



## **TRAINING PROGRAMME IN MEDICAL BIOTECHNOLOGY**

With the intent to carry out research on future health implications of Methyl isocyanate (MIC) in the existing population of the Bhopal Gas Tragedy and other medical ailments, a well equipped Research Department was established in January 2004. The research and clinical faculty have been working in multi-faceted directions with cross disciplinary approach on varied aspects of medical biotechnology including origin and evolution of cancer, molecular regulation of apoptosis, cellular and humoral immune abnormalities and patho-biology of various diseased states.

The Department offers molecular diagnostic services using Automated Nucleic Acid Amplification Technology (NAT), Real Time PCR (RT-PCR) and Flow Cytometry (FACS) platforms, the first among its kind in Central India. Quantitative real time monitoring of viral load, qualitative detection of pathogens, relative expression of gene transcripts, immuno-phenotyping and karyotyping services are also being provided.

The Department has emerged as one of the “Centers of Excellence” for Wet-Lab training in area of Biotechnology for both under graduate and post graduate students of Life Sciences. More than 5000 students have benefited from these trainings till date. The Department also offers Summer Training, Post Graduate Dissertation and Certificate Courses in frontier areas of Medical Biotechnology (ClinicalCytogenetics,ClinicalImmunology,ClinicalBiochemistry,Molecular Diagnostics and Molecular Biology). In addition to the above training courses, a few candidates who are recipients of national level fellowships are pursuing Ph.D. programme (5 years duration).



**Staff of the Department:**

**Director-BMHRC:**

**Brig. (Dr.) K.K. Maudar**  
**MBBS, MS (Gen Surg); MS (Paed Surg.); Ph.D; FAMS;**  
**FACS; FAAP; FRCS (Edin.); FRCS (Glasgow)**

**Faculty:**

**Dr. Puneet Gandhi,**  
**M.Sc., PGDHHM, Ph.D,**  
**Professor & Head**

**Dr. Ravindra M. Samartha,**  
**M.Sc., Ph.D. PDF (NSC-Taiwan),**  
**Assistant Professor**

**Dr. Rahul M Shrivastav**  
**M.Sc., Ph.D.**  
**Assistant Professor**

**Scientific Staff:**

**Dr. Protiti Bose, SRA**  
**Mrs. Rashmi Barathi, JRA**  
**Mr. Ram Prakash Punde, JRA**  
**Mr. Hemant Pandey, JRA**  
**Ms. Nivedita Chakraborty, JRA.**

**Technical Staff:**

**Ms. Anchal Garg**  
**Ms. Zeba Khan**  
**Ms. Sangeeta Singh**  
**Ms. Shweta Mishra**  
**Mr. Vikram Gurjar**  
**Mr. Javed Noor (Lab Attendant)**



### Training Objective:

Our country is viewed as a destination for investment in biotechnology and the industry is witnessing foreign direct investments in this arena with a parallel growth in National Centers for Excellence. More venture capital companies are also surfacing which really need good, qualified trained manpower with hands-on-experiences in various state-of-the-art cutting edge technologies.

We are going to be the Youngest Nation by the year 2009 and it's predicted that our nation would have one of the largest fleet of biotech graduates in the world. As you are well aware that the subject of biotechnology needs huge capital investments for developing infrastructural facilities, the reason why, most of our institutes do not have them and shortage of workforce/expertise in this area is again one of the added-on limitations to the existing one. In developing nations like ours, shortage of resources is one of the limiting factors which hurdle in establishing well furnished state of laboratory facilities with GMP/GLP compliance to carry forward biotech research. However, outsourcing usage of existing facilities may substantially reduce this burden on the state.

To achieve these larger goals, we at BMHRC, as a societal responsibility are expanding the flow of benefits to the student community of the state by coordinating and outsourcing our established state of art facilities and technical expertise.

### **Molecular Immunology and Cell Signaling:**

- Double sandwich ELISA.
- Immuno-affinity chromatography.
- Analysis for TH1/ TH2 paradigm by CBA.
- Separation of amino acid mixture by TLC.
- Direct and indirect immunofluorescence.
- Cell signaling and signal transduction assays.
- DNA cell cycle analysis by flow cytometer.
- Apoptosis assays by flow cytometer.
- Cell separation by table top cooling centrifuge.
- Antigen stimulated T-cell proliferation.
- Lyophilization
- Immunophenotyping
- Redox signaling assays
- DNA damage & repair signaling Assays
- Cancer cell signaling assays



### Animal Tissue Culture Techniques:

- Introduction to tissue culture.
- Secondary cell culture and maintenance.
- Media preparation for cell culture.
- Single cell cloning.
- Soft-agar transformation assays.
- Nano-drug delivery assays.
- Site directed mutagenesis assays.

### Molecular Cytogenetics:

- Metaphase preparation.
- Epi-fluorescence microscopy
- Spectral karyotyping (SKY).
- G-banding.
- Fluorescence *in-situ* hybridization (FISH).

### Proteomics and Genomics:

- Cell lysis and protein extraction.
- Isolation and estimation of DNA.
- Isolation and estimation of RNA.
- Isolation and estimation of Proteins.
- 1- D vertical slab SDS-PAGE.
- 2- D electrophoresis (IEF)
- Western blot.
- Horizontal electrophoresis–agarose gel electrophoresis.
- Southern blot.
- Apoptotic DNA ladder assay.
- Inter simple sequence repeat PCR.
- Reverse transcriptase PCR.
- DNA autoradiography.
- Gel documentation.



### Molecular Diagnostics and Prognosis of Diseases:

- Molecular diagnosis by COBAS Amplicor & Real Time PCR for  
Hepatitis B Virus DNA (HBV)  
Hepatitis C Virus RNA (HCV)  
Human Immunodeficiency Virus DNA (HIV)  
Mycobacterium Tuberculosis DNA (MTB)
- Relative expression analysis of BCR-ABL transcripts.
- Real time viral load monitoring of Entero virus.
- Quantitative PCR for HSV-1/2.
- Decontamination and bacterial DNA isolation.
- Viral DNA isolation and quantification.
- Viral RNA isolation and cDNA synthesis.
- Determination of total C-reactive protein by ELISA.
- Determination of total IgE by ELISA.

### Other-Biotechniques:

- Sterilization techniques.
- Preparation of nutrient media & broth.
- Pouring and plating techniques.
- Preparation of reagents & buffers.
- Measurement of pH of various reagents & biological buffers.
- Cell lysis of erythrocytes through hypotonic and hypertonic solutions.
- Haematology and serum clinical chemistry.
- High speed centrifugation.
- Ultra centrifugation.
- Tissue banking



**INFRASTRUCTURAL FACILITIES AVAILABLE**

S. No.	Name of Instrument	Name of the Principal
1.	BACTOHOOD (LAMINAR AIR FLOW)	TELSTAR, GERMANY
2.	CALIBRATED DENSITOMETER	BIO-RAD, USA
3.	CIRCULATING WATER BATH	GE HEALTH CARE, UK
4.	CIRCULATING WATER BATH	LAB TECH., INDIA
5.	COBAS AMPLICOR	ROCHE AS & MD, GERMANY
6.	CO <sub>2</sub> INCUBATOR	THERMO ELECTRON CO., USA
7.	DEEP FREEZER -80 °C	HERAEUS, GERMANY
8.	DEEP FREEZERS -20 °C	VESTFROST, USA
9.	DEIONIZED WATER SYSTEM	MILLIPORE, USA
10.	DNA ELECTROPHORESIS SYSTEM	GE HEALTH CARE, UK
11.	DNA SEQUENCING GEL	BIO-RAD, USA
12.	DOUBLE DISTILLATION	UNIT LAB TECH, INDIA
13.	ELISA READER	TRIVITON, USA
14.	FLOW CYTOMETER & CELL SORTER (FACS)	BECTON & DICKINSONS, US
15.	FLUORESCENT RESEARCH MICROSCOPE	CARL ZEISS, GERMANY
16.	FUME HOOD FOR RADIOACTIVE ISOTOPE HANDLING	S.M. SCIENTIFIC INSTRUMENT (PVT. LTD.), IND.
17.	GEL DOCUMENTATION UNIT	VILBER LOURMAT, FRANCE
18.	GEL-DRYER UNIT	GE HEALTH CARE, UK
19.	HIGH SPEED CENTRIFUGE	BECKMAN COULTER, USA
20.	HOT AIR OVEN	LAB TECH, INDIA
21.	HYBRIDIZATION OVEN	GE HEALTH CARE, UK
22.	INCUBATOR COOLING	REMI, INDIA
23.	INCUBATOR-SHAKER	NEW BRUNSWICK SCIENTIFIC, USA
24.	INVERTED PHASE CONTRAST & FL. MICROSCOPE	NIKON, JAPAN
25.	INVERTED MICROSCOPE	OLYMPUS, JAPAN
26.	LAMINAR AIR FLOW	HERAEUS, GERMANY
27.	LAMINAR AIR FLOW	TELSTAR, GERMANY
28.	LIQUID NITROGEN TANKS	PLASTO CRAFT HOT FROG, ITALY
29.	LIQUID NITROGEN TANKS	THERMO ELECTRON CO., USA
30.	LYOPHILIZER	MARTIN CHRIST GMBH, GERMANY
31.	MAGNETIC STIRRER	LABLINE INSTRUMENTS INC., USA
32.	MICROCENTRIFUGE	EPENDORF, GERMANY
33.	MICROWAVE OVEN	LG HOME PRODUCTS, INDIA
34.	MINI ELECTROPHORESIS GEL	BIO-RAD, USA
35.	ORBITAL SHAKER	FINEPCR, SOUTH KOREA
36.	PCR	MJ RESEARCH, USA
37.	PH METER	THERMO ELECTRON CO., USA
38.	PROTEIN ELECTROPHORESIS SYSTEM	GE HEALTH CARE, UK
39.	RADIATION SURVEY METERS	VWR SCIENTIFIC PRODUCTS CO., USA
40.	REAL TIME PCR	ROCHE AS & MD, GERMANY
41.	ROCKING PLATFORM SHAKER	LABLINE INSTRUMENTS INC., USA
42.	SEMI-DRY TRANSFER UNIT	GE HEALTH CARE, UK
43.	SLOT BLOT APPARATUS	GE HEALTH CARE, UK
44.	SPECTRAL KARYOTYPING SYSTEM	APPLIED SPECTRAL IMAGING, ISRAEL
45.	SPECTROPHOTOMETER	BIO-RAD, USA
46.	SPEED VAC	MARTIN CHRIST GMBH, GERMANY
47.	TABLE TOP CENTRIFUGE	REMI, INDIA
48.	TABLE TOP HIGH SPEED COOLING CENTRIFUGE	HERAEUS, GERMANY
49.	TISSUE HOMOGENIZER	REMI, INDIA
50.	TOP PAN DIGITAL BALANCE	VWR SCIENTIFIC PRODUCTS, USA
51.	ULTRACENTRIFUGE	SORVAL HERAEUS, GERMANY
52.	VORTEX MIXER	REMI, INDIA
53.	VORTEX MIXER	FINEPCR, SOUTH KOREA
54.	VORTEX MIXER	VWR SCIENTIFIC PRODUCTS CO., USA
55.	WATER BATH	LABLINE INSTRUMENTS INC., USA
56.	WATER BATH	SCIENTECH, INDIA
57.	2- DIMENSION, ELECTROPHRESIS (IEF)	SCIE-PLAS, UK



**APPLICATION FOR POST GRADUATE DISSERTATION/ SUMMER /SHORT TERM TRAINING  
/CERTIFICATE COURSE**

**Name:**

**Age/Sex:**

**Language Known(Reading):**

(Writing):

Recent Passport Size Photograph
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**Academic Qualifications (attach photocopies of mark sheets):**

S.No.	name of Examination	Board/University	Year	% / Grade
01	HIGH SCHOOL CERTIFICATE			
02	HIGHER SECONDARY			
03	UNDER-GRADUATE			
04	POST-GRADUATE (specify specialization)			

**Details of Academic Trainings & Workshops:**

**Current Institutional Address:**

**Address for Correspondence:**

**E-mail:**

**Signature of the Candidate:**

**Contact No.:**

**Official Endorsement from HOD/Principal:**

**Completed Application Form along with supporting documents & clearly stating programme applied for should reach through Speed Post to:**

Director/Head  
Bhopal Memorial Hospital & Research Centre  
Department of Research & Training, R&T Block  
Raisen Bypass Road, Bhopal - 462 038 (MP)  
Tel.: 0755-2742152 , Fax No: +91 755 2748309  
E-mail: [bmhrcresearch@gmail.com](mailto:bmhrcresearch@gmail.com) web: [www.bmhrc.org](http://www.bmhrc.org)



S.No	Course	Period of Training	Training fee for Students ( in Rs.)	Training fee for Faculty( in Rs.)
1.	Ph.D.	3-4 Years	25,000 /-Admission Fee + 2,000/- p.m	30,000 /- Admission Fee + 2,400/- p.m
2.	M.Sc. Dissertation	3/4/6 months	12,000/15,000/18,000/	-----
3.	Project Training –UG & PG	3/4/6/12 months	10,000/12,000/15,000/ 30,000/-	-----
4.	Summer/Internship Training Programme	30/45 days	10,000/11,500/-	Rs. 12,000/-
5.	Short-term Training Programme	14 days	Rs. 5,000/-	Rs. 7,000/-
6.	Short-term Training Programme	6 days	Rs. 3,000/-	Rs. 4,500/-
7.	Hands-on practical skill upgradation- PG	12 days	Rs. 6,000/-	Rs. 7,500/-
8.	Hands-on practical skill upgradation- UG	6 days	Rs. 3,000/-	Rs. 4,500/-
9.	Specialization Certificate courses	60 days	Rs. 10,500/-	Rs. 12,500/-

\* Hostel fees (lodging and boarding charges) not included.

\*\* Fees to be submitted through Demand Draft only, drawn in favor of Director, BMHRC payable at Bhopal, **15 days** prior to commencement of programme. Training fees is non-refundable.

### **Terms & Conditions**

- Candidates with NET (CSIR-JRF) qualification/independent fellowship only are admitted for Ph.D.
- The topic of Dissertation /Internship/Summer training work is allotted by the Department of Research, BMHRC, pertaining to the various arenas of Medical Biotechnology.
- During the training, candidates have to work on every working day of the stipulated period (0900-1700 hrs), 6 days a week. Scholars and students are permitted to use canteen and library facilities of the Institute.
- In case interested, candidates are permitted to avail in-house accommodation (hostel) facilities as per existing norms, with 15 days prior intimation.
- BMHRC possesses the option of termination of the academic programme, if the candidate is found lacking in commitment /conduct or incorrect information is supplied in application form.
- No stipend is provided for candidates accepted for dissertation/internship/summer training.
- E-mail id is mandatory for further correspondence/intimation of acceptance.
- Only 5 days of leave will be sanctioned for competitive exams during the tenure of any training.
- Eligibility for certificate course is- minimum final year graduate.
- Lab visit (advanced instrumentation) for 1 day,( Rs. 50/- per student). One faculty can accompany 10 students for a lab visit.