



Haffkine Institute

For Training Research and Testing

An Autonomous Institute of Govt. of Maharashtra Registered under Societies Registration Act 1860

Recognised as "Scientific & Industrial Research Organisation" (SIRO) by Govt. of India, Ministry of Science & Technology.



ANNUAL REPORT

2014-15

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ISO 9001:2008 Certified



ANNUAL REPORT

2014 - 2015

**HAFFKINE INSTITUTE
FOR TRAINING, RESEARCH & TESTING**

**ACHARYA DONDE MARG, PAREL
MUMBAI 400 012**



**HAFFKINE INSTITUTE
FOR TRAINING, RESEARCH & TESTING**



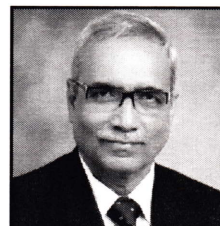
HAFFKINE INSTITUTE FOR TRAINING, RESEARCH & TESTING

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DIRECTORS DESK



Greetings from Haffkine Institute!!!

At the end of another scientifically enriching year, I am happy to present the Annual Report of the Haffkine Institute for the year 2014-2015. It gives a glimpse of the Training, Research and Testing activities of the Institute, which are given equal importance in our efforts to uphold our mandate.

As one of the oldest biomedical research institutes today Haffkine Institute has evolved as a centre for multidisciplinary research with human health at its own. Today it has been accredited as an ISO 9001:2008 certified organization.

The quality policy of this institute well reflects the mandate of the Institute that is "**rogapahari vidnyanam lokakalyana sadhanam**"- Alleviating human suffering through science and thereby serving the welfare of the people.

The Institute is recognized by University of Mumbai and Maharashtra University of Health Sciences (MUHS) to undertake Master's and Doctoral degree programmes. Certificate courses, different workshops and training activities conducted in institute are focused on a multi-disciplinary approach with the aim of imparting knowledge in the biological and medical sciences.

Haffkine Institute has been recognised by the Ministry of Finance, Government of India by exempting donations up to 175% of made to Haffkine Institute under section 35 (1) (ii) of the Income Tax Act.

The Institute has a rich scientific resource in the form of visiting scientists and adjunct professors who also comprise of the Institute's Research Advisory Council and Academic Advisory Council which are an integral part of the research and training activities carried out by the various departments. Over the past few years, our collaborations with experts from various national and international institutions have made this resource pool even richer.

The Institute is also engaged in various research activities ranging from classical microbiology to modern-day biotechnology and molecular biology. Antibiotic sensitivity tests and bacterial load are evaluated in juxtaposition with proteomics and PCR technology which includes Gram positives, Gram Negatives and the dreaded killer tuberculosis (TB).

Multiple viruses like HIV, Rabies, Influenza, Dengue and Japanese Encephalitis (JE) are studied for potential antivirals and vaccine development. Zoonotic agents, too, such as Malaria and Leptospirosis hold a special platform for research in the Institute. Testing is a major revenue earner for the Institute. Anti-virals, anti-malarials, anti-bacterials are tested on one hand, while on the other, country liquor, disinfectants and detergents are tested for toxicity. We have also initiated studies to understand the basis of complementary systems of medicine like Ayurveda and Homeopathy using contemporary scientific methods.

I am sure that your whole heartedly participation in the institute's research, training and testing activities will achieve its goal to become one of the finest research institute in the world. I wish all the readers of this prestigious organization's annual report to achieve success in their future prospects, careers and endeavors.

DR ABHAY S. CHOWDHARY

GOVERNING COUNCIL

1. **Shri Jitendra Awhad (Date : 29th May 2014 to 29th Sept. 2014)** **President**
Shri. Vinod Tawde (Date : 1st Nov 2014 to till date)
Hon. Minister, Medical Education,
Government of Maharashtra,
Mantralaya, Mumbai – 400 032.
2. Hon. Minister of State, Medical Education,
Government of Maharashtra,
Mantralaya, Mumbai – 400 032. **Vice – President**
3. **Smt Manisha Mhaiskar ,IAS (Date :10th Feb 2014 to 5th Jan 2015)** **Member**
Smt. Dr. Medha Gadgil, IAS
(Date : 5th Jan 2015 to till date)
Addl.Chief Secretary,
Medical Education & Drugs Department,
Government of Maharashtra,
Mantralaya, Mumbai – 400 032.
4. **Shri Mahesh Zagade , IAS (Date : 30th Aug 2011 to 6th Aug 2014)** **Member**
Dr. Harshadeep Kamble, IAS (Date : 21st Jan 2015 to till date)
Commissioner,
Food & Drugs Administration,
Bandra-Kurla Complex,
Bandra (E), Mumbai – 400 051.
5. **Dr. Pravin Shingare,** **Member**
Director,
Medical Education & Research,
Government of Maharashtra,
St. George's Hospital Campus,
Mumbai – 400 001.
6. **Dr. Jagdish Prasad,** **Member**
Directorate General of Health Services,
Government of India, Room No. 444, 'A' Wing, Nirman Bhawan,
New Delhi – 110108.
7. **Dr. Abhay S. Chowdhary** **Member – Secretary**
Director, Haffkine Institute, Parel, Mumbai –12.

ACADEMIC COUNCIL

- | | | |
|-----|--|--------------------|
| 1. | Dr. (Mrs.) Mrudula A. Phadke
Consultant, WHO, Vaccine Committee &
Former Vice-Chancellor, MUHS & DMER, Mumbai.
181, Beuna Vista, Gen. J. Bhosle Marg, Mumbai-400 021 | Chairperson |
| 2. | Dr. Pravin H. Shingare
Director of Medical Education & Research
Mumbai – 400 001 | Member |
| 3. | Dr. B. G. Kulkarni
Director, Institute of Science, Mumbai – 400 032. | Member |
| 4. | Dr. A. S. Khemnar
Director, Institute of Chemical Technology
Nathalal Parekh Marg, Matunga, Mumbai – 400 019. | Member |
| 5. | Padmashree Dr. T. P. Lahane
Dean, Grant Government Medical College
& Sir J.J. Hospital, Mumbai – 400 008 | Member |
| 6. | Dr. (Mrs.) Nilima Kshirsagar
Dean, ESI-PGIMS M. G. M. Hospital
Mumbai – 400 012 | Member |
| 7. | Dr. Avinash Supe
Dean, Seth G. S. Medical College
& K.E.M. Hospital, Mumbai – 400 012 | Member |
| 8. | Dr. A. M. Paturkar
Dean, Bombay Veterinary College
Parel, Mumbai – 400 012. | Member |
| 9. | Dr. Abhay S. Chowdhary
Director Haffkine Institute
Parel, Mumbai – 400 012. | Member |
| 10. | Dr. Shashikant P. Vaidya
Assistant Director
Haffkine Institute –Parel, Mumbai-400 001 | Convener |

ADVISORY COUNCIL FOR RESEARCH

- | | | |
|-----|---|--------------------|
| 1. | Padma Bhushan Dr. R. D. Lele
102, Beuna Vista, Gen. J. Bhosle Marg,
Mumbai - 400 021. | Chairperson |
| 2. | Dr. (Mrs.) Mrudula A. Phadke
Consultant, WHO, Vaccine Committee &
Former Vice-Chancellor, MUHS & DMER, Mumbai
181, Beuna Vista, Gen. J. Bhosle Marg, Mumbai -400 021. | Member |
| 3. | Dr. Pravin H. Shingare
Director of Medical Education & Research,
Mumbai – 400 001. | Member |
| 4. | Dr. Satish D. Pawar
Director of Health Services, Mumbai – 400 001. | Member |
| 5. | Vd. Kuldeep Raj Kohli
Director of Ayush, Mumbai – 400 001. | Member |
| 6. | Dr. Shubhada V. Chiplunkar
Director
Advanced Centre for Treatment, Research and
Education in Cancer (ACTREC),
Kharghar, Navi Mumbai – 410 210. | Member |
| 7. | Dr. (Mrs.) Nilima Kshirsagar
Dean, ESI-PGIMS M. G. M. Hospital,
Mumbai – 400 012. | Member |
| 8. | Dr. H. S. Palep
19, Mahalaxmi Industrial Estate,
1 st Floor, Gandhi Nagar, D. C. Road,
Lower Parel (W), MUMBAI – 400 013. | Member |
| 9. | Dr. Abhay S. Chowdhary
Director, Haffkine Institute, Mumbai – 400 012. | Member |
| 10. | Dr. Shashikant P. Vaidya
Assistant Director ,Haffkine Institute, Mumbai-400 012 | Convener |

EXECUTIVE COMMITTEE (ADMINISTRATION)

- | | | |
|----|--|---------------------------|
| 1. | Dr. Abhay S. Chowdhary
Director,
Haffkine Institute
Parel, Mumbai-400 012 | Chairperson |
| 2. | Dr. Shashikant P. Vaidya
Assistant Director,
Department of Clinical Pathology
Haffkine Institute
Parel, Mumbai-400 012 | Member |
| 3. | Shri. Shrikant .P. Gajbhiye
I/C. Asst. Director,
Department of Bacteriology,
Haffkine Institute
Parel, Mumbai-400 012 | Member |
| 4. | Dr. Sandesha N.Pashte
Medical Officer,
Department of Clinical Pathology (Dispensary)
Haffkine Institute
Parel, Mumbai-400 012 | Member |
| 5. | President, Shramik Utkarsha Sabha
(Workers' Union Representative) | Invitee |
| 6. | Shri. Dinesh. B. Malekar
Chief Administrative Officer
Haffkine Institute
Parel, Mumbai-400 012 | Member – Secretary |

INSTITUTIONAL ETHICS COMMITTEE

1	Dr. (Mrs.) Mrudula. A. Phadke Consultant, WHO, Vaccine Committee & Former Vice-Chancellor, MUHS & DMER, Mumbai 181, Beuna Vista, Gen. J. Bhosle Marg, Mumbai – 400 021	Chairperson (Clinician)
2	Dr. Abhay. S. Chowdhary Director Haffkine Institute, Parel, Mumbai – 400 012	Member (Basic Medical Scientist)
3	Dr. (Mrs). R. A. Deshmukh Former Director & Adjunct Professor Haffkine Institute, 104, Colina Vista, Sus-Baner Road, Pashan, Pune -411 021	Member (Basic Medical Scientist)
4	Shri. Arun. A. Lad, Retired Judge, Central Govt. Industrial Tribunal 56A, 103 Chintamani Society, Pratiksha Nagar, Sion Koliwada, Mumbai	Member (Legal Expert)
5	Shri. N. G. Wagle, C-108, Nupur Co-operative Housing Society representative of non-govt, Vartak Road (Dixit road extension), voluntary agency Vile Parle (E), Mumbai –400 057	Member (Civil Society Representative)
6	Dr. A. H. Bandivadekar Scientist E (Deputy Director), National Institute for Research in Reproductive Health, J. M. Street, Parel Mumbai-400 012.	Member (Scientist)
7	Dr. Aditee Vaidya 1/6, zelam Society, Shivaji Park, Dadar, Mumbai-400 028	Member (Women Representative Civil Society)
8	Dr. Shashikant P. Vaidya Assistant director, Haffkine Institute, Parel, Mumbai -400 012	Member Secretary

INSTITUTIONAL ANIMAL ETHICS COMMITTEE

- | | | |
|---|---|--|
| 1 | Dr. (Mrs.) Mrudula. A. Phadke
Consultant, WHO, Vaccine Committee &
Former Vice-Chancellor, MUHS & DMER, Mumbai
181, Beuna Vista, Gen. J. Bhosle Marg,
Mumbai - 400 021 | Chairperson
(Clinician) |
| 2 | Dr. Abhay. S. Chowdhary
Director
Haffkine Institute
Parel, Mumbai – 400 012 | Member
(Basic medical scientist) |
| 3 | Dr. (Mrs). M. Gatne
Prof of Pharmacology and Toxicology,
Bombay Veterinary College
Parel, Mumbai – 400 014 | Member
(Veterinarian) |
| 4 | Dr. (Mrs). R. A. Deshmukh
Former Director & Adjunct Professor
Haffkine Institute
104, Colina Vista, Sus-Baner Road,
Pashan, Pune -411 021 | Member
(Basic Scientist) |
| 5 | Dr. D. P. Chowdhary
Deputy Manager (Veterinary)
Haffkine Bio-pharmaceutical Corporation Limited
Parel, Mumbai-400 012 | Member
(Veterinarian) |
| 6 | Dr. A. H. Bandivadekar
Scientist E (Deputy Director),
National Institute for Research in Reproductive Health,
J. M. Street, Parel Mumbai-400 012. | Member
(Scientist) |
| 7 | Dr. Aditee Vaidya
1/6, Zelum Society, Shivaji Park,
Dadar, Mumbai-400 028 | Member
(Women Representative
Civil Society) |
| 8 | Dr. Shashikant P. Vaidya
Assistant director,
Haffkine Institute,
Parel Mumbai 400 012 | Member Secretary |

MAHILA TAKRAR NIVARAN SAMITI

1	Dr. Sandesha N.Pashte Medical Officer, Department of Clinical Pathology (Dispensary) Haffkine Institute Parel, Mumbai-400 012	President
2	Ms. Anagha Sarpotdar "ASMI" NGO Member	Member
3	Mr. Pradip Jadhav Senior Technical Assistant Zoonosis Department Haffkine Institute, Parel, Mumbai-400 012	Member
4	Mrs. Seema Borate Laboratory Attendant Administration Haffkine Institute, Parel, Mumbai-400 012	Member
5	Dr. (Mrs). Mrunal Sawant Scientific Officer Venomous Animal Unit Haffkine Institute, Parel, Mumbai-400 012	Member Secretary

RECOGNITIONS OF HAFFKINE INSTITUTE

1. Haffkine Institute is accredited as an ISO 9001: 2008 certified Organization.
2. Haffkine Institute is recognized by Govt. of India as a "Scientific and Industrial Research Organization (SIRO)", "Public Funded Research Institute (PFRI)" and "Department of Science and Technology (DST).
3. Haffkine Institute is also recognized as World Health Organization (WHO), Indian Council of Medical Research (ICMR), Integrated Diseases Surveillance Programme (IDSP) and National Influenza Surveillance Centre for Human and Avian Influenza.
4. Institute is also recognised as Government of India and State Government of Maharashtra authorized Laboratory for Molecular Diagnosis of pandemic H1N1 (Swine Flu)
5. Haffkine Institute is recognized as World Health Organization (WHO) Reference Centre for Rabies and National Centre for Disease Control (NCDC) Plague surveillance centre.
6. Chemical Testing Department of Haffkine Institute is Food and Drug approved (FDA) laboratory, which carries out testing of Indian Made Foreign Liquor (IMFL), alcoholic beverages, and denaturants from State Excise Department and private distilleries of Government of Maharashtra.
7. Haffkine Institute has been recognised by the Ministry of Finance, Government of India by exempting donations up to 175% of made to Haffkine Institute under section 35 (1) (ii) of the Income Tax Act.



Haffkine Institute

for Training, Research & Testing

An ISO 9001:2008 Certified, Autonomous Institute of Government of Maharashtra

Quality Policy

We are committed towards serving the welfare of humans and animals through the investigative discovery of the means of ameliorating and alleviating suffering and providing holistic measures for research, diagnosis, prevention, treatment and education in the bio-medical and allied fields of science.

We aim:

To be a continually improving and learning scientific institution by providing education, training, conducting research concerning vital problems in various medical and related scientific fields and by being a pioneer in the field of clinical diagnosis and testing of diverse substances.

To be a socially responsible institute that provides advice, collaboration and assistance to the Government and appropriate authorities and other organizations in all matters concerning the welfare of public health.

November, 1st, 2010

Director

STAFF OF THE HAFFKINE INSTITUTE

ADMINISTRATION

Director

Dr. Abhay S. Chowdhary
M.D., DHA, DM Virology, FIMSA

Chief Administrative Officer

Shri. Dinesh B. Malekar
B.Com, DHRM, DBM

Accounts Officer

Smt. Vidya D. Sankhe, B.A

Statistician

Smt. Hemangee N.Khanolkar, M.Sc.

BACTERIOLOGY

Assistant Director (Addl. Charge)

Shri. Shrikant P. Gajbhiye, M.Sc

Scientific Officer

Smt. Amita S. Patil, B.Sc.

Smt. Jayashree A. More, B.Sc

BIOCHEMISTRY AND BIOTECHNOLOGY

Assistant Director (Contract)

Dr. A. Rosalinda Marita, Ph.D

Senior Scientific Officer (Contract)

Dr. Usha Padmanabhan, Ph.D

Scientific Officer

Ms. Amruta A. Naik, M.Sc.

CHEMICAL TESTING UNIT

Assistant Director (Contract)

Dr. Anil S. Bobade, Ph.D

Senior Scientific Officer

Smt. Suvarna N. Pachpore, M.Sc.

Scientific Officer

Smt. Shashikala L. Patil,
B.Sc (Retd on 31st July 2014)

Shri. Ashish L. Asrondkar, M.Sc.

Shri. Manoj K. Patil, M.Sc

Shri. Santosh B. Bagal, B.Sc.

CHEMOTHERAPY

Assistant Director (Contract)

Dr. Anil S. Bobade, Ph.D

Scientific Officer

Ms. Vrushali N. Patil, M.Sc.

Shri. Sushant R. Kaple, M.Sc

CLINICAL PATHOLOGY

Assistant Director

Dr. Shashikant P. Vaidya,
Ph.D., Dip Public Health, MA, MHRDM.

Senior Scientific Officer

Smt. Pallavi V. Ansulkar ,
M.Sc. (Resigned on 15th May 2014)

Dr. Shital U. Vasave
M.B.B.S, P. G. Dip in health Science
In Diabetology, MPH, AFIH.

Medical Officer

Dr. Sandesha N. Pashte,
M.B.B.S, D.H.H.M, AFIH

Dr. Shital U. Mane,
M.B.B.S, P.D. Dip in Health and Family Welfare Management

Scientific Officer

Smt. Vibhuti A. Thakur, B.Sc.

LIBRARY

Librarian(Addl charge)

Shri. Sandeepan Mukherjee, M.Sc.

TOXICOLOGY

Scientific Officer (Office In charge)

Dr. Mrunal S. Sawant .M.V.Sc.

Smt. Swati U. Mumbarkar, B.Sc.

TRAINING

Officer In-charge

Dr. A. Rosalinda Marita, Ph.D.

VIROLOGY AND IMMUNOLOGY

Head of the Department

Dr. Abhay S. Chowdhary
M.D., DHA, DM Virology, FIMSA

Senior Scientific Officer

Dr. (Ms). Sweta. T. Kothari.Ph.D., M.B.A.

Scientific Officer

Dr. Ritwik V. Dahake, Ph.D.

Shri. Sandeepan R. Mukherjee, M.Sc.

Shri. Pawankumar T. Todkar,M.Pharm

ZOONOSIS

Assistant Director{Addl. Charge Contract}}

Dr. Mira L. Ramaiya, Ph.D.
(Retd on 30th November 2014)

Scientific Officer

Dr. Mrunal S.Sawant.M.V.Sc

Smt. Trupti A. Satvekar, B.Sc.

TRAINING (STATE TRAINING POLICY PROGRAM)

Training Director

Dr. Abhay S, Chowdhary
M.D., DHA, DM Virology, FIMSA

Training Manager

Dr Shashikant P. Vaidya
Ph.D., Dip Public Health,M.A., MHRDM

Assistant Training Manager

Shri. Dinesh B. Malekar
B.Com, DHRM, DBM

HIGHLIGHTS OF ACHIEVEMENTS

1. The "Haffkine Foundation Day" (10th August, 2014) and the "Haffkine Day" (10th January, 2015) were commemorated by the Institute. Over 200 delegates from various faculties of Medical and Para-medical fields participated in the scientific programs conducted during these events.
2. The 479th meet of "Teaching Pathologists & Microbiologists Conference" was organised by the Institute on 31st January, 2015. It was attended by the pathologists of the different hospitals, staff and students of the Haffkine Institute.
3. International Women's Day was celebrated by women staffs of Haffkine Institute on 4th March 2015. The central focus was the Organ Donation.
4. Currently the Institute has 30 Ph.D and 10 MSc students.
5. In this year, Institutional Ethics Committee (IEC) and Institutional Animal Ethics Committee (IAEC) meetings were held four times and total 11 and 18 research projects were evaluated respectively.
6. Haffkine Institute selected as the Nodal institute for training under State Training Policy by Medical Education and Drugs Departments (MEDD). Institute has trained 38 participants in this year, mainly doctors from Department of Ayurveda, Directorate of Medical Education and Research, Haffkine Institute and Maharashtra University of Health Sciences under the "Foundation Training Program" in which training for administrative work is given.
7. The Institute participated in the 7th Science Expo, organised by Nehru Science Centre. Various technical aspects were elucidated for School Students thereby trying to generate enthusiasm for science in the students.
8. As a part of the ISO 9001:2008 recertification protocol, internal and external audits were conducted across various sections of the institute.
9. Venomous animal Unit, Department of Zoonosis has received License from State Forest Department, Moef and Maharashtra for hunting of Snakes under permit no. SPP-1 dated 31/03/2015 for Education, Scientific Research and for derivation, collection or preparation of snake venom for the manufacturer of life saving drugs.

Haffkine Institute is one of the oldest biomedical research institutes in the country. It was established in 1899 and is named after the scientist (Dr. Waldemar Mordecai Haffkine) who invented the plague vaccine. Since then, Haffkine Institute has emerged as a multi-disciplinary Institute engaged in training, research and testing of various aspects of infectious diseases. The institute comprises of various departments.

ADMINISTRATION

The Governing Council, presided over by Hon. Minister of Medical Education, Govt. of Maharashtra, meets once/twice a year. The Governing Council gives directions to the functioning of the Institute. Governing Council also takes policy decision for the institutes smooth functioning. The governing council is the think tank of all the Ex-Officio members of the Government. Apart from this supreme body of the institute, Executive Committee (Administration) meets regularly to execute the decisions of Governing Council and also take decision in local issues. All the decision with financial implications is discussed in the executive committee. The said decisions are then ratified by the governing Council.

Administration Department maintain personal records of all the staff members. It also maintains record of all the Scientist and Students and caters to the need of various departments for smooth functioning of the Institute. After ISO audit the record maintenance system has been improved.

Accounts Section which works under Administration Dept, also maintain all the books of accounts of the institute. It also maintain record of all grants received by institute for various research Project from ICMR, IDSP, DBT and DST, apart from grant in aid received from Government of Maharashtra. All the accounting is migrated to accounting software which facilitation monitoring institutes financial position. Though the payment of salary to staff is received through Directorate of Ayurved, the pay bills are prepared and record is maintained at Institute level.

Store Section which also function under Administration Department, procure all consumables, drugs and plasticware and glassware items and distribute to all departments as per their requirement. It also procures all local and Imported Scientific Instruments for all departments of the Institute.

BACTERIOLOGY

Department of Bacteriology provides testing facilities for carrying out bacteriological examination of water samples from various industrial & household sources and all types of water purifying systems. Department also provides guidelines and testing facilities for carrying out antimicrobial efficacy testing of sanitizers & disinfectants and carrying out microbiological examinations of food, fruit products, soil samples, coated steel tiles, plastic sheet, asbestos sheet and also bacteriological examination of water storage tank, qualitative and quantitative examination of swab samples. This department also provides guidance & experimental facilities to M.Sc. & Ph.D. researchers.

BIOCHEMISTRY AND BIOTECHNOLOGY

The Department of Biochemistry and Biotechnology was established in 1923 as per the recommendations of the Advisory Board of the Indian Research Fund Association. In 1965, the department worked in close association with UNICEF in implementing a program in public nutrition in rural regions of Maharashtra. Currently, the department is actively engaged in various types of training, research and testing projects, reflecting the Institute's name. The present activities of the department include the biochemical testing of clinical samples for hospitals, private practitioners and rodent models. In the past year the Department has expanded its testing services to include Honey testing. In addition the Department also conducts Annual Medical Check-ups for Governmental & Private organizations. It is actively working on various research projects focusing on diseases prevalent in India such as Diabetes and Cancer. Biochemical and molecular characterization as well as *in vitro* & *in vivo* investigations for biological activities of *Ayurvedic* herbs & formulations or synthetic compounds & drugs forms an integral part of the departmental research activities. Some clinical trials are also being conducted for the same.

CHEMICAL TESTING UNIT

The main aim and objective of the Chemical Testing Unit is to analyze the alcoholic beverages like Indian Made Foreign Liquors (I.M.F.L.), Toddy, Country Liquors etc, also to analyze the Denaturant (such as Benzene, Acetone, Crotonaldehyde, Diethylphthalate, Diethyl-Ether, Pyridine Base, Toluene, Diethylamine), Bitterants (Denotarium Saccharide and Denotanium Benzoate), Colourants (Crystal Violet and Methylene Blue) those are added for preparing Ordinary Denatured Spirit (O.D.S.) and Special Denatured Spirit (S.D.S.) sent by State Excise Department of Government of Maharashtra. To analyze the samples of Special Denatured Spirit (S.D.S.), Ordinary Denatured Spirit (O.D.S.), French polish, Thinner, etc. sent by State Excise Department of Government of Maharashtra and to extend the expertise to others States of India in respect of above referred activities.

CHEMOTHERAPY

Chemotherapy Department is being concerned with the research on synthesis, isolation, Chemical & Biological characterization of synthesized chemical compounds which are medicinally active intermediates. The department is affiliated to the University of Mumbai for M.Sc & Ph.D degree for Organic Chemistry. Currently in the Department of Chemotherapy, three students are registered for Ph D and three students are registered for M.Sc degree for Organic Chemistry. The Department is going to present & published their research work in National & International Conferences. The department has started short term training programme for one month (STRIP) for Post-graduate students of M.Sc (Chemistry), B.Pharm, M.Pharm. The department conducts three days workshop on 'Analytical Training for Instrumentation' for under-graduates & post-graduate students. The department is involved in testing activities of HPLC (High Performance liquid chromatography), GCMS (Gas chromatography mass spectrophotometer), and IR (Infrared spectrophotometer) samples on commercial & academic purposes.

CLINICAL PATHOLOGY

Though the activities of this department can be said to have commenced with the starting of the Plague Research Laboratory in 1896, a separate Department of Clinical Pathology was established in the year 1905. From its very inception the department undertook studies on plague, diagnostic and investigational studies on almost the entire range of communicable diseases like cholera, Malta fever (Brucellosis), typhoid, malaria, diphtheria, relapsing fever etc. which in their epidemic forms brought devastation to the mankind. The department covered a wide range of laboratory functions and was concerned with the diagnosis, patient care, and prevention of diseases. Under the leadership of Dr Abhay Chowdhary, director of Haffkine Institute, this department has been revamped as per GLP norms providing facilities of clean room, tissue culture laboratory etc. At present Department is actively involved in Training, Research and Testing activities. Department participates in training programmes like Annual Biotechnology Training and Viro-vitals. Department also train students for M.Sc. and Ph.D. degree in Microbiology and applied Biology affiliated to Mumbai University.

Department is actively involved in research on various infectious diseases like tuberculosis Methicillin Resistant Staphylococcus Aureus (MRSA), Extended Spectrum β -Lactamase (ESBL) and Metallo β -Lactamase (MBLs). Department is also involved in biosynthesis of nano particles, checking anti-bacterial activity of Kombucha (Chinese tea) and Caffeine, development of diagnostic tests for Tuberculosis and herbal anti tuberculosis compounds, research in autoimmune disorder (Scleroderma) in collaboration with National Institute of Immunohaematology. The department also carries out anti-bacterial and antifungal activities of different fruit juices.

The department has well established testing laboratory where following test are conducted like, hematology, serology, bacteriology, mycology and histopathology. It receives clinical samples from E.S.I.S. hospitals, govt. hospitals and public health dispensaries. Department also conducts antimicrobial, antimycobacterial and antifungal testing of synthetic compounds developed by the research centres, colleges and pharmaceuticals. Department conducts annual medical check-up of HITRT employees. Department conducts bacteriological investigation of post fumigation Operation theatre swabs received from various primary Health care centres and rural hospitals.

The department has future plan of conducting training program on scientific writing and industrial microbiology, department has also planned training for health care workers on operation theatre infection control and prevention. The department has future plan to reintroduce various histopathological and cytological examination of biopsy specimens and serological tests for diagnosis of auto-immune diseases and other infectious diseases.

DISPENSARY

Dispensary provides Outpatient Department facility & monthly medication for chronic illness for students, staff & family members of staff. It provides free consultation and treatment to PWD workers & contract workers, vaccination for Tetanus toxoid, Rabies, Hepatitis-B & Influenza Vaccine to employees and students. Dispensary conducts Annual Medical Check-up, Pre-employment medical check-up and Medical bill reimbursement of HITRT employees.

LIBRARY

The aim and objective of the Haffkine Institute Library is to collect, organize, search and retrieve information in the areas of prime activities of the institute i.e. Biomedical and allied sciences with a special reference to the communicable diseases. The library subscribes to specialized national and international journals from various renowned publishers and scientific societies.

This year library continued to provide online scientific search and retrieval facilities to the staff, researchers and students. During the period total 484 users made use of the online search and retrieval facility offered by the library. Users mainly consisted of Scientific Staff, Research Fellows and the students enrolled for the various programmes of the institute. The library also provided reference service by Telephone, Email, Post, Courier, etc. to the distant users who could not come to the library.

The library made available different research and scientific publications from other libraries to the scientists and students of the Haffkine Institute for 3 times on the basis of Inter Library Cooperation. Similarly, 7 publications available in our library were made available to other libraries in the current year.

The library regularly imparted induction and orientation training to outside visitors and new students of the institute on the library usage and how to conduct the literature search effectively.

TOXICOLOGY

The Department of Toxicology was established about 20 years ago and since then it has provided services for the comprehensive studies for the registration of pharmaceuticals, agrochemicals, biocides, cosmetics, chemicals and related products. All the studies conducted in the Department are in accordance with the regulatory requirements of the OECD, ICH, FDA, EMEA, OPPTS, BIS and ISO10993.

TRAINING SECTION

Haffkine Institute has been affiliated by the University of Mumbai for the M.Sc. by Research and PhD (Microbiology, Applied Biology, Biochemistry and Organic Chemistry) degrees and by the Maharashtra University of Health Sciences (MUHS), Nashik for PhD (Medical Microbiology) degree. The Institute has offered various training program for graduate and post graduate students of various colleges. In the year 2014-15 more than 314 students has been participated and trained under various training program.

VENOMOUS ANIMAL UNIT (VAU)

Venomous animal Unit is actively engaged in Training, research and testing. It is involve in screening of natural compounds to explore the repellent property against snake in laboratory. It conducts various training programmes on Snake and its importance for those who are working with the public health authorities, paramedical and medical

termite research and testing procedure for evaluating the efficacy of repellents coated in pipes, cables etc. VAU is also engaged in research on herbal anti snake venom and anti-scorpion compounds which will facilitate in reducing the snake and scorpion bite fatality incidences.

VAU also undertake scientific training on identification of venomous and non-venomous snakes, how to apply first aid measure post snakes bite and how snakes are important to maintain the ecological balance. Snake survey is one of the major activities of the VAU where in it provides scientific guidance to various institutes, universities, five star, three star hotels etc for controlling the snake menace in their premises. Apart from this it is also involved in various research activities on snake and scorpion venom to explore their therapeutic potential.

VIROLOGY AND IMMUNOLOGY

The Department of Virology and Immunology is a relatively young department in the timeline of Haffkine Institute. It is primarily engaged in understanding the epidemiology, Pathophysiology and the host immune response towards various viruses and diseases caused by them. Department of Virology and Immunology is a National Influenza Centre recognized by the World Health Organization. The department has been part of an ICMR-WHO National Influenza Surveillance Project for Human Influenza. Currently, it is a network laboratory under the NCDC-IDSP Influenza like Illness Surveillance. A separate Biosafety-3 facility has been set up with the Department of Virology under the NCDC-World Bank-MoHSW project for pandemic-preparedness for Avian Influenza. . The Department is affiliated to the University of Mumbai & MUHS, Nasik, for M.Sc. and Ph.D. degrees and currently has 8 Ph.D. students and 2 M.Sc. students carrying out research. The Department also undertakes several training programs at an undergraduate and post-graduate student level. These include the Annual Biotechnology Training Program, Annual Course in Medical Virology (VIROVITALS) and Hands-on Training in Techniques in Virology and Immunology. It comprises of four major divisions, viz. Basic Virology, Molecular Virology, Immunology and Proteomics. Neurovirology, Retrovirology, Vector-borne Virology and Respiratory Virology are some interesting and highly active facets of the Department. Research is undertaken on understanding the virus-host relationship and its implication on public health. Studies related to anti-viral efficacy analyses of novel chemical entities (NCEs) of both synthetic as well as natural origin are undertaken at the Department.

Department of Virology is involved in understanding the epidemiology, patho-physiology and the host immune response towards various viruses and diseases caused by them. It comprises of four major divisions, viz. Basic Virology, Molecular Virology, Immunology and Proteomics. Neurovirology, Retrovirology, Vector-borne Virology and Respiratory Virology are some interesting and highly active facets of the Department. Research is undertaken on understanding the virus-host relationship and its implication on public health. Studies related to anti-viral efficacy analyses of novel chemical entities (NCEs) of both synthetic as well as natural origin are undertaken at the Department. These evaluations have both for academic as well as commercial outcomes. The testing includes diagnosis of viral infections by classical culture methods to novel PCR techniques. Under Immunology, the Department is engaged in identifying the immune response to various viral and non-viral entities, by means of genomic or proteomic analysis. Here, differential expression of immune parameter genes; (e.g. Cytokines, chemokines, growth factors); as well as proteins in various infections, is studied. The Department is also setting up in-vitro models for evaluating inflammation, immune-modulation and specific toxicity.

The Department of Virology has numerous state-of-the-art equipments for conducting research in the fields of Virology and Molecular Biology. The laboratories of the department house instruments such as Thermal Cyclers, RealTime PCRs, Ultra Pure Water Purification system, -20° and -80°C Freezers, FACS Count, Inverted Microscopes, Refrigerated Centrifuges, Microplate Readers etc. The department is also involved in various testing activities for commercial and academic purposes. These include diagnosis of viral infections by ELISA and PCR, *in vitro* and *in vivo* cytotoxicity testing and assaying potential anti-viral agents. The Proteomics division is state-of-art equipped with instruments such as 2D Electrophoresis Unit, Western Blotting Apparatus and an automated Gel Documentation System.

ZOONOSIS

Department of Zoonosis is actively engaged in research, testing and training activities on vector and vector borne diseases of zoonotic importance since many years. The department is following the tradition of Haffkine Institute to be active in research in Public health and Infectious diseases. Research activities in the department are directed in various domains like vaccine development and therapeutics of diseases like Malaria, Japanese Encephalitis and Toxoplasma. The Department is actively engaged for Bioefficacy, persistency, repellence, testing against crawling & flying insects, mosquito repellence test on human skin, Water resistance study and study of products for testing of Anti- Ant and Anti Wasp activity as per WHO guidelines.

Prof. Abhay Chowdhary rejuvenated the department in 2008 and established several facilities at the department for Bio-efficacy, repellence, persistency testing against crawling & flying insects as per WHO guidelines. Several new instruments and equipments, Peet Grady chamber were added to enhance testing facilities.

Currently Dr. Ramaiya Mira is heading the department. Earlier activities supported by with new training and testing methodologies are carried out with full zeal & devotion.

Department actively participates in training programmes like Annual Biotechnology Training and Viro-vitals. The Zoonosis department conducts training programme "Mission to Control Mosquito Menace" for under graduate and post graduate students. The Department is affiliated to the University of Mumbai & MUHS Nasik, for M.Sc. and Ph.D. degrees. Currently the department has 6 Ph.D. students, 2 M.Sc. students and 1 Strip (Short term research internship programme) students.

TRAINING

1. DEPARTMENT OF BACTERIOLOGY

Imparting Training on various Bacteriological and Fungal aspects to Ms. Anagha Apte, Junior research fellow.

2. DEPARTMENT OF BIOCHEMISTRY & BIOTECHNOLOGY

No training activity is carried in this year by the department.

3. CHEMICAL TESTING UNIT

Training course on "Testing of Alcoholic Beverages".

1. Brief information

The hands on course of principle and practical application of instruments in Laboratory and its wide applications in the field of Research and Development as well as Quality control and Analytical development Laboratory. Additionally, this course will help y to have an exposure to work in the field of Alcoholic Beverages and related field.

2. Number of batches and their duration

Batch	Duration	Number of participants
I	04-06-2014 to 05-06-2014	09

4. DEPARTMENT OF CHEMOTHERAPY

Analytical Training for Instrumentation

1. Brief information

The Department of Chemotherapy, Haffkine Institute, conducted three days Training Programs in Fundamental and Applied aspects of analytical Chemistry for students of University of Mumbai. Students who are enrolled in Organic or Physical or Analytical Chemistry for their Masters Degree are invited to apply for the same

2. Number of batches and their duration

Batch	Duration	Number of participants
I	19/05/2014 to 21/05/2014	13
II	28/05/2014 to 30/05/2014	09
III	02/06/2014 to 04/06/2014	18
IV	09/06/2014 to 11/06/2014	09
V	25/06/2014 to 01/07/2014	07
VI	09/07/2014 to 15/07/2014	09
VII	13/01/2015 to 15/01/2015	09
TOTAL		74

5. DEPARTMENT OF CLINICAL PATHOLOGY

Department actively participates in conducting lectures and demonstrations for Microbiology and biotechnology students in Annual Biotechnology training program

A. DISPENSARY

Dr. Sandesha Pashte Medical Officer delivered Guest lecture on Management on snake bite during workshop on "Introduction to covert Existence of Snakes" organized by Venomous Animal Unit on 10th May 2014 at Haffkine Institute.

Dr. Shital Mane, Medical Officer, delivered Lecture on "Dengue Fever" during Dengue Awareness programme organized by Department of Zoonosis on 12 November 2014 at Haffkine Institute.

6. DEPARTMENT OF TOXICOLOGY

Workshop on "Principle and Practices of Laboratory Animal Care"

1. Brief Information

Workshop consists of lectures, demonstrations and hands-on training to cover the practical aspects of the course. Topics covered in the workshop are part of graduate and post graduate curricula. Hence, this workshop benefits students, teachers and also the researchers working in the field of Animal experimentation.

2. **Number of batches and their duration**

Batch	Duration	Number of participants
I	12/4/2014 to 13/4/2014	12
II	03/5/2014 to 04/5/2014	12
III	14/06/2014 to 15/06/2014	06
TOTAL		30

7. **VENOMOUS ANIMAL UNIT**

A. **Two day workshop on “Principle and Practices of Laboratory Animal Care.”**

1. **Brief Information**

Workshop consists of lectures, demonstrations and hands on training to cover the practical aspects of the course. Topics to be covered in the workshop are part of graduate and post graduate curricula. Therefore, it is anticipated that this workshop will benefit students, teachers and also the researchers working in this field of Animal experimentation.

2. **Number of batches and their duration**

Batch	Duration	Number of participants
I	12/4/2014 to 13/4/2014	12
II	03/5/2014 to 04/5/2014	12
III	14/06/2014 to 15/06/2014	06
TOTAL		30

B. **Two day workshop on “Introduction to covert Existence of Snakes”**

1. **Brief Information**

The purpose of the workshop is to describe how to understand the behavior, physiology, health care procedures of the Snakes on field and in the captivity. Workshop consists of lectures, demonstrations and training to cover the practical aspects of the course. Topics to be covered in the workshop are part of graduate and post graduate curricula. Therefore, it is anticipated that this workshop will benefit students, teachers and also the researchers working in this field.

2. **Number of batches and their duration**

Batch	Duration	Number of participants
I	09/05/2014 to 10/05/2014	04

C. **“Identification of venomous and non-venomous snakes’ first aid measures post snake bite”.**

1. **Brief Information**

The purpose of the training is to provide basic knowledge to the sanitary inspector students (Diploma holders) to differentiate between venomous and non-venomous snakes and how to provide the first aid measure in snake bite cases. Training consists of lectures, demonstrations. Topics to be covered in the workshop are part of diploma curriculum of the sanitary inspectors.

2. **Number of batches and their duration**

Batch	Duration	Number of participants
I	9/06/14	48
II	12/06/14	48
III	25/11/14	46
IV	26/11/14	48
V	27/11/14	48
VI	28/11/14	48
VII	01/12/14	50
VIII	02/12/14	50
IX	03/12/14	50
X	04/12/14	50
TOTAL		486

primary and secondary high school on identification of venomous and non-venomous snakes, First Aid measures after snake bite. The total number of visitors visited during the period 1st April 2014 to 31st 2015 is as follows:

Sr. No.	Date	No. of Visitors attended
1	April 2014-March 2015	1707

8. DEPARTMENT OF VIROLOGY

Hands on Training in Techniques in Virology and Immunology

1. Brief information

Complementary to the VIROVITALS training program which is predominantly a lecture-demo series, this program aims to provide in depth knowledge in Virological techniques, by means of providing hands-on training experience to the participants.

2. Total Number of participants: - 41.

9. DEPARTMENT OF ZOONOSIS

Mission to Control Mosquito Menace (MCMM)

This is one day training programme (workshop).

It describes medically important mosquito species, their life cycle and identification. The standard vector sampling methods such as collection methods for adult mosquitoes and developing stages at indoor and outdoor locations are described.

Batch	Duration	Number of participants
I	25/4/14	66
II	07/07/14	205
III	27/2/2015	08
TOTAL		279

Department also actively participated in Viro-vital Training programme and Annual Biotechnology Training programme

RESEARCH

A. RESEARCH PROJECT COMPLETED

Short Term Research Internship Programme

1. **“Study of the Biofilm formation, antibiotic resistance, detection of ESBL & MBL producers and Plasmid profiling in *Pseudomonas aeruginosa* isolated from pus samples.”**

Investigator	Ms. Vimi Varghese
Guide	Dr. Abhay Sadashiv Chowdhary.
Co-guide/ mentor	Mr. Rohan D. Dudhale
Funding Agency	Haffkine Institute for Training, Research and Testing

ABSTRACT

Pseudomonas aeruginosa is one of the common pathogens responsible for variety of infections particularly burn wound infection, UTI and nosocomial infections. It is established as key colonizers of burn wound as it flourishes on damp burn wound surface and endures well in hospital environments, once established; it can persist for long period of time in a system. However what makes such infestations reach grave depths is the ability of *Pseudomonas aeruginosa* to acquire drug resistance. Such drug resistance has been primarily attributed to acquisition of Plasmids carrying specific drug resistance traits. Plasmid associated genes are easily transferred across members of same and other species by means of Horizontal Gene Transfer. In the present study we are trying to estimate the biofilm formation followed by their antibiotic resistance towards the different classes of drugs includes the detection of ESBL & MBL producers in *Pseudomonas aeruginosa*. Plasmid profiling will be carried out for detection of plasmid in these isolates which gives the general idea regarding the percentage of plasmids in such clinical environments.

B. RESEARCH PROJECT IN PROGRESS

Ph.D

1. **“Microbiological and Immunological studies on *Panchagavya* classes and its herbal formulation”**

Investigator	Mr. Shrikant Pandurang Gajbhiye.
Guide	Dr. Abhay Sadashiv Chowdhary
Funding agency	Haffkine Institute for Training, Research and Testing

ABSTRACT

Panchagavya finds mention in many ancient texts in the scripts of Vedas and in texts related to ayurveda. It has high medicinal value. In Sanskrit means the blend of five products obtained from the cow. All these five products are individually called *Gavya* and collectively termed as *Panchagavya*. Apprehensions concerning the toxicity and other side effects and safety of modern synthetic drugs have played a prominent role for clinical therapy. Antibiotic drugs do destroy disease causing bacteria and viruses, but together with it they also adversely affects the life force and the digestive flora of the patients which gives rise to further serious diseases therefore is emphasis is also laid on the integration of traditional medicine with modern health practices.

2. **“Production and immobilization of lipase from *pseudomonas* spp. & its applications”.**

Investigator	Mr. Vivek Sudam Vishwe.
Guide	Dr. Abhay Sadashiv Chowdhary
Funding Agency	Haffkine Institute for Training, Research and Testing

ABSTRACT

Lipases are enzymes which catalyze the hydrolysis of triacylglycerol into a diacylglycerol and fatty acid. Microbial lipases have been widely used for biotechnological applications in fat hydrolysis, food ingredients, detergents, dairy and textile industries, production of surfactants and oil processing. *Pseudomonas* spp. are easy to cultivate & grow under normal laboratory conditions. The present study shall hence explore the potentials of these organisms in the production of Lipase. The present study aims at purifying and characterizing lipase enzyme isolated from *Pseudomonas* strains obtained from various soil and water samples.

Pseudomonas spp. from soil & water samples shall be isolated using suitable enrichment method. The lipase producing strains shall then be screened microbiologically using Tributyrin agar medium, biochemically using enzyme assays. The growth conditions of selected isolates shall then be optimized. Lipase purification using ammonium sulphate precipitation, followed by dialysis. Lipase enzyme shall be immobilized using adsorption & entrapment methods. The immobilized Lipase shall be used for the hydrolysis of edible oils and also for

detection of lipolysis of butter. Isolation & characterization of Lipase enzyme from *Pseudomonas* may help us better our pre-existing industrial protocols for enzyme mediated lipolysis & Biodiesel Production.

Major breakthrough of project: During last 02 years of research, managed to isolate around 100 Lipolytic *Pseudomonas* spp. from different oil contaminated soil & water samples. These isolates have screened for the Lipase enzyme production by enzyme assay. Standardization of protocols for optimization of fermentation parameters have performed.

3. **"Plasmid diversity in *Pseudomonas aeruginosa* from different clinical sources"**

Investigator	Mr. Rohan Dattatraya Dudhale.
Guide	Dr. (Mrs) Sunita D. Deshpande.
Funding Agency	Haffkine Institute for Training, Research and Testing

ABSTRACT

A plasmid is a genetic material that can replicate in a controlled way physically separate from the chromosome. Plasmids are extremely diverse & distributed universally in a range of hosts & ecological niches. Plasmid associated genes are easily transferred across members of same and other species by means of Horizontal Gene Transfer. *Pseudomonas aeruginosa* is one of the common pathogens responsible for variety of infections particularly burn wound infection, UTI and nosocomial infections. *Pseudomonas aeruginosa* can attain characters like antibiotic resistance, degradation of hydrocarbons and tolerance to significant concentrations of Heavy metals. The present study aims to assess Antibiotic Resistance patterns in the clinical isolates, Heavy-Metal Resistance patterns, and Hydrocarbon Degradation patterns. To isolate Plasmids & confirm plasmid associated characters from strains demonstrating one or more of the above-mentioned characters by plasmid curing & to carry out sequencing of the isolated plasmids.

Pseudomonas aeruginosa isolates from different clinical samples shall be collected and identify biochemical test with the help of Bergey's Manual of Systematic Bacteriology. The antibiotic susceptibility of isolated *Pseudomonas aeruginosa* was by Kirby-Bauer Disk Diffusion Method & performs the heavy-metal resistance. In this study to check the isolated *Pseudomonas aeruginosa* able to degrade the hydrocarbon likes Naphthalene, Toluene, Benzene, Oil & paraffin. Isolation of plasmid done by the method described in [Sambrook, J & Russell, D.W., (2001), Molecular Cloning: a laboratory manual. Cold Spring Harbor, NY].

The study shall help us identify the prevalent strains of *Pseudomonas aeruginosa* in clinical samples from the study population which are resistant to antibiotics, Heavy metals or degrades hydrocarbons. It will also help to elucidate the genetic elements – of plasmids – in such strains, which are responsible for the exhibition of such phenomenon. We also expect to be able to comment on the diversity of such gene elements across the bacterial kingdom by means of plasmid sequencing, thus elucidating the processes of probable Horizontal Gene Transfer (HGT).

C. ABSTRACT/POSTERS PRESENTED IN CONFERENCES/ SYMPOSIUM

1. Anna R Anthony, Abhay Chowdhary, Shrikant Gajbhiye, A.S. Bobade, "Simpler and faster route to synthesis Antibacterial active Halogen substituted derivatives of coumarin and study their anti oxidant properties" presented at conference International symposium on New Horizon in chemistry (ISNHC)-2014 at S.V. college chembur, Mumbai on 8th – 9th December 2014. won 3rd prize.
2. Anna R. Anthony, Abhay Chowdhary, Shrikant Gajbhiye, A.S. Bobde "Green synthesis of Antimicrobial active Nitro substituted Derivatives of Coumarin and study their Anti oxidant properties" presented at two days National conference on chemistry- sustainability and Environmental, Ramnaran Ruia college, Mumbai 20th – 21th February 2015 won Best paper award.

DEPARTMENT OF BIOCHEMISTRY & BIOTECHNOLOGY

A. RESEARCH PROJECTS IN PROGRESS

Ph.D.

1. Role of Inflammation in Type 2 diabetes

Investigator	Ms. Gauri Patade
Guide	Dr. A. Rosalind Marita
Co-guide/mentor	Dr. Abhay Chowdhary
Funding agency	Haffkine Institute for Training, Research and Testing

ABSTRACT

Type 2 diabetes has become the prime cause of morbidity and mortality in today's age. Almost 300 million people are affected worldwide. In India, the number of people suffering from the disease is growing at an alarming rate. With 63 million of its population suffering from Type 2 diabetes, India has earned the title of being the "Diabetic capital of the world. Obesity has been linked to type 2 diabetes and its complications by virtue of tissue insulin resistance. However, most of the diabetic Indians are not obese but rather lean. This phenotype is very intriguing from the point of view of inflammation. Currently, limited information is available on inflammation in type 2 diabetes in Indian population. Moreover, the role of adipose tissue macrophages in initializing insulin resistance of adipose tissue in humans largely remains unknown. The proposed study will throw light on the link between the occurrence of markers of adipose tissue inflammation and the development of adipose tissue insulin resistance in diabetic patients.

2. Biochemical Parameters in HIV-TB Co-infection

Investigator	Mr. Shreewardhan H. Rajopadhye
Guide	Dr. Sucheta P. Dandekar
Co-guide/mentor	Dr. Abhay Chowdhary
Funding agency	Haffkine Institute for Training, Research and Testing

ABSTRACT

Oxidative stress contributes significantly to the pathogenesis and prognosis of the both HIV & TB disease. One of the key host components in the prognosis of HIV disease is the binding of the transcription factor like NF κ B to the LTR of infected HIV proviral DNA thereby inducing transcription of the virus. TB induces the activation of NF κ B cells. Hence co-infection of HIV with TB may potentiate the replication of the proviral DNA of HIV. Assessing the role of a level of such activating factors shall help us better understand the molecular mechanisms of HIV disease.

3. Serum Brain Derived Neurotrophic Factor and Gene mutation in Autism spectrum disorders

Investigator	Mr. Nikhil Kasarpalkar
Guide	Dr. Usha Dave
Funding agency	Haffkine Institute for Training, Research and Testing

ABSTRACT

The Brain Derived Neurotrophic Factor (BDNF) is one of the proteins within the family of proteins, called as neurotrophins that are responsible for the growth, development and maturation of neurons in the brain. BDNF is responsible for the neuronal differentiation and plasticity in the nervous system. The involvement of BDNF is well studied phenomenon in many psychiatric disorders e.g Alzhiemers Disease, Huntington's disease and Bipolar Disorder. Serum Brain Derived Neurotrophic Factor and Gene mutation in Autism spectrum disorders is a DBT approved project, carried out at the Dept. Of Biochemistry to investigate the role of BDNF, if any, in the pathogenesis of Autism Spectrum Disorders. A functional Single Nucleotide polymorphism (SNP), G196A which changes the amino acid Valine at the 66th position of the protein to Methionine is the most studied polymorphism in the BDNF Gene. This and other SNPs along with the epigenetics involved in the BDNF Gene will be studied under this project.

4. Characterization and assessment of anticancer activity of Indian honey.

Investigator	Ms. Amruta Naik
Guide	Dr. Sucheta Dandekar
Co-guide/mentor	Dr. Abhay Chowdhary
Funding agency	Haffkine Institute for Training, Research and Testing

ABSTRACT

The traditional Indian medicine for the treatment of various diseases has received considerable importance and thus continuing search for new anticancer compounds in these is a realistic and promising strategy to deal with the disease like cancer. At the same time it is very true that though our traditional medicine was used in ancient time for treating cancer but the mode of their anticancer action is not well explored in terms of modern science. Medicinal properties of honey are gifted by the flora from which they have been collected and hence they vary from region to region. Indian honey can act as inexpensive and less hazardous alternative to current therapeutic modalities toward the treatment strategies for cancer either as separate entities or in synergism to slow down the progression of this disease at many stages. The study of various modes with which honey exhibits an anticancer activity in cancerous cells gives us the opportunity to establish the natural treatment against certain types and stages of cancer. Thus the present study is proposed to assess the anti-cancer potential of Indian honey and to elucidate its mechanism.

Departmental Projects

1. Genetic of Epilepsy: Mutational Diagnosis and genetic Counselling.

Investigator	Mr. Nikhil Kasarpalkar
Guide	Dr. Usha Dave
Co-guide/mentor	Dr. Vandana Kumavat
Funding agency	Sanctioned by Indian Epilepsy Association

ABSTRACT

The World Health Organization (WHO) estimates that around 50 million people worldwide have epilepsy and that nearly 80% of the people with epilepsy are found in developing regions. A report published in 1999, estimated the number of epilepsy cases in the year 2001 to be 5.5 million and that 0.5 million new cases was being added every year (Sridharan and Murthy, 1999). Based on these calculations, by the year 2015, India will have approximately 10-15 million people suffering with epilepsy. In this project we aim to screen and identify the families having more than one sibling with idiopathic epilepsy and/or family history of epilepsy/I GE or other known type of familial epilepsy proved by appropriate neurological examination & EEG pattern. We aim to conduct a mutational study on selected (n = 10) families for the following epileptic conditions which are very prevalent in the Indian population. (1) Benign Familial Neonatal-Infantile Seizures (Bfnis) caused by mutations in *SCN2A* (2) Benign Familial Neonatal Seizures (Bfns) where the *KCNQ2*, *KCNQ3* are involved. (3) Genetics (Generalized) Epilepsy with Febrile Seizures Plus (GEFS+) which are caused by mutations in *GABRG2*, *SCN1A*, *SCN1B*, *SCN2A*. (4) Juvenile Myoclonic Epilepsy (JME) caused by *CACNB4*, *EFHC1*, *GABRA1* (5) Microcephaly with Early-Onset Intractable Seizures and Developmental Delay (MCSZ) caused by *PNKP* (6) Epilepsy with Variable Learning and Behavioral Disorders where *SYN1* is mutated.

2. "Investigating the role of inositol pyro-phosphates in development of prostate cancer."

Investigator	Dr. Usha Padmanabhan
Funding agency	Sanctioned by DBT

ABSTRACT

Prostate cancer is the fifth leading cancer occurring in men above the age of 45. In India it is the 10th cause of mortality among older men. Growth and differentiation of the prostate gland during development is dependent on the androgens- testosterone and dihydrotestosterone, which are released by the testis and are in turn under the control of the hypothalamus and the pituitary and forms a part of the HPG axis. Many of the pathways which control growth and differentiation are also prognostic factors in the development of prostate cancer (PCa). Novel approaches for both diagnosis and treatment of PCas include the identification of new proteins involved in either the process of cellular transformation or contribute to signalling mechanisms which aid tumorigenesis and have identified the Hedgehog (Hh) signalling pathway which is expressed in stem cells and has been shown to aid both development of the prostate in embryos and malignant transformation of prostate cells. Inositol pyrophosphate (in particular, InsP7) is primarily synthesized by Ip6 kinase (Ip6-K) action on InsP6 and are degraded by the diphosphoinositol phosphate phosphatases (DIPPS) encoded by *NUDT* genes. It is the purpose of this study to investigate the role of InsP7 through Ip6-K and/or DIPP in the malignant transformation of prostate cells with particular emphasis on their role in modulation of Hedgehog signaling. If these investigations corroborate results which have been reported in more primitive vertebrates such as zebra fish, then these genes can be targets for developing drugs for treatment of PCa.

B. BOOKS PUBLISHED

Rosalind Marita, A (2014), Chapter 17 entitled "Endocrine and Metabolic Role of Adipose Tissue in the Pathogenesis of Diabetes" in the Text Book of Diabetes Mellitus, 3rd edition by Research society for the Study of Diabetes India, RSSDI edited by HB. Chandalia, Jaypee publications, New Delhi

C. RESEARCH PAPERS PUBLISHED IN SCIENTIFIC JOURNALS

1. Suparna Deepak and Rosalind Marita (2015), Genomics of Type 2 Diabetes, J.Pharm.Sci.Tech.Mgmt. 1(1): 72-80.
2. Patade GR, Marita AR (2014), Metformin: A Journey from countryside to the bedside. J Obes Metab Res 1:127-30
3. Kasarpalkar N., Kothari S., Dave P. (2014) Brain-Derived Neurotrophic Factor in children with Autism Spectrum Disorder. *Annals of Neurosciences*; 21(4): 129-133

D. ABSTRACT/ POSTERS PRESENTED IN CONFERENCES/ SYMPOSIUM

1. Dr. Usha Padmanabhan delivered a lecture entitled "Biological Importance of Calcium and Iron for Women" on 6th December 2014 at MD College Parel, Mumbai.
2. Dr. Usha Padmanabhan delivered a lecture entitled "Make in India 2015-Opportunities and Challenges for the Pharmaceutical and Biotechnology Sector" at Virtualities 2015 organized by SIES College of Management Studies (SIESCOMS) on 13th February 2015 at Mumbai.

E. TRAINING/CONFERENCES / SYMPOSIA ATTENDED

1. Dr. Usha Padmanabhan Senior Scientific Officer and Mr. Nikhil Kasarpalkar Senior Research fellow attended 12th Biennial Conference of Indian Society for Prenatal Diagnosis and Therapy on 20th and 21st September 2014 at The Leela, Mumbai.
2. Ms. Gauri Patade Senior Research fellow attended Advanced School for Diabetes and Metabolic syndrome, jointly organized by RCB and IUBMB from 24th to 29th November 2014 at Gurgaon, Haryana
3. Dr. Usha Padmanabhan Senior Scientific Officer attended FICCI India Innovation Growth Programme" on 30th December 2014 at Hotel the Lalit, Sahar Airport Road, Mumbai.

CHEMICAL TESTING UNIT

A. RESEARCH PROJECTS COMPLETED

Departmental Project

1. Isolation and Characterization of *Anona muricata* (Graviola) Leaves.

Investigator	Mr. Manoj K. Patil and Mr. Santosh Bagal
Guide	Dr. Abhay Chowdhary
Co-guide/mentor	Dr. Anil Bobade
Funding agency	Haffkine Institute for Training, Research and Testing

ABSTRACT

Natural plant products have served as the basis of man's medicinal arsenal since time immemorial. The history of herbal medicine in the treatment of disease coincides with the history of medicine, and indeed with the history of civilization itself. Literature citations are recorded for more than 3,000 plant species that have been used or recommended in various parts of the world for the treatment of cancer. Annonaceous acetogenins are long chained fatty acid derivatives and Derivatives of quinoline and Isoquinolene extracted from different tropical plants such as the tree *Annona muricata*, also known as Graviola. It has been recently shown that Graviola extracts exert multiple anti-cancer activities on pancreatic cancer cell models (Torres MP et al., 2012). The potential anticancer have been confirmed with mouse xenografts models, where graviola reduces both tumor growth and formation of metastasis. Our results indicate that methanolic extracts and to a lesser extent acetone extracts of leaves have potential anti-bacterial and anti-cancer compounds in them, which is in corroboration with previously reported results. This project therefore aims to further our previous research by isolation and characterization of the ingredients present in these extracts.

B RESEARCH PROJECTS IN PROGRESS

Departmental Project

1. Detection of chemical constituents presents in *Phyllanthus emblica* fruit Juice.

Investigator	Mr. Manoj K. Patil and Dr. Shital Vasave
Co-Investigator	Mr. Sushant Kaple and Mr. Santosh Bagal
Guide	Dr. Anil Bobade and Dr Shashikant P. Vaidya

ABSTRACT

Amla is a gift of nature to mankind. It is an indispensable part of the ayurvedic and unani system with amazing remedial qualities. In Sanskrit, it is called Amalaki or Dhartiphala. Amla is perhaps the single most often mentioned herb in "Charak Samhita", the Ayurvedic medicine literature. The Sanskrit name, Amlaki, translates as the Sustainer or The Fruit where the Goddess of Prosperity Resides. In Hindu religious mythology the tree is worshipped as the Earth Mother as its fruit is considered to be so nourishing as to be the nurse of mankind. *Emblica* fruits are one of three "myrobalans," a term deriving from the Greek for acorn, which is a well-known astringent used in tanning. In fact, both emblic myrobalans and chebulic myrobalans (*Terminalia chebula*) are relied upon for their high content of tannins; chebulic myrobalans have long been used for tanning leather. The third fruit, beleric myrobalans, is a close relative of the chebulic myrobalans (*Terminalia belerica*) and this too is a tanning agent. These three fruits together make up the popular remedy "Triphala," a rejuvenating formula that is often applied to treating intestinal disorders (inflammation, infection, diarrhoea and constipation).

Objective of the study is to detect the chemical constituent present in the amla (*PhyllanthusEmblica*) fruit juice which is used Ayurvedic medicine. Ayurvedic medicine has around a thousand herbs that are commonly used in this traditional system of medicine, but overall there may be more than 2,500 that are used across India in all forms of herbal medicine.

Literature search we got the approx chemical constituent present in amla (*PhyllanthusEmblica*) fruit juice are Ascorbic Acid, Gallic Acid, Chebulinic Acid, Mucic Acid, Chlogenic Acid, Ellagic Acid, Chebulagic Acid, Quecetin, Other ingredients like Alkoloids, Terpentines and Trigallyol glucose

Major breakthrough of the project: Characterization by using UV- Spectrophotometer, HPLC and GCMS

C. TRAINING / CONFERENCES / SYMPOSIA ATTENDED

1. Mr. Manoj K. Patil, Scientific Officer attended "Training Course on RTI Act 2005" on 5th January to 7th January 2015 at Yashada, Pune on Behalf of State Government of Maharashtra.
2. Dr. Anil Bobade, Head of Department and Mr. Manoj K. Patil Scientific Officer attended Technical Seminar with Demonstration on "Workshop on Microstate Particle Size Analyser and Voltametry" on 10th and 11th July 2014 at Metrohm India Research and Development Center Chennai.

3. Dr. Anil Bobade Head of Department and Mr. Manoj K. Patil Scientific Officer attended Technical Seminar with Demonstration on "Total Organic Carbon Analyzer from IR Service (O-I Analytics)" held on 14th and 15th May 2014 at Kolkata University, Kolkata.
4. Mrs. Suvarna Pachpore, Senior Scientific Officer attended Workshop on "Research Methodology and Biostatistics" from 9th September to 11th September 2014 at Haffkine Institute.
5. Mr. Manoj K. Patil Scientific Officer and Mr. Santosh Bagal Scientific Officer attended Technical Seminar on "Metrohm IC and Elga water Purification System" held on 3rd November 2014 at Vashi, Navi Mumbai.
6. Dr. Anil Bobade Head of Department, Mrs. Suvarna Pachpore, Senior Scientific Officer Mr. Manoj K. Patil Scientific Officer Mr. Santosh Bagal Scientific Officer and Mrs. Deepali Kambli Senior Technical Assistant attended "Bio Safety" training on 25th November 2014 at Haffkine Institute.
7. Dr. Anil Bobade Head of Department, Mrs. Suvarna Pachpore, Senior Scientific Officer Mr. Manoj K. Patil Scientific Officer Mr. Santosh Bagal Scientific Officer attended "ISO Internal auditors training course" on 29th and 30th November 2014 at Haffkine Institute.
8. Staffs of Chemical Testing Unit, attended "ISO awareness program" on 2nd December 2014 at Haffkine Institute
9. All scientific staffs and students of department attended "479th Teaching Pathologists and Microbiologists Conference (TPMC)" meeting on 31st January 2015 at Haffkine Institute.

DEPARTMENT OF CHEMOTHERAPY

A. RESEARCH PROJECTS COMPLETED

Ph.D.

1. "Synthesis & Study of Heterocyclic compound as possible therapeutic agents".

Investigator	Ms. Vrushali N. Patil
Guide	Dr. Anil S Bobade
Funding Agency	Haffkine Institute for Training, Research and Testing

ABSTRACT

Benzothiazole are an interesting group of compound and biological activities of this class of compound that are reported in literature are anti-cancer, anti-microbial, anti-tubercular, anti-bacterial activity.

All the above observation indicates the importance of benzothiazole as biologically active moieties. Taking into account above mentioned fact, it was decided to synthesize new molecule Triazolo- benzothiazole which will further studied for their in vitro antibacterial activity. We have synthesized Triazolo-benzothiazole by using 2-amino benzothiazole and hydrazine hydrate in ethylene glycol to form hydrazinobenzothiazole which further is treated with CS₂/KOH to form Triazolobenzothiazole. The structure of new derivatives of Triazolo-benzothiazole was confirmed by spectral analysis. The synthesized compound will be analyzed on the basis of IR, TLC, and NMR analysis. Such a number of heterocyclic derivatives play an important role in the control of various microbial diseases and hence, in this present study a new series of heterocyclic compounds have been synthesized and studied for their properties as anti-bacterial and anti-fungal agents.

2. "Synthesis & study of Heterocyclic compounds as possible Anti-Microbial agents."

Investigator	Mr. Ashish L. Asrondkar
Guide	Dr. Anil S Bobade
Funding Agency	Haffkine Institute for Training, Research and Testing

ABSTRACT

It is well documented that various heterocyclic organic compounds such as Benzothiazole, Benzimidazole, triazole, Oxadiazole, coumarin and piperazine etc shows promising biological activities. The chemistry of heterocyclic compounds has been an interesting field of study for a long time. The synthesis of novel oxadiazole derivatives and investigation of their chemical and biological behaviour have gained more importance in recent decades for biological, medicinal and agricultural reasons. 1, 3, 4-Oxadiazoles represent an important class of heterocyclic compounds. Their derivatives possess a broad spectrum of biological activity in both agrochemicals and pharmaceuticals such as anti-malarial, anti-HIV, anti-tubercular activities. Literature survey shows that Benzimidazole derivatives play a vital role in biological fields such as anti-diabetic, anti-microbial, antiviral activities. The above present work describes the synthesis of some new substituted oxadiazole derivatives as a possible anti-microbial activity. The synthesized compound will be confirmed by IR, TLC, and NMR analysis. The substituted oxadiazole derivatives will be evaluated for their in vitro anti-microbial activity. The prepared compound will be screened against *E. coli* and *S. aureus* ATCC 3750 bacterial strain.

3. "Evaluation & synthesis of new biological entities as possible Anti-bacterial & Anti-Fungal agents"

Investigator	Ms. Neha U. Mishra
Co-guide / mentor	Ms Vrushali N. Patil
Guide	Dr. Anil S Bobade
Funding Agency	Haffkine Institute for Training, Research and Testing

ABSTRACT

Coumarin is a chemical compound in the benzo-pyrone chemical class; Coumarin is used in the pharmaceutical industry as a precursor molecule in the synthesis of a number of synthetic anticoagulant pharmaceuticals. Coumarin has clinical medical value by itself, as an edema modifier. Coumarin and other benzo-pyrone, such as 5, 6 benzo-pyrone, 1, 2 benzo-pyrone, diosmin, and others, are known to stimulate macrophages to degrade extracellular albumen, allowing faster resorption of edematous fluids. Other biological activities that may lead to other medical uses have been suggested, with varying degrees of evidence.

Coumarins nucleus have shown some evidence of many biological activities, although they are approved for few medical uses as pharmaceuticals. The activity reported for substituted coumarin includes anti-HIV, anti-tumor, anti-hypertension, anti-arrhythmia, anti-inflammatory, anti-osteoporosis, antiseptic, and analgesic. It is also used in the treatment of asthma. Coumarin has been used in the treatment of lymph edema.

Considering all the activities of coumarin nucleus and its derivatives it was decided to form its hydrazino which was further fused with series of aromatic aldehydes and its hydrazino was cyclised which was further fused to acid chloride. The so formed molecule will be further tested for various activities like anti-microbial, anti-

inflammatory and anti-oxidant to determine whether so formed molecule shows any enhanced activity or not.

M.Sc.

1. "Synthesis of some Quinoline Derivative as potent Anti-Microbial agents"

Investigator	Mr. Gaurav H. Desai
Guide	Dr. Anil S Bobade
Co-guide / mentor	Mr. Ashish L Asrondkar
Funding Agency	Haffkine Institute for Training, Research and Testing

ABSTRACT

Medicinal chemistry is the science that deals with the discovery and design of new therapeutic chemicals and their development into useful medicines. Medicinal chemistry is concern with the organic, biological and analytical aspects of this process. Thus it occupies a strategic position at the interface of chemistry and biology. Based on these aspects, efforts have been made to synthesize molecules with incorporation of various substituents with active moieties such as 8- HydroxyQuinoline.

Quinoline derivatives have been well known not only in medicinal chemistry, because of their wide occurrence in natural products and drugs. 8- HydroxyQuinoline and their derivatives are important constituents of biologically active. Synthetic compounds, as several derivatives of this heterocyclic unit have been found to possess useful biological activities such anti-malarial, anti-cancer, anti-viral, anti-HIV, anti-microbial agents. 8- HydroxyQuinoline family compounds are widely used as a potent compound to make drug.

2. "Synthesis and evaluation of anti- microbial activity of substituted Coumarin derivatives"

Investigator	Mr. Pravin Chowdhary
Guide	Dr. Anil S Bobade
Co-guide / mentor	Mr. Ashish L Asrondkar
Funding Agency	Haffkine Institute for Training, Research and Testing

ABSTRACT

Among medicinal agent, there is growing interest in the development of newer, effective antimicrobial agents. Among the variety of compound studied, coumarin derivatives form an important class. Coumarin and its derivatives represent one of the most active classes of compound possessing a wide spectrum of biological activity. The review clearly emphasizes the importance of heterocycles in naturally as well as synthetic agents and does an important of heterocycles in naturally diversified pharmacological action such as anti-microbial, anti-inflammatory etc. This point encouraged further investigation in the field. In this work, bearing in mind that the biological activities of known moieties and attempting certain structural modification in drug research incorporation newly emerged pharmacophores on coumarin moiety.

Research in field of anti-microbial therapy is continuously ongoing and demanding study. Among several reasons the major ones are resistance developed by microbes and emergence and occurrences of newer infection. Hence, search for newer effective anti-microbial agents is imperative. It focuses on the better activity against variety of infections. Hence, the objective of present project was to synthesize and characterise the derivatives of newer coumarin analogues which may enhance anti-microbial activity.

Short Term Research InternshipProgramme

In year 2014-15 four students worked at Chemotherapy department as an observer in Organic Synthesis Lab & Analytical Instrumentation Lab for period of one month.

B. RESEARCH PROJECTS IN PROGRESS

Departmental Project

1. "Synthesis of Indole incorporated phenylthiazole derivatives as potential biological agents."

Investigator	Mr. Sushant R Kaple
Guide	Dr. Anil S Bobade
Funding Agency	Haffkine Institute for Training, Research and Testing

ABSTRACT

The class of heterocyclic compounds known as thiazole is found in many natural and synthetic products with a wide range of pharmacological activities, such as antiviral, anticancer, antibacterial, antifungal, anticonvulsant, antiparkinsonian and anti-inflammatory activities that can be well illustrated by the large number of drugs in the market containing this function group. Indole is an important heterocyclic system because it is built into the proteins in the form of amino acid tryptophan, because it is the basis of drugs like indomethacin and because it provides the skeleton of indole alkaloids -biologically active compounds from plants including strychnine and LSD. The incorporation of indole nucleus, a biologically accepted pharmacophores in medicinal compounds has made versatile number of heterocyclic compounds possessing wide spectrum of biological activities such

as Anti-inflammatory and analgesic, Antiarthritis, Antimigraine, Nootropic, CNS stimulant, Antihypertensive, Antibiotic. In the present study, Indole nucleus is treated with various phenacyl bromides to incorporate various substituted thiazole rings to form phenylthiazole derivatives. Till now the compounds of intermediate steps & few derivatives are obtained along with their uncorrected melting points. Further the compounds will be confirmed by various spectroscopic analyses such as U.V. Visible spectroscopy, I.R. spectroscopy, N.M.R spectroscopy etc. and also they will be screened for their biological properties.

2. "Study on Organic Acidurias Using Urinary GC/MS Profiling."

Investigator	Mr. Ashish L Asrondkar
Guide	Dr. Anil S Bobade
Co-Guide	Dr. Usha P. Dave
Funding Agency	Haffkine Institute for Training, Research and Testing

ABSTRACT

In most developed countries, neonatal mass screening programs for the early diagnosis of inborn errors of metabolism (IEM) have been implemented and have been found to be effective for the prevention or significant reduction of clinical symptoms such as mental retardation & developmental delay. "Organic acidemia" or "organic aciduria" (OA) applies to a group of disorders characterized by the excretion of non-amino organic acids in urine. Most organic acidemias result from dysfunction of a specific step in amino acid catabolism, usually the result of deficient enzyme activity.

The GC/MS method intended to be used in the present study analyses amino acids, organic acids, sugars, sugar alcohols, sugar acids, and nucleic acid bases in less than 15 minutes per sample. The objective of this short study is to standardize urinary GC/MS analysis for detection of organic acidurias.

C. RESEARCH PAPERS PUBLISHED IN SCIENTIFIC JOURNALS.

1. Ashish L Asrondkar, Vrushali N Patil, VibhavValsangkar, Anil S Bobade, Abhay S Chowdhary, "Synthesis of substituted 4-(3-chloro-2-oxo-4-phenylazetidin-1-yl)-1, 5-dimethyl-2-phenyl-1, 2-dihydro-3H-pyrazol-3-one with Green Chemistry approach" IOSR Journal of Applied Chemistry (IOSR-JAC) 2014 Apr;7(3):01-06 (Impact factor-1.4)
2. Vrushali N Patil, Ashish L Asrondkar, OmkarShinde, Anil S Bobade, Abhay S Chowdhary," Comparative studies on Synthesis of 2-Chloro-N-(2, 5-Dihydro-1, 3, 4-Thiadiazol-2-Yl) Acetamide using Microwave irradiation and Conventional techniques and their Antioxidant activity" IOSR Journal of Applied Chemistry (IOSR-JAC) Volume 2014 Apr; 7(4):10-15.(Impact factor-1.4)
3. Vrushali N Patil, Ashish L Asrondkar, ShantanuPande, Anil S Bobade, Abhay S Chowdhary, "Synthesis of 5-Aryl-3-(5-Bromo-3-Benzofuran-2-yl)-1-Pyrazole as Antimicrobial Agent" IOSR Journal of Pharmacy and Biological Sciences (IOSR-JPBS) 2013 Dec;8 (4):04-08.
4. Ashish L Asrondkar, Vrushali N Patil, Neha U Mishra, Anil S Bobade, Abhay S Chowdhary, "Synthesis & Study Of (5z)-5-[(4-Oxo-4h-Chromen-3-Yl) Methylidene]-1, 3-Thiazolidine-2, 4-Dione Derivative". Der Pharm Chemica, 2013; 5(4): 288-292.
5. Ashish L Asrondkar, Vrushali N Patil, ShantanuPande, Anil S Bobade, Abhay S Chowdhary, "Synthesis of substituted 1, 2, 4-triazole derivatives by Microwave irradiation" IOSR Journal of Applied Chemistry (IOSR-JAC),2013Dec;6(2):16-19.
6. Neha Mishra ,Vrushali N Patil, Ashish L Asrondkar, Anil S Bobade, Abhay S Chowdhary, "Synthesis of substituted Coumarin derivatives and their spectral characterization." IOSR Journal of Applied Chemistry (IOSR-JAC), 2014; 7(8):48-51.
7. Vrushali N Patil, Ashish L Asrondkar, Neha Mishra, Anil S Bobade, Abhay S Chowdhary, Biological evacuation of some synthesized Benzothiazole derivatives &their characterization",World Journal Of Pharmaceutical Research,2015;4(2):842-850
8. Ashish L Asrondkar, Vrushali N Patil , Neha Mishra, Anil S Bobade, Abhay S Chowdhary, "Synthesis of some MercaptoBenzothiazole derivatives & their characterization and Biological evacuation." World Journal of Pharmaceutical Research, 2015; 4(2):618-626
9. Neha Mishra, Vrushali, N Patil , Ashish, L Asrondkar, Anil, S Bobade, Abhay, S Chowdhary, "Characterization by spectral analysis of some synthesized Coumarinderivatives & biological applications."World Journal of Pharmaceutical Research, 2015; 4(2):627-636.
10. Vrushali N Patil, Ashish L Asrondkar, Vishal Bhadane, Anil S Bobade, Abhay S Chowdhary, "Synthesis and anti-inflammatory activity of 2-amino-6-methoxy benzothiazole derivatives" Journal of Applied Chemistry (IOSR-JAC) 2014 Apr;8(1):01-02.
11. Anna R. Anthony , AbhayChowdhary , ShrikantGajbhiye, A.S.Bobade , " Green synthesis is of Anti-Microbial active Nitro Substituted Derivative of Coumarin and study their Anti-oxidant properties presented at two days

national conference on chemistry sustainability and environment RamnarainRuia college, Mumbai. Won best paper award.

D. ABSTRACT /POSTER PRESENTED IN CONFERENCES/ SYMPOSIUM

1. "Microwave assisted synthesis of Triazole derivatives" Vrushali N Patil, Ashish L Asrondkar, Neha U Mishra, A S Bobade, AbhayChowdhary, from 3rd to 7th Feb 2014 presented at Indian Science Congress, Jammu.
2. "Synthesis of Some Substituted 4-Thiazolidinones derivatives as possible anti-microbial agent" Neha U Mishra, Vrushali N Patil, Ashish L Asrondkar, Anil S Bobade and Abhay Chowdhary, from 3rd to 7th Feb 2014 presented at Indian Science Congress, Jammu.
3. "Simpler and Faster Route to Synthesis Antibacterial active Halogen substituted derivatives of coumarin and study their anti-oxidant properties" Anna R. Anthony, AbhayChowdhary, ShrikantGajbhiye, A.S Bobade Presented at conference International Symposium on New Horizon in Chemistry (ISNHC)- 2014 at S.V College Chembur Mumbai on 8th -9th December 2014 won 3rd Prize.
4. "Synthesis of Substituted Coumarin Derivatives and Their Spectral Characterization" Neha U Mishra, Vrushali N Patil, Ashish L Asrondkar, Anil S Bobade and AbhayChowdhary Presented at Indian Science Congress, Mumbai, From 3rd To 7th Feb 2015.
5. "Synthesis, Analytical Evaluation and Biological Investigation of 2-Amino-6- Methoxy Benzothiazole Derivative" Vrushali N Patil, Ashish L Asrondkar, Anil S Bobade and Abhay Chowdhary Presented at Indian Science Congress, Mumbai, From 3rd To 7th Feb 2015.
6. "Synthesis and Evaluation of Some MercaptoBenzothiazole." Ashish L Asrondkar, Vrushali N Patil, Anil S Bobade and Abhay Chowdhary, Presented at Indian Science Congress, Mumbai, From 3rd To 7th Feb 2015.
7. "Synthesis of some Quinoline Derivative as potent Anti-Inflammatory agents " Gaurav H. Desai, Vrushali N Patil, Ashish L Asrondkar, Anil S Bobade and Abhay Chowdhary Presented at Indian Science Congress, Mumbai, From 3rd To 7th Feb 2015.

DEPARTMENT OF CLINICAL PATHOLOGY

A. RESEARCH PROJECTS IN PROGRESS

Short Term Research Internship Programme

1. In year 2014-15 one student was enrolled as an observer in Tuberculosis Research laboratory of Clinical Pathology Lab for period of one year.
2. Five students from SIES College, pursuing B.Sc., were enrolled as an observer in Clinical Pathology Lab for period of two weeks.

B. RESEARCH PROJECTS IN PROGRESS

Ph.D.

1. **Assessment of Novel Molecular Methods for the Diagnosis of Tuberculosis.**

Investigator	Ms. Suvarna Joshi
Guide	Dr. Abhay Chowdhary
Co-Guide	Dr. Shashikant P. Vaidya
Funding agency	Haffkine Institute for Training, Research and Testing

ABSTRACT

The project aims to standardize the Loop mediated isothermal PCR (LAMP) assay as a rapid diagnostic tool for pulmonary and extra pulmonary tuberculosis. The method will be initially standardized using standard strain of *M. tuberculosis* and then validated using clinical specimens of pulmonary and extra pulmonary tuberculosis. The samples shall also be evaluated with conventional diagnostic methods including culture on semi solid Lowenstein Jensen (LJ) medium and Liquid medium (BACTEC), Demonstration of Acid Fast Bacilli by Ziehl-Neelson staining and Demonstration of *M. tuberculosis* DNA by Real Time PCR. The sensitivity and specificity of the LAMP assay shall be determined.

This shall help us developing a cost effective and rapid diagnostic technique for tuberculosis. The second part of the project aims to develop a allele-specific depletory PCR (ASD-PCR) assay for the detection of isoniazid and rifampicin drug resistant strains of *M. tuberculosis* in the study cohort.

2. **Molecular characterization of Methicillin Resistant *Staphylococcus aureus* (MRSA) isolates in Mumbai**

Investigator	Mr. Arunagiri Subramanian
Guide	Dr. Ranjana A Deshmukh
Co-Guide	Dr. Shashikant P. Vaidya
Funding agency	Haffkine Institute for Training, Research and Testing

ABSTRACT

Methicillin Resistant *S. aureus* (MRSA) a drug resistant variant of *S. aureus* has been a global public-health. Many of these strains are becoming multidrug-resistant and are susceptible only to glycopeptides such as Teicoplanin and Vancomycin. The emergence and rapid spread of MRSA has posed a new challenge for infection control in hospitals settings.

The control of disease transmission by MRSA, in hospitals/communities has been recognized as a major challenge. Genotyping data from large international studies have shown that a few clones of MRSA are responsible for the spread of the disease in various parts of the world. Molecular typing will be useful in establishing clonal relationship between isolates, for e.g., to determine whether the isolates arise from the same clone or from a different source. Hence it is of importance to track down and find out which clones of MRSA are responsible for infections in the hospital and community environment. The information obtained can aid in epidemiologic studies, thorough surveillance and in detecting the emergence of new pathogens subtype

3. **Assessment of sub inhibitory concentrations of antibiotics on *Pseudomonas aeruginosa***

Investigator	Mr. Omkar H. Lele
Guide	Dr. Abhay Chowdhary.
Co-Guide	Dr. Shashikant P. Vaidya
Funding agency	Haffkine Institute for Training, Research and Testing

ABSTRACT

Antibiotics have a number of effects on bacterial physiology. There are studies which show that antibiotics

have modulated global gene expression in tested bacteria. These secondary effects often occur at sub inhibitory concentrations, which is an indication of the signaling nature of antibiotics. Sub - Minimum Inhibitory Concentrations (sub-MIC's) of antibiotics may have various effects on bacteria which are totally different from the effects of high doses.

To address in more detail the effect of sub inhibitory concentrations of antibiotics in bacterial physiology, the current study uses *Pseudomonas aeruginosa* as a model, opportunistic gram negative bacteria. Learning the response of *P. aeruginosa* to sub inhibitory concentrations of antibiotics is a relevant task to understanding the biological responses of this bacterium in patients under treatment.

In the present study described here will focus on assessment of effect of sub inhibitory Concentrations (SIC's) of different classes of antibiotics on the virulence factors, quorum sensing gene transcription, adaptive resistance, membrane proteins and structure and oxidative stress in two different phenotypes of *P. aeruginosa*.

4. "Synthesis, Characterization and Evaluation of anti-Microbial Activity of Silver Nanoparticles."

Investigator	Mrs. Richa Lakhota
Guide	Dr Abhay Chowdhary
Co-guide	Dr Shashikant P. Vaidya
Funding agency	Haffkine Institute for Training, Research and Testing

ABSTRACT

The field of nanotechnology is one of the most active areas of research in modern materials science. A number of approaches are available for the synthesis of silver nanoparticles, but use of environmentally benign materials like plant leaf extracts for the synthesis of silver nanoparticles offers numerous benefits of eco-friendly whereas chemical synthesis methods lead to the presence of some toxic chemical adsorbed on the surface that may have an adverse effect on the medical applications. Herein, we propose the synthesis of silver nanoparticles by biological and chemical solution. Further these synthesized nanoparticles will be comparatively evaluated against different human pathogens.

The focus of the study is to compare the antibacterial efficacy of silver nanoparticles (AgNPs) fabricated by exploiting biological (Aloe Vera plant extract) and chemical means (NaBH₄ as a reducing agent). The synthesized nanoparticles were characterised using UV-visible absorption spectrophotometry (UV-vis), Transmission electron microscopy (TEM) and Scanning Electron Microscopy (SEM). Biologically synthesized silver nanoparticles (BAGNPs) were observed at 423 nm with particle sizes of 50–100 nm. The chemically synthesized silver nanoparticles (CAGNPs) showed a maximum peak at 422 nm with particle sizes of 5–15 nm. An antibacterial potency of BAGNPs compared to the CAGNPs will be checked on different bacterial, fungus and viral strain.

5. Biosynthesis of Nanoparticles & its Potential Therapeutic Applications.

Investigator	Mr. Kapil Punjabi
Guide	Dr. (Mrs.) Sunita D. Deshpande
Co-Guide	Dr. Shashikant P. Vaidya
Funding agency	Haffkine Institute for Training, Research and Testing

ABSTRACT

Bacteria isolated from soil and effluent of silver electroplating industry will be screened for synthesis of silver nanoparticles. The isolate screened positive shall be evaluated for capability to synthesize other metal nanoparticles like gold and copper. All nanoparticles shall be characterized for its size, shape & conformity using various analytical techniques like electron microscopy and other spectral studies. To evaluate therapeutic activities of nanoparticles, toxicity studies will be carried out on normal & cancerous cell lines. Assessment of antimicrobial properties shall derive eventual application of nanoparticles in treatment of pathogenic bacteria and its drug resistant species. If certain concentrations of nanoparticles are non-injurious to normal cell but lethal to pathogenic bacteria or if nanoparticles and antibiotics are found to synergistically more effective against pathogens an opportunity to develop better treatment is workable.

6. Immunobiology in understanding the Pathophysiology of Active Scleroderma patients from Western India.

Investigator	Mr. Prasad Vidyadhar Khadilkar
Guide	Dr. Sunita D. Deshpande
Co-Guide	Dr. Shashikant P. Vaidya
Funding agency	Haffkine Institute for Training, Research and Testing

ABSTRACT

This study aims at determining the basic immune profile including the Immunobiology in Scleroderma patients from western India and to understand the co-relation between clinical, serological and pathological aspects. This study will assess the role possible of biomarkers for scleroderma disease pathogenesis.

A total of 100 Scleroderma patients (10 mL Venous blood) and an equal number of age sex matched controls will be analyzed in this study. The study of Apoptosis using Skin Tissue samples, a sample size of 30 scleroderma individuals (who agree / consent to undergo a surgical biopsy [2cm x 0.5 cm elliptical surgical biopsy]) and 2 healthy controls (bald skin discarded during hair transplant procedures) will be analyzed.

M.Sc.

1. Comparative Analysis of Different Molecular Methods for Diagnosis of Multi- Drug Resistant Tuberculosis

Investigator	Mr. Jaishankar Sharma
Guide	Dr. Shashikant P. Vaidya.
Mentor	Dr Abhay Chowdhary
Funding agency	Haffkine Institute for Training, Research and Testing

ABSTRACT

During the past several years, many molecular methods have been developed for direct detection, species identification, and drug susceptibility testing of Mycobacteria. These methods can potentially reduce the diagnostic time from weeks to days. These assays are rapid and offer high sensitivities and specificities.

The aim of the study is to perform a comparative analysis of the different molecular diagnostic procedure available for the diagnosis of tuberculosis. The study shall be useful to identify the best possible methodology in the detection and diagnosis of MDR tuberculosis. The study expects to diagnose MDR-TB and produces an algorithm which might help in implementation of newer protocols in the diagnosis of Multi Drug Resistant tuberculosis.

2. The study of differential expression of matrix metalloproteinase genes in macrophage infected with *Mycobacterium tuberculosis*.

Investigator	Mr. Jinesh Maniar
Guide	Dr. Shashikant P. Vaidya.
mentor	Dr Abhay Chowdhary
Funding agency	Haffkine Institute for Training, Research and Testing

ABSTRACT

The macrophage is the main replication niche of *Mycobacterium tuberculosis* (Mtb), despite the bactericidal characteristics and functions that this cell type normally has. Mtb interacts with the macrophage through several different receptors. During infection, their role is to ingest and destroy pathogens, recruit other cells of the immune system, and present antigens from the microbe to cells of the adaptive immune system.

Therefore it will be of great importance to assess the differential responses with respect to matrix metalloproteinases gene expression in resident macrophages of various organs when infected with *Mycobacterium tuberculosis*. This study will analyse these differential response in Microglia, Alveolar and Circulating blood macrophages when infected with Mtb *in vitro*.

3. Characterization and assessment of antimicrobial and antioxidant activity of Kombucha.

Investigator	Ms. Tehmeena Mukadam
Guide	Dr.(Mrs.) Sunita Deshpande
Co-Guide	Dr. Shashikant P. Vaidya
Funding agency	Haffkine Institute for Training, Research and Testing

ABSTRACT

Kombucha is a refreshing beverage obtained by the fermentation of sugared tea with a symbiotic culture of acetic acid bacteria and fungi.

The focus of this study is to investigate the antimicrobial and antioxidant activity of kombucha and chemical characterization of fermented kombucha. Organisms in the symbiotic culture used for fermentation, will be isolated and identified using biochemical and molecular techniques. Antimicrobial activity of kombucha tea will be assessed against various Gram positive (*Staphylococcus aureus*), Gram negative bacteria (*Escherichia coli*, *Pseudomonas aeruginosa*, *Klebsiella*) and fungus (*Candida albicans*). Chemical characterization of the

system will be carried out using chromatographic techniques, for estimating the levels of sugars, organic acids and ethanol. Antioxidant activity will be assessed by DPPH assay.

Departmental Projects.

1. Preparation of EMTACT Nosode and to evaluate the response of Emtact Nosode on Immune System using In- Vivo Study.

Principal Investigator	Dr. Rajesh Shah Dr. Abhay Chowdhary
Site Investigator	Dr. Shashikant P. Vaidya
Coordinator	Mr. Sandeepan Mukherji Mrs. Suvarna Joshi Mrs. Geeta Talele
Funding agency	Life Force Homeopathic Research institutes
Research Students	Mr. Jaishankar Sharma Mr. Jinesh Maniar.

ABSTRACT

Nosodes are vaccine-like homeopathic medicines prepared using clinical sample and applying homeopathic manufacturing practices. A wide range of nosodes has been in use by the homeopathic fraternity ever since 1810. Various nosodes have been found effective in many infectious diseases as well as non-infectious diseases. Nosodes are used as preventive as well as therapeutic measure. For instance, current Tuberculinum nosode is used to treat opportunistic infections, frequent colds, recurrent Upper and Lower Respiratory tract infections, etc. The scientific approach would be to find out the *modus operandi* of the action at cellular and immunological level.

The hypothesis is that any significant improvement in Recurrent Upper and Lower Respiratory Infections must reflect in some measurable immunological parameters. We will try to examine various possible immunological markers through cytokine expression which may be indicative of post medication improved immune status, which include pro-inflammatory and anti-inflammatory cytokines and T-cell proliferation.

The study shall give us important immunological (Cytokine Gene Expression) and Pathological (Histology) correlates of administration of Tuberculinum in Normal and induced immune-compromised mice. This shall throw lights on the tentative mechanism of action of this preparation.

2. Identification of Extended Spectrum β - Lactamases (ESBL's) and Metallo β - Lactamases (MBL's) in Clinical Isolates.

Investigator	Mr. Jaishankar Sharma, Mr. Jinesh Maniar
Guide	Dr Abhay Chowdhary
Co-Guide	Dr. Shashikant P.Vaidya
Funding agency	Haffkine Institute for Training, Research and Testing

ABSTRACT

Antibiotic resistance is an important issue affecting public health, and rapid detection in clinical laboratories is essential for the prompt recognition of antimicrobial-resistant organisms. Infection-control practitioners and clinicians need the clinical laboratory to rapidly identify and characterize different types of resistant bacteria efficiently to minimize the spread of these bacteria and help to select more appropriate antibiotics. This is particularly true for ESBL-producing bacteria.

Accurate detection of Extended-Spectrum Beta-Lactamases (ESBLs) among *Enterobacteriaceae*, *Pseudomonas sp.*, *Acinetobacter sp.* etc has been a focal point for many clinicians and laboratorians lately. Extended-spectrum beta-lactamases- (ESBL's)-producing Gram Negative Bacilli (GNB) is an increasingly significant cause of community-acquired infection worldwide. Current study focuses on assessment of presence ESBL-in GNB and also analyzes the relationship between antimicrobial susceptibility profiles to presence of NDM-1 gene in these isolates.

In this study ESBL producing bacteria will be screened by phenotypic methods like Double Disk Synergy Test and Confirmatory Test which are recommended by the Clinical and Laboratory Standards Institute (CLSI). ESBL types and NDM-1 genes will be detected by PCR technique. Since there is limited data available on the prevalence of ESBL among pathogens and absolutely no data available regarding production of NDM-1 by pathogens in this region the current study is extremely important to assess rampant multi-drug resistance shown by GNB in this region.

3. Evaluation of Anti-microbial Activity of Wild Apple and Gooseberry fruit juices

Investigator	Mr. Jaishankar Sharma, Mr. Jinesh Maniar. Ms Tehmina Mukadam
Guide	Dr. Shashikant P. Vaidya
Co-Guide	Dr Shital Vasave

ABSTRACT

The development of microbial resistance to currently available antibiotics due to its indiscriminate use has necessitated the search for new antimicrobial agents. With growing interest in eco-living lifestyle, increased attention is being paid to the natural antimicrobial agents. The fruits and vegetable juices serve as a source of some essential nutrients and reportedly exhibit significant antimicrobial effect, the bioactivity being associated with mineral content and biologically active constituents. Hence these fruit juices with the property of bioavailability and the retention of certain minerals by polyphenolic compounds can be recommended for their use as alternative anti-infective agent in natural medicine for the treatment of infectious diseases.

Apples have high phenolic content that possess various biological functions such as Astringent, Antioxidant, Anticancer, Anti-inflammation and antibacterial activities. Indian gooseberry (*Phyllanthus emblica linn*) or "Amla" fruit is reputed to contain the highest content of vitamin C compared with any other naturally occurring substances in nature. Active extract of *P.emblica* have been shown to possess several pharmacological properties including analgesic, anti-inflammatory, Antioxidant and chemo-protective activities.

The aim of the study is to assess the antimicrobial activity of fruit extract with the following objectives:

1. To determine the antimicrobial activity of the fruit juices qualitatively using the agar well diffusion method.
2. The quantitative assessment of antimicrobial activity shall be done by determining the Minimum Inhibitory Concentration and Minimum Bactericidal/Fungicidal Concentration using Broth Dilution method.

Collaborative Project

1. Development of targeted inhalation systems for Anti-tubercular drugs

Investigator	Mr. Rajesh Jain
Guide	Dr. Mala Menon, Bombay Pharmacy College
Co-guide	Dr. Shashikant P. Vaidya

ABSTRACT

The current treatment approach for tuberculosis requires oral administration of a combination of four or more drugs for 6-9 months, a highly intensive regimen resulting in a lack of patient compliance. Despite orally administered high doses of several hundreds of milligram to gram quantities, only a small fraction of the total dose reaches the lungs, which gets cleared in a matter of few hours. Moreover *Mycobacterium tuberculosis* (*Mtb*) is an intracellular pathogen, localized within phagocytic cells (alveolar macrophages) and most antibiotics, although highly active *in vitro*, do not actively pass through cellular membranes, resulting in inadequate concentrations within the infected cells.

Discovering new Anti-Tubercular Drugs (ATDs) has met with limited success because of the complexities and peculiar features of *Mtb* and its tubercule lesions, the cell envelope barrier and the anoxia. A faster accelerated approach to ensure rapid cures for TB would be attempts to optimize and target delivery of current orally administered ATDs. An inhalation delivery system could be a means to achieve this. Although TB is a systemic disease that can potentially affect any organ system, the lung is the major portal of entry for *Mtb* and thereby the site of the initial immune response as well as an important site of reactivation disease. Hence inhalable or respirable delivery systems for ATDs which can be administered via the pulmonary route would be a very sensible and vast improvement to oral delivery. Also, as *Mtb*, is an intracellular pathogen, localized within phagocytic cells (Alveolar macrophages), targeted delivery systems which can be administered via the pulmonary route and target alveolar macrophages would be a vast improvement to help in direct drug delivery to the diseased organ in targeted manner. Such an approach might allow the high levels of anti-TB drugs to be concentrated in the main cellular reservoir of the tubercular bacilli, the macrophage, while minimizing exposure of other host tissues to high levels of potentially nonselective and/or toxic agents. The present investigation/work aims to develop targeted inhalation delivery systems of antitubercular agents based on particulate systems, with suitable targeting moieties (ligands) with a view to target the diseased organ (lungs) and the macrophages harbouring the *Mycobacteria* and reduce the dose and shorten the treatment time, and thereby toxicity. This will lead to improved patient compliance and thereby improved therapy for pulmonary TB.

2. Evaluation of anti-bacterial and anti-tubercular activity of metallic Nanoparticles with special references to drug resistant organisms

Investigator	Mr. Sourabh Mehta
Guide	Dr. H. Muthurajan, National Centre for Nanoscience and nanotechnology, University of Mumbai
Co-guide	Dr. Shashikant P. Vaidya

ABSTRACT

In light of drug resistivity of bacteria due to evolution of bacteria or adoption of defence mechanism at cellular or molecular level created bigger chance for microbiologist and pharmacologist. To answer the issue researcher and pharmacologist are in dire need of new drug molecules which can crack bacteria defence, keeps window open for researcher to design new materials and mechanisms. From Ayurveda era people have used Bhasmas as medicine against many diseases. Literature suggests that metallic Nanoparticles are cytotoxic to myriads of species of gram positive and negative bacteria. As per suggested mechanism of Nanoparticles mediated cytotoxicity few bacteria may adopt resistivity against nanoparticle, literature suggest the same. Thus considering dire need for new nano particles as an antibacterial molecule, this project aimed to investigate and evaluate an antibacterial activity of Biosynthesised Nanoparticles of gold and silver. The project also evaluate an enhanced activity of drug molecules used along with nanoparticles and to learn mechanisms of action of Nanoparticles on drug resistant bacteria.

C. RESEARCH PAPERS PUBLISHED IN SCIENTIFIC JOURNALS

1. Review Article published entitled "Biosynthesis of Nanoparticles : A Review" in International Journal of Pharmaceutical Sciences Review and Research; Volume no: 30(1), January – February 2015; Article No. 40, Pages: 219-226

Authors: Kapil Punjabi, Pallavi Choudhary, Lalit Samant, Sandeepan Mukherjee, Shashikant Vaidya, Abhay Chowdhary.

D. ABSTRACT/ POSTERS/PAPER PRESENTED IN CONFERENCES/ SYMPOSIUM

1. Ms. Suvarna Joshi, Senior Research Fellow, Presented Paper entitled "Molecular Characterization of Multidrug-Resistant *Mycobacterium tuberculosis* (MDR-TB) Isolates in and around Mumbai" at MahaMicroCon Conference, 20th-21st Sept, 2014 at Nagpur.
2. Mr. Arunagiri Subramanian, Senior Research Fellow presented paper entitled "Laboratory Diagnosis of MRSA: Conventional methods V/s Molecular approach" at 47th Teaching Pathologists and Microbiologists Conference Meeting (TPMC) on 31st January 2015 at Haffkine Institute.
3. Mr. Arunagiri Subramanian, Senior Research Fellow presented paper entitled "Correlation of Staphylococcal Cassette Chromosome mec (SCCmec) types, accessory gene regulator (agr) groups and Panton-Valentine Leukocidin (PVL) occurrence among MRSA isolates in Mumbai, India in the 24th European Congress of Clinical Microbiology and Infectious Diseases on 10th-13th May 2014 at Barcelona, Spain
4. Mr. Jaishankar Sharma, Junior Research Fellow presented paper entitled "Study of effects of Sub-inhibitory Concentrations of antibiotics on Biofilm formation by Extended Spectrum β -lactamases (ESBL) producing clinical isolates" at MahaMicroCon Conference on 20th to 21st September 2014 at Nagpur

E. TRAINING/ CONFERENCES / SYMPOSIA ATTENDED

1. Ms. Suvarna Joshi, Senior Research Fellow, Mr. Jaishankar Sharma, Junior Research Fellow and Mr. Jinesh Maniar Junior Research Fellow, attended "Principle and Practices of Laboratory animal Care Program", on 3rd to 4th May 2014 at Haffkine Institute.
2. Dr. Shashikant Vaidya, Assistant Director and Head and Dr. Shital Vasave Senior Scientific Officer, attended training on "Overview of GCP and its implementation" on 24th June 2014 at Arogya Bhavan.
3. Dr. Shital Vasave, Senior Scientific Officer and Mrs. Vibhuti Thakur, Scientific Officer, attended Workshop on "ASM virtual workshop on culture of responsibility" on 4th July 2014 at Haffkine Institute
4. Dr. Shital Vasave, Senior Scientific Officer, Mr. Kapil Punjabi, Senior Research Fellow, Mr. Jinesh Maniar Junior Research Fellow and Ms. Tehmeena Mukadam Junior Research Fellow attended workshop on "Research Methodology and Biostatistics" from 9th to 11th September 2014 at Haffkine Institute
5. Ms. Suvarna Joshi, Senior Research Fellow and Mr. Jaishankar Sharma, Junior Research Fellow attended Medical Microbiology Conference "MahaMicroCon" on 20th and 21st September 2014 at Nagpur
6. Dr. Shital Vasave, Senior Scientific Officer, Mrs. Vibhuti Thakur, Scientific Officer, and Mr. Ravikant Khochre, Laboratory Assistant, attended "Bio Safety" training on 25th November 2014 at Haffkine Institute

7. Dr. Shashikant Vaidya, Assistant Director and Head, Dr. Shital Vasave, Senior Scientific Officer, and Mrs. Vibhuti Thakur, Scientific Officer, attended "ISO Internal auditors training course" on 29th and 30th November 2014 at Haffkine Institute
8. Staffs of Department of Clinical Pathology, attended "ISO awareness program" on 2nd December 2014 at Haffkine Institute
9. Dr. Shashikant Vaidya, Assistant Director and Head attended training on "Entrepreneurship development and management for scientist and Technologist working in Govt sector" on 8th December to 12th December 2014 at Entrepreneurship development Institute of India, Ahmedabad.
10. All scientific staffs and students of department attended "479th Teaching Pathologists and Microbiologists Conference (TPMC)" meeting on 31st January 2015 at Haffkine Institute.
11. Dr. Sandesha Pashte, Medical Officer, Dr. Shital Mane, Medical Officer and Mrs. Rupali Ghugare, Nurse attended training on "Overview of GCP and its implementation" at Arogya Bhavan on 24th June 2014.
12. Dr. Sandesha Pashte, Medical Officer, Dr. Shital Mane, Medical Officer, and Mrs. Rupali Ghugare, Nurse, Department of Clinical Pathology attended "Bio Safety" training at Haffkine Institute on 25th November 2014
13. Dr. Sandesha Pashte, Medical Officer attended lecture on "Culture Community & Sexuality" at Mumbai University on 21st Nov 2014.
14. Dr. Sandesha Pashte, Medical Officer, Dr. Shital Mane, Medical Officer attended "ISO Internal auditors training course" at Haffkine Institute on 29th and 30th November 2014
15. Staffs of Dispensary attended "ISO awareness program" at Haffkine Institute on 2nd December 2014
16. Dr. Sandesha Pashte, Medical Officer, attended "Foundation Training Program" from 9th March to 28th March 2015 at YASHADA, Pune.

F. INFORMATION, DEPARTMENT WANTS TO HIGHLIGHT.

1. Department of Clinical Pathology has arranged lecture cum Demonstration on topic entitled "Innovation in PCR" on 4th December 2014 at Haffkine Institute.
2. Department also involved in Science Expo from 4th February to 7th February 2015.
3. Department has arranged seminar series by ACTREC on 14th February 2015 at Haffkine Institute.
4. Department has also arranged demonstration on fully automated Immunoassay Analyzer-CHORUS by Immunoshop India Pvt Ltd on 24th March 2015.
5. Staff and students of Department of Clinical Pathology actively participated in trainings and conferences organised by the institute.
6. Dr. Shashikant P. Vaidya Assistant Director and Head of Department was invited as a judge for Science Projects and Teacher's Aids of Western India Science Fair 2014 on 19th December 2014 at Nehru Science Centre, Mumbai.
7. Dr. Shashikant P. Vaidya Assistant Director and Head of Department invited as an examiner for evaluation of "Presentation: technical" and "Presentation: Administration" and "Book Review" in Foundation Course in State Training Policy, MEDD in YASHADA, Pune.
8. Dr. Shashikant P. Vaidya Assistant Director and Head of Department invited as an examiner for evaluation of pre PhD viva for students submitting degree in Medical Microbiology to Maharashtra University of Health Sciences on 9th January 2015 at Haffkine Institute.

DEPARTMENT OF TOXICOLOGY

A. RESEARCH PROJECT IN PROGRESS

Departmental Projects.

1. "Validation of Reproductive Toxicity Parameters in *Wistar Rats*" by Prenatal Developmental Toxicity Test (PNDT)

Principle Investigator	Dr. Abhay Chowdhary
Co-investigator	Dr. Mrunal Ghag-Sawant
Funding agency	Haffkine Institute for Training, Research and Testing

ABSTRACT

The objective of this study is to provide information concerning the effect of prenatal exposure of the test substance on the pregnant test animals and on the developing progeny. This includes assessment of maternal effects as well as death, structural abnormalities, or altered growth in the foetus. The OECD guideline 414 is being used to study the effects of well-known developmental toxicants with immunomodulatory properties - Ketokonazole and Ca polysulphide in Wistar rats in reproduction. Preliminary studies indicate toxic effect of both the compounds in the pregnant rats and malformation of the foetus.

B. TRAINING /CONFERENCE/SYMPOSIA ATTENDED

Dr. Mrunal Sawant, Scientific Officer attended "Certificate Course in Laboratory Animal Science" jointly organized by TANUVAS, CPCSEA, NIAW and LASA, India during 01.09.2014 to 11.09.2014 at Madras veterinary College, Chennai CC.

C. INFORMATION, DEPARTMENT WANTS TO HIGHLIGHT

Department staff actively participated in the organization of the International Women's day celebrated by Institute on 4th March 2015.

VENOMOUS ANIMAL UNIT

A. RESEARCH PROJECTS IN PROGRESS

Departmental Projects

1. “Evolution of wound healing activity of Mesenchymal stem cell in rat”.

Principle Investigator	Dr. Abhay Chowdhary
Co-investigator	Dr. Caroline Mathen, Director, OCT Therapies and research Pvt.Ltd. Dr. Mrunal Ghag-Sawant,
Funding agency	Haffkine Institute OCT Therapies and research Pvt. Ltd.
Type	Academic Research

ABSTRACT

Mesenchymal stem cells represent an area of tremendous medical interest and are currently being used for various indications globally. Especially the advantages related to MSCs derived from umbilical cord are many: It is the youngest known source of adult stem cells. There are no ethical or controversial debates regarding the source. An interesting fact is that apart from their differentiation capacities, MSCs also have inherent immunomodulatory properties while being hypimmune cells themselves and can establish a regenerative environment. Homologous skin grafts are primarily used in the treatment of severe burns or chronic ulcers. The donor skin can be used as a physiological natural dressing to control pain and protect tendons, cartilage and nerves, and to induced re-epithelization thereby reducing healing time. However, in the absence of other viable alternatives, this conventional technique implies skin loss and secondary surgical wounds. The long-term morbidity of non-healing wounds is primarily due to the scarring and contractures that result from damages to or loss of the dermis. Efforts to develop more comprehensive synthetic skin grafts that replace both the epidermis and the dermis have begun. However such composite grafts are not only unavailable in India, they are also prohibitively expensive. To counter this problem, we aim to harness Mesenchymal stem cells derived from Wharton's Jelly (WJ-MSCs) to achieve complete wound healing.

2. “Validation of Reproductive Toxicity Parameters in *Wistar rats*” (Prenatal Developmental Toxicity study)

Principle Investigator	Dr. Abhay Chowdhary
Co-investigator	Dr. Mrunal Ghag-Sawant,
Funding agency	Haffkine Institute for Training, Research and Testing

ABSTRACT

The objective of this study was to provide information concerning the effect of a test substance on prenatal exposure in the pregnant test animal and on the developing organism; this includes assessment of maternal effects as well as death, structural abnormalities, or altered growth in the fetus.

The test substance used in this study was Ketoconazole at dose rate of 100mg/Bwt by oral route and Ca-polysulphide at dose rate of 50mg/Bwt by oral route. Both the substances are well-known developmental toxicant with immunomodulatory properties. The OECD guideline 414 was used to study the effects of Ketoconazole and Ca polysulphide in graduated doses to 5 females of wistar rats per groups in reproduction

B. RESEARCH PAPERS PUBLISHED IN SCIENTIFIC JOURNALS

1. L. Samant, N. Shah, D. Thatavarthy, M.Ghag-Sawant and Abhay Chowdhary. In silico Characterization and computational modeling of Neurotoxins of Indian Cobra. IJPSR (2014); 5 (8): 3435-3442.
2. Dhaval Patel, Mrunal Ghag-Sawant and Ginpreet Kaur. Evaluation of anti-osteoarthritic activity of *Vigna mungo* in papain induced osteoarthritis model. Indian Journal of Pharmacology. 01/2015; 47(1):59-64.

C. ABSTRACT/ POSTER PRESENTED IN CONFERENCES/ SYMPOSIUM

1. Title: “Anticancer effect of *Daboia russelli* venom”Authors: Nakul Shah, Dr. Mrunal Ghag Sawant, Sanchita Ahuwalla, Anuj Rastogi, Dr. Abhay Chowdhary.Poster presented: TSIcon 2014 dated on 20-22 November 2014 at Department of clinical and Experimental Pharmacology Calutta school of Tropical Medicine.
2. Title: “Biochemical Characterization, Anti-Cancerous and Anti-Bacterial Activity of *Bungarus caeruleus* Venom.”Authors: Nakul Shah, Lalit R. Samant, Mrunal Ghag-Sawant, Dipti Thatavarthy and Abhay ChowdharyPoster presented: TSIcon 2014 dated on 20-22 November 2014 at Department of clinical and Experimental Pharmacology Calutta school of Tropical Medicine

D. TRAINING /CONFERENCE/SYMPOSIA ATTENDED

1. Dr. Mrunal Sawant, Scientific Officer and Mr. Lalit Samant Senior Research Fellow attended two days training on MLD/LD 50 evaluation of venom, Quality standards of snake venom as per WHO guidelines and standardization of testing/research protocols for snake venom on 8th May 2014 and 9th May 2014 at Premium Serums & Vaccines Pvt. Ltd., Narayangaon.
2. Dr. Mrunal Sawant, Scientific Officer and Mr. Sanjay Mane Senior Technical Assistant attended one day training on Animal husbandry of snakes and other reptile on 27th June 2014 at Katraj Snake Park, Pune.
3. Dr. Mrunal Sawant, Scientific Officer attended "Certificate Course in Laboratory Animal Science" jointly organized by TANUVAS, CPCSEA, NIAW and LASA, India during 1st September to 11th September 2014 at Madras veterinary College, Chennai.
4. Dr. Mrunal Sawant, Scientific Officer and Mr. Lalit Samant Senior Research Fellow attended TSIcon 2014 at Department of clinical and Experimental Pharmacology Calutta school of Tropical Medicine during 20th November to 22nd November 2014.

DEPARTMENT OF VIROLOGY

A. RESEARCH PROJECTS COMPLETED

M.Sc.

1. Evaluation of Neuro-Inflammation Due to Different Dengue Virus Serotypes.

Investigator	Mr. Rushil Bhatt
Guide	Dr. Sweta Kothari
Co – Guide /Mentor	Dr. Abhay Chowdhary
Funding Agency	Haffkine Institute for Training, Research and Testing

ABSTRACT

Dengue viruses are group B togaviruses that form a complex of four closely related antigenic types (types 1 to 4). Each of the four virus types can be transmitted by infected mosquito vectors (*Aedes aegypti* or *Aedes albopictus*) to man, where they often cause a self-limiting, febrile disease. Locations endemic for dengue virus infection often harbour two or more dengue types resulting in individual hosts (man or mosquito) being exposed to, and possibly becoming infected with, multiple dengue virus types. The biology of co-infection with two dengue virus types in either of these hosts is, however, poorly understood.

Dengue encephalitis is one of the more severe outcomes in the infection, wherein the virus goes and invades the neuronal cells. This is associated with a high degree of morbidity and mortality. Secondary infection with a serotype different from that of the primary infection leads to DHF/DSS. Moreover, studies are necessary to understand the differential virulence with respect to serotypes in Dengue.

We therefore envisage an in-vitro study to evaluate the differential virulence of the Dengue serotypes as this would be more convenient and ethical than using mouse models as a preliminary set-up. This will open a new dimension in the understanding of the neuro-pathogenesis of "Indian" serotypes of dengue virus, which in turn would help in alleviating the morbidity and mortality due to Dengue associated complications.

Departmental projects

1. Seroprevalence of Measles, Mumps and Rubella In Adolescents In Mumbai – India

Investigator	Dr. Abhay Chowdhary
Guide	Dr. Sweta T Kothari
Co-guide/ mentor	Ms. Devanshi Gohil
Funding agency	Serum Institute of India Research Foundation

ABSTRACT

Measles, Mumps and Rubella (MMR) are vaccine preventable viral infectious diseases which cause a significant mortality and morbidity to the global population. Increased incidence rates of these infectious diseases are observed in young adolescents. Information on seroprevalence data on MMR in India is limited with no serological evaluation studies from Mumbai. The objective of this study was to determine the prevalence of IgG antibodies against MMR among young adolescents. This was a prospective study involving 192 healthy adolescents. Blood samples were collected from individuals of 18-23 years of age between December 2012 and September 2013. The quantitative determination of IgG antibodies in serum specimens against MMR were determined using enzyme linked immunosorbent assay. Data on history of vaccination was collected from participants. The MMR vaccination status of 96% of participants was not known and 2% were unvaccinated. Among 192 healthy adolescents, measles, mumps, and rubella seroprevalence were 91%, 97%, and 88%, respectively. The overall seropositivity of MMR was 79%. The highest level of seronegativity was seen with regards to rubella specific antibodies with 12% of cases. The important cause associated with seronegativity to measles, mumps and rubella is the missing MMR vaccination. The female population in present belongs to reproductive age group. Expecting mothers may have their offspring at risk of the congenital rubella syndrome in absence of rubella antibody. Thus, a booster dose of MR vaccine should be provided for long term protection against measles and rubella.

B. RESEARCH PROJECTS IN PROGRESS

PhD

1. Immunogenicity study of recombinant dengue gene construct in mice.

Investigator	Mr. Ajit Kulkarni
Guide	Dr. Ranjana A Deshmukh
Co – Guide /Mentor	Dr. Abhay Chowdhary
Funding Agency	Haffkine Institute for Training, Research and Testing

ABSTRACT

Dengue virus infection is now recognized as one of the most important mosquito borne human infections of 21st century. Because of its complicated immunopathological mechanism and the correlates of protection are still to be defined, the development of dengue vaccine effective against all four serotypes is still not possible. Immunity to Dengue viruses is primarily mediated by neutralizing antibodies directed against envelope (E) glycoprotein. T cell responses are also considered to be important for controlling and sometimes clearing a viral infection. The study aims to develop the recombinant Dengue gene constructs encoding envelope domain III for all Dengue serotypes and to assess immunogenicity in murine model. The study expects to provide important information on the immune responses elicited by the recombinant Dengue gene constructs and to determine the correlates of protection. The study will provide a promising direction for dengue vaccine development.

2. Molecular Characterization of 2009 H1N1 Pandemic Influenza and Seasonal Influenza Viruses from Patients in Mumbai Region.

Investigator	Ms. Devanshi Gohil
Guide	Dr. Ranjana A Deshmukh
Co – Guide /Mentor	Dr. Abhay Chowdhary
Funding Agency	Haffkine Institute for Training, Research and Testing

ABSTRACT

Influenza (commonly referred to as “flu”) is one of the most commonly known viral diseases that represent a health and economic threat to both humans and animals worldwide. Two types of antigenic variations occur in the HA and NA genes. The first kind of variation, called antigenic drift, involves point mutation and secondly, antigenic shift in which the new strain would be expected to vary at the amino acid level 20–50% from the corresponding protein of previously circulating strains. Thus antigenic shifts are responsible for worldwide pandemics, which occur at irregular and unpredictable intervals.

Haffkine Institute for Training, Research and Testing is a Regional Center for testing of pandemic H1N1 Influenza samples in and around Mumbai region. Greater than 6000 samples have been received and preserved in a –80°C deep freezer till date. A minimum of 100 samples positive for 2009 H1N1 pandemic by rRT-PCR and minimum of 100 samples positive for seasonal influenza A by rRT-PCR will be included in this study. Isolation of influenza virus for the samples will be processed on Madin Darby Canine Kidney (MDCK) cells. Seasonal Influenza A will be sub-typed by real time PCR using primers specific for H1 and H3. Viral RNA segments for HA, NA and M gene of pandemic H1N1 influenza and seasonal influenza virus will be amplified specifically by conventional RT-PCR and identified by agarose gel electrophoresis. Sequence analysis of the PCR product will be carried out using commercially available sequencing primers.

Drug susceptibility of viral isolates for 2009 H1N1 and seasonal influenza viruses will be studied genetically by sequencing and phenotypically using commercially available kits.

3. Study of Potential Therapeutic Activity of Gold Nano Particles against HIV.

Investigator	Mr. Rohan Kesarkar
Guide	Dr. Abhay Chowdhary
Funding Agency	Haffkine Institute for Training, Research and Testing

ABSTRACT

Given the backdrop of current antiretroviral therapy and timeline required for newer anti-HIV drugs to be made, the current dissertation tends to explore nanotechnology to combat this veritably omnipresent and intelligent virus. Objective of the study is to investigate the anti-HIV activity of gold nanoparticles as well as assessing their capability as a potential carrier for available antiviral drugs.

Research on gold nanoparticles (GNP) with respect to its biomedical applications has gained a tremendous resonance in recent years. High stability, high carrier capacity, feasibility of various routes of administration, inertness, non-toxic nature and high biocompatibility make GNP ideal starting point for drug carrier construction. These properties of nanoparticles enable improvement of drug bioavailability and reduction of dosing frequency and may solve the problem of non-adherence of prescribed therapy. Apart from using these nanoparticles as carrier system, GNP can also be explored as a potent anti-viral agent. Focus would also be given in improving drug loading and release kinetics of attached anti-viral onto GNP and synergistic activity of GNP with attached anti-viral for HIV.

4. Study of Neuronal Proteome in Prognosis of Rabies in Murine Model.

Investigator	Ms. Shraddha Mehta
Guide	Dr. Abhay Chowdhary
Funding Agency	Haffkine Institute for Training, Research and Testing

ABSTRACT

Rabies, one of the oldest known and a 100% vaccine preventable disease causes encephalitis that almost always proves to be fatal. The burden of the disease is quite high with nearly 20,000 people dying of rabies each year in India only. Presently, the following aspects of the disease are being investigated in murine model. The study is focused on assessing proteomic changes that may be occurring in the neurons of rabies infected animals using different strains of the virus. It is primarily being carried out to isolate, identify and investigate the role of differentially expressed viral as well as host proteins that may be involved in neuronal dysfunction.

5. Characterization and Assessment of Differential Proteome in Patients with Acute Respiratory Infection.

Investigator	Mr. Rahul Chavan
Guide	Dr. Abhay Chowdhary
Funding Agency	Haffkine Institute for Training, Research and Testing

ABSTRACT

Acute Respiratory Infection (ARI) is a major cause of morbidity and mortality around the globe. It is estimated that around 2 million people suffer from ARI from various etiologies (bacterial, viral and fungal) every year. However there is no simple diagnostic marker for the assessment of the etiology of these conditions. The objectives of the study are assessing the samples for various respiratory viruses and bacterial infections which particularly go undetected out on a surveillance basis. The next objectives are to aid in understanding the differential protein profile between the normal and the infected sample which further will help to use those proteins on a diagnostic or therapeutic role. This would be very helpful in enabling the establishment of the proteomic model for studying the protein expressions which will help leading to development of a supportive therapy to reduce the burden of infections on the society.

6. Assessment of Plant Proteins/Peptides as Potential Anti-Viral Agents.

Investigator	Mr. Sandeepan Mukherjee
Guide	Dr. Abhay Chowdhary
Funding Agency	Haffkine Institute for Training, Research and Testing

ABSTRACT

Anti-virals are the mainstay in treatment and management of Viral Diseases in Humans. However a large number of viral diseases have no known anti-virals. Also the fact, that emerging drug resistance makes the available anti-virals ineffective, calls for the development of novel anti-viral molecules. Plant peptides and secondary metabolites are known to have potent anti-viral activity. Although most such activities are directed against plant viruses, the mechanism of action remains common for most anti-virals. The present study shall investigate the potential antiviral activity in Plant protein/peptides against Influenza and HIV.

7. To Study siRNA Associated Suppression of Rabies Virus Infection and Assess its Therapeutic Potential.

Investigator	Mrs. Purna Charan
Guide	Dr. Abhay Chowdhary
Funding Agency	Haffkine Institute for Training, Research and Testing

ABSTRACT

Rabies virus belonging to genus Lyssavirus of family Rhabdoviridae causes one of the oldest neurodegenerative diseases known to mankind. Rabies virus is an enveloped, non-segmented negative-stranded RNA virus. As per the WHO studies about 55,000 deaths are still an attribute of rabies infection. Rabies virus has approximately 12 kb long single stranded RNA genome consisting of a leader region followed by genes encoding Nucleoprotein (N), Large Polymerase (L), Matrix Protein (M), Glycoprotein (G) and Phosphoprotein (P). Antivirals currently used against rabies include ketamine, midazolam, ribavirin and amantadine, but only one successful case of human treatment happened in 2004. RNA interference (RNAi) is a system within living cells that takes part in controlling the genes which are active and how active they are. Short RNAs can direct repression of genes with homology to those short RNAs. This repression is called RNAi. The purpose of this study is to understand the RNAi process and its application in suppressing rabies virus infection in humans. In this study, we will target the viral proteins like Nucleoprotein and Large Polymerase with siRNA designed specifically to be homologous to their mRNAs and observe the effect on the viral replication as the targeted proteins and enzymes are crucial for viral replication.

8. A Comparative Study of the Level of Expression of IFITM Proteins in Influenza Virus Infection across Species.

Investigator	Mrs. Paly Chatterjee
Guide	Dr. Abhay Chowdhary
Funding Agency	Haffkine Institute for Training, Research and Testing

ABSTRACT

Influenza epidemics exact a formidable toll on world health. Moreover, viral super-infections can produce antigenic shifting, resulting in more virulent pathogens. Recently, the emergence of a novel influenza A H1N1 viral strain led to a pandemic, producing illness in over 200 countries and territories (World Health Organization Pandemic (H1N1) 2009 - update 75). Additionally, the related avian influenza a viral strain, H5N1, represents a potentially catastrophic global health risk.

Interferon-induced transmembrane (IFITM) genes are transcribed in most tissues and are with the exception of IFITM5 interferon inducible. The interferon induced transmembrane (IFITM) genes IFITM1, IFITM2 and IFITM3 (IFITM1-3) belong to the family of small ISGs. Its members are induced in response to viral infections. IFITM proteins protect against viral challenges depending on the type of the virus/strain in addition to the IFITM properties. The study aims at a comparative analysis of the level of expression of the IFITM (1-3) proteins across species on infection with varied strains of influenza virus.

9. **Assessment of Potential Anti-Viral Activity of Indian Medicinal Plants against Rabies Virus Causing Encephalitis.**

Investigator	Mr. Soumen Roy
Guide	Dr. Abhay Chowdhary
Funding Agency	Haffkine Institute for Training, Research and Testing

ABSTRACT

Antiviral chemotherapy is an important component in the management of viral diseases. However at present potent antivirals for clinical usage are available only against limited number of family of viruses (Orthomyxoviridae, Herpesviridae, Retroviridae). There are no potent antiviral drugs against rabies virus. Therapeutic human rabies immunoglobulin (HRIG) and vaccine is available against rabies virus but it is ineffective once the virus enters the CNS. This necessitates the need for development of novel antivirals against rabies virus. Plant secondary metabolites have tremendous potential to be antiviral agents. *Datura metel* has long been known for its sedative action and known to cure hydrophobia in ayurveda and *Cynodon dactylon* is known to possess anti-inflammatory and immunomodulatory activities. Thus these two medicinal plants may therefore be explored for potential antiviral activity against Rabies virus causing encephalitis.

MSc

1. **Detection of TORCH infection in children and its relation with birth defects.**

Investigator	Ms. Payal Panchal
Guide	Dr. Sweta Kothari
Co Guide /Mentor	Dr. Abhay Chowdhary
Funding Agency	Haffkine Institute for Training, Research and Testing

ABSTRACT

Early diagnosis, evaluation and adequate therapy in mothers and their newborns help in prevention of diseases and long term disabilities in children. One of the most important causes of bad obstetric history in women and/or congenital disorders in children is TORCH infection, comprising of infections due to *Toxoplasma gondii*, Rubella virus, Cytomegalovirus and Herpes Simplex virus 1 and 2. TORCH infections can cause mild maternal morbidity but have serious fetal consequences. These infections are grouped together because they can cause a cluster of symptomatic birth defects in newborns, collectively called the TORCH syndrome. TORCH infections in the mother are transmissible to fetus in the womb or during the birth process and cause a cluster of symptomatic birth defects. Approximately 2%– 3% of neonates in India are found to harbor congenital malformations, which lead to morbidity, mortality and disability in such children, wherein the prevalence varies as per geographical area.

As the classical diagnosis of TORCH infections based on serological tests, there is an ambiguity in data, which may be consequent to false positivity or cross reactivity in serological estimation. Therefore, a confirmatory diagnosis based on the direct demonstration of the etiological agents in tissues or biological fluids becomes imperative. PCR is sensitive and the diagnosis can be confirmed within 24-48 hours. It has simplified the applications for prenatal diagnosis, making it faster, more sensitive, and thus, helping decrease the morbidity and mortality due to these infections. However, no PCR data is available from Indian literature on infected children. Our present study aims to bridge this gap.

Departmental Projects

1. Design, Synthesis and Evaluation of Novel Neuraminidase Inhibitors in Treatment of Influenza (H5N1/H1N1)

Investigator	Dr. Sweta Kothari, Dr. Meena Kanyalkar
Guide	Dr. Abhay Chowdhary
Funding Agency	Haffkine Institute for Training, Research and Testing & Kundanani College of Pharmacy

ABSTRACT

Influenza, the most alarming pandemic threat that can turn into lethal epidemic, is caused due to H5N1/H1N1 virus. The life cycle of influenza virus provides several potential targets for drug intervention. Among those Neuraminidase (NA) is of particular importance as it is responsible for viral release and progression of the disease. Structure based drug design methods have played critical role in discovery of its inhibitors such as Oseltamivir and Zanamivir. But emergence of resistant strain to Oseltamivir necessitates the development of new and effective neuraminidase inhibitors using alternative approaches. We have focused our research on design and synthesis of novel compounds as neuraminidase inhibitors.

2. Prophylactic and Therapeutic Effect of Virgin Coconut Oil and Omega Three Rich Vegetable Oil Blends on Neuro-Inflammation

Investigator	Dr. Sweta Kothari, Dr. Subhadra Mandalika
Guide	Dr. Abhay Chowdhary
Funding Agency	Haffkine Institute for Training, Research and Testing & Nirmala Niketan College of Home Science

ABSTRACT

Coconut oil is composed of 92% saturated fat out of which over 50% is medium chain triglycerides composed of fatty acids chain length 8 to 12. Coconut oil is devoid of one of the essential fatty acids i.e. omega 3 fatty acids. Beneficial role of consumption of omega three fatty acids in inflammation is well established, particularly in rheumatoid arthritis. High dietary consumption of omega 3 fatty acids has shown to reduce MPTP neurotoxin (1-methyl-4-phenyl-1, 2, 3, 6-tetrahydropyridine) induced decrease in dopamine in animal models. Also, omega 3 fatty acids share a reciprocal relationship with saturated fatty acids in modulating pattern recognition receptors (PPR) mediated inflammation by inhibiting PPRs including toll like receptors (TLRs).

Hence we propose to blend virgin coconut oil along with vegetable oils rich in omega 3 fatty acids and observe its preventive as well as therapeutic effect on neuro-inflammation.

3. Studies on Neuronal Proteomics, Virus-Host Interaction and Immune-Pathological Alterations in Rabies Encephalitis in Murine Model.

Principal Investigator	Dr. Abhay S. Chowdhary
Co- Principal Investigator	Dr. S. Madhusudhana, NIMHANS; Dr. Akhilesh Pandey Dr. T.S.Keshava Prasad, IOB.
Funding Agency	Department of Biotechnology, Government of India

ABSTRACT

The study is based on enhancing the knowledge on pathophysiological basis of neurological infections causing encephalitis with emphasis on rabies. It is intended to fill the gaps that are left in the overall comprehension of the immunopathogenesis of rabies and the current therapeutic options available for the management of rabies. Although vaccine preventable, rabies is left with no treatment once the clinical signs and symptoms of the disease appear. The mechanism of classical symptoms and inevitable death is still poorly understood. As there is no marked neuronal lysis and apparent pathological findings, focus is now mainly towards understanding the mechanisms that lead to profound neuronal dysfunction that may result from alteration in neuronal metabolism involving synthesis of neuronal proteins including neurotransmitters. Some earlier studies suggested probable deficiency of acetyl choline, serotonin and over production of GABA. Our study hopes to glean better understanding of rabies virus infection focusing on these aspects coupled with host factors and immune response elicited during disease progression. We hope that understanding these mechanisms may give some leads to formulate specific therapeutic measures to otherwise a fatal disease. We propose to carry out quantitative proteomic profiling to identify gene expression levels associated with rabies in rabies virus infected mouse brain. We also aim to identify proteins, which are associated with the viral infection by quantitative proteomics. In order to accomplish this, we will carry out a quantitative proteomic profiling of rabies infected mouse brain and normal mouse brain. We will also perform proteomic profiling of mouse brain tissues, which are challenged with various rabies strains. This proteomic approach will be achieved

by in vitro labeling using iTRAQ technology followed by liquid chromatography and high resolution tandem mass spectrometry (LC-MS/MS). An important goal of this proposal is to identify proteins that are differentially regulated in rabies.

4. Mechanism Based Screening and Validation of Herbal Drugs Using Radiotracer Techniques

Principal Investigator	Dr. Abhay S. Chowdhary
Co-Principal Investigator	Dr. R. D. Lele, Dr. H. S. Palep, Dr. Tarala Nandedkar, Dr. N. Sivaprasad
Funding Agency	Department of Science & Technology, Government of India

ABSTRACT

Based on experiential wisdom of over 5000 years, Ayurveda has described 50 categories of drugs with their clinical indications. Using current understanding of molecular biology, the anti-oxidant, anti-inflammatory and immunomodulatory actions of many Ayurvedic herbal drugs have been established. A classical example is Curcumin (active principle of haldi), which prevents NF apoptosis. Ayurveda describes 12 "Medhya Rasayanas"—Memory enhancing drugs which need validation using the transgenic mouse model of Alzheimer's disease (AD) which is now commercially available. These mice are normal at birth and within 4 months, they develop all the pathological changes in human AD, which can be studied by in vivo imaging, without killing the animals. We plan to study the potential of Ayurvedic herbal drugs for prevention as well as reversal of established diseases. The importance of this project can be appreciated by the fact that today there is no effective drug for AD yet. US\$15 billion are being spent by patients to buy drugs for AD. If our mission validates Medhya Rasayans, a world market of \$15 billion for this simple disease awaits us. The world market of herbal drugs is over \$100 billion of which Chinese share is 57%. India's share is a mere 2%. Hence, the importance of supporting our project.

C. RESEARCH PAPERS PUBLISHED IN SCIENTIFIC JOURNALS

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D. ABSTRACT/ POSTERS PRESENTED IN CONFERENCES/ SYMPOSIUM

1. "Study of Neuronal Proteome in Prognosis of Rabies in Murine Model "Ms. Shraddha Mehta, 484th Teaching Pathologist and Microbiologists Conference Meeting (TPMC), Mumbai. 31st Jan 2015
2. "Study of potential therapeutic activity of gold nano particles against HIV", Mr Rohan Kesarkar, 484th Teaching Pathologist and Microbiologists Conference Meeting (TPMC), Mumbai. 31st Jan 2015
3. "Assessment of potential antiviral activity of Indian medicinal plants against Rabies virus causing encephalitis", 484th Teaching Pathologist and Microbiologists Conference Meeting (TPMC), Mumbai. 31st Jan 2015

E. TRAINING/CONFERENCES/SYMPOSIA ATTENDED

1. Dr. Sweta T. Kothari Senior Scientific Officer and Pavankumar Todkar Scientific Officer attended the ISO 9001:2008 Auditor/Internal Auditor Training Course held on 29th and 30th November 2014 at Haffkine Institute.
2. Dr. Sweta Kothari, Senior Scientific Officer attended the Program on Integrated Scientific Project Management for Women Scientist/Technologist on 22nd to 26th September 2014 at centre for Organization Development, Telengana
3. Mr. Sandeepan Mukharjee Scientific Officer attended the Workshop on Neurochemistry & Electron Microscopy on 14th to 19th July 2014, NIIMHANS, Bangalore.
4. Ms. Payal Panchal, Junior Research Fellow attended the 12th Biennial Conference of Indian Society for Prenatal Diagnosis and Therapy (ISPAT 2014) on 20th and 21st September 2014 at The Leela, Mumbai.
5. Dr. Sweta Kothari, Senior Scientific Officer invited as an examiner for evaluation of pre PhD viva for students submitting degree in Medical Microbiology to Maharashtra University of Health Sciences on 9th January 2015 at Haffkine Institute

F. GUEST LECTURES DELIVERED / CONFERENCES ATTENDED BY

Dr. Abhay Chowdhary, Director, Haffkine Institute (2014 – 2015)

Sr. No.	Date	Name of the Institution	Guest Lectures delivered / Conferences attended
1.	24 th to 27 th April 2014	J.N. Medical College, Belgaon	Participated as a Speaker during the Symposium on "Hospital Infection, Prevention & Control".
2.	25 th April 2014	Haffkine Institute, Mumbai	Organized symposium on the occasion of "World Malaria Day".
3.	19 th June 2014	Sharadashram Vidyamandir & Haffkine Institute, Mumbai.	Organized "Awareness Camp for Cervical Cancer & HPV Vaccination 2014" and delivered a lecture on "Anti-Biotic Resistance".
4.	20 th to 22 nd June 2014	Renaissance Mumbai Convention Centre Hotel, Powai, Mumbai.	Participated & delivered a talk on "Clinical Research in Ophthalmology: 2014" on the occasion of 20th Anniversary Congress of Eye Advance 2014 organized by International Academy for Advances in Ophthalmology.
5.	24 th June 2014	DHS, Arogya Bhavan, Mumbai.	Participated in the workshop on "Good Clinical Practices (GCP)" jointly organized by UNICEF & MUHS.
6.	04 th July 2014	Haffkine Institute, Mumbai	Organized American Society for Microbiology – Culture of Responsibility Workshop.
7.	12 th September 2014	SNDT Women's University, Mumbai.	Invited as „Chief Guest on the occasion of Centennial year of SNDTWU.

Sr. No.	Date	Name of the Institution	Guest Lectures delivered / Conferences attended
8.	28 th November 2014	India Habitat Centre, New Delhi.	Invited to speak at "Policy Forum on Antimicrobial Resistance and Stewardship in Hospitals".
9.	03 rd December 2014	Krishna Institute of Medical Sciences Deemed University, Karad	Participated as faculty in the International Multifocal Conference 2014.
10.	13 th December 2014	TNMC & BYL Nair Ch. Hospital	Invited to chair the symposium entitled "Expanding Horizons" during the "Update Ayurveda 2014" Conference.
11.	04 th February to 07 th February 2015	Nehru Science Centre, Mumbai.	Participated in Science Expo 2015 "An Interface of Science & Society" and delivered a talk on "Hand Hygiene".
12.	06 th February and 07 th February 2015	Lalit Hotel, Mumbai.	Participated in "NATCON 2014" – 69th National Conferences on Tuberculosis and Chest Diseases 2014.
13.	26 th February 2015	Sharadashram Vidya Mandir & Haffkine Institute, Mumbai.	Organized "Awareness Camp for Cervical Cancer & HPV Vaccination 2015

G. DAYS CELEBRATED BY DEPARTMENT

1. **19th June 2014-** Conducted medical camp to vaccinate women with 3rd free dose of HPV vaccines (Gardasil® and Cervarix™) in collaboration with Hinduja Hospital, B. J. Medical College and Sassoon General Hospital, SRL diagnostics and Haffkine institute interdepartmental staffs and students.
2. **26th February 2015-** Conducted medical camp to create awareness among women for cervical cancer, HPV and HPV vaccines in collaboration with Shardashram Vidya Mandir, Haffkine institute interdepartmental staffs and students and Sakal Media group.

DEPARTMENT OF ZONOSIS

A. RESEARCH PROJECTS COMPLETED

Departmental Projects

1. "Evaluation of Anti-Plasmodial Potential of plant derived alkaloids" project started from 1st November 2011.

Investigator	Dr. Saroj Bapna
Guide	Dr. Abhay Chowdhary
Co-guide/mentor	Dr. Mira Ramaiya
Funding agency	ICMR

ABSTRACT

Malaria is the most important parasitic disease and its control depends on specific chemotherapy, now complicated by *Plasmodium falciparum* that has become resistant to most commonly available Antimalarial. Many plant species are used in traditional medicines of malarious countries and a relatively few number of these have been investigated for evaluation of their antimalarial effect. Still lower is the number of those that have had the active natural compounds isolated and the toxicity determined to provide a viable alternative to existing Antimalarial against drug resistant *falciparum* malaria. This area is, then, of great research interest. The efficacy of these medicinal plants will be measured by *in vitro* micro test against *Plasmodium falciparum* (Fidock et al. 2004). Extracts showing promising antimalarial activity will be processed further for isolation and characterization of various bioactive principal (with special reference to alkaloids) present therein. Alkaloids are one of the major classes of natural products that exhibit antimalarial activity. As some of the active plants that produce alkaloids carry a reputation for traditional usage needs sound scientific evaluation. These alkaloids will be isolated via phytochemical studies and bioassay-directed fractionation. Different concentrations of diversified alkaloidal classes will be evaluated individually as well as in combination with standard antimalarial drugs (Artemisinin and chloroquine) against *Plasmodium falciparum*. Compounds showing promising activity will be further evaluated against *plasmodium berghei* in mice.

2. To evaluate the bio-efficacy and surface Persistency of insecticidal combinations against Cockroaches, Bedbug.

Investigator	Ms. Mansi Malik , Ms. Raksha Shinde
Guide	Dr. Abhay Chowdhary
Co-guide/mentor	Dr. Mira Ramaiya
Funding agency	Bayer CropScience Ltd.

ABSTRACT

The main objectives of project are to establish insect colonies and to evaluate the Bioefficacy and persistency of test compounds against different crawling and flying insects for public health importance. Different insects breeding facilities will be established by specific methods as per the protocol designed by WHO and NABL. Test species will be maintained in an environment –controlled room at a temperature of 24-27 °C and relative humidity of 75%-80%. The photoperiod will be 12 hours light and 12 hours darkness. The species will be housed in sterile autoclaved stainless steel cages/tray in a tier racks.

B. RESEARCH PROJECTS IN PROGRESS

PhD

1. "Assessment of Dendritic cell vaccines as an immunotherapeutic agent in malaria"

Investigator	Mr. Rahul Ashok Gosavi
Guide	Dr. Ranjana A Deshmukh
Co-guide/mentor	Dr. Abhay Chowdhary
Funding agency	ICMR

ABSTRACT

Malaria is a vector born infectious disease affecting approximately 40% of the world population. In South-East Asia region, 10 out of 11 countries are malaria endemic. India itself contributes about 64% of the total malaria cases. Use of Dendritic cells as a vaccine for the development of Immunotherapy strategies is also one of the approach to stimulate innate immune response against malaria. Our aim is to sensitize dendritic cells with merozoite antigen and check the immune response elicited *In vivo* and *In vitro* against *Plasmodium berghei* / *Plasmodium yoelii* malaria in murine model. Expressions of different cytokines will be check. The Dendritic cells will be purified and will be loaded with merozoite specific antigen in the merozoite induced malaria murine model. Flow cytometry will be used to detect and to quantify *In vivo* merozoite specific cytotoxic killing activity in

the injected mice. Quantitation of cytokine production by dendritic cell will be determined by using commercial ELISA kit. Expression of different cytokine will be studied using molecular technique. The study expects to analyse the dendritic cell response *In vivo* and *In vitro* against *Plasmodium berghei* / *Plasmodium yoelii* in murine model. If this strategy of immunizing mice against *Plasmodium berghei* / *Plasmodium yoelii* shows promising results, similar concept may be applied in human malaria targeting *Plasmodium falciparum*.

2. **"Assessment of BCG vaccines as an adjuvant in Japanese Encephalitis virus vaccine"**

Investigator	Mr. Sahil Kulkarni
Guide	Dr. Abhay Chowdhary
Funding agency	ICMR

ABSTRACT

In this study we propose to construct a safe and efficacious recombinant BCG based JEV vaccine expressing the most immunodominant antigen of JEV the D-III protein. JEV culture shall be used to extract the DIII gene which is known to confer immunity against JEV. The extracted gene will be amplified using RT-PCR and cloned in *E.coli*; this will be expressed in a BCG host. This recombinant BCG-JEV (rBCG-JEV) along with other different formulations will be inoculated subcutaneously (s.c) in BALB/c mice. These animals will be vaccinated with prime boost approach. Immune response to the various preparations shall be evaluated by assessing the surrogate markers like neutralizing antibody response, CTL Response and Th1/Th2 response. This novel approach would lead to elicitation of a protective immune response with reduction in not only the volume and dose of the vaccine to be administered but also in terms of the number of booster doses required to elicit and maintain the level of neutralizing antibody response over long periods of time. This may pave way for safe and efficacious JEV vaccination programs.

3. **Interplay of Trace elements in the pathophysiology of murine model of malaria**

Investigator	Ms. Mansi Rajendra Malik
Guide	Dr. Abhay Chowdhary
Funding agency	ICMR

ABSTRACT

Malaria has been a scourge of humanity since antiquity and it remains so today. World Health Organisation estimates that malaria is endemic in more than 100 countries, which puts 2.4 billion people - over 40% of the world's population at risk. The study "Interplay of Trace Elements in the pathophysiology of Murine Model of Malaria" aims in providing a metallomic insight to the pathophysiology of malaria with context to the disease progression. These trace metals are physiologically essential as they are a constituent of large number of Redox enzymes and also are involved in many other metabolic pathways. The trace metals levels are often associated with the impairment or enhancement of the biological functions, these elements if studied with context to tissue specificity and stage specificity can help in giving an insight into palliative therapy and also providing a therapeutic intervention. This shall also help in understanding the systemic changes and the pathology with context to disease progression.

4. **Isolation and characterization of Toxoplasma gondii antigens and assessment of its tumour suppression activity.**

Investigator	Mr. Apurva S Gode
Guide	Dr. Abhay Chowdhary
Funding agency	Haffkine Institute for Training, Research and Testing

ABSTRACT

Cancer is the most prevalent and lethal cancer worldwide, and has been reported in many nations, including the India and many developing countries. Gliomas also have large contribution in current situation. The mortality rate attributed to cancer may be the result of induced multi-drug resistance and a high frequency of metastatic occurrence. The current approaches of treatment include surgery, radiation, and chemotherapy which can also adversely affect the normal cell population in the patient. The infiltrative growth pattern of gliomas means that not every last tumour cell can be surgically removed. Radiotherapy as well as chemotherapy has certain limitations pertaining to normal tissue toxicity. Thus there is a need for an alternative form of treatment to overcome these problems. A new approach for the treatment of glioma is therefore evident. Immunotherapy may represent one such approach, and several different strategies for glioma immunotherapy have recently been developed. The goal of cancer immunotherapy is to augment the weakened host immune response against tumors using specific and/or nonspecific immune stimulants. Some of the reports suggest that *T. gondii* is a powerful agent for cancer immunotherapy, and is useful as a stimulant of the cellular immune responses.

5. **To Assess the Contribution of Sweat in Parasite Induced Attractiveness to Insect Host in Malaria Patients**

Investigator	Mr. Chinmayanand Oroskar
Guide	Dr. Abhay Chowdhary
Funding agency	ICMR

ABSTRACT

Protozoan parasites of the genus *Plasmodium* infect a wide variety of vertebrates, and are responsible for the devastating impact of malaria in humans. Parasites' twofold evolutionary concern is to multiply and be transmitted between hosts. So in order to facilitate its transmission from human host to mosquito, the prime intention of the parasite will be to attract the mosquito towards its human host. As it has been observed in the previous studies, that malaria infection increases attractiveness of humans to mosquitoes and taking into consideration that humans are potent attractants to mosquito, the parasite must be inducing some changes in its host, such that it becomes more attractive to the mosquitoes. Human sweat contains components that are attractive to anthropophilic mosquito species, and variation in sweat composition causes differential attractiveness to mosquitoes within and between individuals and also between humans and other mammals. Thus there lies a scope for the parasite; whose ultimate aim is to disseminate to the insect host i.e. mosquito (in order complete its lifecycle); to alter the composition of sweat in such a way that it would attract the mosquitoes. Thus this study will help to understand if the parasite is inflicting some change in the composition of sweat in such a way that it helps its transmission to the insect host. The understanding of how exactly does the parasite make the modifications in the sweat to cause the attractiveness; would be the outcome of this study.

6. **Comparative Assessment of Immunomodulatory Activities of Plant Extracts and Their Synthesized Nanoparticles.**

Investigator	Mrs. Pallavi Chetan Choudhary
Guide	Dr. Abhay Chowdhary
Funding agency	ICMR

ABSTRACT

The immune system involved in the etiology as well as pathophysiologic mechanisms of many diseases. Currently available immunosuppressive and immunostimulating agents have major limitations. Immunomodulation using plant material can provide an alternative to conventional chemotherapy for a variety of diseases.

Discovery of new molecules and manipulating those available naturally in nanosize could be appealing for their greater potential to improve health care. Hence our aim is to synthesize novel gold nanoparticles using plant extracts as reducing agents; characterized them and comparatively assess the immunomodulatory activity of plants and synthesized gold nanoparticles taking into consideration that enhanced immunomodulatory activity will be obtained using gold nanoparticles.

The study helps us to design the novel method for the synthesis of gold nanoparticles. The study expects detailed understanding of immunomodulation of mentioned plants and their synthesized nanoparticles and will open new ways for a number of potential therapeutics as innovative therapeutic agents for infectious diseases, cancer, various life threatening immune mediated diseases and will be efficiently used to overcome the problem of multidrug resistance in many diseases like malaria, tuberculosis, etc.

M.Sc.

1. **Comparative Analyses of Different Methods for Diagnosis of Malaria.**

Investigator	Mr. Paras Mahale
Guide	Dr. Mira Ramaiya
Co-guide/mentor	Dr. Abhay Chowdhary
Funding agency	Haffkine Institute for Training, Research and Testing

ABSTRACT

Among the tropical diseases, malaria occupies a prime position with high rate of morbidity and mortality. It's a vector-borne infectious disease, caused by Protozoan organism of genus *Plasmodium* which is transmitted by the bite of the infective female *Anopheles stephensi* mosquito. Almost half of the population is exposed to the burden of malaria which ranges from 300 million cases and above, and on an average 1-2 million deaths per year. Sensitive, specific and rapid diagnosis of malaria is the need of the hour. Considering the fact that initiation of appropriate anti-malarial therapy relies on the detection of the diseases, it becomes imperative that the condition is identified accurately in the shortest possible time. The study shall be useful in identify the best possible methodology, that will specifically and sensitively detect the presence of malaria parasite in patients presenting with specific clinical manifestations and produce an algorithm which might help in implementation of newer protocols in the detection and diagnosis of malaria

2. Insecticide Resistance gene diversity in Mosquito Larvae

Investigator	Ms. Raksha Shinde
Guide	Dr. Mira Ramaiya
Co-guide/mentor	Dr. Abhay Chowdhary
Funding agency	Haffkine Institute for Training, Research and Testing

ABSTRACT

Pyrethroid insecticides are extensively used in Mumbai region for public health pest control. Accurate resistance monitoring is essential to guide the rational use of insecticides and resistance management. Here, the study includes nucleotide diversity (gene diversity in insecticide resistant gene) and the sequence analysis of the para-sodium channel gene. Part of VGSC (voltage gated sodium channel gene) of mosquitoes collected from Mumbai, amplified from genomic DNA, sequenced and analyzed for the presence of deduced amino acid substitutions. Early detection of resistance could help the health personnel to plan and select appropriate alternative control measures or insecticide for effective control. The present study is therefore designed to evaluate insecticide resistance of mosquito population in and around Mumbai.

Short Term Research Internship Programme

1. Evaluate the effect of gold nanoparticles on the maturation of murine bone marrow derived dendritic cell.

Investigator	Ms. Ansha Anson Anto
Guide	Dr. Abhay Chowdhary and Dr. Mira Ramaiya
Co-guide/mentor	Mr. Rahul Gosavi

ABSTRACT

Gold nanoparticles, in the form of nanocarriers and drug delivery systems have been widely explored to improve the delivery of therapeutics and overall management of the disease. As these nanoparticles are in size range similar to cellular components and proteins; there is a high possibility that they might interact with them and cause changes in their respective metabolism. While using these nanoparticles for drug delivery applications, their interaction with circulating cells particularly immune cells should also be taken into considerations. Dendritic cells (DCs) are one of the most important antigen presenting cells and key players in initiation of adaptive as well as innate immune responses. Thus in this study we try to understand the effect of gold nanospheres (GNS) on maturation process of bone marrow derived DCs. Effort are also focussed on changing the surface chemistry of GNS and determine their role in cytokine expression and overall maturation of DCs. This approach would provide a preliminary data to decorate/functionalize nanoparticles for specific activation of DCs against many infectious diseases and can be explore them as nano-vaccines.

Departmental Projects

1. To Study the bio-efficacy and Persistency of insecticidal product for public health importance.

Investigator	Mr. Chinmayanand Oroskar, Mr. Paras Mahale
Guide	Dr Abhay Chowdhary
Co-guide/mentor	Dr. Mira Ramaiya
Funding agency	M/S BASF India Ltd.

ABSTRACT

The main objectives of project are to establish insect colonies and to evaluate the bioefficacy and persistency of test compounds against different crawling and flying insects. Insects usually colonize and rest on indoor surfaces in particular walls, ceilings etc inhibiting this will help in reducing the insect population. In this study we evaluate the use of various insecticidal products which has been used to coat walls and surfaces and determine their bioefficacy and persistency for public health importance

2. "Isolation and characterization of extracellular secondary metabolites from micro-organisms isolated from different ecological niche for its mosquito-larvicidal potential"

Investigator	Dr. Mira Ramaiya
Guide	Dr. Bela Nabar
Co-guide/mentor	Dr, Abhay Chowdhary
Funding agency	UGC

ABSTRACT

The ongoing research work has shown that microorganisms from non-farming soils, hot spring water & forest regions of Sikkim & Arunachal Pradesh which are the regions of hot spot of diversity have yielded new and potent isolates producing cry protein effective against several insect pests and mosquito larvae.

Microorganisms with biotechnological potential such as biopolymer production, bioremediation of chemicals in effluent and radiation resistant microbes were isolated and studied. *Actinomyces* spp. isolated from sea water samples and soils from hotspots of biodiversity showed mosquito larvicidal activity. Bacteria from Khoksar region of Himachal Pradesh having extreme cold climate yielded heat resistant enzymes.

Such studies has initiated us to search for new microbes, molecules, metabolites from natural untapped sources such as soils from extreme cold and hot regions, effluent water, sea water, hot spring water samples, and cold desert region of Ladakh which can be a source of microbes effective in control of resistant vectors larvae .

The present study intends to screen microbes from diverse environments and to tap its capacity in production of extracellular compounds to control the mosquito larvae in different stages of its growth.

3. Isolation & Identification of the novel bacterium having mosquito Larvicidal activity.

Investigator	Dr. Avinash Kale
Guide	Dr. Abhay Chowdhary
Co-guide/mentor	Dr. Mira Ramaiya
Funding agency	CBS

ABSTRACT

There are millions of people all around the world losing their life due to various mosquito borne diseases like malaria, dengue, chikungunya, etc. The different methods employed to control these lethal diseases are through vaccination, medication or precaution against the vector but still human deaths due to the above mentioned diseases are tremendously increasing. Most of the biologists are more interested in studying the mechanism of invasion of the parasite in human body but very few of them actually focus on the control of the vector- (mosquito). Therefore, in an attempt to take one step ahead in the field of controlling the number of vectors instead of the actual parasite, this research work mainly includes identification of some bacteria having mosquito Larvicidal activity. A lot of studies have been done on Larvicidal toxins produced by *Bacillus* spp. like *B. thuringiensis* & *B. sphaericus* known to produce crystal toxins like cry, bin8 , sphaericolysins and so on. The aim is to collect different species of dead mosquito larvae from the wild environment and to isolate & identify their gut microflora which might be responsible for their Larvicidal action. The isolates will be used to check their toxicity level on lab cultured larvae of different species and the one showing maximum toxic potency will be used for further proteomic studies.

Research project/Fellowship submitted for grants

1. "Comparative assessment of immunomodulatory activities of three plant extracts and their synthesized nanoparticles"

Investigator	Mrs. Pallavi Chetan Choudhary
Guide	Dr. Abhay Chowdhary
Funding agency	ICMR

ABSTRACT

Immunomodulation is the process of modifying an immune response in positive or negative manner by administration of a drug or compound. Plants play an essential role in the health care needs for the treatment of diseases and to improve the immunological response against much pathology. The modulation of immune response with the aids of various medicinal plants in order to alleviate certain diseases is an active area of interest. In the present study three plants will be used for the synthesis of gold nanoparticles and the plant extracts and synthesised gold nanoparticles will assess for the in vivo immunomodulatory activity.

As the preliminary work on antimalarial activity of plant extract intends to have good activity. The plant extract and synthesised gold nanoparticles will be assessed for *in vitro* antimalarial activity against *P. falciparum*.

C RESEARCH PAPERS PUBLISHED IN SCIENTIFIC JOURNALS

1. Saroj Bapna, Mira Ramaiya and Abhay Chowdhary (2014) "Antimalarial potential of plants used as chewing sticks for oral hygiene in rural areas of Rajasthan, India.
American Journal of Ethno- medicine yr.2014, Volume No.5, Page No.319-325
2. Saroj Bapna, Pallavi K. Choudhary, Trupti Satvekar, Mira Ramaiya and Abhay Chowdhary (2014) Anti-plasmodial potential of crude alkaloidal extract of three plants used in traditional medicine in India published in IOSR Journal of Pharmacy and Biological Sciences (IOSR-JPBS) , Volume 9, Issue 5 Ver. VI (Sep -Oct. 2014), PP 48-51 .

D. TRAINING/CONFERENCE / SYMPOSIUM ATTENDED

1. Dr. Ramaiya Mira & Dr. Saroj Bapna attended programme on Vector Borne Diseases on 7th April 2014 at SNDT College, Mumbai.

2. Dr. Ramaiya Mira, Trupti Satvekar, Pradeep Jadhav and all students attended "Bio safety Training Program" conducted in the Durbar Hall on 25/11/2014.
3. Dr. Ramaiya Mira, Trupti Satvekar, Pradeep Jadhav attended "ISO Internal Audit Training Program" conducted in the Durbar Hall on 29/11/2014 and 30/11/2014
4. All students and Staff attended Science Expo 2015 on 4 to 7 February at Nehru Science Centre, Worli Mumbai.

E. DAYS CELEBRATED BY DEPARTMENT

1. Malaria day celebrated on 25 April 2014

The Malaria day was celebrated to provide information of Malaria, its control, prevention and treatment also to bring awareness of Malaria.

Workshop was arranged on "Mission to Control Mosquito Menace" on Malaria day on 25/4/2014 and it was sponsored by United Phosphorus Limited.

Total 66 numbers of students from K.C. College, D.Y. Patil College and Elphinston College were present for this programme.

This programme was organised under the guidance of Dr. Mira Ramaiya and Dr. Saroj Bapna.

2. Dengue awareness Programme on 12 November 2014

Programme was organised during dengue outbreak in Mumbai, and the aim of this programme was to create awareness among people about dengue.

Dengue is a viral disease, spread by *Aedes* mosquito.

Through this programme, we had provided information on identification of mosquito species and public awareness regarding disease transmission and control measures. This programme was organised under the guidance of Dr. Ramaiya Mira and Dr. Shital Mane.

TESTING

DEPATMENT OF BACTERIOLOGY

A. The list of testing services provided by the Department

1. Testing of Water Samples.
2. Testing of Water purifiers
3. Antibacterial & antifungal efficacy testing of Disinfectant samples like Hand sanitizer, Sanitizer for food products, Floor cleaner, Toilet cleaner, Instruments sterilants, Soap solutions, various BipolSymersamples, Food package cartons, Antibacterial coated stainless steel tiles, along with chemically synthesized drugs etc.
4. Bacteriological & fungal testing of plastic made water storage tanks.
5. Bacteriological examination of Phosphate solubilising bacteria from liquid bio fertilizers.
6. Microbiological examinations of Wall scrap swabs.
Determination of pH, specific gravity & Concentration of Water sanitizer as per Iodometric Titration Method APHA 1998(Method 4500-ClO₂ B).
7. Bacteriological & fungal examination of various animal food samples.
8. Examination of moist soil samples (Bio coulter) for total aerobic & anaerobic bacterial count.
9. Validation of Antimicrobial properties of paint samples incorporated with antimicrobial agents as per Japanese specification. JIS 2801.
10. Qualitative and Quantitative examination of swab samples received from variousHospitals

B. The number of tests performed by the Department

Sr. No.	Nature of the sample tested And the Test performed	Total number of sample tested
1	Water sample	32
2	Water purifier	05
3	Disinfectant solution	14
4	Miscellaneous	171

DEPARTMENT OF BIOCHEMISTRY & BIOTECHNOLOGY

A. New testing services provided by the Department

Sr. No.	Name of Test
1.	Hydroxymethylfurfural [HMF] of honey
2.	Prolife of honey

B. The list of testing services provided by the Department

Sr. No.	Name of Test
1	Blood Glucose (F)
2	Blood Glucose (PP)
3	Total Cholesterol
4	Triglycerides
5	HDL Cholesterol
6	SGOT
7	SGPT
8	Total Bilirubin
9	Direct Bilirubin
10	Blood Urea Nitrogen
11	Creatinine
12	Stone analysis (Kidney, Gall, Liver)

C. The number of tests performed by the Department

Sr. No.	Nature of the sample tested And the Test performed	Total number of sample tested
1	Serum / plasma	13 (paying) + 205 (non-paying) = 218
2	Stone (Kidney, Gall, Liver)	Kidney- 59, Gall- 01, Liver- 00
3	Honey testing	6 samples.

CHEMICAL TESTING UNIT

A. The list of testing services provided by the Department

1. Testing of Liquors (Such as Country liquor from manufacturer and retailers, Wine, vodka, rum, Brandy, whisky, toddy...etc) samples from excise department, Government of Maharashtra.
2. Testing of Denaturants.
3. Testing of water samples.
4. Testing of fine chemicals.
5. Testing of Polymeric materials.

B. The number of tests performed by the Department

Sr. No.	Nature of the sample tested And the Test performed	Total number of sample tested
1	TDL, ODS, SDS	4931
2	CL – I	13,112
3	CL – III	7,212
4	Toddy	3,169
5	TL (Beer, IMFL)	390
6	TCL	60
7	TFS	02
8	TAC	02
9	CL-II	0
10	Miscellaneous Samples	09
11	Revenue Achieved By giving Duplicate report to the party	151 (Reports)
	Total Revenue in Rs.	1,08,69,600

DEPARTMENT OF CHEMOTHERAPY

A. The list of testing services provided by the Department

1. HPLC (High Performance liquid chromatography)
2. GCMS (Gas chromatography mass spectrophotometer)
3. IR (Infrared spectrophotometer) samples on commercial & academic purposes.

B. The number of tests performed by the Department

Sr. No	Nature of sample tested & the test performed	Total number of sample tested
1	Snake venom was tested by using HPLC	11

DEPARTMENT OF CLINICAL PATHOLOGY

A. List of Testing Services Provided By the Department

1. Haematology & Other test (HB, CBC, ESR, MP, and Urine R/M)
2. Serology (Widal, Weil-Felix, Brucella –Extended Widal test)
3. Microbiology (OT Swab, Aerobic Culture, AST)
4. Diagnostic Mycology (Fungal Culture & Sensitivity)
5. Testing of commercial synthetic compounds for antibacterial, antifungal and anti tuberculosis activity.
6. Operation theatre monitoring

B. The number of tests performed by the Department

Sr. No.	Nature of the sample tested		Total number of sample tested
1	Haematology & Other test (CBC, ESR, MP, Urine R/M)		329/161/40/218
2	Serology (Extended Widal)		631
3	Microbiology	OT Swab	1873
		Aerobic Culture and AST	34
4	Mycology (Fungal Culture & Sensitivity)		49
	Total		3335

DISPENSARY

1. Annual medical check-up of employees and students:-135.
2. Total number of staff and students vaccinated are as follows:-
 - 2.1 Hepatitis-B- 13.
 - 2.2 Rabies -28.
 - 2.3 Tetanus Toxoid -50.
 - 2.4 Influenza Vaccine- 19.
3. OPD facility for employees and students of HITRT- 1304
4. Pre-employment examination -24

DEPARTMENT OF TOXICOLOGY

A. List of testing services provided by the Department

1. Acute oral toxicity in rats
2. Primary skin irritation in rabbits.
3. Mucus membrane irritation in rabbits.
4. Sensitization study in guinea pigs.
5. Oral LD50 in Rat

6. Dermal LD50 in rabbits.
7. Acute fish toxicity

B. The number of tests performed by the Department

Sr. No.	Nature of the sample tested and the Test performed	Total number of sample tested
1	Acute oral toxicity in rat as per OECD guideline	3
2	Acute Dermal Irritation as per OECD guideline	2
3	Mucus membrane irritation in Rabbits	1
Total		5

Revenue generated from these tests is INR 3, 17,136/-.

VENOMOUS ANIMAL UNIT

A. The list of testing services provided by the Department

1. Evaluation of Anti Termite activity of test compound
2. Evaluation of Anti Rodent activity of test compound
3. Identification of Unknown Venom Sample

B. The number of tests performed by the Department

Sr. No.	Nature of the sample tested and the Test performed	Total number of sample tested
1	Evaluation of Anti Termite activity of test compound	2
2	Evaluation of Anti rodent activity of test compound	9
3	Identification of Unknown Venom Sample	7
4	Anti-squirrel testing	1
5	Snake repellency	1
Total		20

C. Other department activities

1. Department supply Lyophilized venom to various institutes' colleges for research purpose. Venom production and supply during Year April 2014 to March 2015 are as follows

Snake and scorpion	Opening stock (gm)	Closing stock (gm)
Cobra	132.496	142.256
R. Viper	18.856	21.088
Krait	0.692	0.047
Echis	16.296	14.891
Red scorpion	11.486	10.276
Bamboo Pit viper	0	0.025

2. Department conduct "Survey of venomous and non-venomous snakes", provides expert advice, measures and tools required for controlling the snake menace. Total number of snake survey conducted during the period 1st April 2013 to 31st 2014 are as follows:

Sr. No.	Period of work	Total number of survey
1	April 2014-March 2015	19

3. Department provides certificates for Identification of different types of Venomous and Non venomous snakes. Total number of identification report issued during the period 1st April 2014 to 31st 2015 are as follows:

Sr. No.	Period of work	Total number of snakes received for identification	Total number of reports issued
1	April 2014-March 2015	48	48

DEPARTMENT OF VIROLOGY

A. List of testing services provided by the Department

Sr. No.	Name of the test
1.	Detection of Influenza Virus
2.	Antiviral activity of biological / disinfectants / actives (Qualitative)
3.	Antiviral activity of biological / disinfectants / actives (Quantitative)
4.	Detection of virus by cell culture (HSV, CMV, JEV)
5.	Detection of Rabies (Fluorescent Ab Test)
6.	Detection of Rabies/JEV (Conventional Nested RT-PCR)

B. The number of tests performed by the Department

Sr. No.	Nature of the sample tested And the Test performed	Total number of sample tested
1.	Detection of Influenza Virus	509
2.	Detection of Rabies (Fluorescent Ab Test)	25
3.	Detection of Rabies/JEV (Conventional Nested RT-PCR)	7
4.	Detection of Dengue Virus	5

C. Specialized testing/research provided by the Department

1. Evaluation of various disinfectant products for virucidal efficacy
2. Evaluation of anti-HIV efficacy of drug formulations
3. In-vitro evaluation of hepatotoxicity/hepatoprotectivity of herbal formulations using primary cells model.
4. Validation of molecular biology (e.g. PCR) and ELISA kits for infectious diseases.
5. Analytical laboratory services for Clinical Research Organizations.

DEPARTMENT OF ZONOSIS

A. The list of testing services provided by the Department

Sr. No.	Title
Mosquito	
1	Bio-efficacy study of test compound against <i>Culex quinquefasciatus</i> , <i>Aedes aegypti</i> and <i>Anopheles stephensi</i> mosquitoes
2	Testing of impregnated net against mosquitoes species.
3	Bio-efficacy of liquid vaporiser repellent sprays and mosquito coil against mosquitoes species.
4	Testing of mosquitoes repellent cream, fabric/garment staining property and moisturizing property
5	Bioefficacy of herbal tablet against mosquitoes species.
6	Bio- efficacy study of mosquito Larvicidal oil
Cockroaches	
7	Bioefficacy, Persistency and Water resistance study of test compound against <i>Periplaneta americana</i> and <i>Blattella germanica</i> cockroaches.
8	Bioefficacy testing of fumigator and gel against cockroach species
9	Bioefficacy and surface persistency of mopping liquid against cockroach species.
House Fly	
10	Bioefficacy and surface persistency test of aerosol and oil spray against insects (mosquitoes, housefly and cockroach)
11	Bioefficacy testing of insect's repellent floor cleaner against house fly

Other Insects	
12	Bioefficacy testing of test compound (bait /granules) against common red ants
13	Bioefficacy testing of insect's repellent floor cleaner against common red ants
14	Bioefficacy of plant extract against termite
15	Bioefficacy of test compound against Silver fish
16	Bioefficacy of test compound against Louse

B. The number of tests performed by the Department

Sr. No.	Nature of the sample tested And the Test performed	Total number of sample tested	Testing Charges Earned Rs.
1	Commercial Insecticide Testing	28	46,72,884/-
2	Leptospirosis Testing	-	-
Total Testing Charges			46,72,884/-

LIBRARY

The aim and objective of the Haffkine Institute Library is to collect, organize, search and retrieve information in the areas of prime activities of the institute i.e. Biomedical and allied sciences with a special reference to the communicable diseases. The library subscribes to specialized national and international journals from various renowned publishers and scientific societies.

This year library continued to provide online scientific search and retrieval facilities to the staff, researchers and students. During the period total 484 users made use of the online search and retrieval facility offered by the library. Users mainly consisted of Scientific Staff, Research Fellows and the students enrolled for the various programmes of the institute. The library also provided reference service by Telephone, Email, Post, Courier, etc. to the distant users who could not come to the library.

The library made available different research and scientific publications from other libraries to the scientists and students of the Haffkine Institute for 3 times on the basis of Inter Library Cooperation. Similarly, 7 publications available in our library were made available to other libraries in the current year.

The library regularly imparted induction and orientation training to outside visitors and new students of the institute on the library usage and how to conduct the literature search effectively.

YEAR	2014-2015
Total Titles	10575
Total Bound Volumes of Journals	27161
Total Number of Theses	480
Outside Visitors visiting the library	571
Staff and Students of the Institute visiting the library	1460

Highlights:

Theses, Annual Reports and other documents were scanned using in house digital repository software and made available to the users.

Appendix-I

1. Guides for M.Sc. and Ph.D. degree affiliated to University of Mumbai

Sr. No.	Name Of Guide	Subject	M.Sc.	Ph.D.	University
1	Dr. Abhay Sadashiv Chowdhary	Microbiology	M.Sc.	Ph.D.	Mumbai University
		Applied Biology	M.Sc.	Ph.D.	Mumbai University
2	Dr. Anil Shridharrao Bobde	Organic Chemistry	M.Sc.	Ph.D.	Mumbai University
3	Dr. Smt. Sunita D. Deshpande	Microbiology	M.Sc.	Ph.D.	Mumbai University
4	Dr. A. Rosalind Marita	Biochemistry	M.Sc.	Ph.D.	Mumbai University
5	Dr. (Smt.) Usha Pinakin Dave	Applied Biology	M.Sc.	Ph.D.	Mumbai University
		Biotechnology	M.Sc.	Ph.D.	Mumbai University
6	Dr. Pratibha Chaturvedi	Applied Biology	M.Sc.	Ph.D.	Mumbai University
7	Dr. Mira Lalji Ramiya	Applied Biology	M.Sc.	-	Mumbai University
8	Dr. Shashikant Vaidya	Microbiology	M.Sc.	-	Mumbai University
		Applied Biology	M.Sc.	-	Mumbai University
9	Dr. Sweta Kothari	Microbiology	M.Sc.	-	Mumbai University
		Applied Biology	M.Sc.	-	Mumbai University
10	Dr. Saroj Bafna	Applied Biology	M.Sc.	-	Mumbai University

2. Guides for Ph.D. Degree affiliated to Maharashtra University of Health Sciences, Nashik

Sr. No.	Name Of Guide	Subject	Ph.D.	University
1	Dr. Abhay Sadashiv Chowdhary	Microbiology	Ph.D.	MUHS, Nashik
		Applied Biology	Ph.D.	
2	Dr. (Mrs) Ranjana Anand Deshmukh	Microbiology	Ph.D.	MUHS, Nashik
		Applied Biology	Ph.D.	
3	Dr. (Smt) Sunita D. Deshpande	Microbiology	Ph.D.	MUHS, Nashik
		Applied Biology	Ph.D.	

Appendix-II

1. PhD Synopsis / Thesis Submitted at University of Mumbai

Sr. No.	Name	Status	Date of Submission
1	Mr. Ashish Asrondkar	Synopsis Submitted	06.05.2014
		Thesis Submitted	26.08.2014
2	Ms. Vrushali Patil	Synopsis Submitted	06.05.2014
		Thesis Submitted	25.08.2014
3	Ms. Neha Mishra	Synopsis Submitted	30.10.2014

2. M.Sc. Synopsis Submitted at University of Mumbai

Sr. No.	Name	Status	Date of Submission
1	Mr. Rushil Bhatt	Synopsis Submitted	07.03.2015
2	Mr. Gaurav Desai	Synopsis Submitted	20.03.2015
3	Mr. Pravin Chowdhary	Synopsis Submitted	28.03. 2015

3. STRIP completed

Sr. No.	Name	Department	Project Title
1	Ms. Vimi Varghese	Bacteriology	"Study of the Biofilm formation, antibiotic resistance, detection of ESBL & MBL producers and Plasmid profiling in <i>Pseudomonas aeruginosa</i> isolated from pus samples."

Appendix-III

List of Ongoing projects (University degree)

1. Ph.D. students (Registered at Maharashtra University of Health Sciences, Nasik)

Sr. No.	Name	Subject	Guide	Project Title
1	Ms. Devanshi Gohil	Medical Microbiology	Dr. Ranjana Deshmukh	"Molecular characterization of 2009 H1N1 pandemic influenza and seasonal influenza viruses from patients in Mumbai region."
2	Mr. Ajit Arun Kulkarni	Medical Microbiology	Dr. Ranjana Deshmukh	"Immunogenicity study of recombinant Dengue gene construct in mice."
3	Mr. Rohan Kesarkar	Medical Microbiology	Dr. Abhay Chowdhary	"Study of Potential Therapeutic activity of Gold Nanoparticles against HIV"
4	Ms. Suvarna V. Joshi	Medical Microbiology	Dr. Abhay Chowdhary	"Assesment of Novel Molecular Methods for the Diagnosis of Tuberculosis."
5	Ms. Shraddha M. Mehta	Medical Microbiology	Dr. Abhay Chowdhary	"Study of Neuronal Proteome in Prognosis of Rabies in Murine Model."
6	Mr. Rahul A. Gosavi	Medical Microbiology	Dr. Ranjana Deshmukh	"Assesment of Dendritic Cell vaccine as a Potential Immunotherapeutic Agent in Malaria."
7	Mr. Sahil G. Kulkarni	Medical Microbiology	Dr. Abhay Chowdhary	"Assesment of BCG as an Adjuvant In Enhancing the Efficacy of Japanese Encephalitis Virus Vaccine."
8	Mr. Arunagiri Subramanian	Medical Microbiology	Dr. Ranjana Deshmukh	"Molecular characterization of Methicillin Resistant Staphylococcus aureus (MRSA) isolates in Mumbai."
9	Mr. Sandeepan Mukharjee	Medical Microbiology	Dr. Abhay Chowdhary	"Assesment of Plant Proteins/ Peptides as a potential Antiviral Agents"
10	Mr. Shrikant P. Gajbhiye	Medical Microbiology	Dr. Abhay Chowdhary	Microbiological and Immunological studies on Panchagavya classes and its herbal formulations"
11	Mr. Prasad Khadiolkar	Medical Microbiology	Dr. Sunita Deshpande	" Immunobiology in understanding the pathophysiology of Active Scleroderma patients from Western India"
12	Mr. Satish Pote	Medical Microbiology	Dr. Ranjana Deshmukh	"Isolation and Identification of invasive fungal isolates and their molecular characterization".

2. Ph.D. (Registered at Mumbai University)

Sr. No.	Name	Subject	Guide	Project Title
1	Mr. Chinmayanand Oroskar	Applied Biology	Dr. Abhay Chowdhary	"To Assess the contribution of Sweat inn Parasite Induced Attractiveness to Insect Host In Malaria Patients."
2	Mr. Apurva Gode	Applied Biology	Dr. Abhay Chowdhary	"Isolation and Characterization of <i>Toxoplasma gondii</i> antigens and assessment of It'stumer suppression Activity."

Sr. No.	Name	Subject	Guide	Project Title
3	Mr. Rahul Chavan	Applied Biology	Dr. Abhay Chowdhary	"Characterization and assessment of Differential Proteome in Patients with Acute Respiratory Infection."
4	Mr. Vivek Vishve	Applied Biology	Dr. Abhay Chowdhary	"Production and immobilization of Lipase from <i>Pseudomonas</i> spp. & its applications."
5	Mr. Omkar Lele	Microbiology	Dr. Abhay Chowdhary	"Assessment of Effects of Subinhibitory Concentrations of Antibiotics on <i>Pseudomonas aeruginosa</i> ."
6	Ms. Purna Charan	Applied Biology	Dr. Abhay Chowdhary	"To Study siRNA Associated suppression of Rabies Virus Infection and Assess its Therapeutic Potential."
7	Ms. Mansi Malik	Applied Biology	Dr. Abhay Chowdhary	"Interplay of trace Elements in the Pathophysiology of Murine Model of Malaria."
8	Ms. Richa Lakhotiya (Karnani)	Applied Biology	Dr. Abhay Chowdhary	"Synthesis, Characterization and Evaluation of anti-Microbial Activity of Silver Nanoparticles."
9	Mrs. Pallavi Chowdhary	Applied Biology	Dr. Abhay Chowdhary	"Comparative assessment of Immunomodulatory Activities of Plant Extracts and their synthesized Nanoparticles."
10	Ms. Piali Purnendu Chatterjee	Microbiology	Dr. Abhay Chowdhary	"Assessment of interferon induced transmembrane (IFITM) gene & protein expression in human influenza infection."
11	Mr. Soumen Subodh Roy	Microbiology	Dr. Abhay Chowdhary	"Assessment of Potential Anti Viral activity of Indian Medicinal Plants against Rabies Virus causing Encephalitis."
12	Mr. Rohan Dudhale	Microbiology	Dr. Sunita Deshpande	"Plasmid Diversities in <i>Pseudomonas aeruginosa</i> from different clinical sources."
13	Mr. Kapil Punjabi	Microbiology	Dr. Sunita Deshpande	"Biosynthesis of Nanoparticles & its Potential Therapeutic Applications."
14	Ms. Gauri Ramrith Patade	Biochemistry	Dr. A. R. Marita	"Role of Inflammation in obesity and type 2 diabetes."
15	Mr. Nikhil Kasarpalkar	Applied Biology	Dr. Usha P. Dave	Serum brain derived neurotrophic factor (BDNF) and gene mutation in autism spectrum disorders (ASD)."

3. M.Sc. (By research/ Registered at Mumbai University)

Sr. No.	Name	Subject	Guide	Project Title
1	Ms. Kanchan Kathale	Applied Biology	Dr. Abhay Chowdhary	"To study the Prevalence and Characterization of Dengue Virus in and Around Mumbai."
2	Mr. Paras Mahale	Applied Biology	Dr. Mira Ramaiya	"Comparative Analysis of Different Methods for Diagnosis of Malaria."
3	Ms. Raksh Shinde	Applied Biology	Dr. Mira Ramaiya	"Insecticide Resistant Gene Diversity in Mosquito Larvae."
4	Ms. Tehmeena Mukadam	Microbiology	Dr. Sunita Deshpande	"Characterization and Assessment of Antimicrobial and Antioxidant Activity of Kombucha."

Sr. No.	Name	Subject	Guide	Project Title
5	Mr. Jaishankar Sharma	Microbiology	Dr. S. P. Vaidya	"Comparative Analysis of Different Molecular Methods for Diagnosis of Multi-Drug Resistance Tuberculosis."
6	Mr. Jinesh Maniar	Microbiology	Dr. S. P. Vaidya.	The Study of Differential Gene Expression of Matrix Metalloproteases genes in Macrophages infected with Mycobacterium tuberculosis
7	Ms. Payal Panchal	Microbiology	Dr. Sweta Kothari	"Detection of TORCH Infection in children and its correlation with birth effect."

Appendix-IV

1. List of National Visiting Scientists & Adjunct Professor

Sr. No.	Name & Qualification	Designation	Department
1	Dr.(Smt.) Mrudula A. Phadke MD, DCH, FIAP, MR.CP(UK)	Visiting Scientist and Adjunct Professor	Virology
2	Dr. (Smt.) R. A. Deshmukh M.D., Ph.D.	Visiting Scientist and Adjunct Professor	Virology
3	Dr. H.S. Palep MD.	Visiting Scientist and Adjunct Professor	Chemotherapy
4	Dr.(Smt.) Jaya R. Deshpande MD.	Visiting Scientist and Adjunct Professor	Clinical Pathology
5	Dr.(Smt.) Sunita D. Deshpande M.Sc., Ph.D.	Visiting Scientist and Adjunct Professor	Clinical Pathology
6	Dr.Rajesh V. Warke Ph.D. (Biomedical Sci.)	Visiting Scientist and Adjunct Professor	Virology
7	Dr. Usha P. Dave Ph.D., DHA.	Visiting Scientist and Adjunct Professor	Biochemistry
8	Dr. Kedar Bhide	Visiting Scientist and Adjunct Professor	Zoonosis
9	Dr. Prasad S. Koka	Visiting Scientist and Adjunct Professor	Virology/ Immunology
10	Dr. Sheo Mohan Singh	Visiting Scientist and Adjunct Professor	Immunology
11	Dr. Narendra Bhatt	Visiting Scientist and Adjunct Professor	Chemotherapy
12	Dr. Vidya Arankale	Visiting Scientist and Adjunct Professor	Virology
13	Dr. C.S. Patil	Visiting Scientist and Adjunct Professor	Microbiology
14	Dr. R.D. Kulkarni	Visiting Scientist and Adjunct Professor	Microbiology
15	Dr. Tapan Dhole	Visiting Scientist and Adjunct Professor	Virology
16	Dr. B.G.Khadase	Visiting Scientist and Adjunct Professor	--

2. List of International Visiting Scientists

Sr. No.	Name	Country of Origin
1	Dr. Prakash S. Thombare	United States of America
2	Dr. Lance Robert Peterson	United States of America
3	Dr. Irin Bosh	United States of America
4	Dr. Ellen Jo Baron	United States of America
5	Dr. Deshratna Asthana	United States of America
6	Dr. Harshavardhan Sheware	Australia
7	Dr. Peter Strong	England

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