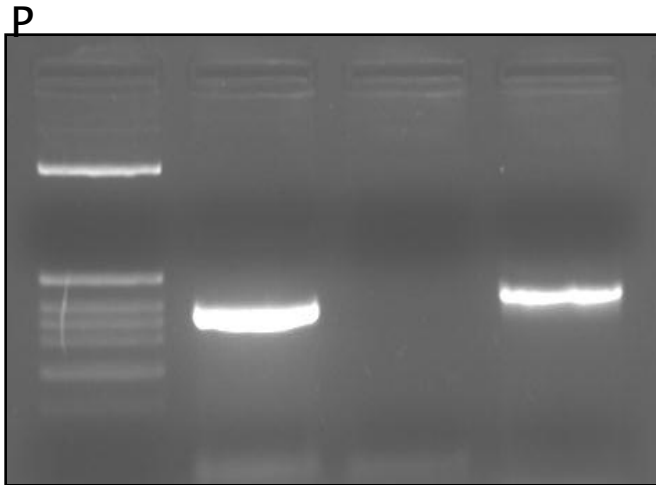
Chronic Myeloid Leukemia



Molecular Diagnostics for Hematological Disorders

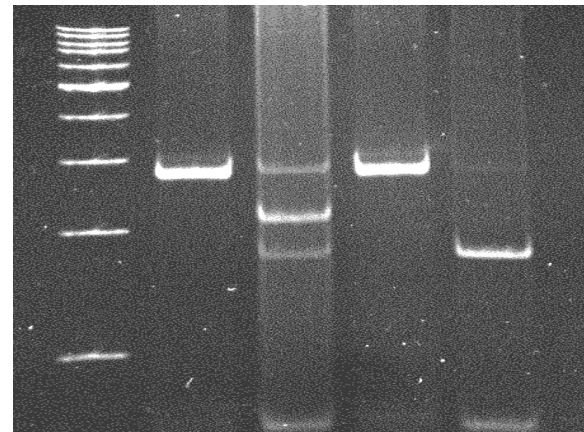
BCR-ABL PCR

M K567 N

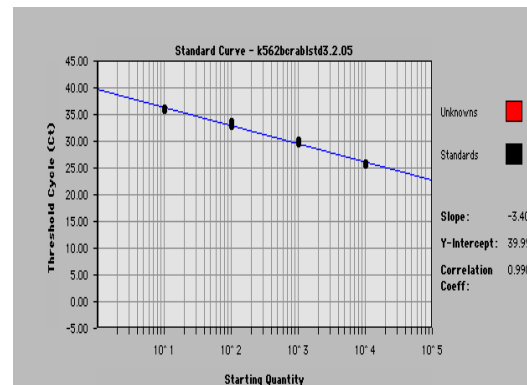
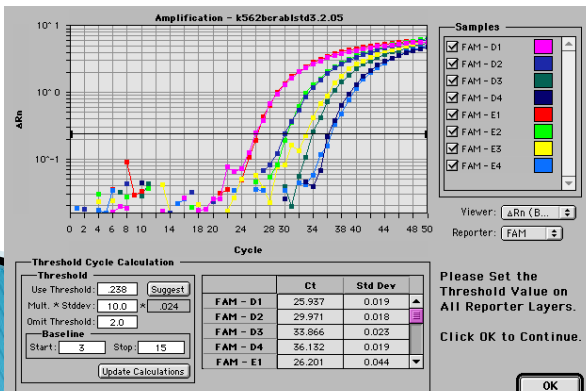


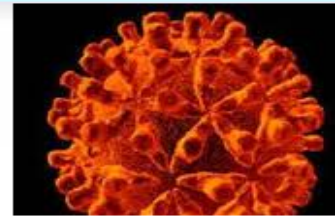
Factor V Leiden by RFLP

M +C +C P1 P2



CML Real Time PCR





DNA sequenced methods for Molecular Diagnostics for Hematological Disorders

- 1. JAK-2 MUTATION**
- 2. NPM-1 MUTATION**
- 3. FLT3 MUTATION**

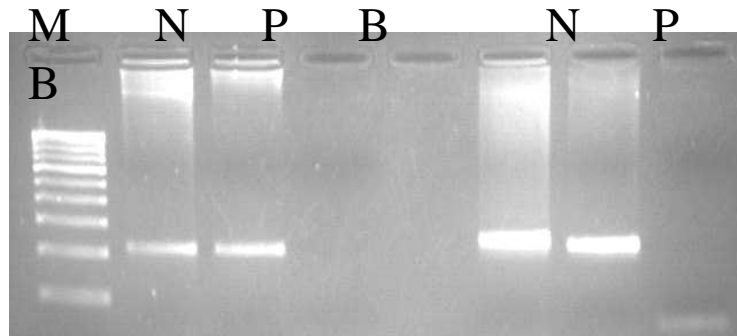


Neurological disorders

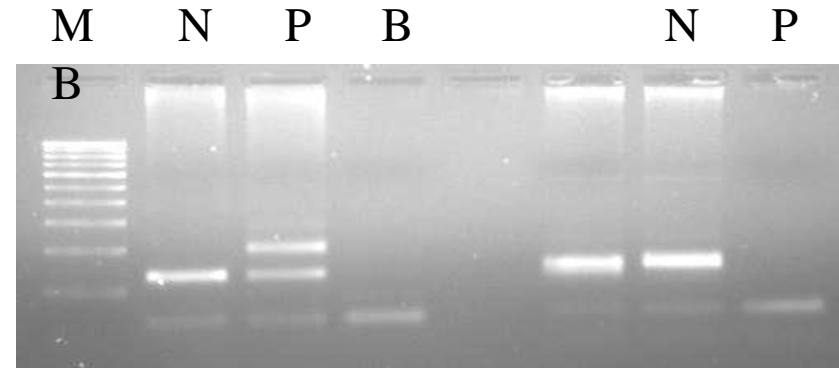


Molecular Diagnostics for Neurological Disorders

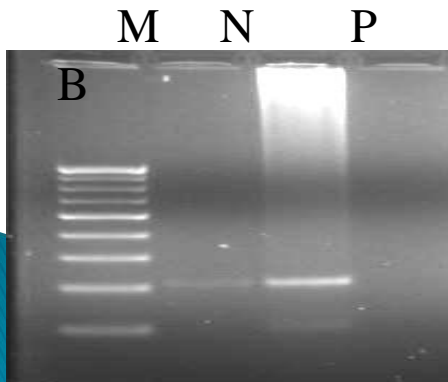
SCA 1 & SCA3



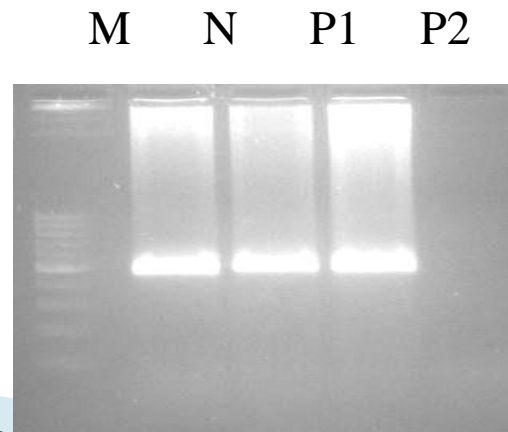
SCA 2 & SCA6



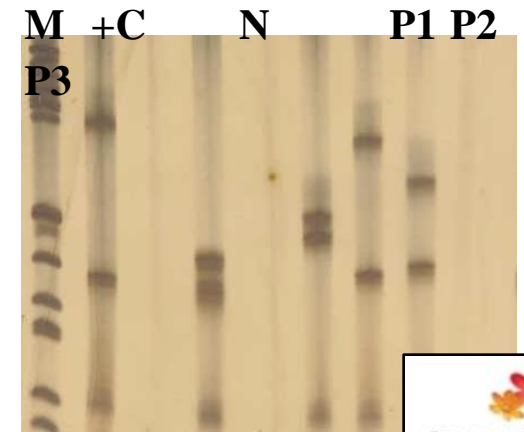
SCA 7

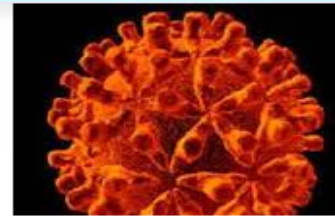


FRDA DNA PCR

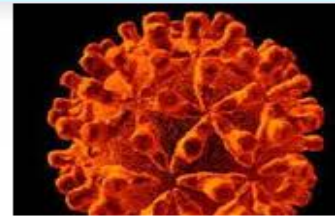


Huntington's Disease DNA PCR



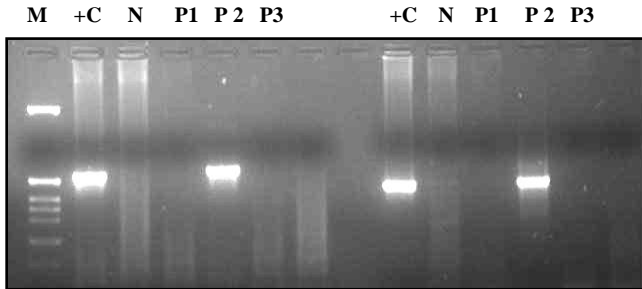


Infectious diseases

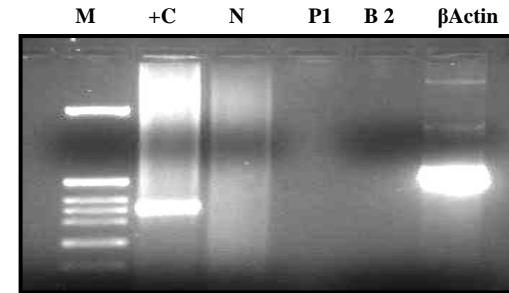


Molecular Diagnostics for Infectious diseases

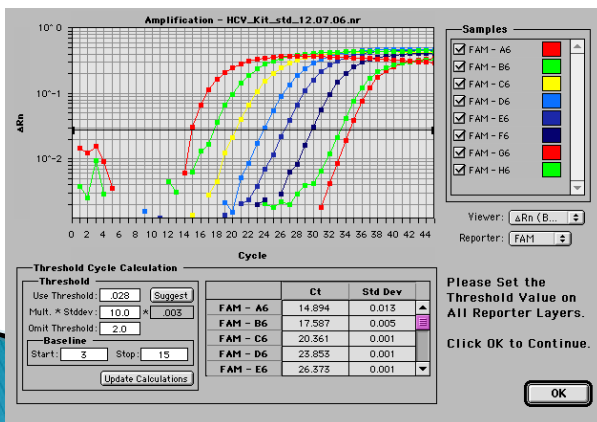
HBV DNA PCR



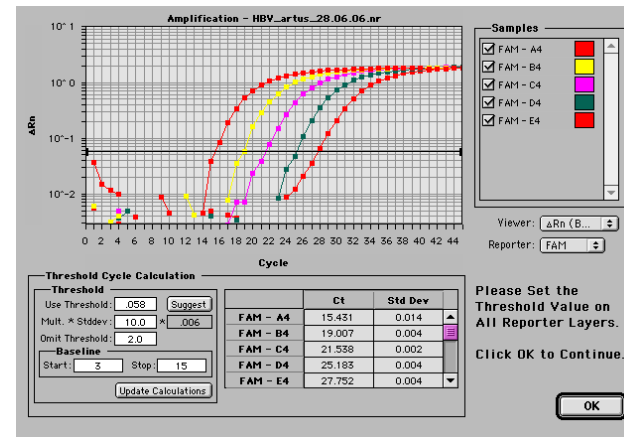
HCV RNA PCR



HBV Real Time PCR

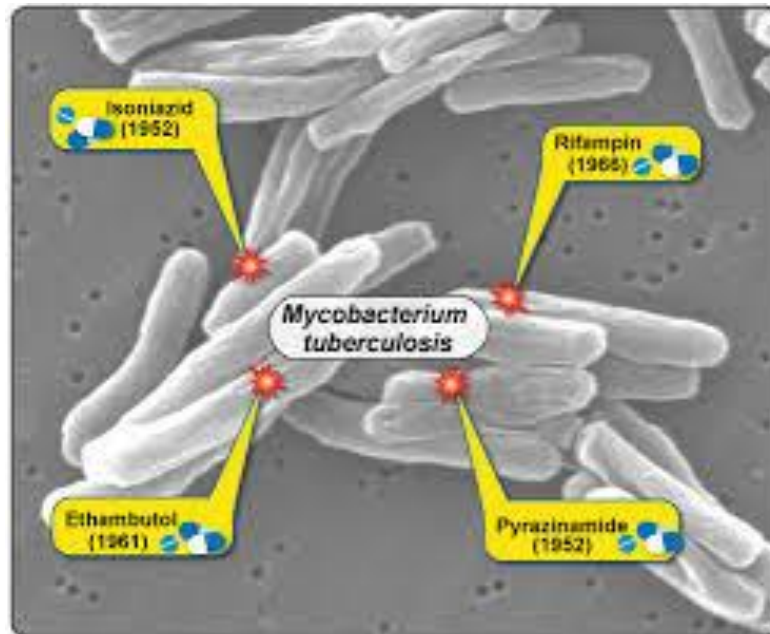


HCV Real Time PCR

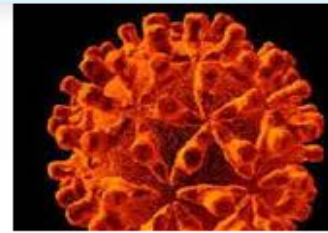




Successful in setting up home brew test for HIV drug Resistant



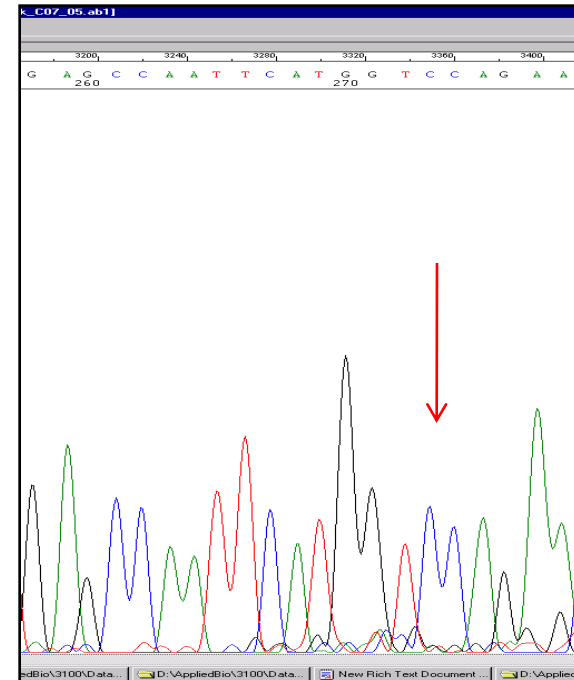
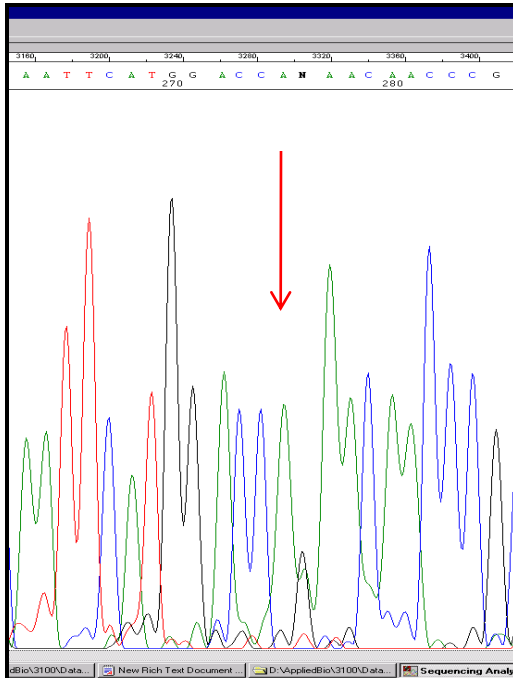
Mycobacterium Tuberculosis



Molecular Diagnostics for M. Tuberculosis Drug Resistant

rpoB – Normal CAG- CAG

rpoB – mutation CAG- CTG



1st Line Genes – rpoB, pncA, ndh, rpsL, Kat G, Kas A, inhA, embB, rrS
 2nd Line genes – Gyr A, GyrB, Thy A



Present Need of Molecular Diagnostic laboratory



Better Health care program of Maharashtra



Overall Message to Maharashtra Government

- Provide basic accredited Molecular diagnostic laboratory to all government hospitals.**
- Set up Centralized facilities in some of the major states of Maharashtra where the laboratory is equipped with all sophisticated instruments for Molecular diagnostics**
- There is a need for well experienced Molecular Biologist to look after this laboratory with R&D unit attached to this facility.**

Molecular Biomarkers & Diagnosis Related Journals

- Advancements in Genetic Engineering
- Journal of Molecular and Genetic Medicine



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