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Importance of Molecular Diagnostics in state of Maharashtra

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Head,
Department of Molecular Medicine & Biology,
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Mumbai-400 026., India.
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 mucociliary differentiation of Rat & human Tracheobranchial epithelia cells
Global Molecular Diagnostic Market


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 is doing complete genome sequences useful in finding out hereditary disease, cancer & genetic & Neurological disorders
Success stories in Molecular Diagnostics
University of Texas, M. D. Anderson Cancer Centre, Houston Texas, USA (2002-2004)

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 & BRCA2

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


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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